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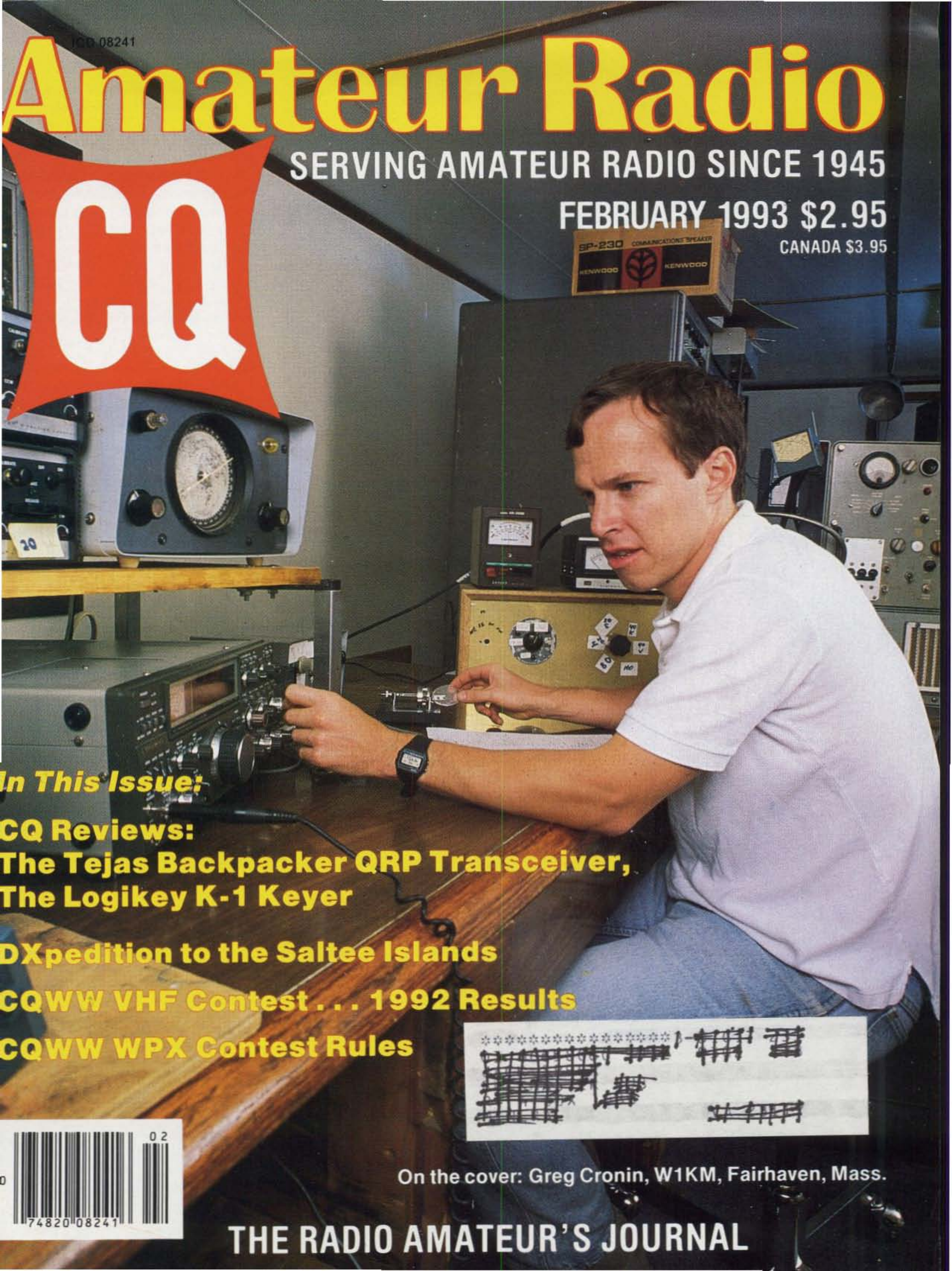
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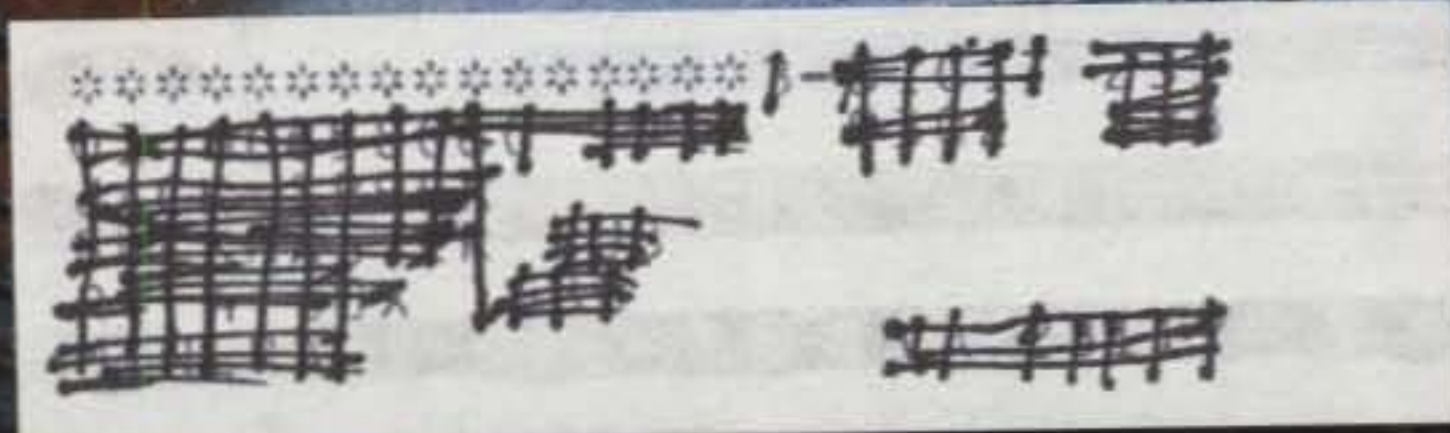
CQ Reviews:

**The Tejas Backpacker QRP Transceiver,
The Logikey K-1 Keyer**

DXpedition to the Saltee Islands

CQWW VHF Contest ... 1992 Results

CQWW WPX Contest Rules



On the cover: Greg Cronin, W1KM, Fairhaven, Mass.

THE RADIO AMATEUR'S JOURNAL

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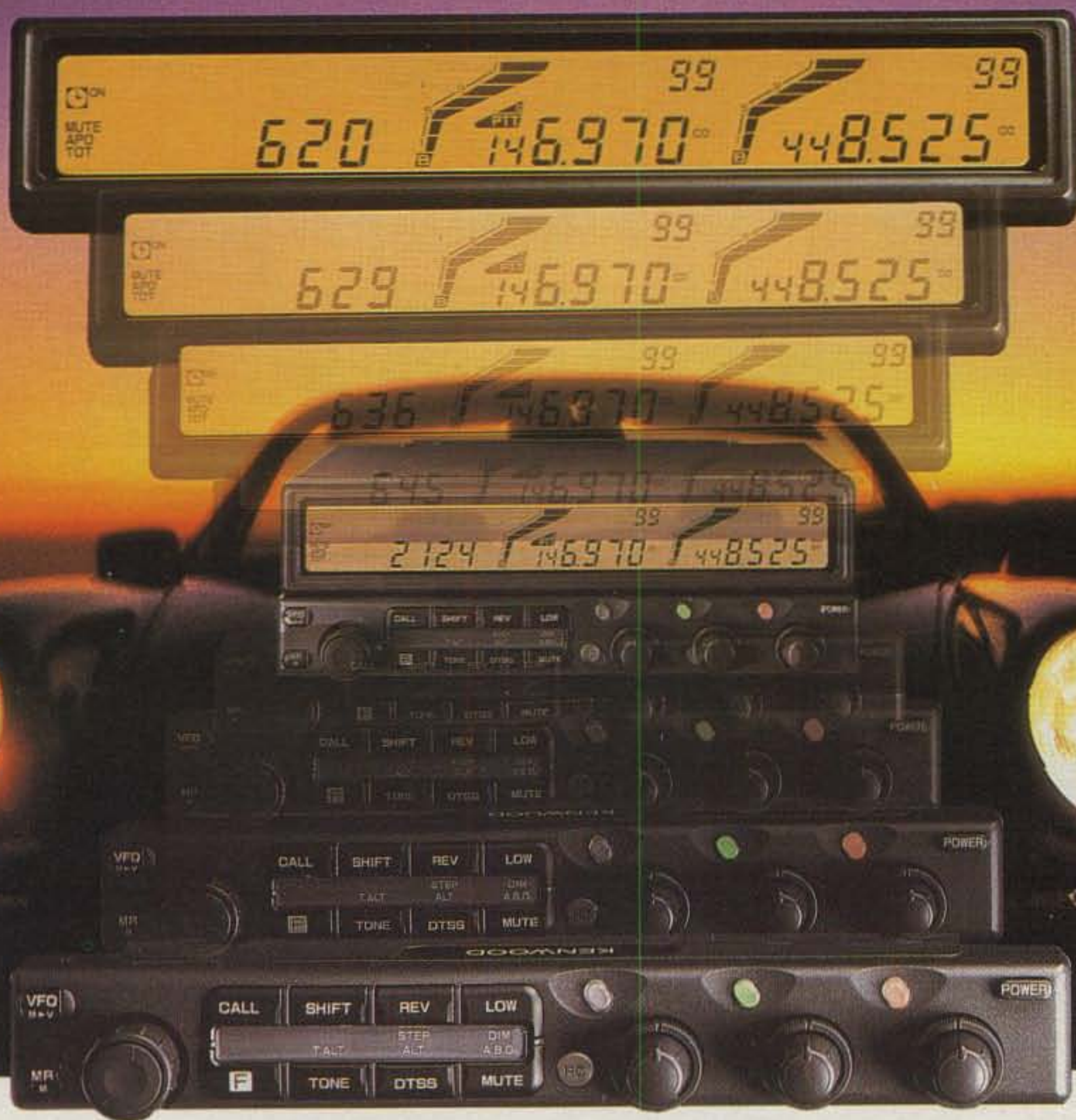
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The Radio Amateur's Journal



ON THE COVER: Greg Cronin, W1KM, of Fairhaven, Mass. lets his fingers do the talking. Greg's antenna farm grows a variety of "silver trees" from his own personal salt marsh. Hmm, we wonder what his priorities were when he went house hunting? (Photo by Larry Mulvehill, WB2ZPI)

FEBRUARY 1993

VOL. 49, NO. 2

FEATURES

DXPEDITION TO THE SALTEE ISLANDS (EU-103)	Declan Craig, EI6FR	13
CQ REVIEWS: THE TEJAS BACKPACKER I—A QRP TRANSCEIVER	Dave Ingram, K4TWJ	18
HOW TO DESIGN AND BUILD A SIMPLE QRP DUMMY LOAD	Ed Stiles, WA7P	22
CQ REVIEWS: THE LOGIKEY K-1 ELECTRONIC KEYS	John Dorr, K1AR	24
RESULTS OF THE 1992 CQ WORLD-WIDE VHF WPX CONTEST	Joe Lynch, N6CL	26
LET'S TALK ABOUT WIRE, PART II—GETTING OPEN-WIRE FEEDERS INTO THE SHACK.....	Lew McCoy, W1ICP	32
CQ REVIEWS: BUCKMASTER PUBLISHING'S HAMCALL BBS SERVICE.....	Joe Lynch, N6CL	44
CQ SHOWCASE: NEW AMATEUR PRODUCTS.....		48
ANNOUNCING: THE 36TH ANNUAL CQ WORLD-WIDE WPX CONTEST..		52
ANTENNAS & ACCESSORIES: FROM OUR READERS	Karl T. Thurber, Jr., W8FX	54
MATH'S NOTES: CHARGING A BATTERY THE SIMPLE WAY	Irwin Math, WA2NDM	60
PACKET USER'S NOTEBOOK: PORTABLE PACKET	Buck Rogers, K4ABT	64
VHF PLUS: FCC ISSUES NPRM CONCERNING VHF + FREQUENCIES	Joe Lynch, N6CL	68
BILL'S BASICS: HOW TO HELP PEOPLE BECOME AMATEURS	Bill Welsh, W6DDB	86
WORLD OF IDEAS: MORE QRP NOTES, RIG VIEWS, AND PROJECTS	Dave Ingram, K4TWJ	92
RADIO FUNDAMENTALS: MULTIBAND WIRE ANTENNAS	Bill Orr, W6SAI	98
WASHINGTON READOUT: EVERYTHING YOU WANTED TO KNOW ABOUT MORSE CODE, BUT WERE AFRAID TO ASK!	Frederick O. Maia, W5YI	126

DEPARTMENTS

AWARDS: STORY OF THE MONTH—JAMES J. CURTIS, N8HAM	Dorothy Johnson, WB9RCY	82	
CONTEST CALENDAR: STRATEGIES FOR QRP CONTESTING, CONTESTS FOR FEB. AND EARLY MARCH.....	John Dorr, K1AR	102	
DX: THE STORY OF HOWLAND ISLAND, KH1	Chod Harris, VP2ML	112	
PROPAGATION: DX CHARTS FOR FEB. 15 THROUGH APRIL 15	George Jacobs, W3ASK	132	
ZERO BIAS.....	4	OUR READERS SAY.....	8
ANNOUNCEMENTS.....	6	HAM SHOP.....	136

EDITORIAL

This past weekend we here on Long Island experienced what was termed a "100 year storm," or a storm that is bound to happen at least once in 100 years. It was extraordinary in the amount of damage it caused throughout the metropolitan area. The damage was in no way comparable to that caused by the hurricane in Florida, for example, but for this area the effect was the same. People not only lost all of their possessions, they also watched as their homes literally disintegrated and went out to sea, never to be seen again.

Local television showed a RACES group aiding a community in providing communications for emergency evacuation. It spoke well of amateur radio and once again proved the worth of our service. It also gave some of that community's residents something to think about when next they want to enact new antenna zoning ordinances. Both Nassau and Suffolk counties here on Long Island have some of the most restrictive zoning ordinances in the country. This unnamed storm provided a number of people with first-hand experience of amateur radio's value and gave television viewers a positive image of what we can do in an emergency. This time it was close to home and not an abstract image half a world away.

Storms and disasters also have a nasty way of pointing out how ill-equipped most municipalities are in caring for people-to-people needs and basic necessities. Most municipalities think in terms of global systems in large air-conditioned vans costing hundreds of thousands if not millions of dollars. Anything less couldn't possibly work nor be funded by federal dollars and grants. I think as amateurs we know first hand that it can be done far cheaper and easier.

If you look at the role amateurs play in these situations, you will also realize the great truth none of these municipalities wants to admit to or talk about. The reason why we are so important and needed is that in most municipalities there is no means or method for inter-agency communications. On Long Island, for example, there are numerous county and local police departments, fire departments, marine bureaus, and even air units. During emergencies it is virtually impossible for these units to communicate with each other in the field. Each of these agencies is also very territorial and protective of what it deems its role to be. We as amateurs transcend the bureaucracies and simply do what is really needed. No one seems to ask, "If the amateur can do it on a moment's notice, why can't my local government?"

I'll share something that will illustrate this point beautifully. A few years ago I worked for a local municipality as one of their Harbormasters. It came time to update the radio equipment on the boat, and being an amateur, the captain put me in charge of selecting replacement gear for the police radio. The police radio at that time was an old and very tired Motorola HT with only one channel. I found the local distributor who

had the contract to supply equipment to the entire county police. In checking their catalogs and asking questions, I found a model that had 12 programmable channels and was about the size of a typical, small 2 meter transceiver. One could also program a separate PL for each channel. My municipality could buy this rig from the same general contract as the county, thereby saving a lot of money.

I then wrote a letter of intent to the Police Commissioner of Nassau County and the head of each agency involved with law enforcement and rescue. I explained that since time was a precious commodity, I wanted our unit to be able to respond to any situation and be able to communicate with anyone who could supply help. Initial responses were quite paranoid in that these agencies were somewhat reluctant to give permission to use "their" frequencies. After a lot of phone calls, they all sent a letter of permission (which was required by the distributor). The entire cost for this equipment, installed, ready for use on a boat or car, was \$1100. The money was in the budget and everything looked good.

At this time our captain passed away suddenly, and he was replaced by a political appointee who thought \$1100 was too much for one radio that sounded too complicated. I explained about a disaster situation and what would be needed. In his wisdom he opted to use that money for two 2-channel radios (both channels on the same frequency).

Three or four months later we had the terrible Avianca Airlines crash in the area, and the big problem was that rescue efforts were hampered by the lack of inter-agency communication. Once again amateurs came to the rescue and provided emergency communication. After things settled down, I again broached the subject of comprehensive communications and what we could have done with the right equipment. I was told not to worry. The Avianca thing was an anomaly and wouldn't happen again, so we didn't need it. Case closed.

We as amateurs manage to communicate with relative ease during any trying situation and also manage to organize as we go along. It is no longer amazing that we do it time after time. We know we can. What is amazing after all of this time is that no governmental agency, with all of their resources, can do it once.

1992 CQ World-Wide Logs

The valiant if not harried CQ Contest Committee has as of this writing (mid-December) received, sorted, and shipped out 34 cartons of CQ WW logs, for a total of just under 1,000 pounds. This year most of the SSB entries were clearly marked as to mode and contest. About one half of the CW logs received so far are not marked with anything other than CQ and our address. I don't know if that indicates that CW operators are a more rebellious lot or that they are stead-

fast non-conformists. One entrant just sent in a summary sheet (no logs or anything else), and another checked off every box on the summary sheet, meaning that he did everything in every conceivable combination on every band.

Sometimes when I see a log from someone I've worked in past contests and from whom I've never received a QSL, I fantasize that somehow his new log either slips gently behind a desk or rests peacefully upon a strong magnet for a week or two before being sent on. So far it's just a fantasy, but the thought of it does keep me chuckling.

1993 CQ WW 160 Meter SSB Contest

Ooops! Somehow we've publicized two dates for this annual event. The correct date, as per tradition, is the last full weekend in February, February 27 and 28 this year. If you're ever in doubt, just think the last full weekend and you can't go wrong. Yes, there is one and only one exception: our CQ VHF WPX Contest. The date for this one had to be different because of a conflict with another activity (which came before us).

Port Washington Chainsaw Massacre

Not too long ago the local power company (LILCO) decided on some preventive maintenance and went on a tree-pruning program, thinning out trees near the power lines. As luck would have it, the end of my inverted-V was attached to one of those trees. Of course it was in a clear spot, with bright blue trap and insulator, but that proved to be an attraction rather than something to be wary of. In their zeal, they chainsawed everything in sight, leaving a shower of blue plastic bits and pieces along with shards of antenna wire all over my front yard. They even left most of the stuff they trimmed from the tree. So until it gets really, really cold and miserable out there (genuine antenna weather), I am experiencing the joys of an inverted unipole. I guess by the end of this month it should be primo antenna weather.

1993 Hamfest Season

Besides being just about optimum antenna weather, February starts our hamfest season for the new year. We'll be at the Miami Hamfest, The Tropical Hamboree, on February 6 and 7. Every year I urge you to come on out to these events and check out real life. Hamfests are a wonderful way to see all the latest gear, meet a lot of old friends, make new friends, and be totally immersed in our hobby. It really is as great as we say it is.

73, Alan, K2EEK

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ANNOUNCEMENTS

• **Dayton ARA 1993 Scholarships** - The Dayton Amateur Radio Assn. is once again offering scholarships to FCC licensed amateur radio operators graduating from high school in 1993. There are eight scholarships in the amount of \$2000 each. There are no restrictions on the source of study planned, nor must the applicant be planning on a four-year baccalaureate degree. However, schools awarding associate degrees or any technical institution selected must be accredited. The awards will be based on a combination of financial need, scholastic achievement, contributions to amateur radio, and community involvement. For an application, write to DARA Scholarship Committee, 45 Cinnamon Court, Springboro, OH 45066-1000. (Applications must be postmarked no later than May 15, 1993.)

• **Utah 160 Meter Challenge** - Sponsored by the Utah DX Assn., this event will take place 0100-0700Z February 13 (Friday evening). CW first three hours; phone last three hours. Utah stations exchange RS(T) and county; others exchange RS(T) and state/province/DXCC country. Multipliers are one per state/province/country and four for each Utah county (max. 29). Score is QSOs \times multipliers; multiply QSO points by 1.5 if power *output* is less than 200 watts. Awards available. Send logs postmarked by March 15 to Ron Johnson, WE7H, 68 South 300 West, Brigham City, UT 84302.

• **The following special events will take place during February:**

K1BKE, from grand opening of K1BKE club station at Christa McAuliffe Planetarium, Concord, New Hampshire, during New Hampshire QSO Party; Contoocook Valley Radio Club; Feb. 13-14 (*no times given*); 80-10 meters. For QSL send No. 10 SASE to Contoocook Valley Radio Club, P.O. Box 88, Henniker, NH 03242.

KC4TDK, from Choose Catholic Schools Special Event, St. Bridget's School, Richmond, Virginia; 1300-2100Z Feb. 15 and other times during the week; 10-80 meter General phone portions, AMTOR and RTTY, and 10 meter Novice phone section. For certificate send QSL with contact number and 9 \times 12 SASE (58 cents postage) to Fr. David V. McGuire, St. Bridget's School, 6011 York Rd., Richmond, VA 23226.

WA5SAM, from celebration of General Sam Houston's 200th birthday; Sam Houston State University, Huntsville, Texas; Huntsville ARS; 0000-2400Z Feb. 28 - Mar. 2; lower portion of HF General phone subbands and Novice 10 meter phone subband, propagation permitting. For a three-color certificate send QSL and 9 \times 12 SASE to HARS Special Event, P.O. Box 7516, Huntsville, TX 77342-7516.

N5SMH, from Charro Days Festival, Brownsville, Texas; Faulk Intermediate School ARC; 1400-2200Z Feb. 25-28; General portion of 40, 20, 15, and Novice portion of 10 meters. For 8 1/2 \times 11 certificate send QSL and SASE to Faulk Intermediate ARC, 2200 Roosevelt, Brownsville, TX 78521.

N8GBA, from UP 200 Sled Dog Championship, Marquette, Michigan; Hiawatha ARA; 1700Z Feb. 19 to 1700Z Feb. 21; lower end of 10, 15, 20, and 40 meters phone. For certificate

send a large SASE (two stamps for unfolded) to Richard Schwenke, N8GBA, 21 Smith Lane, Marquette, MI 49855.

North Central Wisconsin, a group of hams operating from 1993 Badger State Winter Games; Feb. 6-7 (*no times given*); on 28.360, 21.360, 7.260, 38.860. For certificate send QSL and large SASE to Mike, KA9VFP, 1104 E. Lieg Ave., Shawano, WI 54166.

The following hamfests, etc., are slated for February:

Jan. 30, **Ward Melville High School ARC Hamfest**, Ward Melville High School, Setauket, Long Island, New York. Contact Michael Franzino, 516-751-7375. (Exams.)

Feb. 6, **Niagara Peninsula ARC 15th Annual Hamfest & Dinner/Dance**, C.A.W. Hall, St. Catharines, Ontario, Canada. Contact NPARC Inc., P.O. Box 692, St. Catharines, Ontario, Canada L2R 6Y3 (416-934-3231) or VE3KLM @ VE3SNP. (Dinner/dance tickets must be bought in advance.)

Feb. 6, **Dutch Country Computer and Communications Show**, Lancaster Host Golf Resort and Conference Center, Lancaster, Pennsylvania. Contact Columbia Area ARC, P.O. Box 574, Columbia, PA 17512 (717-627-1597).

Feb. 6, **Kerbela Hamfest**, Kerbela Temple, Knoxville, Tennessee. Contact Paul Baird, KY4A, 1500 Coulter Shoals Circle, Lenoir City, TN 37771 (615-986-9562). (Exams, preregistration until 9:30; code tests begin at 10, written at 11. Contact Ray Adams, N4BAQ, 615-688-7771.)

Feb. 13, **Orange County ARC Computer Fair & Winter Hamfest**, John S. Burke Catholic High School, Goshen, New York. Contact Jim Capicotto, 914-564-2707.

Feb. 13, **Midwinter Madness**, National Sports Center, Blaine, Minnesota. Contact Midwinter Madness, Robbinsdale ARC, P.O. Box 22613, Robbinsdale, MN 55422. (Exams Friday evening, preregister only with Dave 612-459-8678.)

Feb. 13, **Midwest Digital Conference**, West River Point Business Center, Minneapolis, Minnesota. Contact Paul Ramey, WG0G, 16266 Finland Ave., Rosemont, MN 55068 (612-432-1640).

Feb. 14, **Mansfield Mid*Winter Hamfest/Computer Show**, Richland County Fairgrounds, Mansfield, Ohio. Contact Dean Wrasse, KB8MG, 1094 Beal Rd., Mansfield, OH 44905 (419-589-2415 after 4 PM EST).

Feb. 19-20, **Sarasota Hamfest & Computer Show**, Sarasota County Fairgrounds, Sarasota, Florida. Contact Sarasota Hamfest, Inc., P.O. Box 3182, Sarasota, FL 34230 (813-388-2688). (Exams 9:30 AM Saturday.)

Feb. 20, **Charleston Hamfest**, Geodesic Dome, Charlestowne Landing, Charleston, South Carolina. Contact Jenny Myers, 803-747-2324. (Exams at Trident Technical College, walk-in only, 11 AM; more info 803-871-4368 or 803-572-1164.)

Feb. 20, **Cherryland ARC Hamfest**, Immaculate Conception School, Traverse City, Michigan. Contact Ken Musson, W8QKP, 9680 Peninsula Dr., Traverse City, MI 49684 (616-947-1372).

(continued on p. 143)

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- 4) I understand that violation of the FCC Rules or willful noncompliance with the VEC will result in the loss of my VE accreditation, and could result in loss of my Amateur Radio operator and/or station licenses, or both.
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Our Readers Say

Alligators!

Editor, CQ:

I have just recovered from the CQ WW DX SSB Contest October 1992, and I must say conditions were excellent here in VK6. However, I am now partly bald due to ripping hair out in sheer frustration at failing to get my callsign between the millisecond breaks between calls by some stations in the USA.

It was *impossible* to give my full call during these breaks in TX! Some of the stations were S9+ in my shack.

This raises some questions:

1. Were the operators asleep and forgot to turn off the digital voice keyer?
2. Do they have deaf receivers?
3. Are they only interested in contacts with Zone 22 or somewhere?
4. Do they really think I can talk at 200 mph?

I heard a VK7 call one of these alligators, and he could not even get "VK" out before the USA station started calling again!

Anyway, it was a good contest. See you next year—if I can get my call out quick enough!

Graham Rogers, VK6RO
Ferndale, West Australia

An Intrusion or A Right?

Editor, CQ:

The other day I signed on to a local repeater on 2 meters with several other operators I knew casually on the air. By the time the conversation had gotten to the third operator, he informed me of the correct spelling of my name, my address, and my age—all gotten from his computer on a disk-listing program sold by a company. I phoned this company and they informed me that this was "public domain" information and they had the right to use it without my permission. In the age of computers and "hackers," all somebody needs is a scanner, a disk, a computer, and a few unprotected data files to get access to more secure data files such as S.S. number, VISA or MC numbers, credit history, as well as a host of other information, not to mention a "junk mail" address listing. The company in question will delete the information if I write a letter to them and enclose a copy of my license as proof of origin. I never asked them to use any data on myself for their profit in the first place! After checking with another ham, I was informed there may be as many as ten data bases with the same type data on it, none of which I have knowledge of.

Please ask your readers if this is a "right" or an intrusion by these companies on the radio amateur operator. After all, I never asked for this service, and now I must spend time, letters, and postage to correct the situation.

Leo F. Waelchli, KA3KUP
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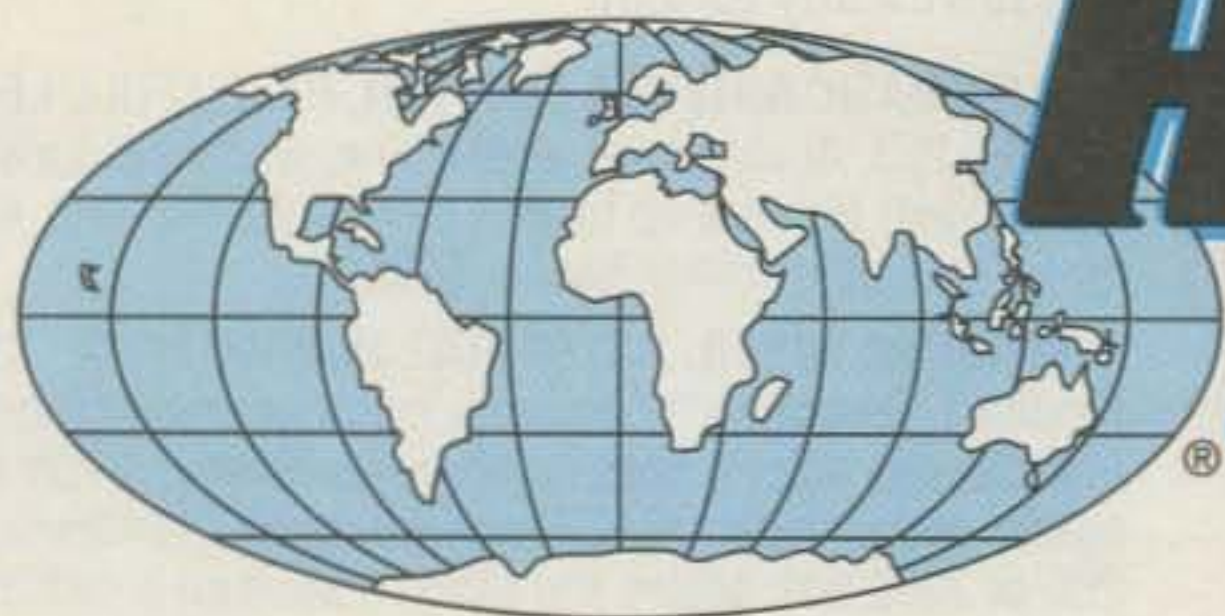
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DXing and DXpeditions don't always involve exotic countries; they sometimes involve exotic islands. Many amateurs avidly chase and collect exotic islands for the IOTA Award, and the pile-ups can be just as deep.

DXpedition To The Saltee Islands (EU-103)

BY DECLAN CRAIG*, EI6FR

According to legend, as St. Patrick chased the Devil out of Ireland, the Devil in a fit of temper took a bite out of the Galtee Mountains. As he fled across the sea, a piece of the mountain fell from his mouth. A mile farther out to sea and three miles from shore he spat the remainder into the water. The islands thus formed are the Saltees, and today they are perhaps the finest seabird sanctuaries in Europe.

The islands in the past have been home to monks seeking solitude, and to a long since departed fishing and farming community. Since 1954 The Saltees have belonged to the Neale family, and the head of that family is known as the Prince of The Saltees. The control of The Saltees and the surrounding sea area is the right of the Prince and his heirs, or in the event of no member of the family living, the island's government will be turned over to "The Absent Twelve," who can come from any country on Earth but all must be fishermen.

Visitors to The Saltees are welcome, and all that is asked is that they leave the islands as they found them for future generations to enjoy. Visitors are taken to the islands by Willy Bates, who for over the course of fifty years has ferried thousands to these beautiful islands. During the course of our operation we were amazed at the number of operators who had visited The Saltees and who asked about Willy and his boat. To all of you Willy sends his regards and hopes one day you will visit again.

In 1990 The Islandhoppers DX Group activated The Saltees for a couple of days. In 1991 the group was active from the

*167 St. James's Rd., Greenhill's, Dublin 12, Rep. of Ireland



The intrepid EJ0SI team. The back row: Conor, EI5HF; Tony, EI2GX; and Declan, EI6FR. The front row, left to right: Liam, EI7DSB; Tony, EI3HA; and Emmet, EI7HF. Alan, the SWL, took the picture.

Blasket Islands (EU-007). The group felt that there were still many island hunters, particularly stateside, who needed The Saltees, so we decided to return to EU-103 and try to provide the opportunity for as many as possible.

After discussion we decided to operate from the island for four to five days in July. It was planned to operate on both CW and SSB with a particular effort on the WARC bands. We were very pleased when the Department of Communications issued us the special call EJ0SI for our operation. With the help of Peter, EI8GM, the Prince of the Saltees, Michael the First, gave permis-

sion for our extended stay on the islands. After some changes in the line-up, the final team was decided: Tony, EI2GX; Tony, EI3HA; Conor, EI5HF, Declan, EI6FR; Emmet, EI7HF; Liam, EI7DSB; and SWL (and generator doctor) Alan. The dates for the operation were set for July 9th to the 14th. The IARU HF Championships were set for this weekend, but we decided not to take part in the contest but instead to concentrate our time on working island hunters. Advance publicity of the operation was distributed with special thanks to Brendan at *DX News-Sheet*; Johnny, I1HYW; Joe, EA6MR; and the *International DX Bulletin*

for their efforts on our behalf.

One of the difficulties encountered in an operation from The Saltees is that of getting the equipment on to the islands. The equipment and supplies must first be loaded onto a fishing boat, which makes the 45 minute trip to the islands. This boat anchors about 300 feet from shore, and all the equipment for the operation is off-loaded into a small open boat which makes the trip to shore. Because no jetty exists and the boat can't quite make the beach, the DXpeditioner must get his feet wet and carry his gear to shore.

We had decided that the minimum requirement for the operation was two complete HF stations. In the end we were able to bring from Kenwood a TS440S, a TS140S, and a TS130S, and from Yaesu an FT747GX. Antennas brought to the island included a Mosley Classic Tribander; a Hy-Gain 18VS vertical; dipoles for 80, 40, 30 and 17 meters; and a half-wave grounded Delta Loop for 40. With all the gear, plus generator, tents, food, and clothing piled on the dock, the boat began to look decidedly smaller.

We were in luck with the weather. The threatened rain held off, and after 45 minutes we anchored off the islands. The task of getting the equipment ashore began. The first boat load of gear went ashore, and as the tidal conditions were perfect, the team completed the transfer without any loss or damage. The ops, however, at this stage had gotten their feet very wet and had picked up a bruise or two from the struggle over seaweed-covered rocks.

After a short inspection of the island we decided to set up the stations on one of the island's high points. Our sleeping quarters were to be in the loft of a small building kept open on the island for visitors in the event of inclement weather. This was located close to the shore and well away from the operating site. A well beside this building provided our drinking water.

Inside the building we discovered a racing pigeon who had made it and the island its home. Percy, as we named him, quickly became the team mascot and joined us for meals. Each evening he made his bed in our quarters. If anybody has lost a rather fat and lazy racing pigeon with a poor sense of direction and the tag number GB 91 B31730, we can report he's alive and living well on the Great Saltee island.

At the island's summit and set into an outcrop of rock is the throne of the Prince of The Saltees. To the front of this is an open, grassy area with a large flag pole, a convenient antenna support. We established our operating site at this location. The generator was positioned behind the rock outcrop so that on this occasion the "power behind the throne" was a 3 kVA generator.

The team split into two working parties. One set up the operating tent and field kitchen, while the other put the antennas



This is what it looks like as you approach The Saltee Islands, IOTA (EU-103).

in place. First up was the Hy-Gain 18VS vertical. Next the flag pole was climbed and the inverted Vees for 80, 40, and 30 meters were put in place. A 20 foot aluminum ladder was set upright and the Mosley tribander affixed to it. This arrangement worked very well. Rotation of the beam was achieved by the Armstrong method. Team members temporarily unclipped the stays and moved the ladder and beam before re-staying.

After several hour's work in brilliant sunshine, and after a couple of beers to cool

off, EJ0SI was ready to go on the air. Initial operation was on 14.260, and the first station in the log was EA6ABN at 1600Z. At 1603 W3KH became the first of many stateside QSOs. Our second station was up and running on 40 meters at 1800Z with EI8GM in the log. Shortly thereafter G3XYP gave us our first QSO with our friends in Gland. Meanwhile, on 20 meters the vertical continued to perform well with 5Z4BP reporting a good signal in Africa. This was confirmed a short time later when TL8NG appeared in the log. CW operation began



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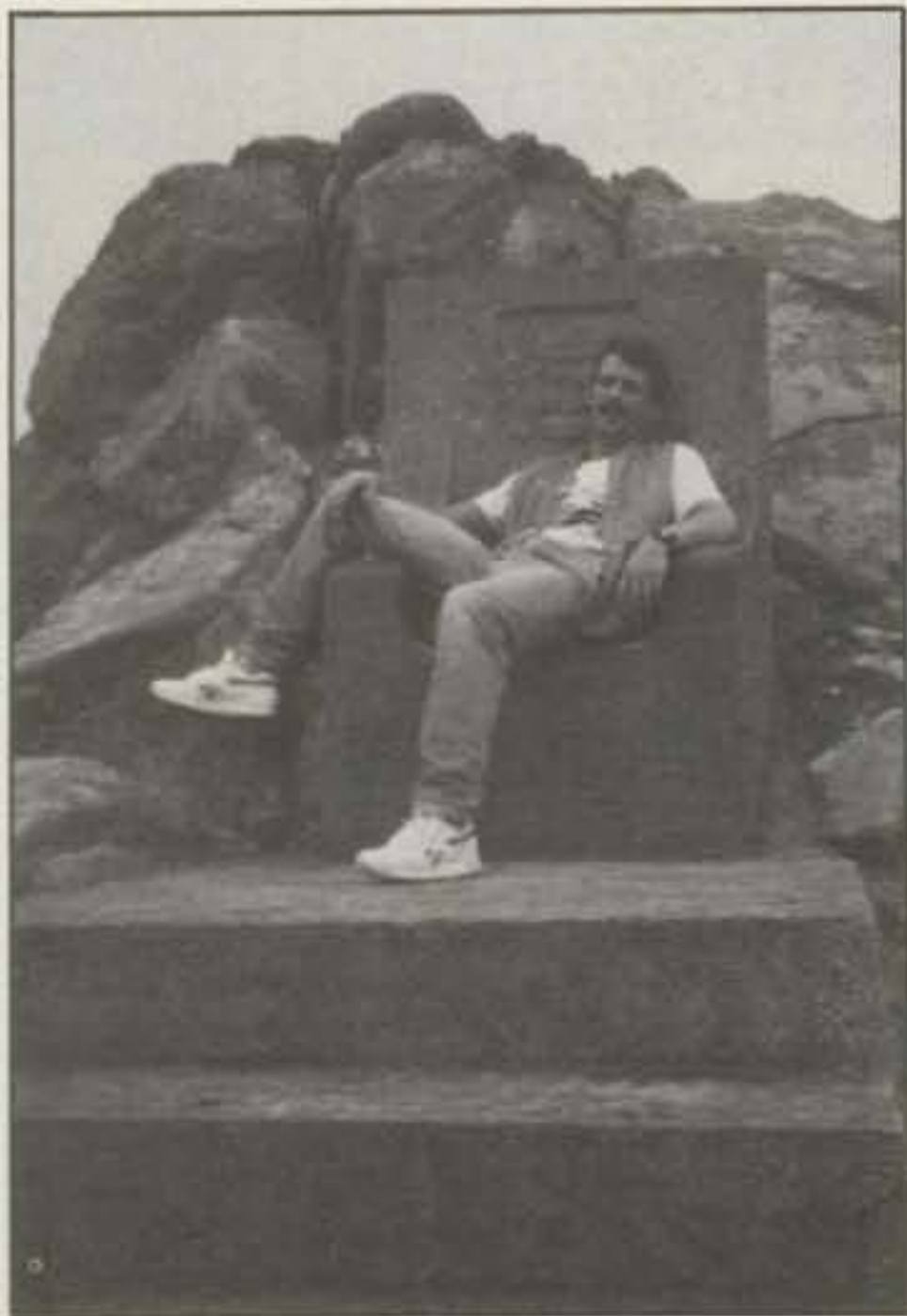
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Tony, EI2GX, takes a break on the official Throne of the Prince of The Saltees.



The kitchen of the "Saltee Catering Corp." showing head chef, Tony, EI3HA.



Declan, EI6FR, operates CW while Emmet, EI7HF, operates phone.

at 1630Z with the first 5NN going to HA5DA.

We took a break for the first of many fine meals prepared by the DXpedition's chef, Tony, EI3HA. Shortly afterwards we resumed operation, and with two stations on the air, it was a pleasure to see the logs filling with the calls of many old and new friends. It was great to hear from Johnny, I1HYW, at 1725Z, and during the hours that followed F9RM, VE7IG, N7BZI, CT4NH, and many more of the IOTA gang. Operation was mainly concentrated around the IOTA frequencies, but a couple of DX nets were also visited, and a special thanks to the guys on 14.256, and to Selim, OE6EEG, and the European DX Net for the warm welcome they gave our station.

The WARC bands received special attention, and we were happy to provide a first QSO with EI for many stations on these bands. Thirty meters in particular was an eye-opener. It produced very loud signals from stateside in the evenings and our 100W and our vertical got many fine reports. It gave a few surprises, with VQ9 being worked in the midst of EUs and VK6HD beating out the stateside pile-up to make the log. One of the few disappointments of the trip was the lack of significant openings to Japan. However, 18 MHz did produce a short opening to this part of Asia, with JF3ASY being the first of our JA friends into the log. We all resolved to pay more attention to the WARC bands from our home stations in the future.

On Sunday morning Tony, EI2GX, opened up the station and was concerned to find that the auto-tuner in the TS440S refused to tune the Yagi. Was it water in

the coax? No, it hadn't rained. Was it a badly fitted PL259? "Certainly not," cried Emmet. "I fitted it." Moments later, from out of the rig crawled a small orange and black caterpillar, who had, it seemed, found the innards of an HF transceiver a cozy place to spend the night. The caterpillar having vacated his temporary lodgings, the rig once more tuned and operated perfectly. This is not the sort of bug (HI) we are used to discovering in our equipment. Perhaps manufacturers should introduce the creepy-crawly soak test in their routines.

We were to leave the island at approximately 11 AM on Monday morning, so in the early hours of Monday we made our last QSOs from Great Saltee. Declan, EI6FR, closed down the CW operation at 0200Z local time, with KQ3F on 40 meters being his last QSO. Emmet, EI7HF, kept the SSB station on the air for a couple more hours, until at 0400Z local time VO1JCC went into the log as the last QSO of Saltees '92.

The morning brought heavy rain, which continued throughout the day, making the job of removing our gear to the beach uncomfortable. However, the prospect of a hot meal and a cool beer waiting at Kilmore Quay made the work a lot easier. A couple of hours later, the equipment and seven very wet DXpeditioners were aboard the boat heading for home. At Kilmore Quay the gear was quickly off-loaded, and there was an anxious moment when one of the tents which had been borrowed from a scout troop teetered on the pier edge before being hauled to safety.

In the local hostelry, after a change of clothes and with dinner ordered, we re-



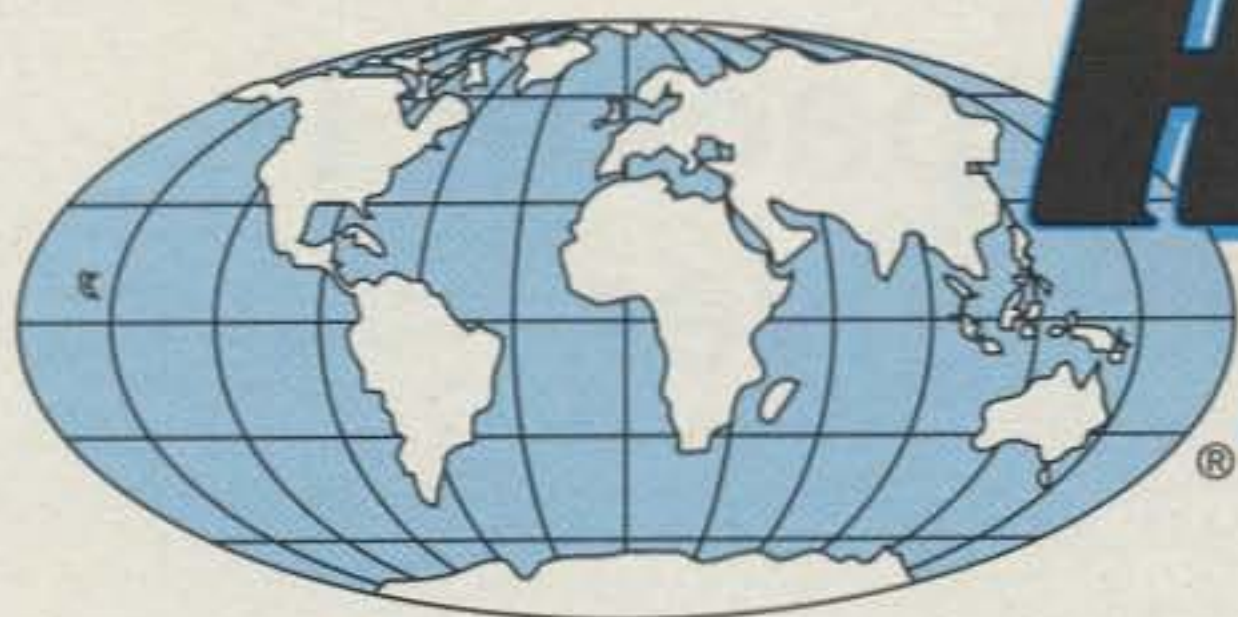
Emmet, EI7HF, and Tony, EI2GX, concentrate on giving out EJ0SI contacts.

viewed the operation. We had kept two transceivers on the air at all times for 70 hours and had over 3000 contacts in the SSB log, with a further 546 having been made by Declan, EI6FR, on CW. All continents had been worked, and some fine DX contacts made, including QSOs with ZL and KH6 in the Pacific, TF and JW in the north, TL8 and 5Z4 in Africa, and some rare islands such as PY0T. We were also very pleased to have worked a number of other IOTA expeditioners, and hope they enjoyed their operation as much as we did ours. Plans were laid for our next operation, and we hope to meet many of our friends again from another island.

All QSOs will be confirmed via the bureau, but for those who wish to QSL direct, Declan, EI6FR, will act as QSL manager.

Many thanks to all the stations who took the time to work us. See you from the next island!





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CQ REVIEWS:

The Tejas Backpacker I QRP Transceiver

BY DAVE INGRAM*, K4TWJ

If you have ever listened below the normal level of strong signals on our HF bands, you know QRP is presently booming in popularity. In addition to stand-alone QRPers braving DX pile-ups (and proving the operator rather than the rig makes the difference), there are informal QRP nets open to all low-power enthusiasts every Wednesday at 0100 GMT on 7.030 kHz and each Sunday afternoon at 2300 GMT on 14.060 kHz. There are also informal QRP QSO parties each month, and several major QRP contests during various weekends throughout the year. Many QRPers enjoy building and using their own equipment, so there is also a special category in many QRP contests for operators using home-assembled gear.

Communicating with a small, battery-powered rig is fun and exhilarating. The rig is easy to set up almost anywhere, and the results are quite impressive when you use a good QRP transceiver such as the Backpacker I featured in this review. This little gem is a 2.5 watt output CW transceiver small enough to carry anywhere, and 2.5 watts is plenty of power for good QSOs when connected to a dipole (or better) antenna. This fact is particularly true on the 200 watt-limited and CW-only band of 30 meters. In fact, my first contact while using the Backpacker I on 10.1 MHz was 3B8CF on Mauritius Island in the Indian Ocean. He answered me on the first call, and a rather sizable pile-up formed immediately thereafter.

If you really want to enjoy the world of QRP in high style after getting your own Backpacker I, incidentally, I heartily recommend joining two or three QRP clubs. Their quarterly newsletters will keep you well informed on happenings in this area. The most popular clubs are QRP ARCI (c/o KG5F, 2045 Ash Hill Road, Carrollton, TX 76007), Michigan QRP Club (P.O. Box 80804, Lansing, MI 48908-0804), and the U.S. Division of the G-QRP Club (c/o W5HKA, 2852 Oak Forest, Grapevine, TX

*4941 Scenic View Drive, Birmingham, AL 35210



The Backpacker I QRP CW transceiver. The unit is available in kit or preassembled form for operation on any single band from 80-10 meters, including the WARC bands.

76051). Be sure to include an SASE for details. Now on with the review!

Overview

The Backpacker I CW transceiver is produced in kit or assembled form by Tejas RF Technology Company. It measures 2½" H × 6½" W × 5½" D, and is enclosed in a scratch-resistant, anodized aluminum case with silk-screened labels on front and back panels. The transceiver can be assembled for operation on any single band from 80 through 10 meters, including WARC bands. Due to its unique design, changing bands only involves swapping one crystal and 10 other fixed components. That's right: No modifications to the VFO are necessary when changing bands, and dial calibration also remains intact.

The Backpacker I is an updated and expanded version of the popular W7EL transceiver described a few years ago in *QST*. It has one of the best direct conversion receivers I have seen, three degrees of selectivity, RIT with center detent, spot

switch for perfectly zero beating other signals, vernier-drive tuning, and full break-in with no relays. The transmitter loafs along at 2.5 watts output; it has timed sequence differential keying that sounds great, high SWR protection, and adjustable CW sidetone that tracks with the front-panel volume control. Transmitter output is also adjustable down to almost zero for milliwattage, and this ultra-low-power pursuit is really hot in QRP today. In fact, many QRPers are working the world while using less than 50 mw of power—a most commendable achievement from any point of view!

The Backpacker I requires a 12 volt DC power source capable of supplying 300 ma. To power the Backpacker I, I used one of the new Quantum "Ham Batteries" designed for all-day operation with an FM handheld, and it worked great. The setup is so portable, I can even operate on my back deck or on a beach. If you decide to "roll your own" battery pack, there is sufficient room inside the Backpacker I's case to squeeze it in and have a completely self-contained rig. Add a miniature key and

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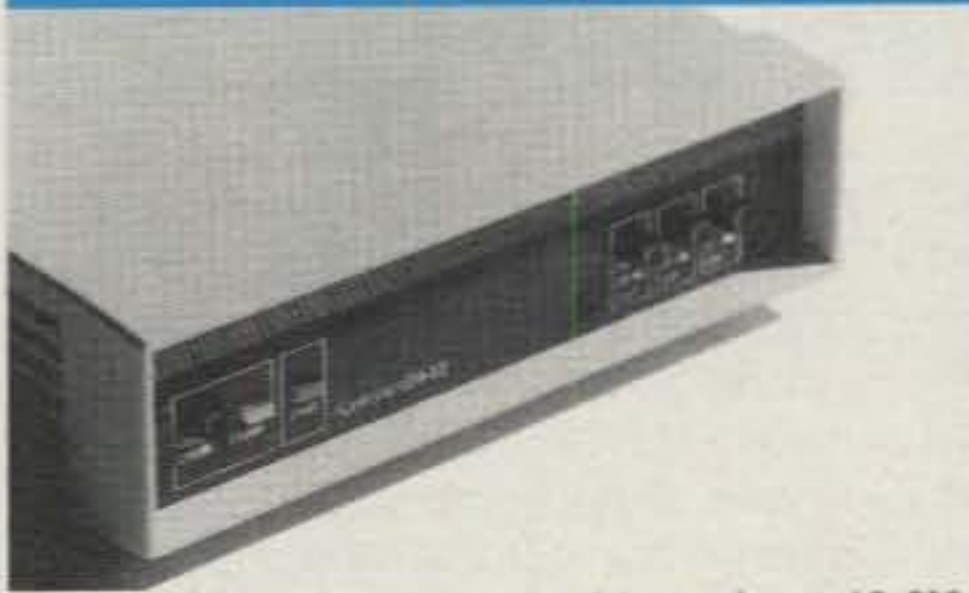
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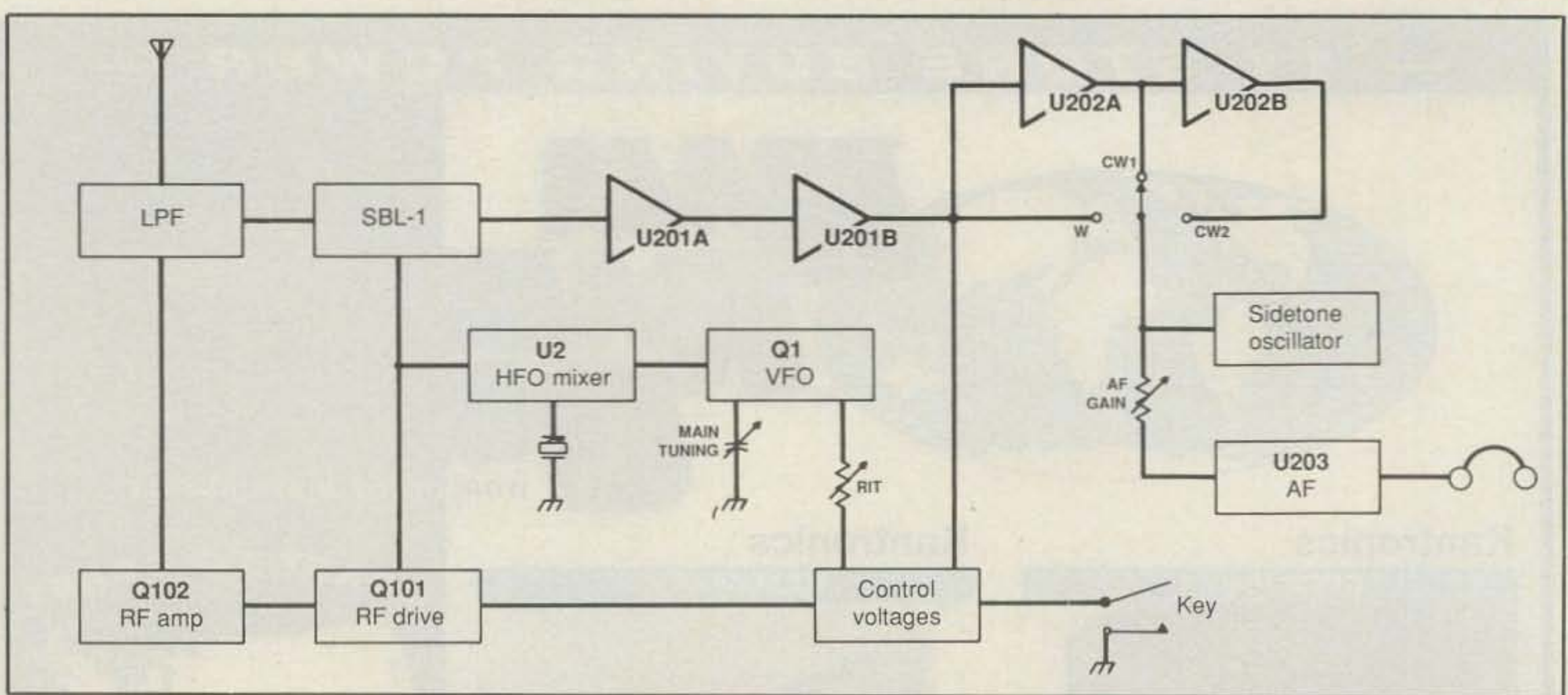


Fig. 1- Block diagram of the Backpacker I transceiver. (See discussion in text.)

a roll-up antenna, slip the whole works into a small camping bag, and you have a complete station ready for traveling or IOTA expediting!

Inside Views

The Backpacker I is assembled on three well-designed PC boards that make assembly easy and testing a snap. One board contains the direct-conversion receiver, another board supports the two-transistor transmitter, and the third board contains the VFO system. The front-panel-mounted 6:1 gear reduction vernier drive is mounted so you can install it one way and later reverse it exactly 180 degrees in changing to differently tuned bands. You can also set the VFO range for 100 or 50 kHz, as desired. Tejas did not cut any corners in this transceiver. Another example is the rear coaxial socket-type DC power connector that is fully insulated from the metal cabinet so you can add dual RF chokes, etc., if desired.

Now let's briefly look at the Backpacker I's block diagram shown in fig. 1. Incoming signals go through a low-pass filter and diode T/R switch to a mini-circuits SBL-1 doubly balanced diode ring mixer (a superb chip for receivers). They proceed through two audio amplifier ICs (the latter U202 serving as a very effective narrow-band CW audio filter) and continue through another IC to the earphones. Closing the key activates the time sequence differential keying system that mutes the receiver, shifts the transmit frequency, and activates the transmitter (in that order). The VFO's output is then amplified by Q101 and boosted to full output by RF amplifier Q102—a rugged 2SC799 SWR-protected

by a 36 volt zener diode. The VFO, incidentally, operates on 6.0–6.2 MHz and requires calibration only once. Afterwards, band changes are narrowed to changing a mixer crystal and receiver input/transmitter output components.

The above description was not intended to make the Backpacker I seem complex for home assembly. Indeed, it is quite easy to construct if you have some previous experience. The rig and its well-detailed manual are exceptionally good, but they are not Heathkit style (such as connect a green wire of 2 inches between point A and point B, etc.). I compare it more to a kit complete right down to the last screw, nut, and miniature component for a magazine article. If you feel hesitant about self-assembly, the Backpacker I is also available in wired and tested form. One good point about self-assembly, however: It qualifies for the "homebrew" category of various QRP contests.

On The Air

The Backpacker I is a barrel of fun to operate, and the little rig works great. Since the transceiver does not represent an arm and a leg investment, I feel more comfortable switching it on/off for a quick band check or QSO than I do with my "big rig." That consideration, combined with the fact my Backpacker I is set up for 30 meters, results in an approximate 85 percent returns ratio on calls. In strictly spare time I have already worked all continents except Africa with the little pup, and only this morning I received a reply to my first CQ from a W8 in Ohio. Two watts connected to a good dipole or Delta Loop gets out great on 30 meters!

Overall, the Backpacker I works as smooth as any "big rig," although it lacks digital readout, memories, etc. The receiver is as hot as Texas chili, the VFO is smooth and stable, and the solid-state QSK is exceptionally quiet without pops or cracks. I especially like combining the rig's variable levels of selectivity and center detent RIT control, as they make cutting out interference easy, and going back to "zero beat" is no problem. I carried the rig with me on a recent IOTA expedition to St. George Island and made contacts throughout the United States plus Japan and Australia while using a small 12 volt battery pack and simple dipole 15 feet above the ground. That's good results from any point of view!

Conclusion

Tejas RF Technology seems to really have its act together with this new Backpacker I transceiver, and it is a great way to get rolling with QRP at economical cost. The kit makes a terrific home project I think you will enjoy building, and having all the parts in one box makes assembly nice. There is also confidence in knowing you can change bands to accommodate future interests.

I understand Tejas will be producing additional amateur radio projects in kit form in the future, and judging by the quality of their Backpacker I transceiver, additional goodies from this company should be most impressive.

The Backpacker I is priced at \$159.95 for the kit and \$199.95 assembled and tested. For more information on the Backpacker I, contact Tejas RF Technology, 17 South Briar Hollow, Suite 101, Houston, TX 77027 (telephone 713-840-8600, or FAX 713-840-8608).

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Here's a project you can easily build that will satisfy most of your QRP (and then some) needs.

How To Design And Build A Simple QRP Dummy Load

BY ED STILES*, WA7P

Since I operate QRP almost exclusively, my dummy loads have consisted mostly of a couple of 2 watt, 100 ohm resistors soldered in parallel to an RCA plug. But when I started experimenting with MOS-FET power amps recently, I needed something bigger—a dummy load that would handle about 20 watts. Sure, I could have bought one, but my motto has always been "Why buy when you can build?" Besides, by using resistors from the surplus bin at a local electronics store, along with parts from my junk box, I could roll my own for a lot less and have the fun of building, too.

The power-handling capabilities and design were dictated largely by the resistors I found in the parts bin. These were 1000 ohm, 2 watt, noninductive types. (Wire-wound resistors won't work because they introduce unwanted inductance into the load.) All I had to do was figure how many I would need to connect in parallel to make a 50 ohm load, and then determine if that load would be hefty enough to survive the power levels I had in mind.

The number of resistors I needed was determined by plugging the value of a single resistor (**R**) into the following formula:

$$N = R/50$$

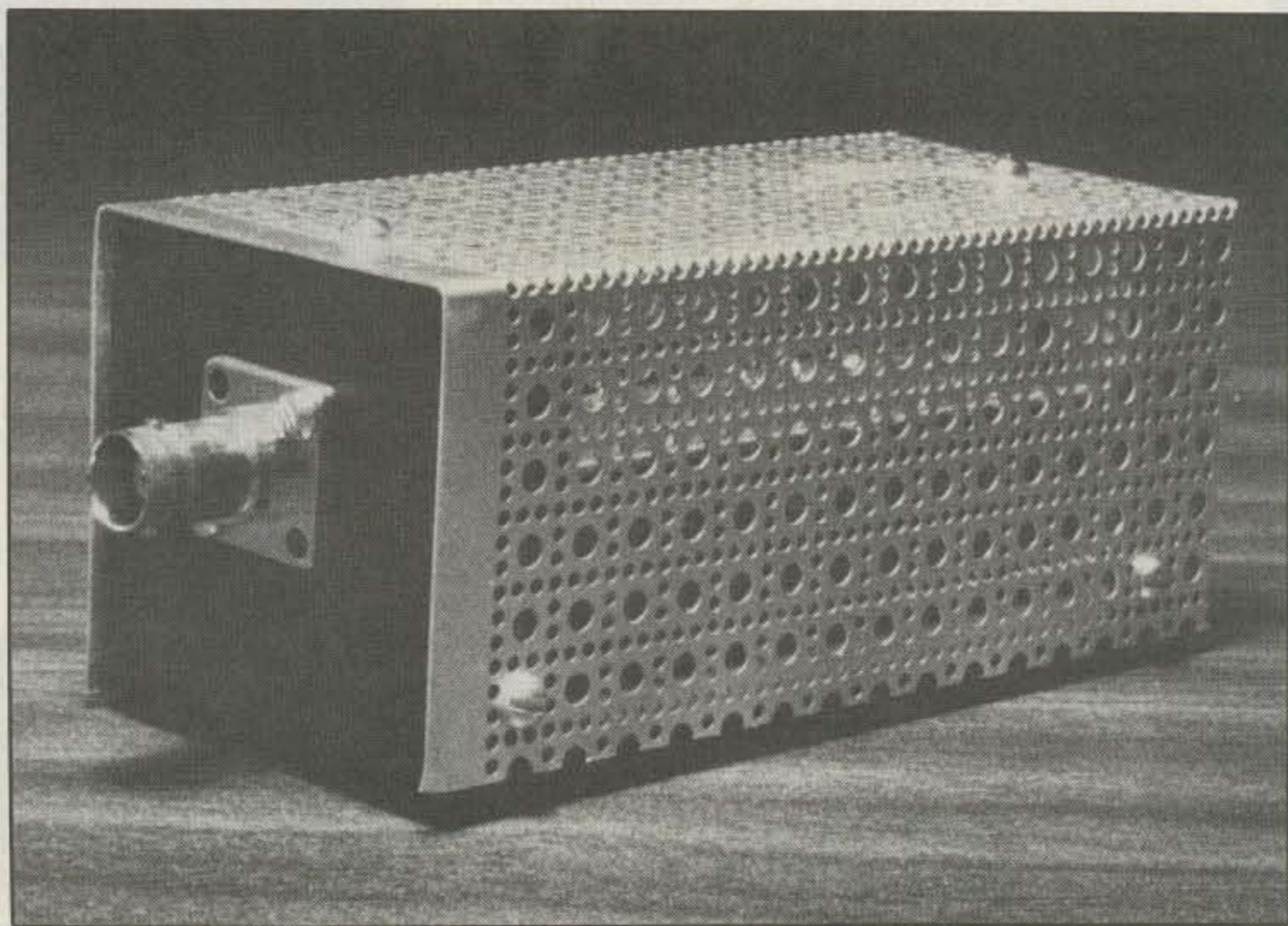
That would be 20 resistors in this case. Since I could buy packs of 5 resistors for a dollar, the total cash outlay for the project would be \$4.00. All the other parts could be found in my junk box.

Only the question of power remained: Would the 20 resistors handle 20 watts? That can be determined easily by plugging the wattage rating of a single resistor and number of resistors connected in parallel into this formula:

$$P = WN$$

where **P** is the maximum power the load can handle, **W** is the power-handling cap-

*3324 E. First St., Tucson, AZ 85716



The completed dummy load is a very compact unit.

ability of one resistor, and **N** is the number of resistors connected in parallel. This formula shows that the dummy load would handle 40 watts maximum, which gave me a comfortable safety factor for the 20 watt final amp I was planning to build.

Construction

The resistors were sandwiched between two pieces of single-sided PC board measuring 1 inch by 4.5 inches. Holes for the leads were drilled at $\frac{3}{8}$ inch intervals on centers that were $\frac{1}{8}$ inch from the edge of the board. This allowed a space around each resistor for air cooling.

I drilled all the holes, tinned the resistor leads and holes in the PC board, and then soldered the sandwich together, with the pieces of circuit board butting up directly

against the resistors. This keeps all the leads as short as possible and prevents adding unwanted inductance into what should be a purely resistive load.

Along a center line on the bottom piece of circuit board material I drilled two holes 3 inches apart and soldered two 4-40 nuts to the board. The resistor sandwich was mounted to the enclosure by means of bolts through these nuts. This piece of PC board was attached to the ground side of a BNC connector at the input, and the other PC board on the resistor sandwich was soldered to the center pin.

I made a box for the dummy load by soldering together several pieces of double-sided PC board. Some leftover screen material from the hardware store was bent in a U shape to make a top for the enclosure. Six 4-40 nuts were soldered over holes along the edges of the enclosure to

hold the screen cover in place. A custom-made box was used instead of a commercial enclosure because I wanted to keep all leads as short as possible.

A BNC connector was mounted on one end of the box with its center pin soldered directly to the resistor sandwich. On the other end of the enclosure a piece of No. 14 solid wire was soldered to the sandwich. It runs out of the box through a grommet to prevent it from shorting to the case. I added this lead for my oscilloscope probe so that I can check the output waveform and power output of the various transmitters I build. The ground clip for the scope probe goes to a 4-40 screw and nut that have been soldered to the case.

After the enclosure was soldered together and the holes drilled, but before the resistor sandwich and other parts were soldered in place, the box was painted flat black. I did this in several thin coats with a brush because I don't like using spray cans.



An inside view of the dummy load. Note the very short leads on the resistors and the BNC jack. Test points for attaching an oscilloscope probe are on the rear of the unit.

Testing

An MFJ 207 antenna SWR indicator was attached to the dummy load by a very short piece of coax and run through the ranges for all bands from 160 to 10 meters. The load showed a flat 1:1 reading across the

entire range, indicating that it is more than adequate for use in homebrew transmitter testing and tune up.

Although this dummy load is overkill for transmitters in the 5-watts-or-less cate-

gory, I use it now whenever I'm testing a new QRP homebrew transmitter, because the ability to easily attach a scope probe to the unit is an added plus when testing my latest creation.



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CQ REVIEWS:

The Logikey K-1 Keyer

BY JOHN DORR*, K1AR

Most of the time when thinking about electronic keyers it is hard to remember why one is better than the next. For the most part, the keyers I have used over the years needed only a couple of features—some memory and a convenient way to change the speed setting. After using the Logikey K-1 keyer, I can report that this product has broken new ground for the serious CW enthusiast.

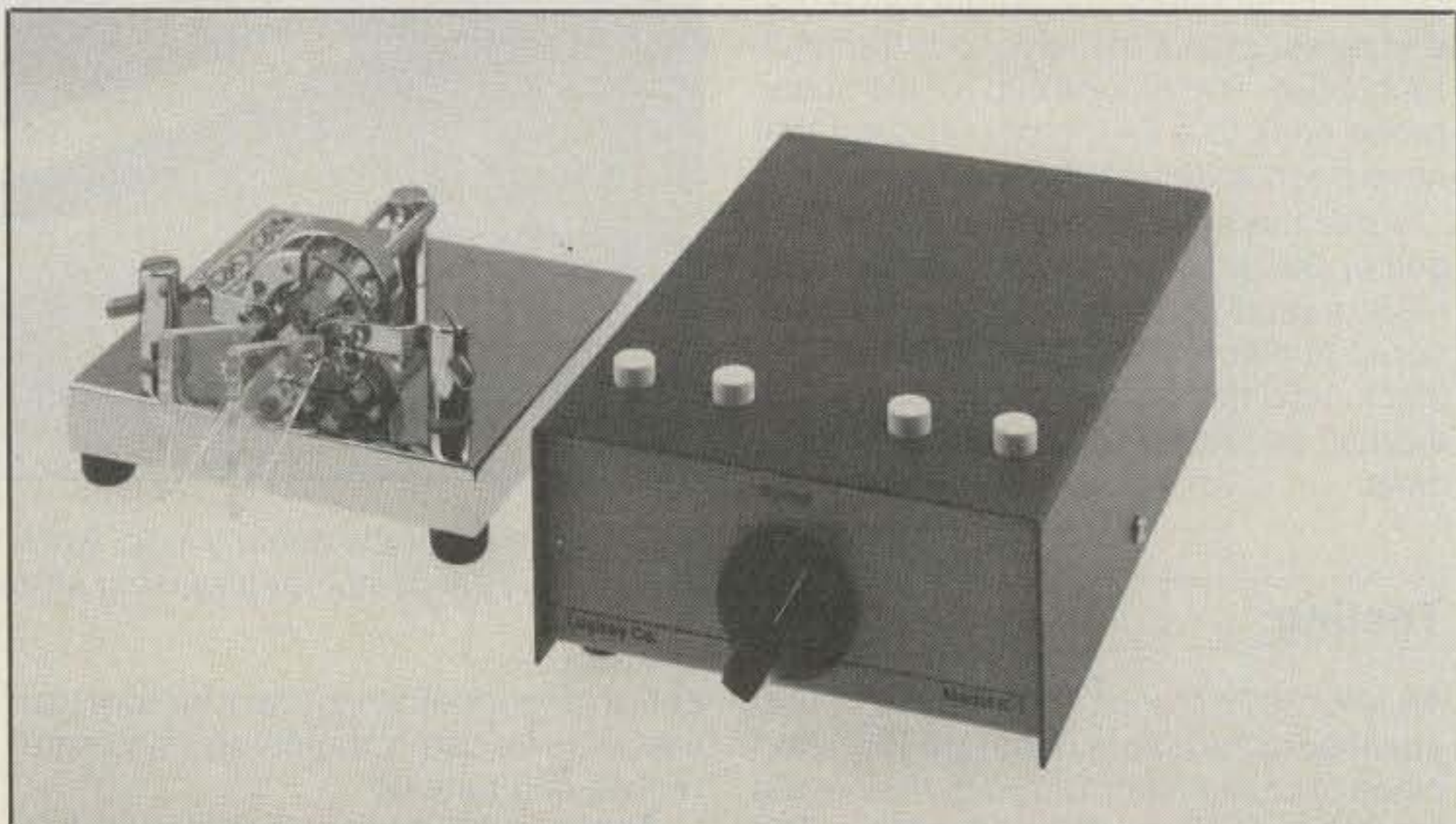
I must admit when I first saw the unit I was fooled by its simplistic look. After all, the product comes with a speed control on the front and four large buttons on the top. This seemed hardly to represent the beginnings of a CW revolution. After a brief scan of the manual and my first few QSOs, however, I was pleasantly surprised.

The Logikey K-1 keyer was designed by Jeff Russell, KC0Q, and Bud Southard, N0II. Scott is also the designer of the Super CMOS Keyer from the *Radio Amateur's Handbook*, the Kansas City Keyer, and the Super CMOS Keyer II found in November 1990 *QST*. The Logikey K-1 is in fact the commercial version of this latter design and is exclusively licensed to Logikey for distribution.

The first thing that struck me about the keyer is the obvious need to read the manual. If you are like me, you are the type who loathes the thought of reading through pages of boring information when learning how to use a product. Like most people, I prefer simply to dig in and figure it out. This is one product that does not afford that luxury and is one of the few negative aspects that I could find. You will find, however, that the manual is easy to read and will let you be well on your way to advanced use in less than an hour. Logikey did an excellent job of dividing the manual into sections so that you can work your way up to more complicated functions. I found that I was able to get started using the unit as a simple memory keyer in just five minutes. After reading the manual, you will discover that the keyer offers remarkable power and functionality.

Although very few people will ever use all of its functions, there are a number of features that you won't want to live without. In essence, the list of capabilities is like a buffet; take what you want.

I found that the unit has one of the most



The Logikey K-1 electronic keyer.

generous timing tolerances of any keyer I have ever used. The feel was instantly comfortable to my sending hand. The proof to me was when I lined up several keyers side by side and set their sending speeds to 45 wpm. The Logikey K-1 was the only unit I could consistently use to send with few mistakes time after time.

I was struck by the conspicuous absence of an ON/OFF switch on the unit. In fact, the keyer draws such a small amount of current (literally in microamps) when idle that this requirement is not necessary. An inexpensive 9 volt battery suffices for months of worry-free operation. Naturally, if you use the speaker monitor extensively, this time frame will drop dramatically.

The most interesting attribute of this keyer is the way you communicate with it and program commands. Unlike most conventional keyers using keyboard-oriented function pads, the Logikey K-1 is programmed by sending CW input from the paddle itself. What better way for the CW enthusiast to utilize a keyer!

The list of commands and features available through this mechanism is seemingly endless. For example, to obtain the keyer's speed setting, you press the right two buttons, activating the **Inquiry** function. When in this operating mode you have the ability to determine the current state of the keyer. After entering the inquiry mode, the

keyer will automatically send a "?" through the built-in monitor speaker. By sending the letter "S" with your paddle, a response will occur providing the precise speed setting in perfect Morse and returning you automatically to the normal mode of operation. After a few days of use, this mode of programming becomes intuitive and fun.

The other major form of operation is the **Function** mode. Activated by pressing the left two buttons, you now have the ability to modify the keyer's current parameters, such as autospacing, speed, weighting, serial number, etc.

Perhaps the most powerful feature of the Logikey K-1 is the availability of embedded commands. An embedded command allows the user to insert keyer functions into programmed messages. This allows for pauses or breaks within messages, calling one message from another, contest serial numbers, or speed changes within messages, etc. While varieties of this design exist with other keyers on the market, Logikey has developed a very creative implementation indeed.

One final functional note has to do with multi-button functions. By depressing combinations of the 4-function buttons, you have the capability to invoke serial number decrements, tune, keying speed reset (20 wpm), hand key mode, etc. In any mode of operation the keyer will always provide an erroneous input "buzz" when

*c/o CQ magazine

Linear speed control (6-60 wpm)
 Weighting control (25-75%)
 Four 48-character message memories
 Fully iambic, dot and dash memories
 Messages containing embedded functions
 Message loop capability
 Input queuing for multiple memory calls
 Multi-format serial numbers to 9999
 Instant serial number decrements
 Selectable auto spacing
 Memory allowance for paddle insertion
 Correctable transmitter keying characteristics
 Built-in monitor and speaker
 Tune function
 Provision for remote switches
 Positive or negative keying
 Built-in battery backup (12 VDC)

Table 1- Main features of the Logikey K-1.

you have incorrectly entered a command into the keyer.

The Logikey K-1 truly differentiates itself when you consider its most advanced features. These functions may seem small by themselves, but when viewed collectively they offer undisputed versatility. Here are just a few examples. The K-1 allows the user to program the letters "N" or "T" in place of 9 and 0 in serial number/contest exchanges. Memories are soft sector, allowing you to program one or two larger messages into available memory. During programming the keyer will automatically tell you when less than 40 bytes of message memory are remaining. Advanced timing is also available to allow the K-1 to "mimic" the timing patterns of other keyers you may have become accustomed to using over the years (e.g., Accukeyer, Curtis, W9TO). You can terminate message replays by tapping the key or hitting two of the message buttons, eliminating that extra "dit" that always is sent when the paddle is touched. And finally, the resume feature allows the sender to stop recorded message replay at any point, insert hand-keyed text, and continue memory playback. This is nice when deployed with the KB-1 paddle/button bracket accessory to implement a complete contest exchange and CQ or QRZ in one message.

One final note is the flexibility of upgrading the unit. Logikey continues to increase the unit's functionality and provide these new capabilities through a low-cost CMOS chip upgrade that takes about 2 or 3 minutes to install.

The Logikey K-1 Keter is a fine addition to the shack of the serious CW enthusiast or even the budding newcomer. It is available from amateur radio dealers or direct from Logikey Company, P.O. Box 583, Deerfield, IL 60015 (708-945-3980). Suggested list price is \$119.95. Other options include the Logikey HK-1 Hookup Kit (\$3.95) and the Logikey KB-1 Push Button Bracket for all Bencher Paddles (\$29.95).

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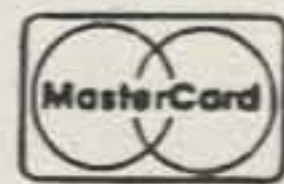
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9140	40 meters	9112	12 meters
9130	30 meters	9110	10 meters
9120	20 meters	9106	6 meters
9117	17 meters		



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Results of the 1992 CQ World-Wide VHF WPX Contest

BY JOE LYNCH*, N6CL

The "new" CQ WW VHF WPX Contest was met with renewed enthusiasm. The new rules were tried out and were liked by a vast majority of participants. The total logs received were just shy of 100. This is an excellent number considering the contest was not held in 1991 and this one is a rebuilding effort. On-the-air interest showed there was no lack of participation, at least in the United States.

Conditions

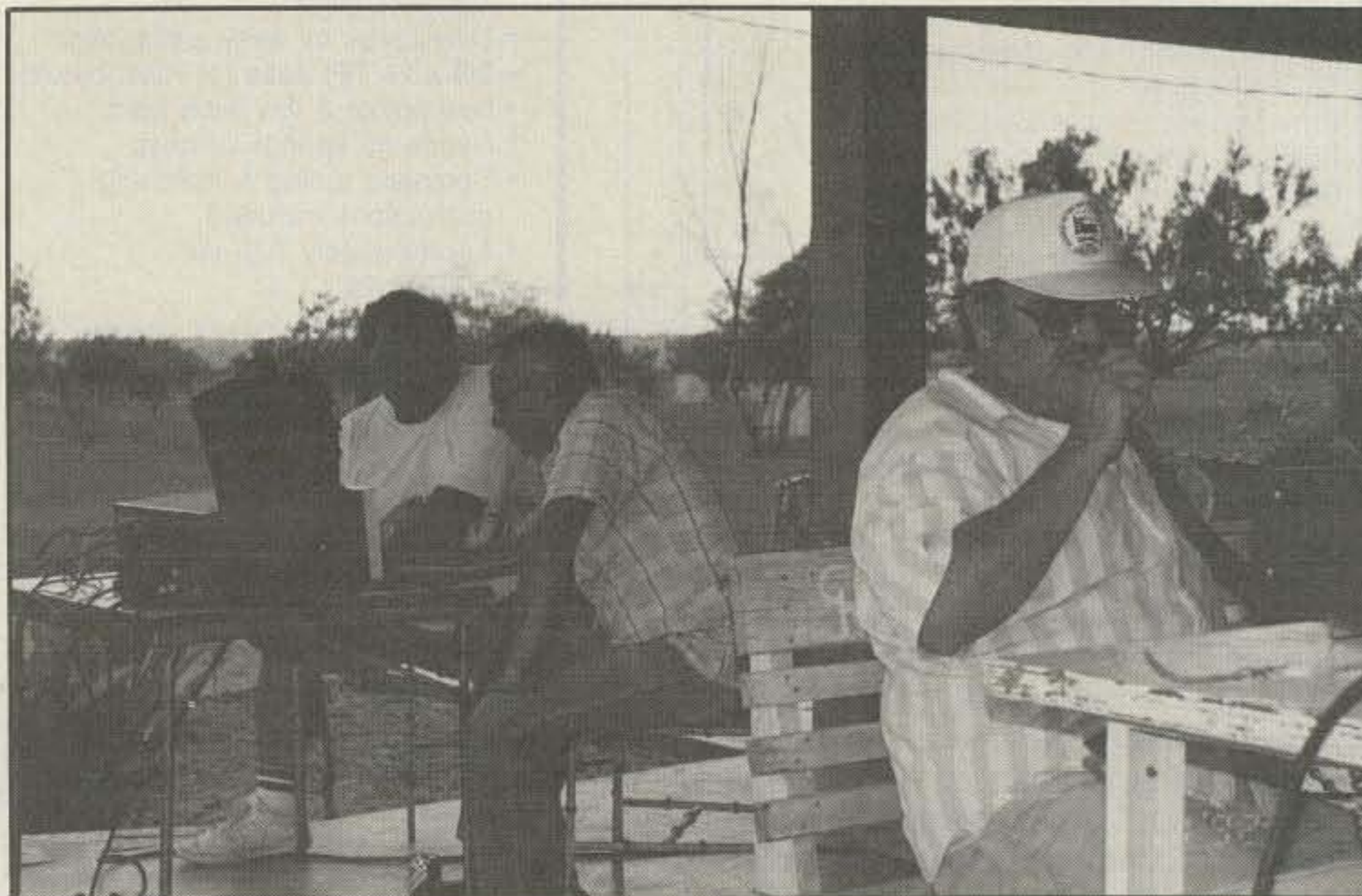
Conditions ranged from good to lousy. Sporadic-E was evident in the log entries on both days of the contest. Tropo enhanced conditions were also evident for those who operated on the higher frequencies.

DX

Thanks to publicity by our sister publication *CQ Espanol*, a fair share of log entries were received from Spain. Their (then) recent acquisition of 6 meter privileges shows up in the use of the EH prefixes. When used, the EH prefix is indicated in the callsign listings. In the single operator category DL1ZC was the European winner. Operating on 144, 432, and 1296 MHz, he amassed over 65k points. EA3/EH3ADW, a multi-operator station operating on 50, 144, and 432 MHz, had a respectable showing by collecting over 31k points. YV25ARV, operating on 50, 144, and 432 MHz, and taking advantage of some multiple-hop sporadic-E into the States, was able to score in excess of 16k points.

North America

Entries were received from across the country, with many reporting fair to good conditions. The highest score obtained in the contest was earned by N6NB, a portable, single operator station, with over 95k points. N7AVK, a fixed station multi-operator category entrant, scored in excess of 85k. AJ0E, the top rover station, scored in excess of 73k points while traveling through nine grids. The multi-op N7AVK



Mexico was represented by a special prefix, XA5T. Operators: Rosendo, N5YBG; Enrique, XE2FU; and Mario, KF5RM. (Photo courtesy KF5RM)

gang—which included WA7TDZ, N0XX, and AA7NH—scored tops with over 85k.

Other Stuff

Because the rules are new and there is no history for this contest, none of the software programs support this contest. However, some of you made valiant efforts to try to make one or another work. Perhaps in a couple of years one of the majors will include this program in one of their packages. Nevertheless, we really appreciated all logs, whether hand written or computer generated.

Scoring seemed to be somewhat of a problem. Apparently, the summary sheet led some of you astray. I re-scored every single log and if warranted corrected your score up or down.

A number of entrants took advantage of the CW multipliers and expressed an appreciation for them. They will continue to be a part of future contests.

A few entrants requested a QRP category in future contests. Accordingly, for the forthcoming contest there will be a QRP category, with the only restriction of no more than 25 watts. This means that you can be at home or portable. Just do not

run more than 25 watts. We will try it this year and see how it works.

The 1992 contest is scheduled for July 10-11, 1993. I look forward to seeing you in this year's contest.

73, Joe, N6CL

Random Comments

Contest site was on top of 9500 foot volcano. Thank goodness the "big opening" didn't occur! CU next year... WA7JTM (N7AMA). Where, oh where is the software to score this test?!... N7AVK. Only ran 2 meters and a small station but we enjoyed it nonetheless... KM0L. Very little participation... N4HB. W2VC's 2 watt rain scatter signal peaked S-9 at 16 degrees east of direct bearing... It was interesting that, at times, the distant 3 cm signals were actually stronger than 2 meter signals over the same path... AF1T. The last QSO was made on CW. It was my first CW QSO on VHF! I am 100% CW on HF. SSB is for VHF... used to be for VHF, hi!... FD1PBL.

A contest is the best way to get people on and stir up activity. Many thanks... WA2HF1. It was a great contest, but I couldn't find even one station to work on 902 MHz in the entire state of California!... N6NB. Drove up to DN56 and almost got stuck in gumbo during a rain storm. Didn't work anybody except a few locals...

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Chip Taylor, W1AIM, operated as from his van as VY2QST on a narrow 1/2 by 2 mile strip of land in grid square FN87. (Photo courtesy W1AIM)

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ROVER STATION

AJ0E (73,377)

Sponsored by Rochester VHF Group

WB7Q. Relatively poor participation and the propagation was not good. I am glad for the new rules for the contest . . . EA3TJ. Giving CW contacts an extra point was a small brilliancy. CW work is far more efficient than SSB (I figure close to 3 dB), and its use should be encouraged . . . WB9GKA.

Good contest, but would like to see more activity. A lot of us are burned out after June ARRL test. Need to get activity on higher bands here; turned out to be 6 meter test . . . WB8YFE. A few days before the contest I hooked up my new SSB Electronics 6 meter transverter. What a difference! . . . Hopefully, next year someone (K1EA or K8CC) will write a contest logging program for this contest . . . AA6TT. Enjoyed the contest. Hope it grows over the years to rival the ARRL June VHF contest . . . WB0CQO. Where were all the 2 meter U.S. ops? Thanks to W1AIM (VE2QST) for FN87 from PEI . . . VE1MQ (CJ1MQ). Missed part of the 6 meter opening because of a paint brush. Hope to spend more time next year . . . KM0A.

I operated only two hours in the contest . . . EA6YY (AN6YY). We operated from Linden in the southeast of the Netherlands (JO21wr). We made our shack on a boat and we put up two masts with antennas on the land beside the boat, one for 50 MHz and one for 144 MHz . . . PA3BIX (PE0WGA and PA6VHF). Rotator went QRT about 6 hours into the contest . . . Operated from Meda Mountain, about 450 meters high, in IN52ss . . . EA1FDI (EA1RCI). Worked my 50th state on 6 meters when Harry, KA3B, operating from AC3T, answered my CQ! . . . N6CL. The bands were dead for the first 17 hours. Then all hell broke loose around 1100Z Sunday. The day was very hot, approximately 102 degrees. So we broke up early. Otherwise we could have accumulated more points . . . KF5RM (XA5T).

This was a FUN contest! I drove 14 hours straight Saturday, traversing five grids and ending up back in DM09 for the evening opening. Next morning I went south to DM08, then north

to CN90, and finished in DN00. N6NB was audible almost everywhere I went, even on my dipole! Love the new format for this contest! I will be back! . . . NC7K. We were plagued by rain and storm activity the whole contest, but it was fun, nonetheless! . . . AJ0E. 721 miles of pure fun!! Wish someone was along to hear some of the long-haul mobile QSOs. My homebrew an-

tenna really works!! . . . K6AAW. There needs to be some incentive to get some microwave activity. Maybe a micro-only category . . . KB3PW.

Conditions were sub par on 6 meters. However, best catch was VY2QST on PEI . . . KA3B (AC3T). Conditions very bad in the 10,000 foot "hole" I live in! My score is a joke, hi! (Not at all—ed.) . . . W7US. There is a 1/2 by 2 mile strip



Sporadic-E propagation gave a number of stateside stations an unexpected contact with YW5N. Operators: (back row) YV5LIX, YV5GE, YV5LDL, and YV4BHJ; (front row) YV5NN, YV5NFX, and YV5JCB. (Photo courtesy YW5N)



Ron Hammel, KC6WLC, stayed home for a change and worked the contest from there. With that QTH, Ron, why do you ever leave home? (Photo courtesy KC6WLC)

of land in grid square FN87. I set up across from the Atlantic Wind Turbine Test Site. Incidentally, PEI has six grids, all within easy reach, plus lots of nice scenery. It is a great place for anyone into grid square DXpeditions . . . W1AIM (VY2QST). Glad to see "E" skip on 6. Otherwise there would have been very little activity here. Was fun even with light activity . . . WD5EWD. The DX made this contest interesting. Hope to do it again next year . . . KY5N.

Enjoyed hearing AA6TT with his big antenna array . . . AD4F. A lot of operators from the Antelope Valley Amateur Radio Club, K6OX, came by to give support, including Dale, K0BGL, Curtis, KD6CUI, Tom, KM6WO, and Henry, KD6LFB . . . KC6WLC. Fun contest but not many stations on 2 meters. Guess everyone was on 6 meters. I like the idea of the CW incentive points, but as a mobile/rover, couldn't take advantage of them . . . NK4Q. My biggest thrill was working HH7PV and several rover stations . . . WB7QBC. Not much activity, also too close to June VHF contest—maybe April contest halfway between the January and June contest would be better . . . WY2H.

How about club competition? . . . WR3E. Lots of fun, but not too many were on. Managed just one new grid square on 6 meters. Where was N6CL? (At least part of the time in DM94—ed.) . . . WB4DBB. Two east Texas 6 meter contacts—only opening to the east—Salt Lake a surprise . . . W6PFE. Worked XA5T and W7s on double hop with only 5 watts! . . . N8AXA. W2UC is the Union College Club call; first VHF contest in years for the club; just a start . . . N2KVN (W2UC). The bands were dead . . . VE1SLM. Where was everyone? Most common comment, "What contest?" . . . N1FUS. Worked a new grid on 222 MHz, WB9CKA, in EN58 . . . W0JRP.

After years of service, my 2 meter rig went south a few hours into the contest, limiting me to 6 meters . . . N7BUP. Fun contest with good band conditions. Just need more participants . . . KC4YO. Worked my first FM simplex contest contact . . . W1ENZ. Where were all the operators? . . . KB0CY. Not many people on, but

first time on 2 meter SSB. Boy, is it better than FM for distance! . . . KB2FTX. Lots of fun for Hal (KC4YO) and me . . . KM4XW. Nice to see you are running VHF contests again . . . WA2BAH. My biggest thrill was working HH7PV. I also en-

joyed making a few CW QSOs. Keep the incentive there . . . KN4QS.

Nice to have the contest back. Maybe conditions will be better next year! . . . W7ABX. Finally snagged YV4AB for country number 78 . . . K4SC. The limited activity on 144 MHz was disappointing. Was this because people being on holiday or too close to the ARRL June VHF contest? . . . W6AXX. Heard N6NB all morning on scatter with no contact. Then the band opened up with sporadic-E and he was 60 over S-9! . . . N3EG. Good contest in spite of band conditions. Had a good time. Will plan to be back next year . . . WA8QNR.

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Rover Station. AJ0E & K0TLM.

RADIO WORKS

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Bulk prices - Call</p> <p style="text-align: center; font-weight: bold;">CAROLINA WINDOM</p> <ul style="list-style-type: none"> * ONE ANTENNA = All Bands, WARC + 80-10M, SWL * OUT PERFORMS dipoles, trap antennas, verticals * It's a top performer, 6 product reviews say so * Special matching transformer and Line Isolator * PERFORMANCE SECRET is the exclusive Ground Independent INVERTED VERTICAL RADIATOR * 'CW' 80-10 M, 132' long, use transmatch * 'CW/2' 40-10 M, 66' long, use transmatch * 'CW160' 160- 10 M, available (\$99.95) <p style="text-align: center; font-weight: bold;">\$74.95</p> <p style="text-align: center; font-weight: bold;">NEW! 'C³' The CAROLINA BEAM</p> <p style="font-size: 0.8em;">If DX is your game, the CAROLINA WINDOM is great, but the CQ-40 or CQ-80 CAROLINA BEAM is even better. It combines the best features and performance of the CAROLINA WINDOM and 'BOBTAIL CURTAIN'.</p> <p style="font-size: 0.8em;">Performance + convenient size = high performance winner</p> <table border="0" style="width: 100%;"> <tr><td>'C³-40' (CQ-40) 40-10 M, CAROLINA BEAM 42'</td><td style="text-align: right;">\$89.95</td></tr> <tr><td>'C³-80' (CQ-80) 80-10 M, 84' or 100' long</td><td style="text-align: right;">\$99.95</td></tr> </table>	'C ³ -40' (CQ-40) 40-10 M, CAROLINA BEAM 42'	\$89.95	'C ³ -80' (CQ-80) 80-10 M, 84' or 100' long	\$99.95
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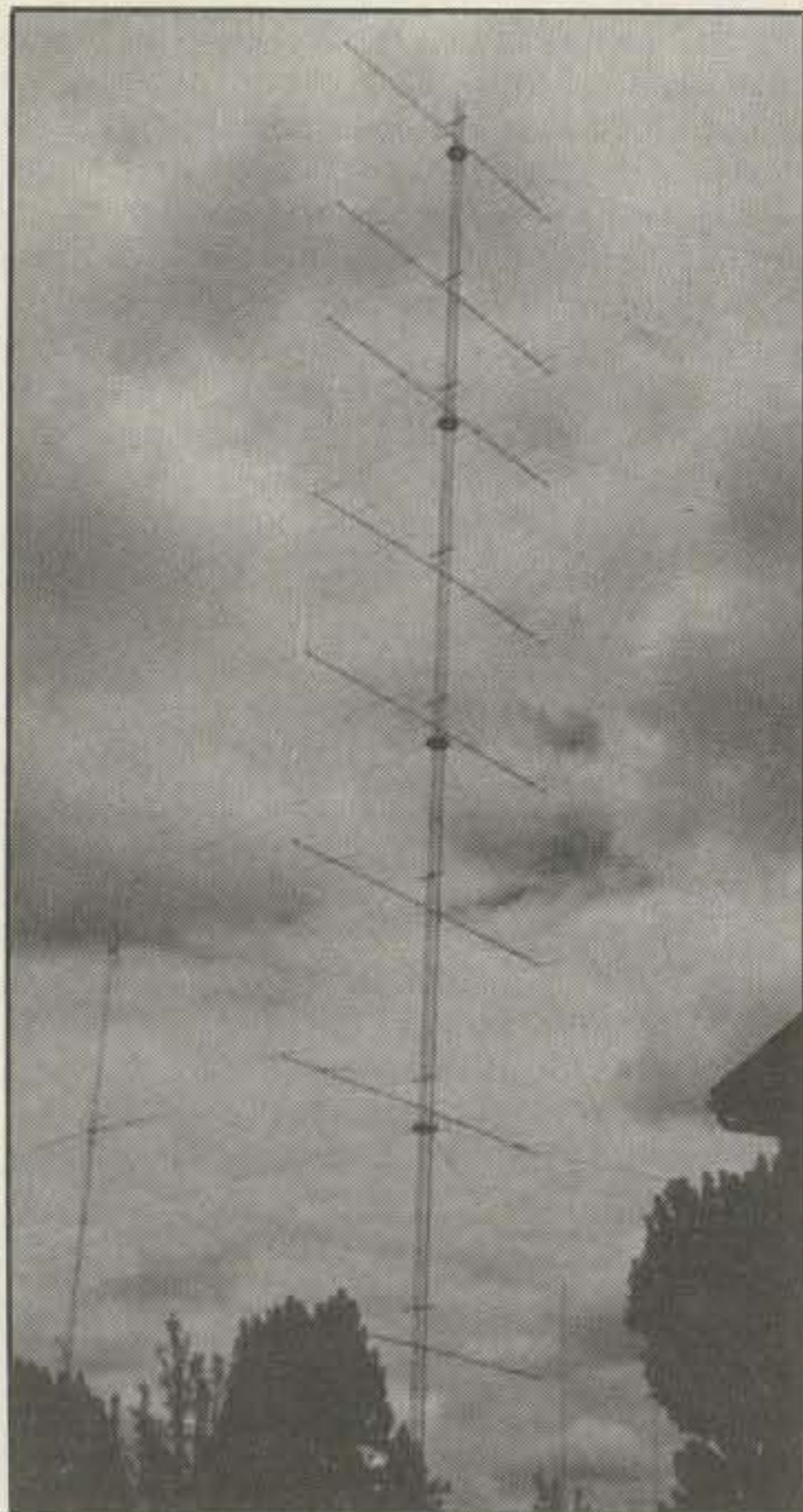
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Did you hear that big signal from Bill Hein, AA6TT? This picture explains why. Bill uses eight (count them from top to bottom) DX Engineering 10-element 40 foot long antennas on a rotating tower. (Photo courtesy AA6TT)

Number groups after call letters denote following: Final score, number of QSOs (including multipliers for band and CW contacts), combined total of prefixes and grid squares, (in the case of Rovers) number of grid squares activated, and bands operated (A = 50, 7 = 70, B = 144, C = 222, D = 432, 9 = 902, E = 1296, F = 2304, G = 3456, H = 5670, I = 10G, J = 24G, L = Light). Certificate winners are listed in boldface.

**FIXED STATION SINGLE OPERATOR
NORTH AMERICA**

UNITED STATES				
N1FUS	104	8	13	B
W1ENZ	70	7	10	B
WA2TEO	31,506	177	178	ABCD9E
KA2MCU	10,640	133	80	ABCDE
KB2FTX	5,986	82	73	AB
WY2H	3,600	80	45	BD
WA2BAH	1,650	50	33	ABCDE
W3ZZ	40,512	211	192	ABCDE
KB3PW	4,998	147	34	D9EFFGH
AC3T	4,661	59	79	A
WR3E	650	26	25	(Opr. KA3B) B
WB4DBB	55,944	259	216	ABCD9EI
KC4YO	27,370	161	170	ABCD
KM4XW	8,829	81	109	ABD
N4HB	6,984	97	72	ABCD9E
KN4QS	6,966	81	86	ABD
K4SC	1,326	51	26	A
AD4F	1,260	28	45	A
KY5N	65,340	270	242	A
WD5EWD	42,218	209	202	ABD
WB5IGF	16,896	128	132	ABCD9E

KC6WLC	7,326	99	74	ABC
W6PFE	1,974	42	47	AB
W6RCW	920	23	40	B
W6AXX	750	25	30	B
KE7CX	31,856	181	176	ABCD9
W7HAH	17,526	127	138	ABD
W7US	2,448	48	51	ABD
WB7QBC	2,322	43	54	A
N7BUP	2,166	38	57	AB
N3EG/7	1,656	36	46	ABD
W7ABX	510	17	30	A
KE8FD	36,652	196	187	ABCDE
WZ8D	18,864	131	144	ABCD
WA8QNR	11,716	101	116	AB
N8AXA	6,240	78	80	ABCD
K2UOP/8	1,365	35	39	ABCDE
WB9GKA	4,180	55	76	ABCD
WB8YFE/9	1,288	28	46	AB
N0LL	27,885	165	169	ABCDE
AA6TT/0	25,428	156	163	AB
WQ0P	23,408	154	152	ABCDE
WB0CQO	11,484	99	116	ABD
NT0V	3,468	51	68	ABD
W0JRP	2,970	45	66	ABCD
N0DQS	1,088	32	34	B
KM0A	242	11	22	AB

CANADA				
CJ1MQ	2,491	47	53	ABD (Opr. VE1MQ)

EUROPE				
GERMANY				
DL1ZC	62,560	340	184	BDE
SPAIN				
EB5IJS	2,279	53	43	B
EH3DZG	1,560	39	40	A
EB2CSB	288	16	18	B
EB1EJB	121	11	11	BD

BALERIC ISLAND				
EA6SA	2,214	54	41	B
AN6YY	120	10	12	B
AN6ZG	70	10	7	D

FRANCE				
FD1PBL	380	19	19	B

ITALY				
IV3VFP	288	16	18	A

BELGIUM				
ON4KIP	14,155	149	95	B

ASIA				
JAPAN				
JE1HXZ	1,584	48	33	ABD

**FIXED STATION MULTI-OPERATOR
CLASS I**

No entries received for this category.

**FIXED STATION MULTI-OPERATOR
CLASS II**

NORTH AMERICA				
UNITED STATES				
N4KWX	6,461	71	91	ABD
N7AVK	85,905	345	249	ABCD
KM0L	840	28	30	B
EUROPE				
SPAIN				
EA3/EH3ADW	31,161	221	141	ABD
EA3CQQ	3,096	72	43	BDE

SLOVENIA				
YZ3TTI	18,908	163	116	B

**PORTABLE STATION SINGLE OPERATOR
NORTH AMERICA**

UNITED STATES				
WA2HFI	3,186	54	59	AB
N6NB	94,500	350	270	ABCDE
WB7Q	15	3	5	B

CANADA				
VY2QST	1,218	29	42	A (Opr. W1AIM)

EUROPE				
SPAIN				
EA1FBF/P	2,420	55	44	B
EA3TJ/P	2,360	59	40	BD
EA1FES	486	27	18	B
EA1FCW/P	315	21	15	B
EA1BFZ/P	234	13	18	B

SLOVENIA				
YU3GO	4,544	71	64	A

**PORTABLE STATION MULTI-OPERATOR
CLASS I**

NORTH AMERICA				
UNITED STATES				
NW7O	26,474	217	122	ABCDE

**PORTABLE STATION MULTI-OPERATOR
CLASS II**

NORTH AMERICA				
UNITED STATES				
AF1T	1,809	67	27	B9EFGI
KA1LMR	315	21	15	BCD
N5MHZ	9,990	111	90	A
N7AMA	44,943	213	211	AB

MEXICO				
XA5T	6,885	81	85	ABD

SOUTH AMERICA				
VENEZUELA				
YV25ARV	16,380	210	78	ABD
YW5N	12,804	194	66	ABD

EUROPE				
SPAIN				
AM1/EH1DVY /P	15,246	126	121	AB
EA1RCI	425	25	17	B

BELGIUM				
ON4ALF/P	21,888	192	114	B

THE NETHERLANDS				
PA6VHF /PE0WGA	21,762	186	117	AB

SLOVENIA				
YU3R	5,360	80	67	B

ROVER STATIONS NORTH AMERICA						
UNITED STATES						
W2UC	1,404	52	27	R	2	BD (Opr. N2KUN)
NK4Q	2,419	41	59	R	5	B
WB9AJZ/6	12,880	112	115	R	4	ABD
K6AAW	6,305	65	97	R	7	BD
NC7K	9,284	91	102	R	8	ABD
AJ0E	73,377	263	279	R	9	ABCDE
KB0CY	273	13	21	R	2	AB

CANADA						
VE1SLM	493	17	29	R	4	AB



FT-747

YAESU



FT-890



FT-5200



FT-415



FRG-8800 Receiver



FT-1000 D



FT-2400



FT-23R



FT-530



rfconcepts

PC Electronics



STARTEK

ICOM

Ramsey Kits

ALINCO



Larsen Antennas

Ameco

Outbacker Antennas



Cushcraft CORPORATION

W5YI

MFJ

DIAMOND ANTENNA



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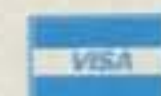
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W1ICP concludes this two-part series by debunking old myths and showing us how easy it is to work with open-wire line.

Let's Talk About Wire—Part II

Getting Open-Wire Feeders Into The Shack

BY LEW McCOY*, W1ICP

Whenver a feed line is resonant on the same band as the antenna in use, it is well nigh impossible to keep the feed line from coupling energy from the antenna and reradiating it. But is this important? The answer is yes and no. If you have a beam and desire a given pattern, then you certainly don't want the feed line radiating and giving you something other than the desired pattern. On the other hand, let's assume you are using a multiband dipole fed with open-wire line. The antenna is going to provide all kinds of patterns, depending on its length, height, band, etc. Feed-line radiation in this case *is not lost power*, and it is going to go somewhere and maybe work someone for you. Therefore, such radiation from a multiband dipole feed line just isn't that important.

As I have already stated, I bring my open-wire line directly into the shack. I use a plastic pipe through my wall to bring the open-wire line to my Transmatch. Some amateurs don't want to do this, however. They want coax coming inside. I know of two rather simple methods of meeting this requirement, and they both will work well. In one case a transformer/balun is used to get from the coax to open-wire line. In the other a section of dual coaxial line is used.

A word or two about coax is in order here. A coaxial feed line is supposed to be a two-conductor line. The inner conductor is one lead and the outer braid is the other. Unfortunately, the outer braid can be looked at as two conductors—the *inside* and *outside* of the braid. When you physically attach the outer braid to one side of the antenna, you of course have physically attached both the inside and outside of the braid to the antenna. If the outside of the braid happens to be of a certain impe-

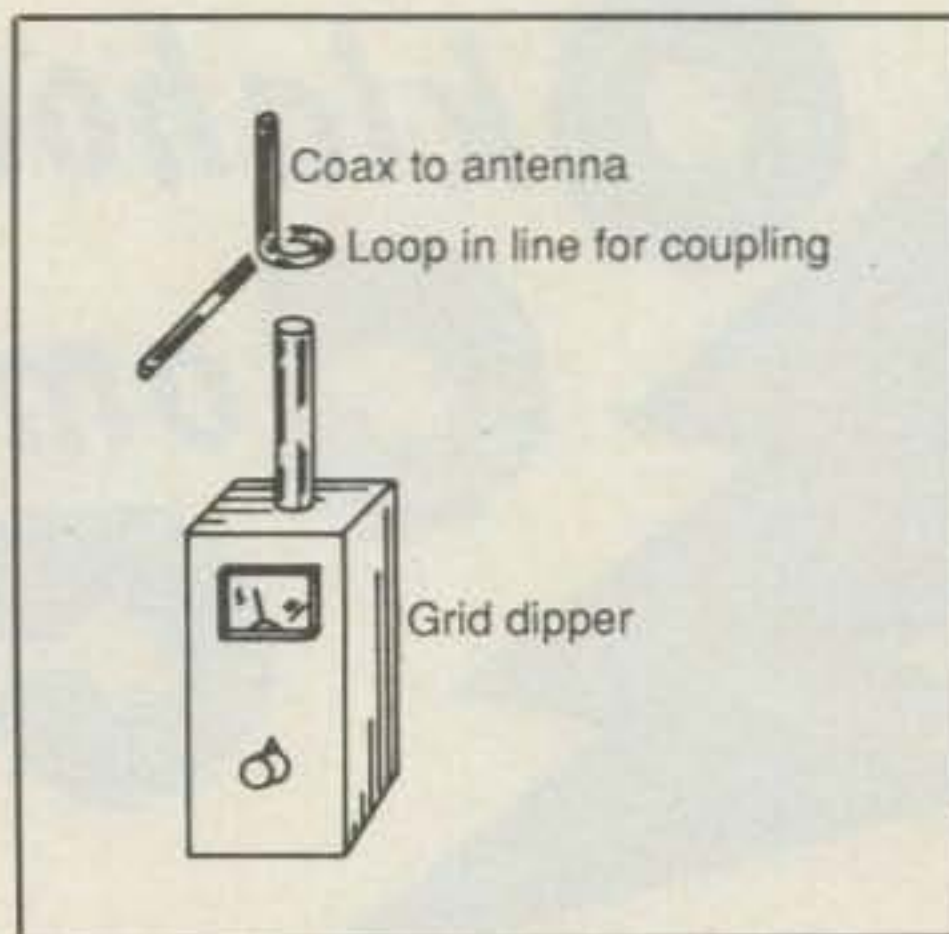


Fig. 1—This shows how I couple the grid dip meter to a loop in the coax. Just laying the grid dip coil alongside the coax does not provide a tight enough coupling. As described in the text, if you find a dip in one of the amateur bands, change the coax length to move the dip out of the band.

dance value (determined by its electrical length), then you will have a difficult time keeping RF from flowing back down the outside of line, causing parallel standing waves and feeder radiation.

You may read or be warned by many "experts" that feed-line radiation can cause TVI or other interference because such radiation is vertically polarized. If they are careful "experts" they will say "can cause" to cover themselves, because quite simply, they could say all vertical antennas "can" cause TVI. In really plain, simple, easy-to-understand language, *any* antenna radiation, horizontal and/or vertical, "can" cause interference. These experts should realize that a TV installation has no respect for vertical or horizontal polarization. The real answer to the problem is that any decent television set should have built-in protection or a high-pass filter

added to stop *any* amateur RF overload.

The reason I emphasize the above is that recently there has been a flood of praise for what are called "current" choke baluns, which are supposed to stop or prevent feeder radiation. I say "supposed to stop," because in many cases they will do a good job, but they are not a cure-all. *No balun is*. Most of these have been described for use with powers up to 150 watts. I made some tests using coaxial line with the shields resonant, via the grid dip meter method, to a 20 meter dipole. I used a good grade of heavy-duty coax (for high power), and I tried different amounts of large ferrite beads installed over the coax line at the feed point of the antenna. In all cases, running 1500 watts test, key down, the beads got too hot to handle, and in several cases they actually shattered. Please understand, this is a worst-case condition with the coax line braid being resonant at the operating frequency.

I might add that if you grid dip your coax, make a small loop of the coax to fit over the coil of your dipper (see fig. 1). This will provide the necessary coupling. Also, *and most important*, the actual electrical length of the line cannot be measured with a measuring tape. The electrical length is the length from the feed point of the antenna, down to your station, through your equipment, and to the point where the line is returned to real earth ground (and we don't know where that is, but the grid dipper will show the resonance). To move the resonance point, I recommend adding coax or changing the length to ground by using a longer ground lead. (Don't, for gosh sakes, prune your coax; it costs too much!) If your beam is multiband be sure to check the other bands, because it may take several changes in length to get the resonance out of each band. You don't have to move the resonance far, as long as it is out of the band.

*Technical Editor, CQ, 200 Idaho St., Silver City, NM 88061

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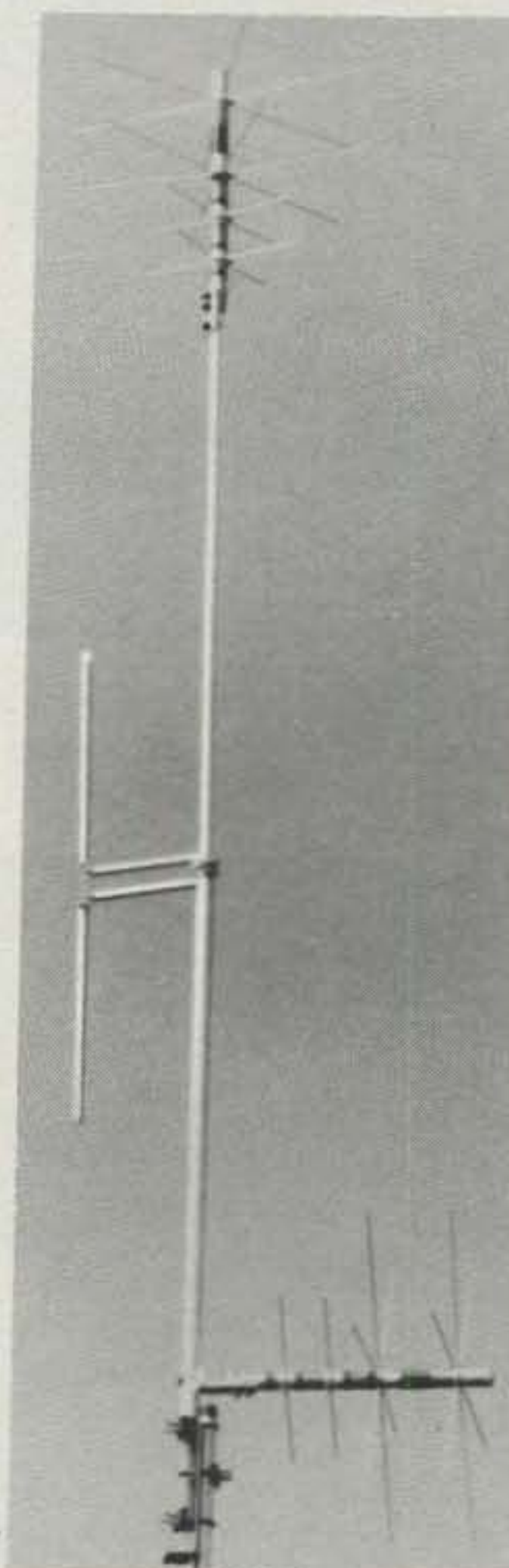
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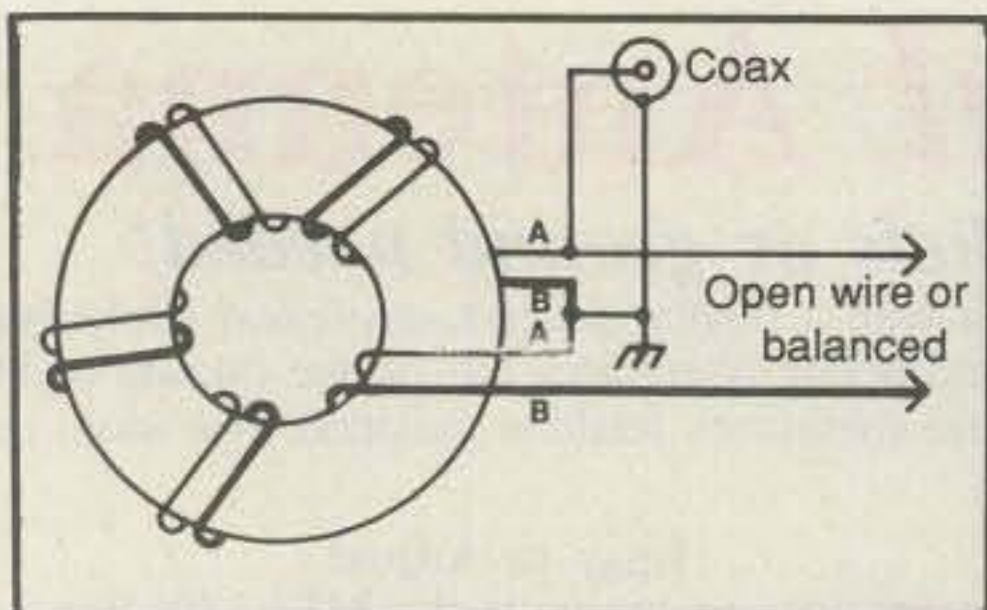
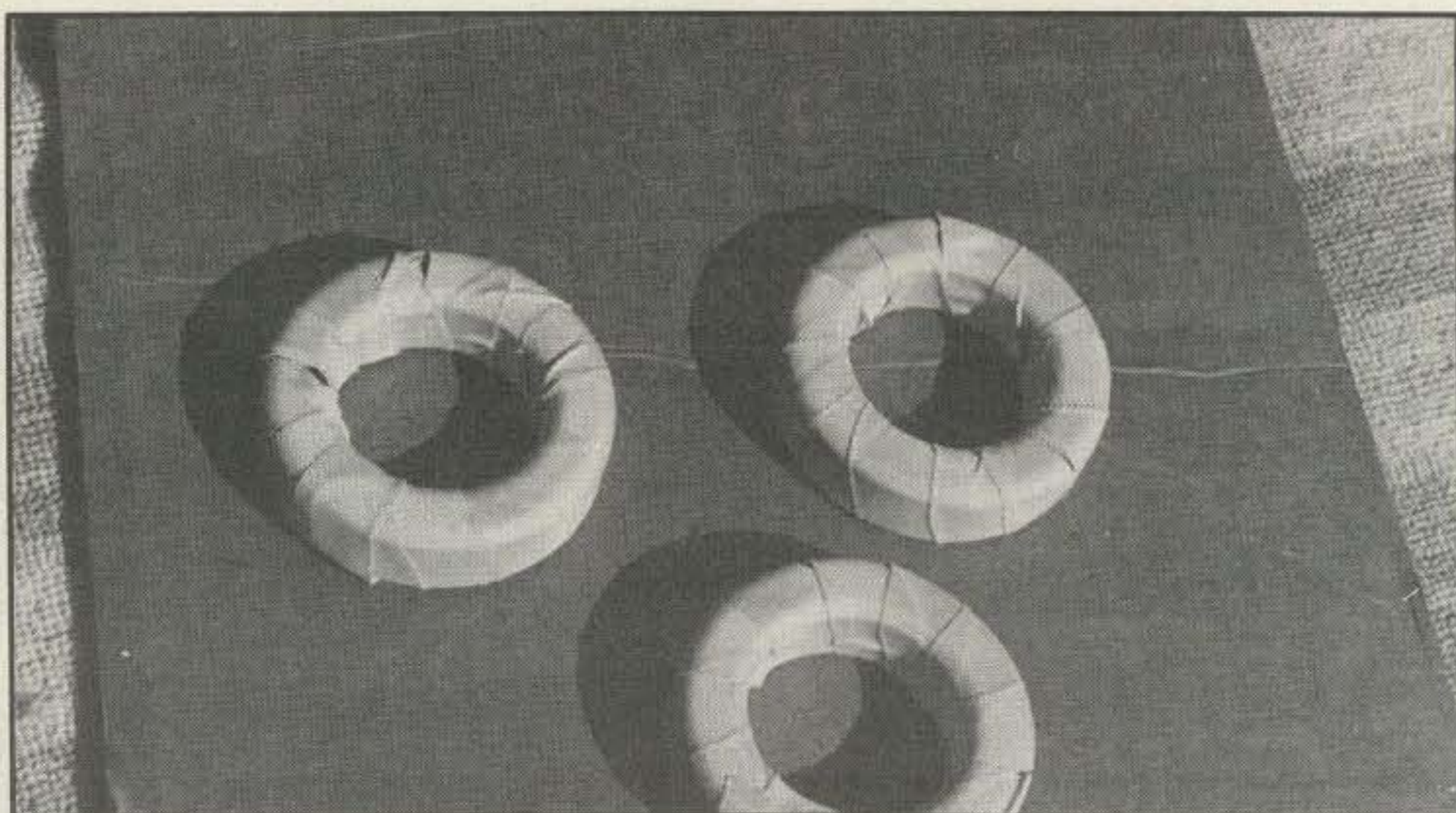


Fig. 2- The 4 to 1 transformer/balun.

There are a couple of other points that should be covered before getting down to coax to open-wire feeder connections. Years ago when I first described the Ultimate Transmatch, I had the problem of going from a circuit that was basically single ended, to a balanced output or line (open-wire or twin-lead feeders). The answer boiled down to using a voltage type of balancing transformer. This is important because over the years arguments have erupted about the ratios, standing-wave matching, and other things. Keep in mind this simple fact: All I wanted was a transformer to go from unbalanced to balanced line. SWR had nothing to do with the design for a very good reason. If you take the composite antenna system load, the antenna plus feeders, the load presented at the Transmatch can be almost any value, as we are not matching that load with the balancing transformer. We are converting this balanced unknown load through the Transmatch to get the load to convert to the unbalanced 50 ohms, the design type of the transmitter or transceiver. The SWR at the balancing transformer is not important. What is important is that the transformer should be able to handle the mismatched currents or voltages. That is point 1.

One other aside here: I mentioned the heating of the current type of balun. The 4 to 1 voltage balun mentioned above, when properly built as described here, just does not "saturate" or overheat, as some people have said. I first made this type of balun in 1957 and have never had problems, and I run the legal limit. It is true that this balun may not be "flat" from 160 through 10 meters, but we are not using it



In Part I we showed the basic kit available from The Wireman. Here are the three powdered iron cores wound with the 3M insulating tape.



I have deliberately left this "open" type construction to show the bifilar windings and the connections to the coax fitting (SO-239 type) and the other two leads connected to the open-wire line. While electrically this would work well, in actual practice the transformer needs to be mounted in a box or case that is weatherproof.

as a matching transformer. Our aim is to get from coax to open-wire line and get as balanced a condition as possible. The cores I used are T-200 type material, and they are not as critical as ferrite, which I would not recommend for this application. Again, I would refer you to Jerry Sevick's excellent book for complete details on

these materials and transformers.

Point 2 is how efficient is this type of balancing transformer in providing balanced output to open-wire line? I know I am being redundant here, but the argument that has erupted over current versus voltage baluns leaves one wondering if the whole thing is a tempest in a teapot. In the first place, and I am speaking now about open-wire feed to a multiband antenna, it is well nigh impossible *not* to have some feeder radiation regardless of the type of transformer used. However, it is important to keep in mind that such radiation is not *lost power*. It is going to go somewhere and probably will work someone for you. (Obviously, with the current balun tests I mentioned above, there is power lost as heat.) As long as pattern distortion is not a problem, and it rarely is with wire multiband antennas, then there should be no concern if there is some feeder radiation.

Since the inception of the Ultimate Transmatch some 30 years ago, manufacturers have used the balun/transformer

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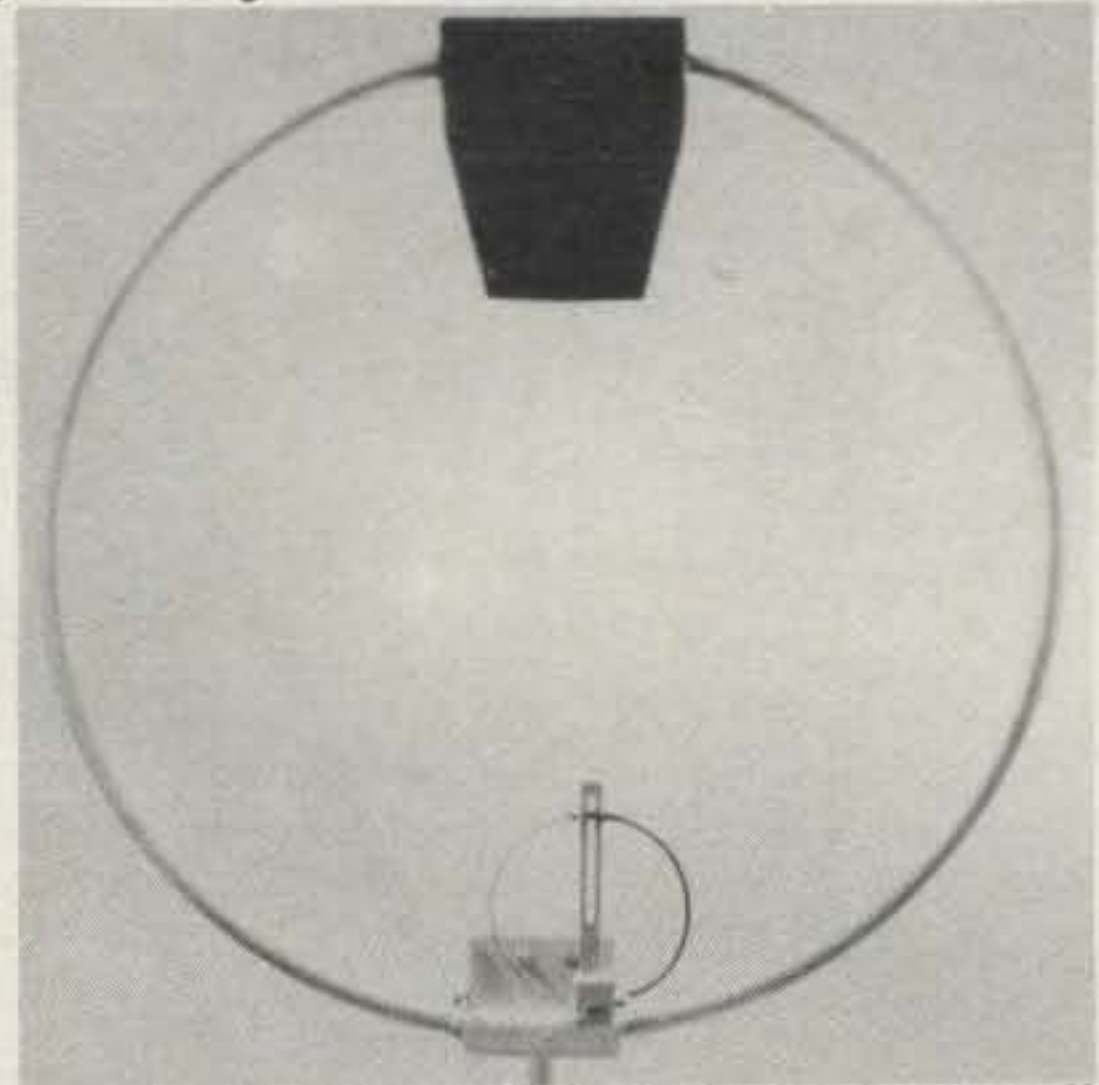
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Round conductor has less RF resistance than flat conductor

The following is quoted from *Electronic and Radio Engineering* by Frederick Terman, 4th edition, page 22: ". . . with a conductor consisting of a thin flat strip, . . . the current flows primarily along the edges, . . . the true or effective resistance will be high

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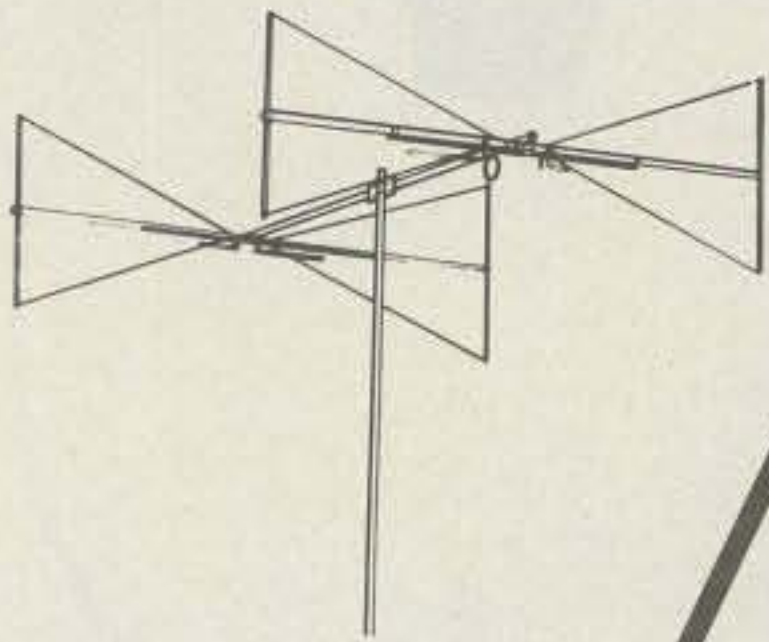
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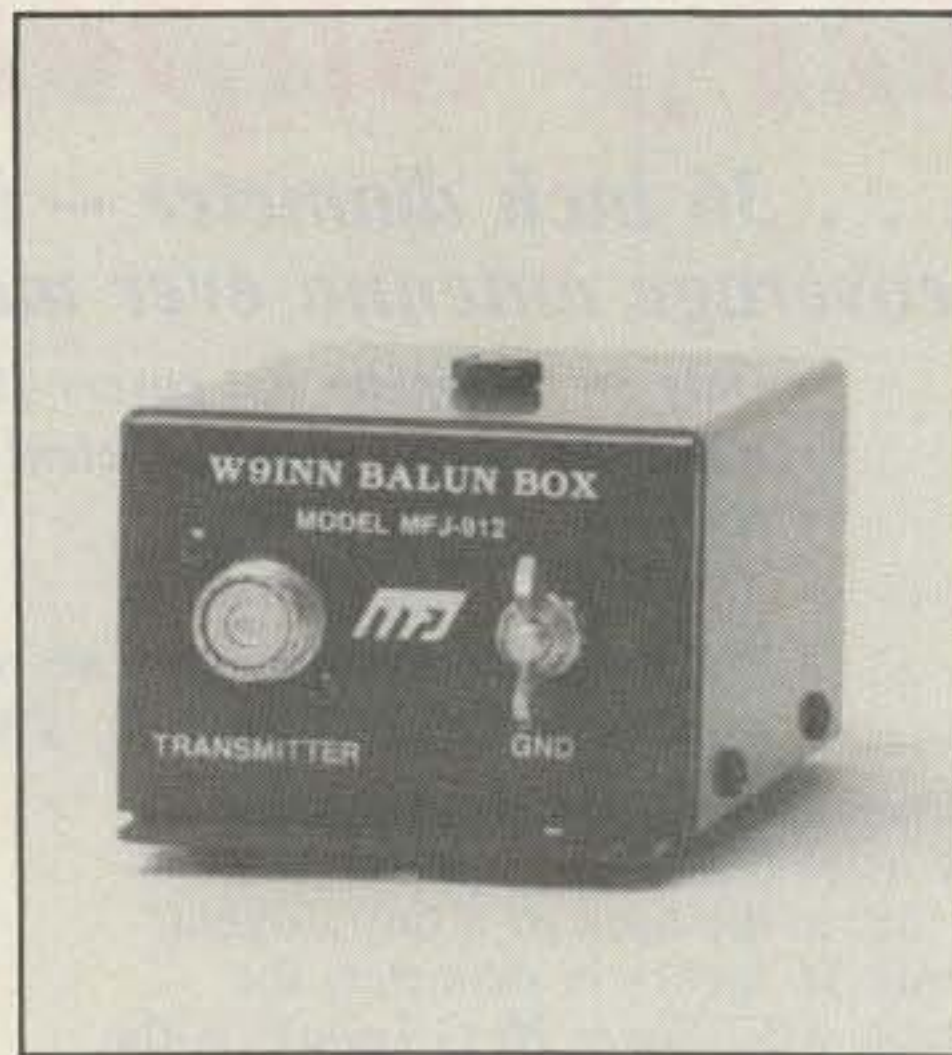
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This is the MFJ-912 four to one open-wire to coax transformer. This is a rugged unit designed to handle big mismatches.

method I described back then in their Transmatch/antenna tuners, and I might add with good success. So since this has worked so well for so many years, I am not about to suggest a change. I am always guilty of using cliches so I have tried to avoid them, but believe me, the old cliche that goes "If it ain't broke, don't fix it" certainly applies here! Fig. 2 is the circuit of this 4 to 1 transformer, and the accompanying photos provide details for constructing the transformer.

The first method of using coax to get outside the shack to open wire consists of using such a balancing transformer. We must come out of the transmitter/transceiver using coax to a Transmatch, then additional coax out to the balancing transformer which converts the system from coaxial line to open-wire line. One important point here: The commonly available built-in antenna tuner used in nearly all modern transceivers *will not* do the job. They simply do not have enough matching range to handle the mismatches encountered with a multiband tuned system. For that matter, in many cases they will not handle an 80 meter trap dipole. A Transmatch that has a wide matching range is needed. If you want to build your own, the handbooks are full of them.

I do not recommend using long runs of coax from the Transmatch out to the transformer. Try to keep the coax length under 25 feet, and by all means use an RG 8/U type, not RG 8X or RG 58, even with just 100 watts output. If you run high power, some very high voltages and currents can be developed and the coax must be able to handle them. Therefore, use a good, high-power type of coax.

There are commercial coax to open-wire line transformers available. The MFJ type is one (see photo). This is an excellent transformer and will easily handle 10 to 1 or higher SWR mismatches. However, for

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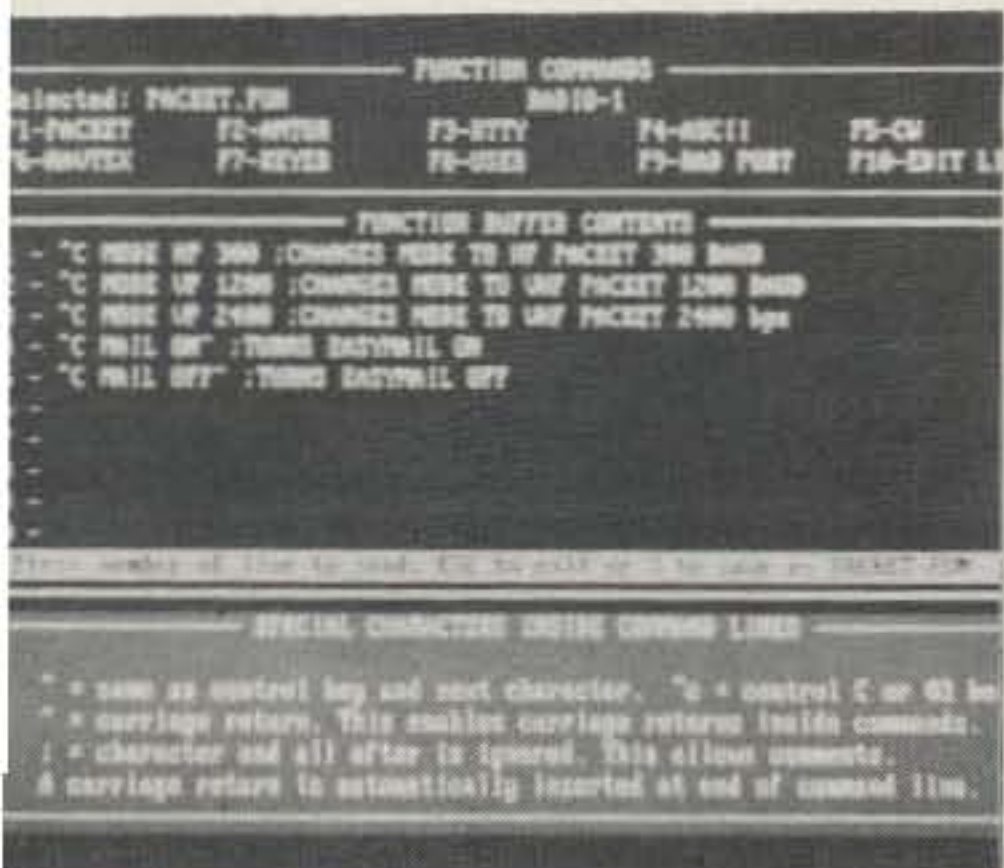
Full Color SSTV picture actually received on 4.230 MHz, using Robot 72 second format. Transmit and receive color and black and white SSTV pictures.



16 Gray Levels WeFAX map actually received on 16.410 MHz. Only MFJ-1278 and MultiCom™ gives you a 16 gray level modem for transmitting and receiving WEFAX, FAX and Color SSTV.



256 Color VGA Packet Picture actually received on packet. Join the fun of packet picture passing. See brilliant full color pictures paint across your screen as they are being received.



Easy and simple . . . MultiCom™ Operation Menu lets you select each mode by pressing a single key. Each mode has 10 user programmable buffers.

New MultiCom™ Terminal Program

MFJ MultiCom™ Starter Pack complete with computer interface cable and instruction. Order MFJ-1289, \$59.95 IBM compatibles, MFJ-1282B, \$39.95 C64/128, MFJ-1290, \$49.95, Amiga MFJ-1287B, \$59.95 Macintosh.

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Solves your wiring headache with the MFJ pre-wired TNC-to-radio cables, \$14.95. TNC/Mic switch allows you to switch between Microphone and MFJ-1278 without disconnecting cables. MFJ-1272B, \$34.95.

Features in this ad uses MFJ-1278 Firmware 3.6, MultiCom™ 2.2 and VGA graphic. Features may vary with other MFJ-1278



16 Gray Levels AP Wire Photo FAX actually received on 20.738 MHz. See tomorrow's news today before it appear in your newspaper.

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MFJ-46A, \$49.95, 32K RAM; MFJ-46B, \$69.95, 128K RAM or MFJ-46C, \$239.95, 512K RAM.

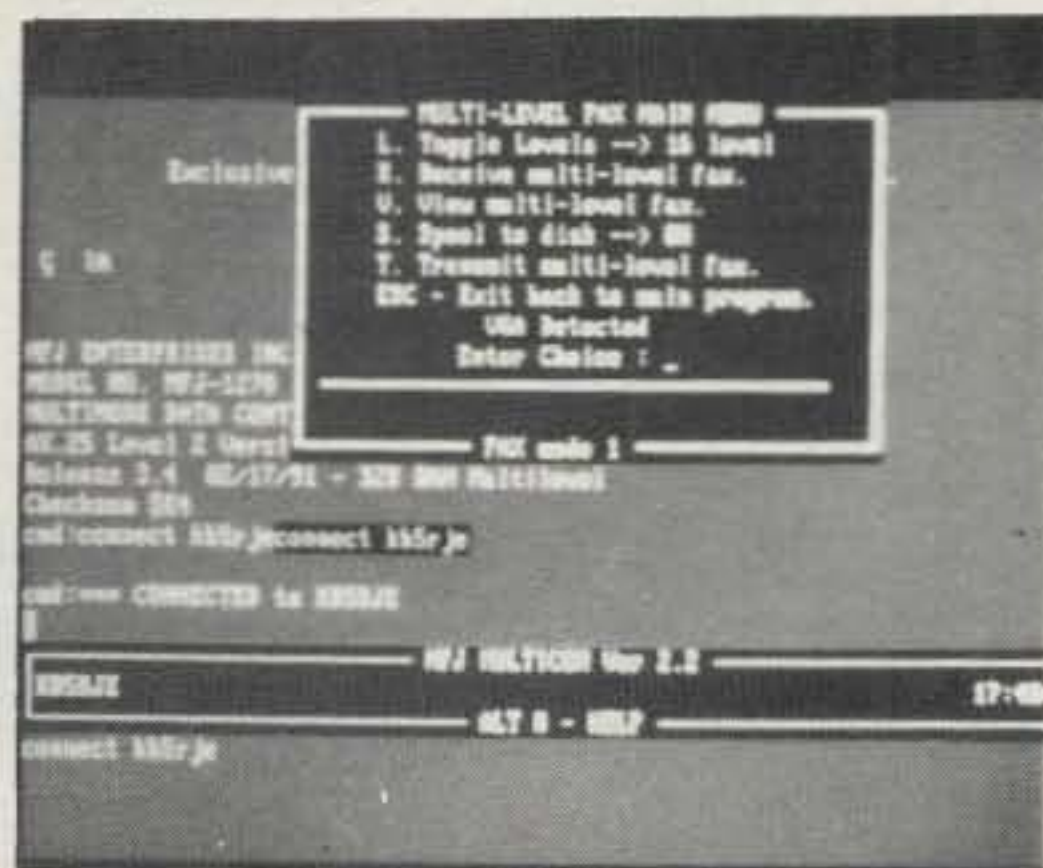
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firmware, terminal program or other graphics system.



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Model P_{in} (W) P_{out} (W) I_c (A) Gain/NF (dB) (13.8 V) Type

50 MHz

0503G	1-5	10-50	6	15/0.6	LPA
0508G	1	170	28	15/0.6	Standard
0508R	1	170	28	+	Repeater
0510G	10	170	25	15/0.6	Standard
0510R	10	170	25	+	Repeater
0550G	5-10	375	60	15/0.6	HPA
0550RH	5-10	375	60	+	Repeater HPA
0552G	25-40	375	55	15/0.6	HPA
0552RH	25-40	375	55	+	Repeater HPA

144 MHz

1403G	1-5	10-50	6	15/0.6	LPA
1406G	25	100	12	15/0.6	Standard
1409G	2	150	25	15/0.6	Standard
1409R	2	150	24	+	Repeater
1410G	10	160	25	15/0.6	Standard
1410R	10	160	24	+	Repeater
1412G	25-45	160	20	15/0.6	Standard
1412R	25-45	160	19	+	Repeater
1450G	5	350	56	15/0.6	HPA
1450RH	5	350	56	+	Repeater HPA
1452G	25	350	50	15/0.6	HPA
1452RH	25	350	50	+	Repeater HPA
1454G	50-100	350	40	15/0.6	HPA
1454RH	50-100	350	40	+	Repeater HPA

220 MHz

2203G	1-5	10-40	6	14/0.7	LPA
2210G	10	130	20	14/0.7	Standard
2210R	10	130	19	+	Repeater
2212G	30	130	16	14/0.7	Standard
2212R	30	130	15	+	Repeater
2250G	5	220	40	14/0.7	HPA
2250RH	5	250	40	+	Repeater HPA
2252G	25	220	36	14/0.7	HPA
2252RH	25	250	36	+	Repeater HPA
2254G	75	220	32	14/0.7	HPA
2254RH	75	250	32	+	Repeater HPA

440 MHz

4403G	1-5	7-25	4	12/1.1	LPA
4410G	10	100	19	12/1.1	Standard
4410R	10	100	18	+	Repeater
4412G	20-30	100	19	12/1.1	Standard
4412R	20-30	100	18	+	Repeater
4448G	5	100	22	12/1.1	HPA
4448R	5	100	22	+	Repeater HPA
4450G	5-10	175	34	12/1.1	HPA
4450RE	5-10	175	34	+	Repeater HPA
4452G	25	175	29	12/1.1	HPA
4452RE	25	175	29	+	Repeater HPA
4454G	75	175	25	12/1.1	HPA
4454RE	75	175	25	+	Repeater HPA



MODEL 1410G
STANDARD



MODEL 1450G
HPA

All amplifiers (non-rptr) are linear, all-mode with fully automatic T/R switching and PTT capability. The receive preamps use GaAs FET devices rated at .5 dB NF with +18 dBm 3rd order IP. LPA, Standard and HPA amps are intermittent duty design suitable for base and mobile operation. Repeater amps are continuous duty, class C.

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RX Preamplifiers

Band	Model	NF (dB)	Gain (dB)	Connector
50 MHz	0520B	.5	25	BNC
50 MHz	0520N	.5	25	N
144 MHz	1420B	.5	24	BNC
144 MHz	1420N	.5	24	N
220 MHz	2220B	.5	22	BNC
220 MHz	2220N	.5	22	N
440 MHz	4420B	.5	18	GNC
440 MHz	4420N	.5	18	N
1.2 GHz	1020B	.9	14	BNC
1.2 GHz	1020N	.9	14	N



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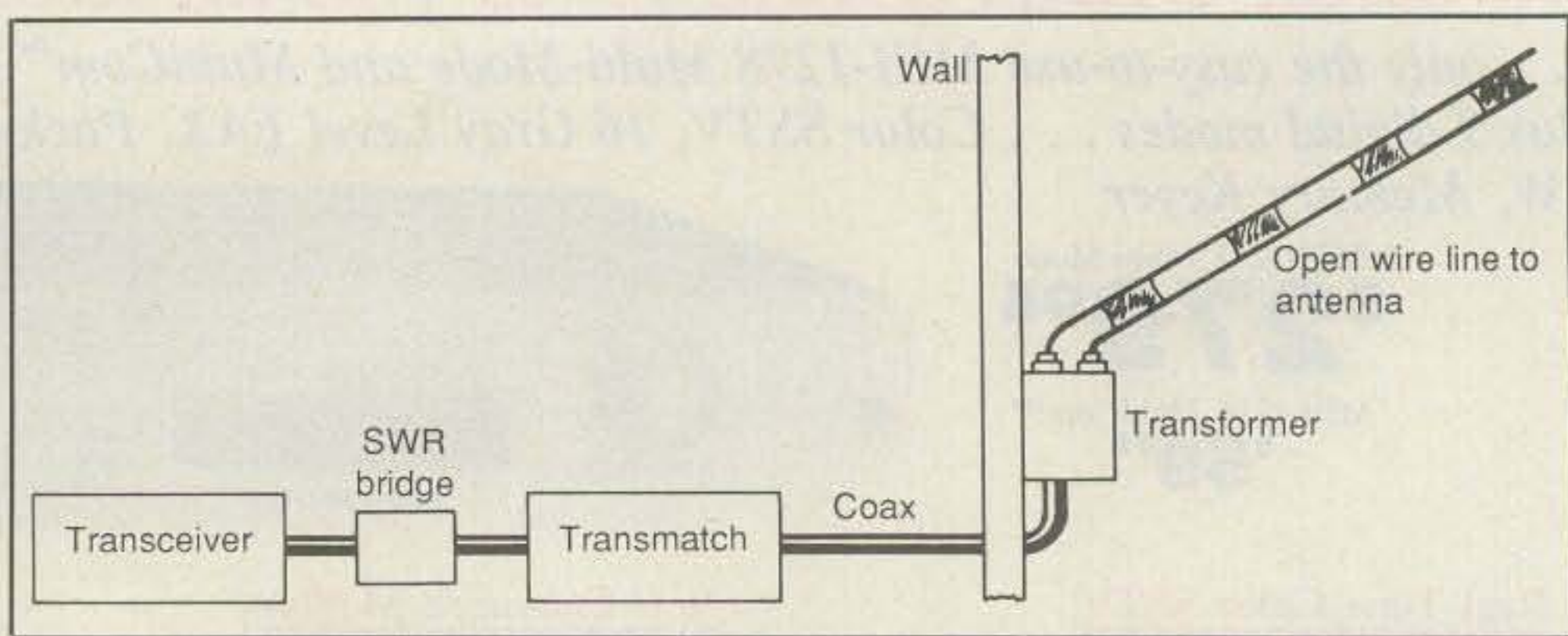


Fig. 3- This shows our goal: to bring the coax through the shack wall (or whatever) out to a transformer and then to the low-loss open-wire line.

those of you who want to roll your own I have shown how to make one in the photos. That way if something goes wrong and you have to blame someone, that someone will be me. The Wireman (see ads in CQ) sells a kit of parts for making the transformers. As I said earlier, don't be concerned about the 4 to 1 ratio, as we are not concerned with SWR here—at least not in the sense most amateurs think of SWR, because this is not a matching transformer. The thing to keep in mind is that we have a transmitter or transceiver that must work into a 50 ohm load, and we must provide this load from an unknown antenna system load. The antenna system load may be very low or very high impedance with lots of reactance, and truly, the balun/transformer is only there to get from an unbalanced to balanced condition; that is all, nothing

more. The Transmatch itself will convert the unknown antenna load to 50 ohms.

In fig. 2 a single T-200 core can be used, with Teflon-covered wire for powers up to a couple of hundred watts. For 1500 watts, key down continuous duty, three stacked cores should be used.

Construction of the transformer is relatively simple. The T-200 core/cores are first wrapped with a layer of the special insulating tape. If you are using the three cores, after each one is taped use a couple of strips of tape to tie the three cores together. Next put the two free ends of the Teflon wire in a vise and draw the two wires taut. I would suggest using some strips of the tape to tape the two conductors together, making a two-conductor wire. Next insert this wire "ribbon" through the cores or core and wind until you have at least 10

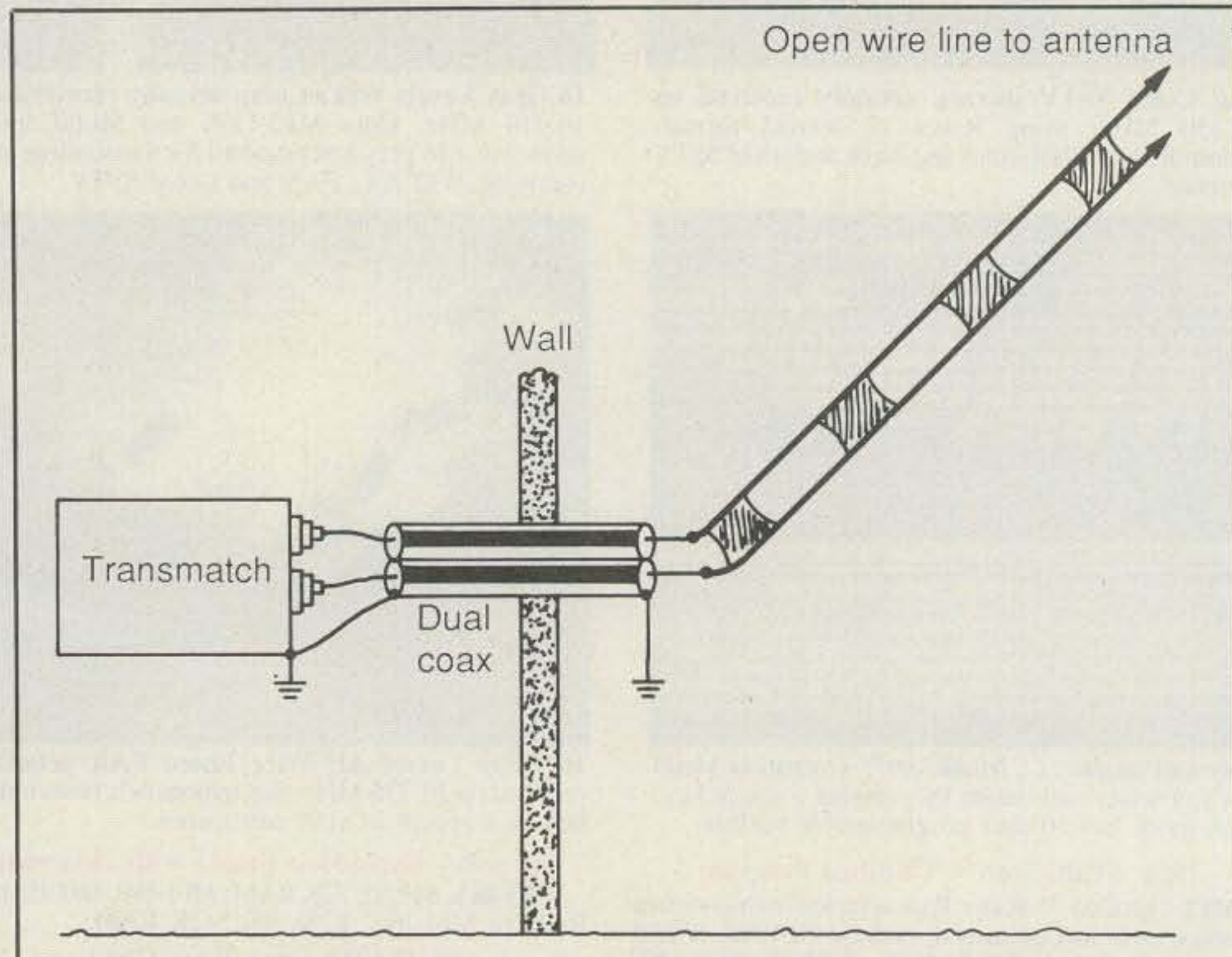


Fig. 4- Here is the second method of using short lengths of coax to get outside the shack. The dual lengths of parallel coax are brought from the balanced output of the Transmatch, out through the wall. At that point, we convert to open-wire line.

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MFJ-422B

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The keyer mounts on a Bencher paddle to form a small (4-1/8 x 2-5/8 x 5/2 inches) attractive combination that is a pleasure to look at and use.

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You can buy just the keyer assembly, MFJ-422BX, for only \$79.95 to mount on your Bencher paddle.

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MFJ-949D is the world's most popular 300 watt PEP tuner. It covers 1.8-30 MHz, gives you a new peak and average reading Cross-Needle SWR/Wattmeter, built-in dummy load, 6 position antenna switch and 4:1 balun -- in a compact 10 x 3 x 7 inch cabinet. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, \$12.95.

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Now you can quickly optimize your antenna for peak performance with this portable, totally self-contained antenna bridge.

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Mount it outdoors away from electrical noise for maximum signal, minimum noise. Covers 50 KHz to 30 MHz.

Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and aux. or active antenna. 6x3x5 in. Remote unit has 54 inch whip, 50 ft. coax and connector. 3x2x4 in. Use 12 VDC or 110 VAC with MFJ-1312, \$12.95.



MFJ-1024

\$129⁹⁵

VHF SWR/Wattmeter



MFJ-812B

\$29⁹⁵

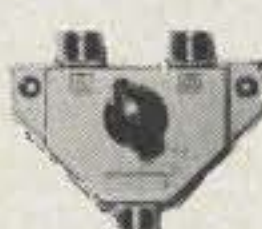
Covers 2 Meters and 220 MHz. 30 or 300 Watt scales. Also reads relative field strength 1-170 MHz and SWR above 14 MHz. 4 1/2 x 2 1/4 x 3 in.

MFJ Coax Antenna Switches



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MFJ-1702B

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MFJ-260B

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MFJ's revolutionary new SWR Analyzers give you a complete picture of your antenna SWR over an entire band -- without a transmitter, SWR meter or any other equipment. Just plug your antenna into the coax connector, set your SWR Analyzer™ to the frequency and read SWR off the meter. You can find your antennas true resonant frequency right at your feedline -- something a noise bridge can't do. Battery operated and handheld sized -- makes it soooooo easy to work on antennas. MFJ-207, 1.8-30 MHz; MFJ-208, 142-156 MHz. 9V battery or 110 VAC with MFJ-1312, \$12.95.

MFJ-207

\$99⁹⁵

MFJ-208

\$89⁹⁵

MFJ Speaker Mics

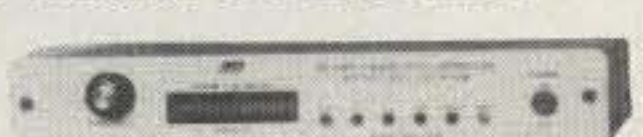
MFJ's compact Speaker/Mics let you carry your HT on your belt and never have to remove it to monitor calls or talk. You get a wide range speaker and first-rate electret mic element for superb audio on transmit and receive. Earphone jack, lapel clip, PTT. MFJ-284 fits ICOM, Yaesu, Alinco. MFJ-286 fits Kenwood. MINIATURE SPEAKER MICS: 2" x 1 1/4" x 1/4". MFJ-285 and MFJ-285L (with "L" connector) fit Icom, Yaesu or Alinco; MFJ-287 or MFJ-287L fit Kenwood; MFJ-283: Split jack Alinco. All features of compact models. One year guarantee.

MFJ-283, 284, 285, 285L, 286, 287 or 287L

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Use computer to transmit/receive in all 9 digital modes: Packet, AMTOR, ASCII, CW, RTTY, FAX, SSTV, Contest Memory Keyer and Navtex receive. Automatic Signal Analysis™ (ASA™), Easy-Mail™, printer port, 20 LED tuning indicator, AC supply, Host, Multi-gray level modem, CW key paddle jack and tons more. Options include 2400 baud modem (MFJ-2400, \$69.95) and software with cables for IBM compatible, Commodore 64/128, Macintosh and VIC-20. MFJ-1278T, \$359.95. MFJ-1278 with 2400 modem built in.



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MFJ-107B

\$9⁹⁵

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turns (10 to 12 turns-are okay). You now have your transformer. It can be mounted on a metal plate or U, with a coax fitting on one side and two terminals on the other side (for the open-wire line). The entire unit can then be mounted on an outside wall, post, or whatever (see fig. 3). When mounted outside, cover the assembly with a plastic freezer box to keep out the rain and snow. The Wireman tells me that they can supply two different kits—high or low power.

As I noted earlier, there are a couple of commercial units sold in which the transformer is already mounted in a case. One in particular is the MFJ-912 W9INN remote transformer, which is identical in circuit to the transformer I described above. This unit uses two cores, but they are larger than the three I specified in the home-built version. They will handle at least 2 kilowatts with mismatches that are very high—10 to 1 or greater. This unit is already in a weatherproof box with mounting screws and terminals.

Remember, it is important that the coax

from the Transmatch in the shack out to the transformer be a high-quality line, RG-8/U type, that will handle 4000 to 5000 RF volts. To repeat: The reason for caution here is that a high SWR can exist on this line between the transformer and Transmatch. A high SWR can cause high voltage or high current to be present, which could cause damage to the coax line. For this reason it is best to keep this coax line as short as possible.

I realize I didn't use a specific number here, but short as possible means just that. I know of some amateurs who have used as much as 50 feet of coax, but I think this is begging for trouble. Keep in mind that a high SWR is likely to exist on this coax into the Transmatch. For example, an 80 meter dipole, 130 feet long, center fed with open-wire line, is likely to have an SWR of 10 to 1 or higher appearing on the line. This mismatch also appears across the transformer and then goes on to the 50 ohm coax. The Transmatch in the station converts the mismatch to a pure 50 ohm match, but there still can be high voltages

and currents on this coax, so keep it as short as possible.

Tune up is simple. With the system all connected and an SWR indicator in the line between the transmitter and Transmatch, apply enough power to obtain a reflected reading on the SWR bridge. Next adjust the Transmatch for a null or match as indicated by the SWR bridge. You can then bring up your power to the desired level.

The second system does not require an external balun/transformer at all. Use the one that is built into the Transmatch. Use two equal lengths of coax to get from the balanced line output of the Transmatch, to a point outside the house, to the open-wire line (see fig. 4). The coax is run together and the two inner conductors will be your section of feed line. The coax shield is connected together at each end (soldered). The coax feeders at the Transmatch end are connected to the balanced output terminals on the Transmatch. (In this case, the balun/transformer is already built into your Transmatch; just about all commercial units have them.) The coax leads at the outside point are connected (soldered) to the open-wire conductors, and the shields are connected to earth ground.

Wait! I know what you are going to say. What about the impedance of the open-wire feeders (450 ohms) being connected to the parallel coaxial feeders (100 ohms)? Isn't this a bad mismatch? It is a mismatch, but *it is of no importance in this case*. The coaxial section is a balanced line, and there can be no radiation from it (not only that, it is shielded). The difference in line impedance does not matter, because we are matching or adjusting a *complete* and complex antenna system load via the Transmatch.

We could, if we wanted to, make a transmission line of combination impedances—say, 300 ohm line, 450 ohm line, 600 ohm line, etc.—as long as both conductors in each line are perfectly equal in length. In theory, the radiation from one conductor cancels the radiation from the other, so the line doesn't radiate. If that is true, our only problem is one of matching this completely unknown load back to 50 ohms at the transmitter—and that is what we do. We adjust the Transmatch as described earlier. Remember, though, as I mentioned earlier, to keep the dual coax lines as short as possible. The same or similar high voltages/currents we mentioned earlier can exist here.

While I have written this article telling you what you can do, it is not what I do. I don't care if the open-wire line comes into the shack. Although I have thoroughly tested both methods, as I stated at the outset, I bring my open-wire line in along with several coax lines through a section of PVC pipe and then up to the Transmatch. Sometimes, however, amateurs like the idea of bringing coax all the way in (also it may keep their wives happy), so be my guest!

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2:1-HDU50	50:22.22-OHMS	\$50.00	6:1-HB300	300:50-OHMS	\$120.00
	50:25-OHMS		9:1-HB450	450:50-OHMS	\$150.00
2.25:1-HU112.5	112.5:50-OHMS	\$45.00	2.25:1-HB112.5	112.5:50-OHMS	\$120.00
2:1-HU100	100:50-OHMS	\$45.00	4:1-HB50	50:12.5-OHMS	\$55.00
2:1-HDU100	112.5:50-OHMS	\$50.00			
	100:50-OHMS				
1.78:1-HU50	50:28-OHMS	\$45.00			
1.5:1-HU50	50:32-OHMS	\$45.00			
1.5:1-HU75	75:50-OHMS	\$45.00			
4:1-HRU50	50:12.5-OHMS	\$50.00			
4:1-HCU50	50:12.5-OHMS	\$50.00			
9:1-HRU50	50:5.56-OHMS	\$50.00			
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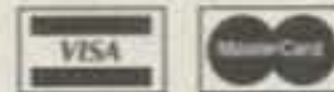
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MFJ TNCs for VHF/HF Packet

MFJ-1270B super TAPR TNC clone has a world wide reputation as *the most reliable packet TNC in the world!* Thousands used as digipeaters, nodes, BBS and in all kinds of commercial applications working 24 hours a day — many work for years without a single failure . . .

NEW ENHANCED MAILBOX

- Expandable 32K, 128K or 512K
- Separate callsign for mailbox
- Mailbox stays on during packet connects
- Auto forwarding and reverse mail forwarding
- Remote Sysop access, Sysop paging
- Chat mode, mailbox C-text
- "Has mail" LED indicator

The MFJ-1270B super TAPR TNC clone has a world wide reputation as *the most reliable TNC in the world!*

Thousands are dedicated as digipeaters, nodes, BBS and used in all kinds of commercial applications working 24 hours a day — many work for years without a single failure.

The Most for Your Money

The widely acclaimed MFJ-1270B may not be the cheapest TNC, but it gives you the most for your money. You get features that others just don't have. See for yourself . . .

Fully TAPR TNC-2 Compatible

You get full TAPR TNC-2 compatibility — all software and hardware designed for the TAPR TNC-2 standard works without modification.

You get Net Rom compatibility that turns your MFJ-1270B into a Layer Three and Four networking node and Rose Switch compatibility that gives you another networking option.

VHF and HF operation

You get high performance VHF and HF modems as standard equipment — lets you double your fun on packet.

You get a true DCD circuit that dramatically reduces sensitivity to noise and dramatically increases completed QSOs.

FREE AC Power Supply

You get a free 110 VAC power supply at no extra cost. With other brands, the AC power supply could cost you an extra \$20.95.

New enhanced Personal Mailbox

The enhanced Easy Mail™ personal mailbox lets you use a dedicated call-sign for your mailbox. Now your mailbox can stay on while you operate packet. This new mailbox will also auto forward or reverse forward mail to and from other BBS. Plus, the "has mail" LED blinks when you have



NEW LOWER PRICES!

MFJ-1270B
\$119⁹⁵

MFJ-1274, with HF tuning indicator
\$139⁹⁵

mail. More features: remote Sysop access, sysop paging, mailbox C-text, chat mode and many other features not available in other TNCs or multimodes. The MFJ TNC mailbox memory is expandable to 32K, 128K, 512K.

WeFAX gives you Weather Maps

You get a WeFAX mode that lets you print full fledged weather maps from your HF radio to screen or printer or save to disk using an MFJ Starter Pack.

2400 or 9600 Baud Modem simply plugs in

You can add MFJ's optional internal 2400 baud or 9600 baud modem just by plugging it in and making a few simple connections.

KISS interface and MFJ Host Mode

You get a KISS interface that lets you run TCP/IP and MYSYS and MFJ's Host Mode that makes it easy to write efficient application programs.

MFJ Anti-Collision™ Technology

You get MFJ's Anti-Collision™ technology (Prioritized Acknowledgement) that prevents packet collisions to improve performance on busy channels.

Plus more . . .

You also get 32K RAM, IC sockets for easy service, true DCD for HF, 256K ROM, speaker jack, lithium battery backup, RS-232 and TTL serial ports, radio cable (you have to add a connector for your particular radio), Fast-Start™ Manual plus much more. Use 12 VDC or 110 VAC. 9½x1½x7½ inches.

One Year Unconditional Guarantee

You get MFJ's famous *No Matter What™* one year unconditional guarantee.

Enjoy Packet for a long, long time

If you want a packet TNC that'll work 24 hours a day without failure — one that has more features than any other — get the ultra reliable MFJ-1270B today and enjoy packet for a long, long time.

TNC with built-in HF Tuning Indicator
MFJ-1274, \$139.95. Same TNC as MFJ-1270B but has precision tuning indicator for HF packet — makes operating HF a pleasure. Just tune your radio to center single LED and you're precisely tuned in to within 10 Hz — and it shows you which way to tune!

New 2400 baud Turbo TNCs

MFJ-1270BT, \$209.95 and MFJ-1274T, \$229.95 have built-in fast 2400 baud modem. Lets you operate 300, 1200 and 2400 baud packet.

ACCESSORIES for TNCs

MFJ Starter Packs

An MFJ Starter Pack, \$24.95, gets you on the air instantly. You get interface cable, software on disk and instructions — just plug it all in and start enjoying packet. Order MFJ-1284 for IBM or compatibles, MFJ-1282 for Commodore 64/128 or MFJ-1287 for Macintosh. For VIC-20 or C64/128 with tape drive use MFJ-1283, \$24.95.

Mailbox Memory Expansion Board

For all MFJ TNCs. MFJ-47A, \$49.95, 32K RAM; MFJ-47B, \$69.95, 128K RAM; MFJ-47C, \$239.95, 512K RAM. Complete with Firmware.

MFJ TNC Real Time Clock

MFJ-43, \$29.95. Ends frustration of setting TNC clock everytime you turn it on. Maintains correct time even when TNC is turned off. Plugs into RAM socket. Works with MFJ TNCs and TAPR TNC clones.

MFJ TNC Firmware Upgrade Release 1.2.9

New firmware features enhanced mailbox and supports expandable mailbox up to 512K. MFJ-40C, \$24.95.

MFJ 2400 and 9600 Baud Modems

MFJ-2400, \$89.95. Operates 300, 1200 and 2400 baud packet. Works with any radio. MFJ-9600, \$109.95. G3RUH compatible 9600 baud modem. Not all radios compatible with 9600 baud. Both plug in MFJ TNCs and MFJ-1278 for easy installation.

MFJ's new TNC/Mic Switch . . . lets you switch between your TNC or microphone by pushing a button!

The MFJ-1272B is the most popular TNC/multimode accessory in ham radio! Why? Because you can switch between your microphone and packet TNC or multimode by pushing a button.

You won't have to unplug your microphone and plug in your TNC everytime you want to work packet or other digital modes.



Just plug the pre-wired cables into your rig's microphone connector and into your TNC and you're ready to go — no more hunting for hard-to-find connectors and wiring up complicated cables.

Works with HF, VHF and UHF radios with 8 pin mic connectors — including Kenwood, ICOM, Yaesu, Alinco and others.

Plug-in jumpers let you quickly set-up for virtually any radio. Factory set for Kenwood and Alinco. Includes easy to follow instructions. Has audio-in and speaker jacks. 3-¼ x 1-¼ x 4 inches.

MFJ-1272B, \$34.95, for MFJ TNC/multimodes and TAPR TNC-2 clones.

MFJ-1272BX, \$39.95, wired with connector for PK-232.

MFJ-1272BYV, \$39.95, wired with connector for KAM, VHF Port.

MFJ-1272BYH, \$39.95, wired with connector for KAM, HF Port.

MFJ-1272BZ, \$39.95, wired with connector for PK-88.

Pre-wired Radio-to-TNC cables . . . \$14⁹⁵

	All MFJ	PK-232™	PK-88™	KAM™
Icom/Yaesu HTs	MFJ-5024	MFJ-5024X	MFJ-5024Z	MFJ-5024YV
Kenwood HTs	MFJ-5026	MFJ-5026X	MFJ-5026Z	MFJ-5026YV
Yaesu 8 pin radios	MFJ-5080	MFJ-5080X	MFJ-5080Z	MFJ-5080YV* MFJ-5080YH*
Icom 8 pin radios	MFJ-5084	MFJ-5084X	MFJ-5084Z	MFJ-5084YV* MFJ-5084YH*
Kenwood/Alinco 8 pin radios	MFJ-5086	MFJ-5086X	MFJ-5086Z	MFJ-5086YV* MFJ-5086YH*

1 does not include IC-W2A 2 does not include 2500 3 does not include 25A & 255A
4 YV models connect VHF port of KAM. YH models connect HF port of KAM

MFJ-5082, \$9.95, open end cable with 8-pin microphone connector
MFJ-5224, \$9.95, open end cable for Icom/Yaesu handholds
MFJ-5226, \$9.95, open end cable for Kenwood handholds
MFJ-5268, \$7.95, open end cable with 8-pin modular telephone plug for Yaesu FT-2400H, Kenwood TM641A, TM714A, TM732A

MFJ-1271 turns your Commodore 64/128 into full featured packet TNC!

Just plug in this MFJ-1271 modem and boot up the public domain Digicom/64 software (not included) to enjoy VHF or HF packet at 1200 and 300 bauds.

You get a high performance modem featuring true DCD circuit with adjustable threshold. DCD detect LED tells you when you're receiving a good signal. Plugs into cassette port and uses 12 VDC or 110 VAC with MFJ-1312, \$12.95.

MFJ-1271
\$49⁹⁵



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The 36th Annual CQ World-Wide WPX Contest

SSB: March 27–28, 1993

CW: May 29–30, 1993

Starts: 0000 GMT Saturday

Ends: 2400 GMT Sunday

I. Contest Period: Only 36 hours of the 48 hour contest period permitted for Single Operator stations. **Off periods must be a minimum of 60 minutes in length and clearly marked in the log.** Multi-operator stations may operate the full 48 hours.

II. Objective: Object of the contest is for amateurs around the world to contact as many amateurs in other parts of the world as possible during the contest period.

III. Bands: The 1.8, 3.5, 7, 14, 21, and 28 MHz bands may be used. No WARC bands.

IV. Type of Competition:

1. Single Operator (Single band and All Band)

(a) Single operator stations are those at which one person performs all of the operating, logging, and spotting functions. **Only one signal is allowed at any one time. The use of DX spotting nets or any other form of DX alerting assistance places the station in the multi-single category.**

(b) **Low Power:** Same as 1(a) except that **output power shall not exceed 100 watts.** Stations in this category will compete with other low-power stations only.

(c) **QRP/p:** Same as 1(a) except that **output power shall not exceed 5 watts.** Stations in this category will compete with other QRP/p stations only.

2. Multi-Operator (All band operation only)

(a) **Single Transmitter:** Only one transmitter and one band permitted during the same time period (defined as 10 minutes).

(b) **Multi-Transmitter:** No limit to transmitters, but only one signal and running station allowed per band. **NOTE:** All transmitters must be located within a 500 meter diameter or within property limits of the station licensee's address, whichever is greater. All antennas must be physically connected by wires to the transmitters and receivers.

V. Exchange: RS(T) report plus a progressive three-digit contact number

starting with 001 for the first contact. (Continue to four digits if past 1000.) Multi-transmitter stations use separate numbers for each band.

VI. Points:

A. Contacts between stations on different continents are worth three (3) points on 28, 21, and 14 MHz and six (6) points on 7, 3.5, and 1.8 MHz.

B. Contacts between stations on the same continent but different countries are worth one (1) point on 28, 21, and 14 MHz, and two (2) points on 7, 3.5, and 1.8 MHz. **Exception: For North American stations only—contacts between stations within the North American boundaries count as two (2) points on 28, 21, and 14 MHz and four (4) points on 7, 3.5, and 1.8 MHz.**

C. Contacts between stations in the same country are permitted for multiplier credit but have zero (0) point value.

VII. Multiplier: The multiplier is the number of different prefixes worked. A "PREFIX" is counted only once regardless of the number of times the same prefix is worked.

A. The letter/numeral combinations which form the first part of the amateur call will be considered the prefix. Examples: N8, W8, Y22, Y23, WD8, HG1, HG19, WB2, WB200, KC2, KC200, OE2, OE25, U3, GB75, ZS66, NG84, etc. Any difference in the numbering, lettering, or order of same shall constitute a separate prefix. A station operating from a DXCC country different from that indicated by its callsign is required to sign portable. The portable prefix must be an authorized prefix of the country or call area of operation. In cases of portable operation, the portable designator would then become the prefix. Example: N8BJQ operating from Wake Is. would sign N8BJQ/KH9 or KH9/N8BJQ, and KH6XXX operating from Ohio would not sign /KH8 which is normally assigned to American Samoa, but could sign /W8, /N8, /K8, etc., or any other prefix authorized for use in the US 8th

district. Portable designators without numbers will be assigned a zero (0) after the second letter of the designator to form the prefix. Example: N8BJQ/PA would become PA0. All calls without numbers will be assigned a zero (0) after the first two letters to form the prefix. Example: XEFTJW would count as XE0, RAEM would count as RA0, etc. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

B. Special event, commemorative, and other unique prefix stations are encouraged to participate.

VIII. Scoring: 1. Single Operator (a) All Band score, total QSO points from all bands multiplied by the number of different Prefixes worked. (b) Single Band score, QSO points on the band multiplied by the number of different Prefixes worked. See VII.

2. Multi-Operated stations. Scoring in both these categories is the same as the All Band scoring for Single Operator.

3. A station may be worked once on each band for QSO point credit. However, **prefix credit can be taken only once** regardless of the number of different bands on which the same station and/or prefix has been worked during the entire contest.

IX. QRPp Section: (Single Operator Only). Output power must not exceed 5 watts. **You must denote QRPp on the summary sheet and state the actual maximum output power used for all claimed contacts.** Results will be listed in a separate QRPp section and certificates will be awarded to each top scoring QRPp station in the order indicated in Section XI. These certificates will be marked QRPp and will show your power output. QRPp stations will be competing only with other QRPp stations for awards. All other information contained in these rules is applicable to this section.

X. Low Power Section (Single Operator Only): Output power must not exceed 100

watts. **You must state the actual output power used for all claimed contacts on the summary sheet.**

XI. Awards: Certificates will be awarded to the highest scoring station in each category listed under Section IV.

1. In every participating country.

2. In each call area of the United States, Canada, Australia, and Asiatic USSR.

All scores will be published. However, to be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must show a minimum of 24 hours.

A single band log is eligible for a single award **only**. If a log contains more than one band, it will be judged as an all band entry, unless specified otherwise. However, a 12 hour minimum is required on the single band.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

XII. Trophies, Plaques and Donors: **SSB**

Single Operator, All Band

WORLD - Stanley Cohen, WD8QDQ

U.S.A. - Atilano de Oms, PY5EG

EUROPE - Jim Hoffman, N5FA

SO. AMERICA - Ron Moorefield, W8ILC

OCEANIA - Phillip Fraizer, K6ZM Memorial

AFRICA - Peter Sprengel, PY5CC

*JAPAN - The DX Family Foundation

WORLD QRPp - Dayton A.R.A.

USA QRPp - Doug Zwiebel, KR2Q

Single Operator, Single Band

WORLD - John N. Reichert, N4RV

WORLD 7 MHz - William D. Johnson, KV0Q

EUROPE - Myron E. Crofoot, WB4VQO

OCEANIA - D. Craig Boyer, AH9B

U.S.A. 3.7 MHz - Lance Johnson Engineering

U.S.A. 7 MHz - Lewis W. Sayre, N7AVK

U.S.A. 21 MHz - Bernie Welch, W8IMZ Memorial

U.S.A. 28 MHz - Novice/Tech. only - Jon Engelhardt, KA0ZFX

Multi-Operator, Single Xmtr.

U.S.A. - Oklahoma Comm Center

Multi-Operator, Multi-Xmtr.

WORLD - Prince Georges Zulu Radio Club

NORTH AMERICA - James Dixon, NL7HI (Burt Curwen, KL7IRT Memorial)

U.S.A. - Glenn Tracey, KC3EK

Contest Expedition

WORLD - Kansas City DX Club

•••

CW

Single Operator, All Band

WORLD - Terry Baxter, N6CW

U.S.A. - Steve Bolia, N8BJQ

OCEANIA - Tom Morton, KT6V

CANADA - Canadian Amateur Radio Federation (C.A.R.F.)

*JAPAN - The DX Family Foundation

Single Operator, Single Band

WORLD - Pedro Piza, Jr., NP4A

(Pedro Piza, Sr., KP4ES Memorial)

WORLD 7 MHz - William D. Johnson, KV0Q

WORLD 3.5 MHz - Lance Johnson Eng.

OCEANIA - D. Craig Boyer, AH9B

U.S.A. - Kansas City DX Club

U.S.A. 28 MHz - Walt Smith, K1DWQ

(Bernie Welch, W8IMZ Memorial)

U.S.A. 21 MHz - Wayne Carroll, W4MPY

U.S.A. 14 MHz - Gene Walsh, N2AA

Multi-Operator, Single Xmtr.

WORLD - Ron Blake, N4KE

U.S.A. - Austin Regal, N4WW

Multi-Operator, Multi-Xmtr.

WORLD - Roger Burt, N4ZC

Contest Expedition

WORLD - Ed Roller, K4IA

•••

Combined SSB/CW

WORLD - SINGLE OP, ALL BAND - Al Slater,

G3FXB Memorial

EUROPE - SINGLE OP, ALL BAND - Les

Nouvelles DX Group

U.S.A. - SINGLE OP, ALL BAND - Oklahoma

Comm Center

Club (SSB & CW)

WORLD - CQ Magazine

U.S.A. - Oklahoma DX Assn.

**Donor is responsible for this trophy.*

A station winning a World Trophy will not be considered for a sub-area award. That Trophy will be awarded to the runner-up for that area if the returns justify the award.

XII. Club Competition: A trophy will be awarded each year to the club or group that has the highest aggregate score from logs submitted by members. The club must be a local group and not a national organization. Participation is limited to members operating within a local geographical area. (**Exception: DXpeditions especially organized for operation in the contest and manned by members.**) Indicate your club affiliation. To be eligible for an award, a minimum of three logs must be received from a club.

XIII. Log Instructions: 1. All times must be in GMT. All breaks must be clearly marked. Single operator and multi-single logs must be submitted in chronological order. Multi-multi logs must be submitted chronologically by band.

2. Prefix multipliers should be entered only the FIRST TIME they are contacted.

3. Logs must be checked for duplicate contacts, correct points, and prefix multipliers. Duplicate contacts must be clearly shown. Computerized logs must be checked for typing accuracy. Original logs may be requested if further cross-checking is required.

4. An alpha/numeric check list of claimed PREFIX multipliers must be submitted with your log.

5. Each entry must be accompanied by a Summary Sheet listing all scoring information, the category of competition, and the contestant's name and mailing address in BLOCK LETTERS.

Also submit a signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

6. Official log and sample summary sheets are available from CQ. A large self-addressed envelope with sufficient postage or IRCs must accompany your request.

If official forms are not available, you can make your own.

7. Contest logs may be submitted on disk. Logs submitted on disk must contain all required information (Time, Band, Call, RST & NR Sent, RST & NR Rcvd, Multiplier, and QSO Points). Files must be in ASCII format and in chronological order for single operator and multi-single entrants. Multi-multi entrants should submit logs chronologically by band. Other file formats (.bin, .res, .dbf, .wks) are acceptable. A sorted multiplier file is also required. Only MS-DOS compatible disks will be accepted (either 5 1/4 or 3 1/2 inch). A written summary sheet must accompany the disk, showing all required scoring information, the category of competition, off times, and the normal signed declaration, as well as your name, address, and a phone or FAX number where you can be reached. The original log may be requested for cross-checking.

XIV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSO's or multipliers will be deemed sufficient cause for disqualification. (Incorrectly logged calls will be counted as unverifiable contacts.) An entrant whose log is deemed by the WPX Contest Committee to contain a large number of errors may be disqualified as a participant operator or station for a period of one year. If within a 5 year period the operator is disqualified a second time, he will be declared ineligible for any CQ contest awards for a 3 year period. The use of non-amateur means to solicit contacts during the contest period is considered unsportsmanlike and will result in disqualification of the entry. Actions and decisions of the CQ WPX Contest Committee are official and final.

XV. Deadline: All entries must be post-marked no later than **May 10, 1993** for the SSB section and **July 10, 1993** for the CW section. **Indicate SSB or CW on the envelope. One extension of up to 30 days, for legitimate reasons, may be granted if requested from the contest director. Logs postmarked after the deadline or extension deadline, if granted, may be listed in the results, but will be ineligible for any awards.**

All logs go to: CQ Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 U.S.A.

Questions pertaining to the WPX Contest can be sent to: WPX Contest Director, Steve Bolia, N8BJQ, 4121 Gardenview Dr., Beavercreek, OH 45431 U.S.A., or via packet to the following: N8BJQ @W8BI.OH.U.S.A.NA.

Please remember to send in early for the WPX Contest Logs and Summary Sheets.

ASTRON POWER SUPPLIES

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MODEL VS-50M

SPECIAL FEATURES

- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-3A, RS-4A, RS-5A, RS-4L, RS-5L
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD except for RS-3A
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS

- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- All units available in 220 VAC input voltage (except for SL-11A)

SL SERIES



• LOW PROFILE POWER SUPPLY

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
SL-11A	•	•	7	11	2 ⁵ / ₈ x 7 ⁵ / ₈ x 9 ³ / ₄	12
SL-11R	•	•	7	11	2 ⁵ / ₈ x 7 x 9 ³ / ₄	12
SL-11S	•	•	7	11	2 ⁵ / ₈ x 7 ⁵ / ₈ x 9 ³ / ₄	12
SL-11R-RA	•	•	7	11	4 ³ / ₄ x 7 x 9 ³ / ₄	13

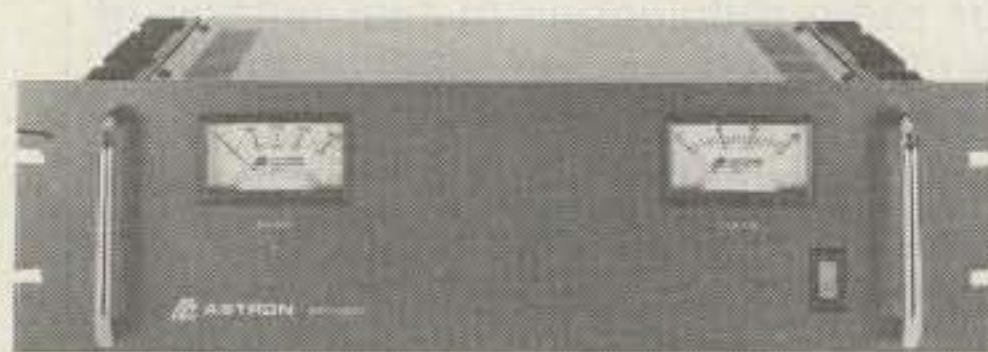
RS-L SERIES



• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-4L	3	4	3 ¹ / ₂ x 6 ¹ / ₈ x 7 ¹ / ₄	6
RS-5L	4	5	3 ¹ / ₂ x 6 ¹ / ₈ x 7 ¹ / ₄	7

RM SERIES



MODEL RM-35M

• 19" RACK MOUNT POWER SUPPLIES

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 ¹ / ₄ x 19 x 8 ¹ / ₄	16
RM-35A	25	35	5 ¹ / ₄ x 19 x 12 ¹ / ₂	38
RM-50A	37	50	5 ¹ / ₄ x 19 x 12 ¹ / ₂	50
RM-60A	50	55	7 x 19 x 12 ¹ / ₂	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5 ¹ / ₄ x 19 x 8 ¹ / ₄	16
RM-35M	25	35	5 ¹ / ₄ x 19 x 12 ¹ / ₂	38
RM-50M	37	50	5 ¹ / ₄ x 19 x 12 ¹ / ₂	50
RM-60M	50	55	7 x 19 x 12 ¹ / ₂	60

RS-A SERIES



MODEL RS-7A

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-3A		•	2.5	3	3 x 4 ³ / ₄ x 5 ³ / ₄	4
RS-4A	•	•	3	4	3 ³ / ₄ x 6 ¹ / ₂ x 9	5
RS-5A		•	4	5	3 ¹ / ₂ x 6 ¹ / ₈ x 7 ¹ / ₄	7
RS-7A	•	•	5	7	3 ³ / ₄ x 6 ¹ / ₂ x 9	9
RS-7B	•	•	5	7	4 x 7 ¹ / ₂ x 10 ³ / ₄	10
RS-10A	•	•	7.5	10	4 x 7 ¹ / ₂ x 10 ³ / ₄	11
RS-12A	•	•	9	12	4 ¹ / ₂ x 8 x 9	13
RS-12B	•	•	9	12	4 x 7 ¹ / ₂ x 10 ³ / ₄	13
RS-20A	•	•	16	20	5 x 9 x 10 ¹ / ₂	18
RS-35A	•	•	25	35	5 x 11 x 11	27
RS-50A	•	•	37	50	6 x 13 ³ / ₄ x 11	46

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4 ¹ / ₂ x 8 x 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 x 9 x 10 ¹ / ₂	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 ³ / ₄ x 11	46

VS-M AND VRM-M SERIES



MODEL VS-35M

• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps)			ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 ¹ / ₂ x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 ¹ / ₂	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 ³ / ₄ x 11	46
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MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
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RS-10S	•	•	7.5	10	4 x 7 ¹ / ₂ x 10 ³ / ₄	12
RS-12S	•	•	9	12	4 ¹ / ₂ x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 ¹ / ₂	18
SL-11S	•	•	7	11	2 ³ / ₄ x 7 ⁵ / ₈ x 9 ³ / ₄	12

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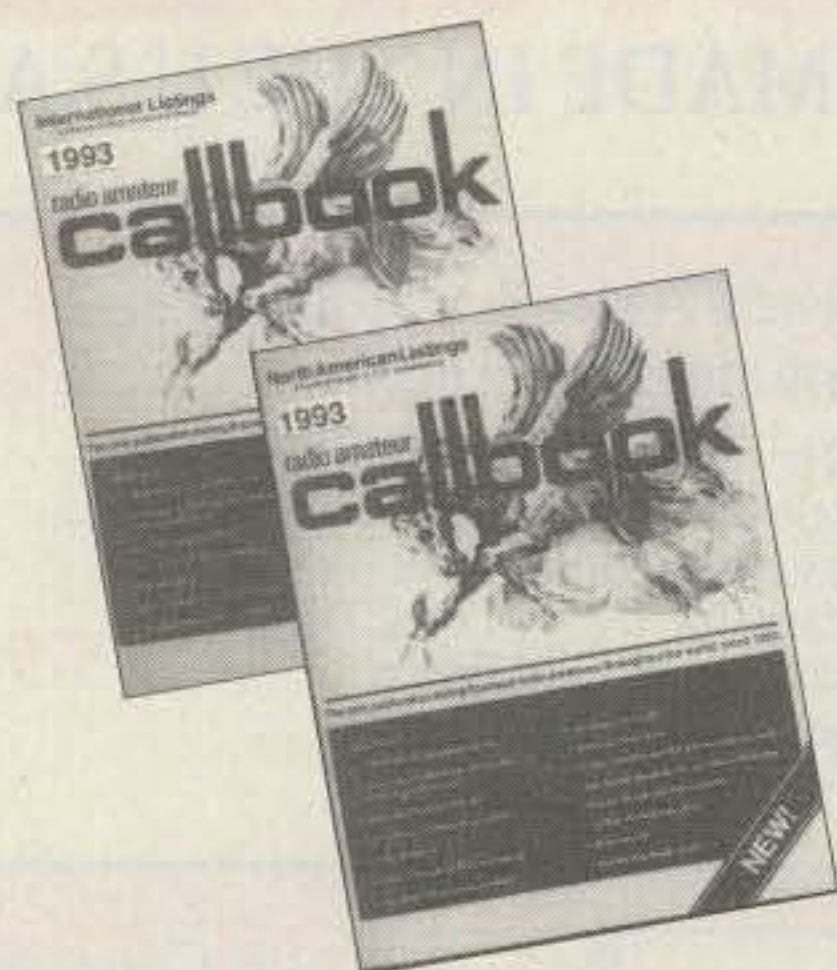
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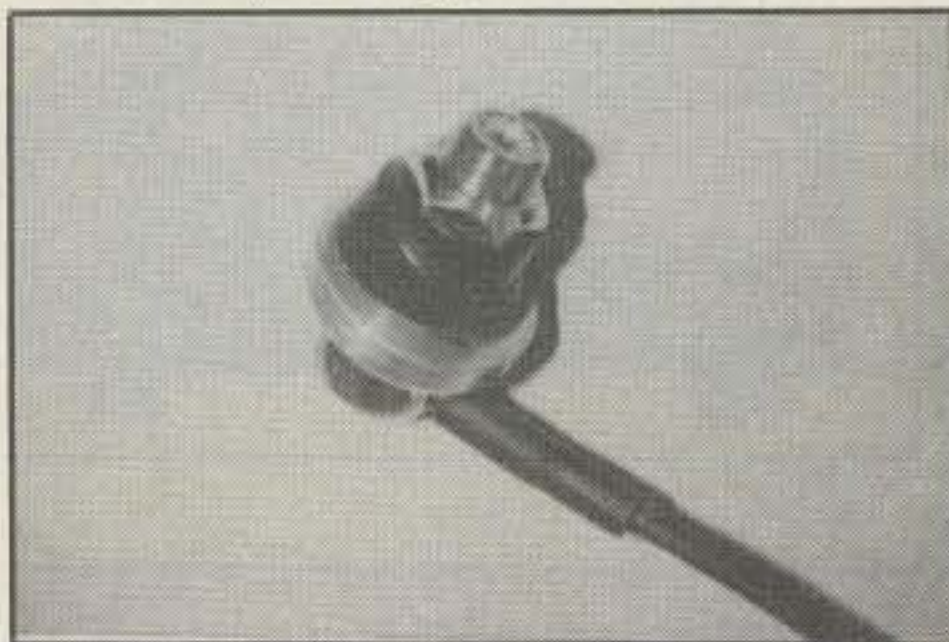
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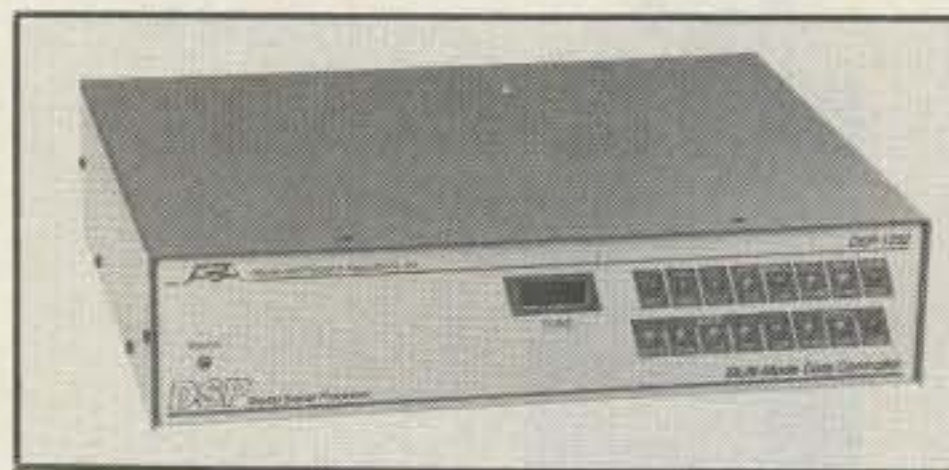


12 feet of RG-58 coax permanently connected in either vertical (fenders) or horizontal (roof) fashion. The N-type sells for \$36 and the PL for \$33.

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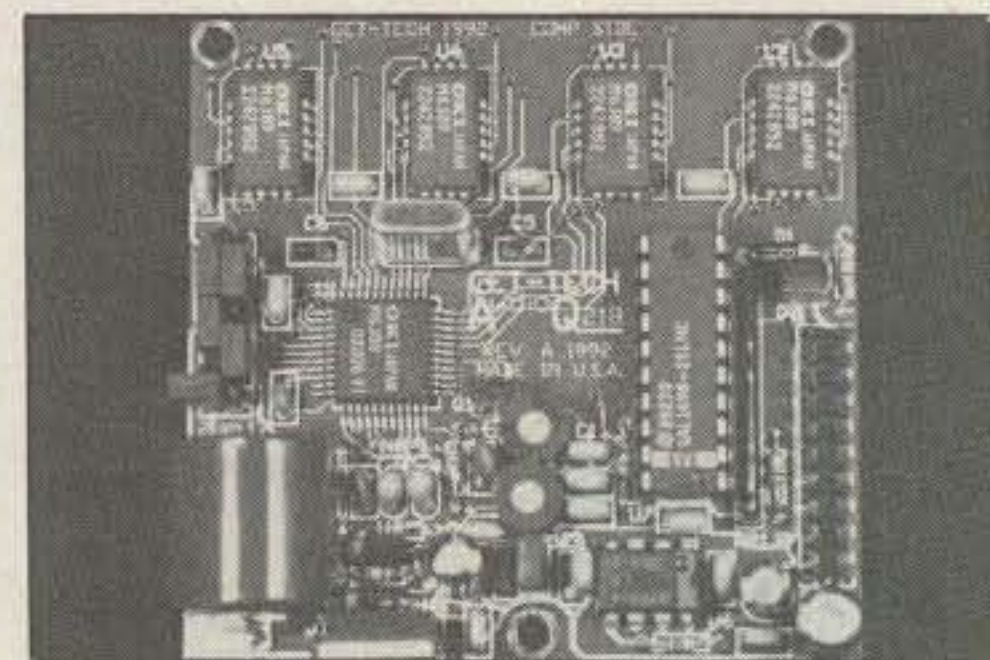


nates the need for external modems for satellite work or high-speed data, as all the modems exist in software.

Suggested list price is \$799. For a product data sheet and list of authorized dealers call AEA's Literature Request Line at 800-432-8873, or contact Advanced Electronic Applications, Inc., P.O. Box C2160, 2006 196th St. SW, Lynnwood, WA 98036.

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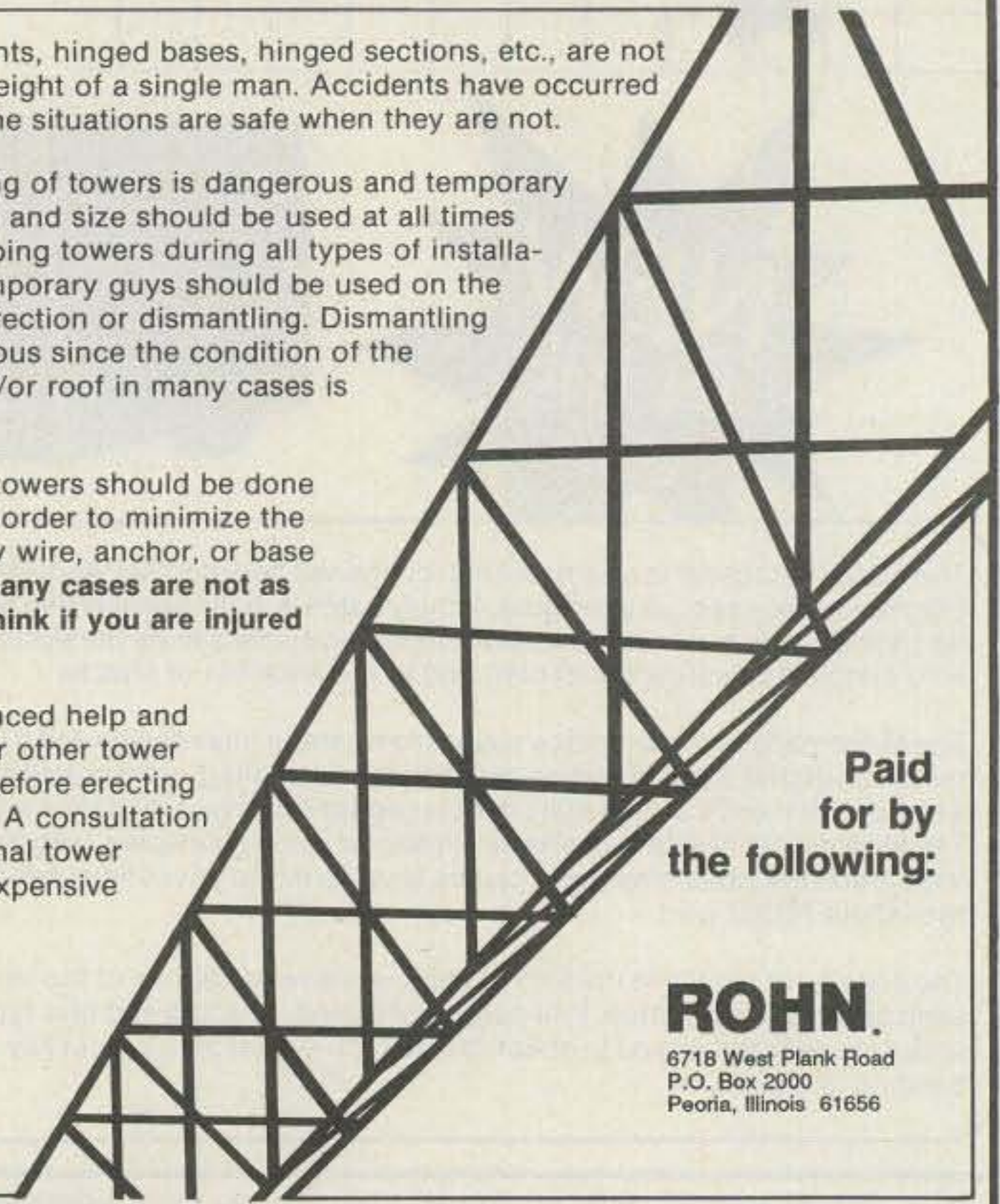
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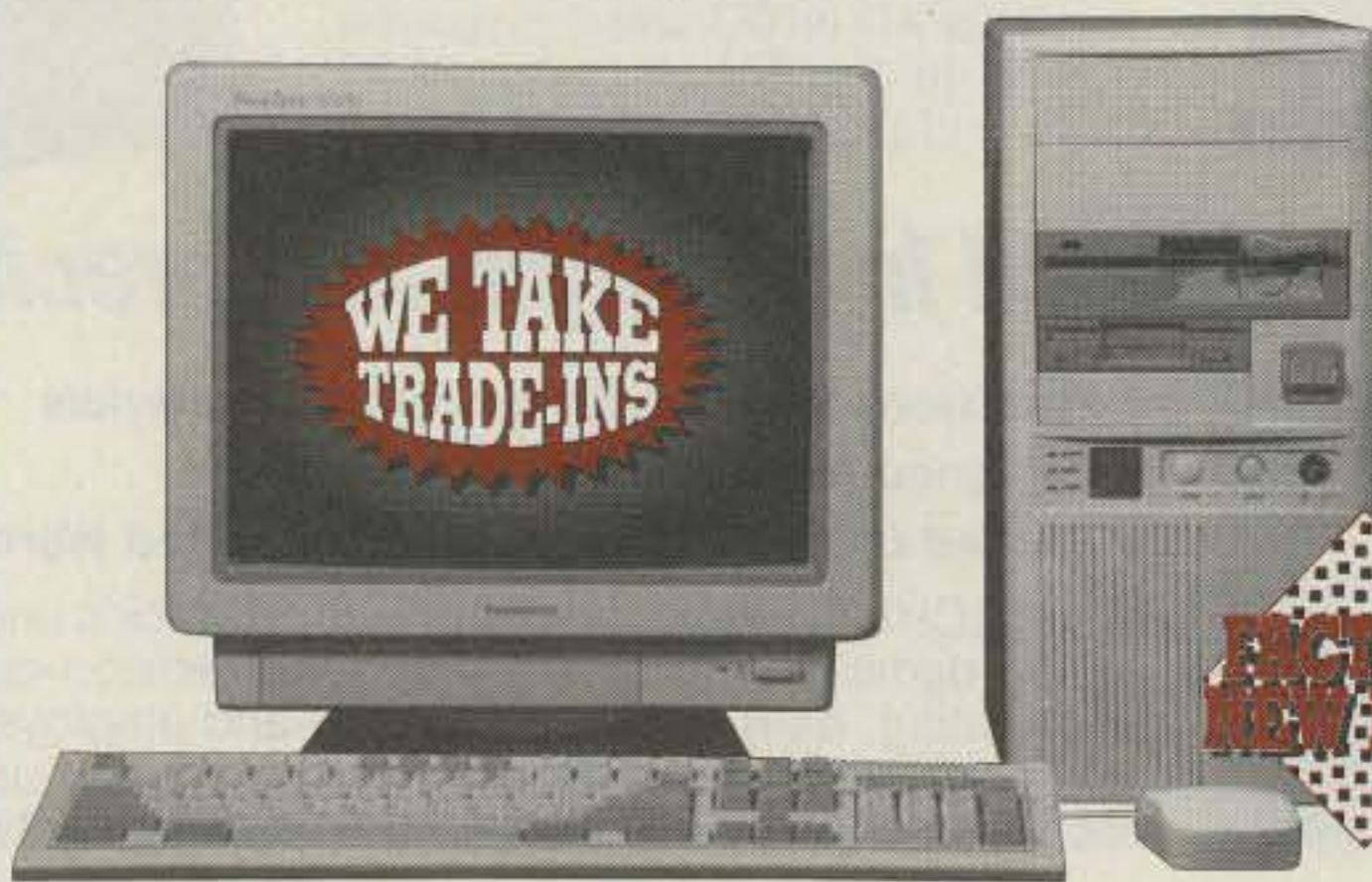
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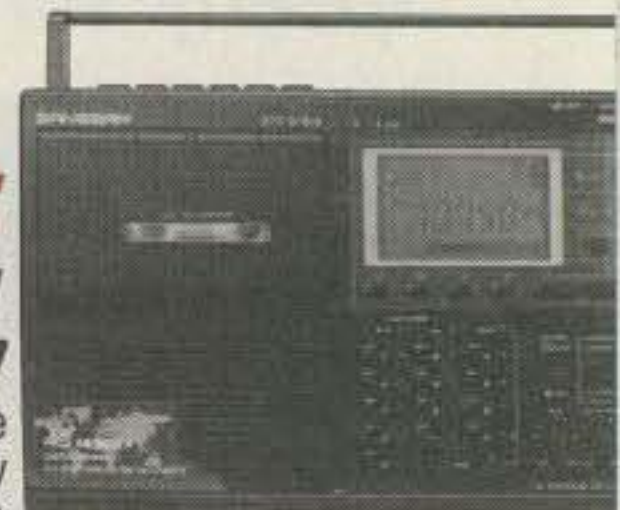


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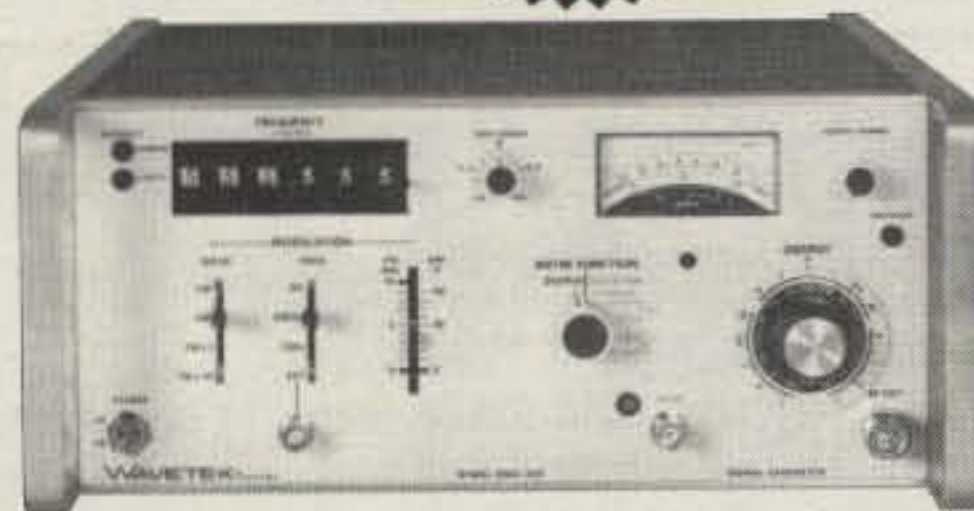
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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Special Delivery

Antenna Potpourri de KJ6GR. We received two letters from Bill Shanney, KJ6GR. Bill's first letter highly recommended a British compendium, *HF Antenna Collection*, edited by Erwin David, G4LQI, and published by the Radio Society of Great Britain (RSGB). The book, which contains articles reprinted from the RSGB's *Radio Communication*, covers single- and multi-element horizontal and vertical antennas, very small transmitting and receiving antennas, feeders, antenna tuners, and more. To Bill, "the book's material is classic British ingenuity applied to wire antennas with many great ideas being presented." It is carried in the ARRL publications catalog (225 Main St., Newington, CT 06111) as #3770, price \$18.

Bill also wrote that he has made some progress in obtaining reasonably good hamshack RF grounding and TVI suppression, frustrating problems of operating HF using limited space antennas in an apartment or condo environment. Bill addressed some of the problems of RF grounding mentioned by Ken Gilcrest, KA8FFL/7, which we cited in last August's column. Ken, we should recall, said that he had read countless articles about small antennas for apartment conditions. The big problem, he felt, was to obtain a good, solid RF ground. He wondered what to do about it, and we offered a variety of suggestions on RF grounding.

At that time we offered Ken some suggestions to minimize "RF in the hamshack" problems, including running several different ground leads in parallel, experimenting with insulated counterpoises on troublesome bands (where the hamshack is "hot with RF"), using an antenna tuner, keeping power levels low, and avoiding the use of voltage-fed antennas with the feedpoint in or near the hamshack.

We noted that a *counterpoise*, a type of capacitive ground, can be useful when an extensive buried ground system, or even a cold-water-pipe ground, isn't available. To work best, the counterpoise should be large enough to have a considerable capacitance to ground, covering as much area as possible. The shape can be anything that's convenient. Often, large-area counterpoises are up to a half-wavelength in radius, but the actual length of individual wires which make it up isn't critical. Too, large counterpoises aren't always realistic. For the simple, insulated-wire counterpoise you might install in a small apartment, you may get away with an insulated wire no more than one-quarter wavelength at the operating frequency. The counterpoise's height isn't important, but it should be routed so as not to be easily tripped over. If outdoors, it should be installed 7-10 feet above ground.

Possible "solutions" to RF grounding prob-



Possible solutions to apartment RF grounding problems include RF counterpoises and even devices such as the MFJ-931 Artificial Ground unit, to help create a usable RF ground. The unit effectively places your rig near actual earth ground potential even if located on the second or higher floor, with no direct earth ground possible. The unit reduces the electrical length of the ground connection to almost zero by tuning out its reactance. The device also can tune a counterpoise, used as an artificial ground when a "real" RF ground isn't available. Doing so essentially resonates the random-length "ground wire" you may have strung along your apartment floor. (Photo courtesy MFJ Enterprises, Inc.)

lems also may include the use of a device such as the MFJ-931 Artificial Ground. The MFJ unit helps create a usable RF ground, especially when using random-length antennas. The unit effectively places your rig near actual earth ground potential even if located on the second or higher floor, with no direct earth ground possible. The device reduces the electrical length of the ground connection wire to almost zero by tuning out its reactance.

Bill, KJ6GR, noted that he's had good success in using coax as a counterpoise. He prefers RG-59 or RG-213, coiling the coax to minimize undesirable radiation. He uses electrical quarter-wavelength sections of the coax (taking into account the cable's velocity factor), at the near end connecting only the center conductor and leaving the far end open circuited. He suggests connecting all hamshack equipment grounds (transceiver, linear amplifier, lowpass filter, antenna tuner, antenna switch, etc.) together and using two sets of counterpoise wires made of coax cable. One set is connected to the antenna tuner's ground lug and the other is connected to the common station ground point. Each set is made up of individually cut counterpoises for each band. Fig. 1 illustrates this grounding arrangement.

Bill also stresses the importance of good station grounding and RF filtering from a harmonic-suppression standpoint. He fits Cho-Sorb beads around all his coax cables to help prevent feedline radiation of TVI-generating harmonics. He

also uses two or three of the beads on each chassis ground lead to absorb RF at fundamental and harmonic frequencies. He also places three beads on the chassis end of the counterpoise wires and five beads on all interconnecting cables, including coax. Bill also uses toroids on his rotor and DC control cables. (The Cho-Sorb beads are available from Radiokit, P.O. Box 973, Pelham, NH 03076.)

A tip of the hat to Bill Shanney, KJ6GR, for his nicely worded suggestions. We're sorry we didn't have room to print his complete RF grounding writeup, and one he sent us on above-ground mounted HF verticals.

Feedback on the UA1DZ Broadband Vertical. In the March 1992 column we ran a short note about an article in a (former?) Soviet radio publication, *RADIO*, that described the "UA1DZ broadband vertical radiator." It consisted of eight phased vertical radiators designed by the late Georgi A. Rummyantsev, UA1DZ. Reportedly using 100 ohm coaxial cable, SWR is said to not exceed 1.2:1 over the range 10 to 30 MHz, and the antenna presents a suitably low angle of radiation for DX work, in common with most other verticals. The original Russian text and an English translation were sent to us by Bill Mollenhauer, N2FZ.

In response to our request to readers for more information on the UA1DZ vertical, Edward T. Tanton, N4XY, wrote that he had been interested in the antenna ever since he saw a reprint of the English language translation in the Prometheus Amateur Radio Association's newsletter. Here are excerpts from Ed's letter:

"I have been working toward building one since. I have found that several of the stackable aluminum antenna mast sections from Fair Radio should be perfect for the antenna. I have gotten 300 feet of 'Flex-weave' wire being advertised by Davis RF, to use. . . . I also would like to upscale the antenna into a suitable 40 meter dimension if possible. We shall see about that: if you allow a low frequency value of 10 MHz and scale the dimensions proportionally to 7 MHz, the total height becomes about 53 feet, a bit high, probably necessitating guying.

"The feedpoint is specified as 200 ohms in the article, and UA1DZ uses the simple coaxial coil to 'balance' the output. I plan to try a 4:1 current balun and see what happens. Again, this will require 'trying-and-seeing' as far as performance is concerned. I also plan to run the coax up the inside of the lower mast. I expect that the balun version will work somewhat better than the coil version, but do not expect significant differences."

Ed went on to explain some of the mechanical problems involved in the design, such as the required insulation between mast sections and the mechanics of the wire spreader rods. He plans to construct the antenna in the near future and promises to let us know how it performs and possibly even how it models using W7EL's

ELNEC antenna analysis program. Ed intends to publish the results after he has built, tested, and operated the antenna, making on-the-air comparisons with his nearby Cushcraft. We'll be looking forward to seeing Ed's results.

MacMININEC: Who's on First? In last June's column we printed some information on MacMININEC. We noted that Chris Smolinski, N3JLY, had developed what he believed to be the only implementation of the MININEC algorithm for the Mac. His MacMININEC V4.4 is an NEC-based antenna analysis program that analyzes antennas, calculating the feedpoint impedance and current distribution, and producing plots of the resulting radiation patterns. Chris, N3JLY, offers MacMININEC for \$35 post-paid from him at 40 South Lake Way, Reisters-town, MD 21136.

This brought a note from Christopher Smith, NX0E, who says that MacMININEC isn't the first implementation of MININEC for the Mac. Christopher asserts: "I have followed the MININEC series since 1984, when I ran across MININEC 2. When MININECC3 became available, a colleague of mine, Don Metzger, and I obtained a copy through ACES, the Applied Computational Electromagnetics Society. Don translated it into Pascal and C [programming languages]. The Mac version came from the C translation, and it does not make use of special Mac features as I am sure MacMININEC does. I distributed it to almost 50 ACES members, so one might find it on a BBS occasionally. Since I no longer have access to a Mac, I no longer distribute that version."

NX0E adds "I also have PC versions of MININECC3, rev. 13, as received through ACES, in BASIC and FORTRAN versions. I will send these out to those who send an SASE and a formatted disk (3.5 or 5.25 inch, DD or HD). These [programs] are *without* documentation, and readers will have to get documents through DTIC or Artech House. I also have a PC version of NEC2, the 'grandfather' of all the MININEC versions, which I will send out *sans* documentation." Christopher Smith, NX0E's address is 12455 Donovan Lane, Colorado Springs, CO 80908.

According to Christopher, "These codes and more are available *with* documents from ACES. Information on the various code packages offered by ACES is available from Prof. Richard Adler, Naval Postgraduate School, Code 62AB, Monterey, CA 93943." Chris adds that amateurs who are serious about antenna investigation should consider joining ACES; their journal and newsletter contain much valuable information on all aspects of electromagnetic modeling.

Scarce Sources of Commodore Software. A few months back we brought up the problem of obtaining current hamshack and other software for Commodore 8-bit computers such as the Commodore Vic-20, C-64, and C-128. I moved over to an IBM PC compatible in 1986 and haven't closely tracked the Commodore software market since then. It seems at first glance to have almost dried up, and today there seems to be little development of new commercial software for 8-bit Commodores. But I still receive many letters inquiring about amateur radio software for such machines. Most of the letters, like one from Rodney Riley, VE3BLB, asked for good logging software. Peter Fournia, WA2BPO, on the other hand, wrote with some specific suggestions, especially regarding the C-128:

"I have been using the C-128 for about 5 years and thought I'd share with you and your readers

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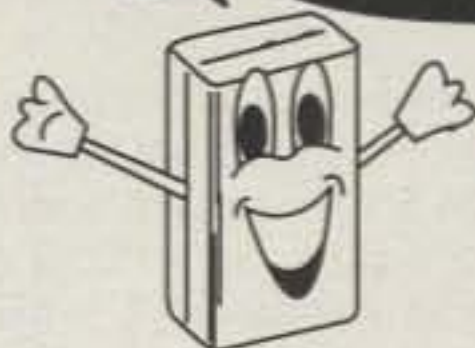
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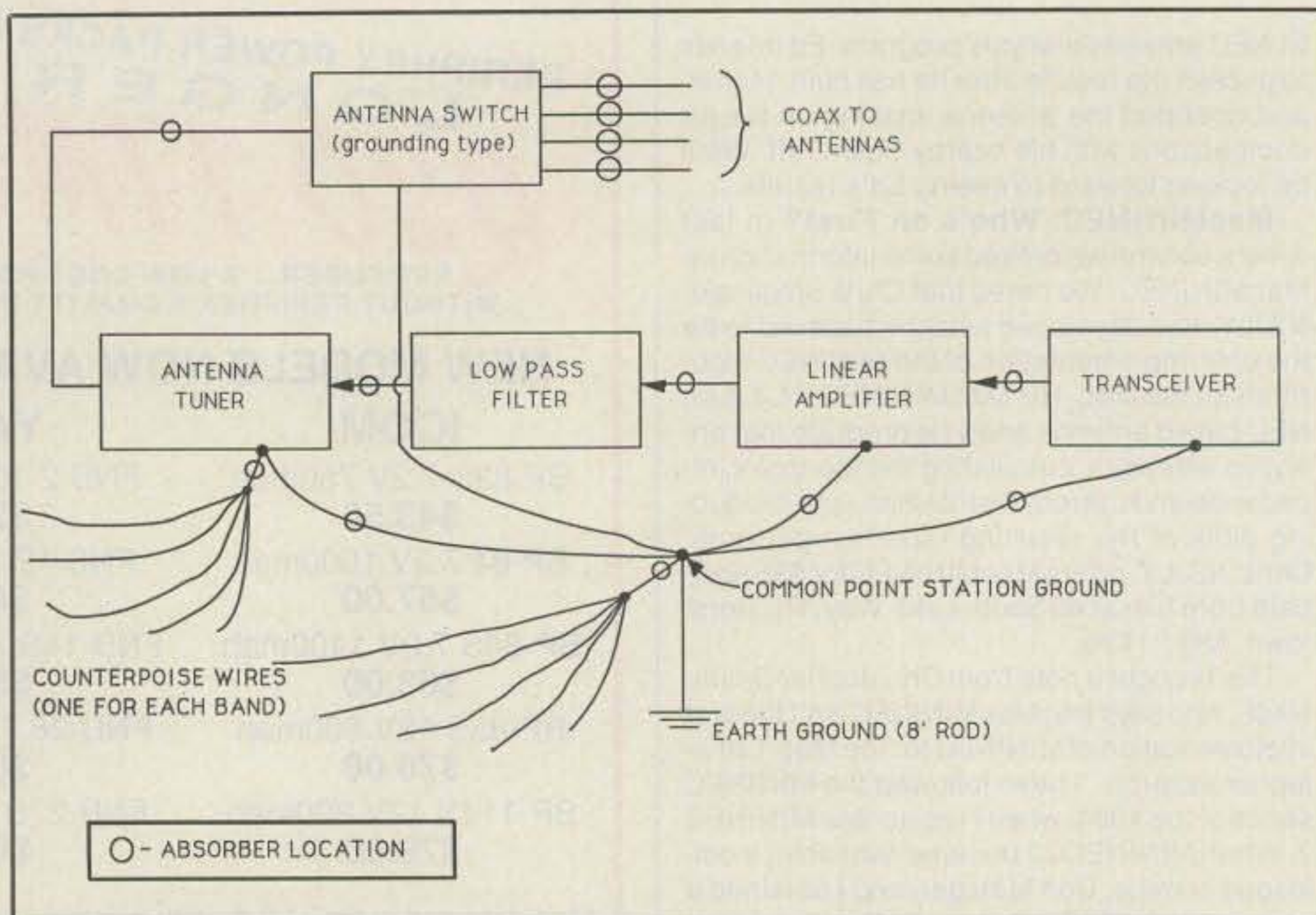


Fig. 1- Shown here is a simplified diagram of Bill Shanney, KJ6GR's ham shack equipment and the locations of the various ground interconnections, counterpoise wires, and RF-absorbing beads he uses. See the text for a discussion of his approach to achieving a good RF ground in an apartment or condo environment and minimizing RFI/TVI. (Sketch courtesy Bill Shanney, KJ6GR)

a couple of my favorite programs designed specifically for the C-128. Programs that use the full features of the C-128 are not easy to find. Most programs are for the C-64. So when a good C-128 specific program comes along, it's worth a little language."

Peter notes: "An excellent program written specifically for the January VHF Sweepstakes is CONTEST LOGGER-128 written by Harry Hoffman, KA2ENE, in Rochester, New York. Harry has placed his last version (V4.0) of April 1990 into public domain. The program uses the 2 MHz, 80-column screen and the memory capabilities of the C-128. It supports numerous printers and has a customizable printer driver program It supports up to 999 QSOs.

"Another favorite C-128 program is ULTRATERM III, written by Steve Boerner, also of Rochester. The program is shareware (\$25) written in June 1988. It also uses the C-128 advantages in speed, 80-column screen, and memory ULTRATERM III is fully featured and comparable to most of the present-day commercial programs. Editing is available in the 60-KByte buffer The program is organized with eight pull-down menus."

Peter highly recommends these C-128 programs and notes that they are accessible free of charge from the Commodore Users Group of Rochester BBS at (716) 621-5908. He adds, however, that he's still looking for a good C-128 satellite tracking program.

We also received a letter from Keith Wyatt, N6JPA, who has assembled a collection of six packet-related Digicom terminal programs, plus some utilities, for the C-64. He is making the public-domain programs available as a package, which includes two program disks and all disk-based documentation. He requests you send an SASE disk mailer with two blank disks and a \$3 shipping and handling fee. Contact Keith Wyatt, N6JPA, Wyatt Industries, P.O. Box 1305, Arroyo Grande, CA 93421-1305.

Despite the relative scarcity of Commodore

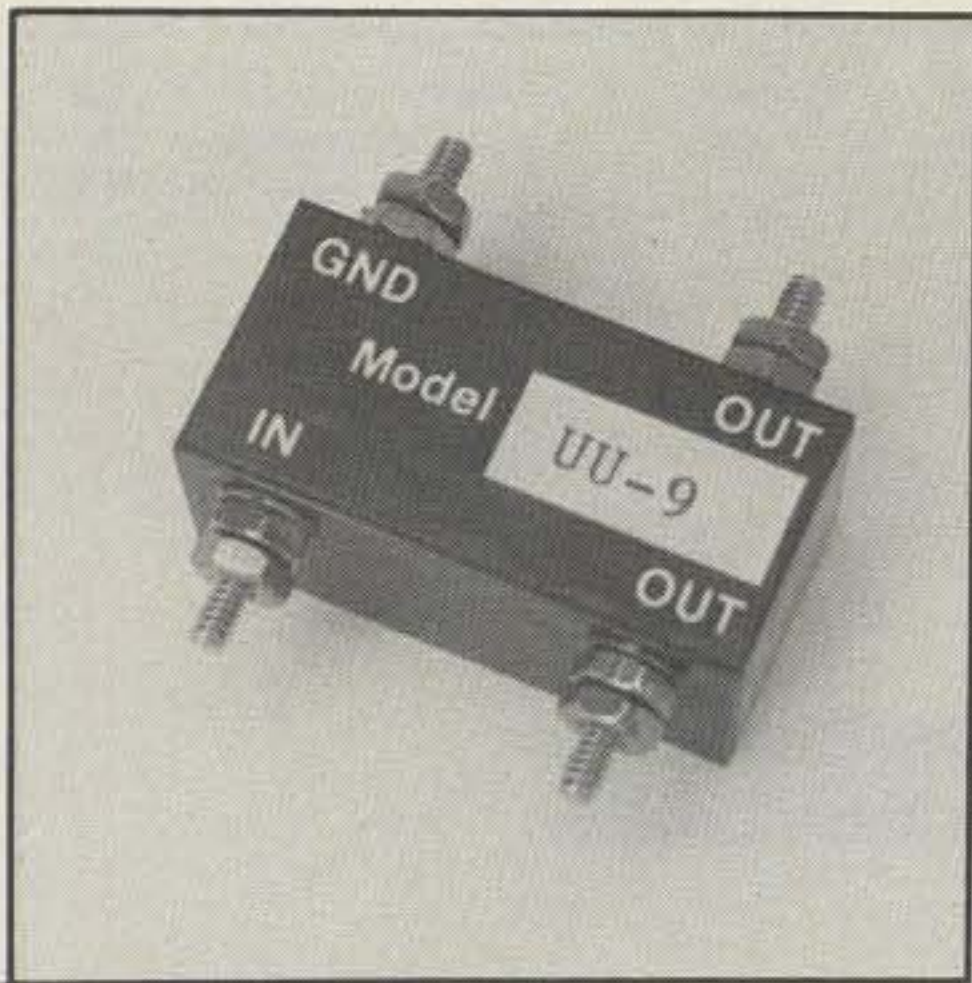
shareware and public-domain software distributors, there still are a few of them around. One is HomeSpun Software, P.O. Box 1064, Estero, FL 33928. They specialize in C-64 amateur radio programs and utilities, and boast that they have, at last count, at least 42 amateur disk sides for the C-64 containing hundreds of programs. These are priced from \$2 to \$5 per disk side, depending on quantities ordered. The firm offers an introductory package of 8 disk sides containing over 200 amateur programs for \$16.95. A catalog is available from HomeSpun Software for a 29-cent stamp.

Antenna Notes

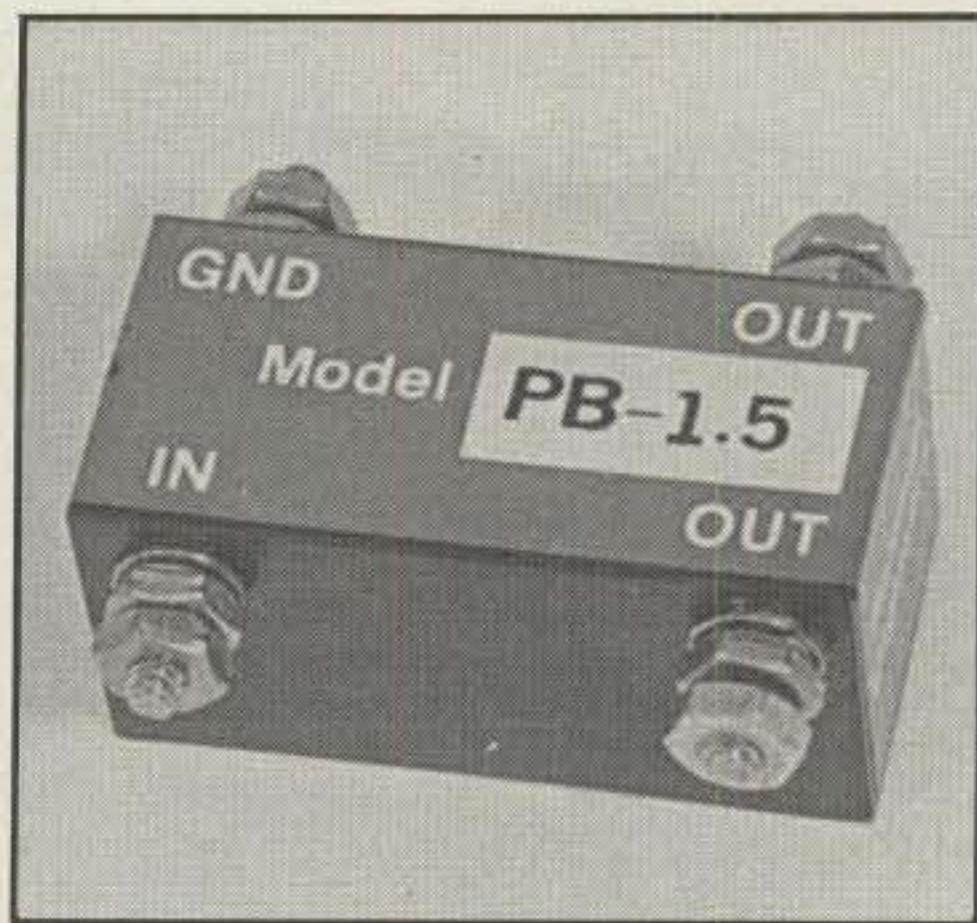
Free Antenna Pubs de ICE. You may recall that in the March 1991 column we mentioned the Industrial Communication Engineers, Ltd. free catalog, which shows a wide range of low-cost antenna accessory products for amateur, commercial, and government applications. As we noted then, the catalog shows various RFI filters, VHF/UHF receiving preamps, signal splitters, RF-tight enclosures, coax lightning and EMP suppressors, coax grounding blocks, ground rod mounts, tower leg mounting fixture kits, rotor cable voltage suppressors, guy wire grounding kits, coax cable assemblies, and other accessories.

Now ICE engineers have prepared a set of (at last count) 17, one-page technical publications for customer reference. The reports are single sheet, 8½" x 11" size, and they cover a variety of subjects related to the use of ICE products, station design and construction, lightning protection, and product comparisons with competitors' goods. The pubs are written in easy-to-understand language for the nontechnical user, and they contain capsulized information not easily found elsewhere.

Current publication topic areas are: conducting noise audits (#10); Beverage antennas (#11); lightning protection (#30, 30A, and 30B); ground-



The Palomar Engineers UU series "Ununs" (unbalanced to unbalanced) transformers are designed to match 50 ohm coax to unbalanced loads such as Beverages. The Ununs are available in 11 different load matches from 50 to 800 ohms. They handle 350 watts PEP. (Photo courtesy Palomar Engineers)



Close cousins to the Ununs are the PB series impedance matching balun transformers used to match coax to balanced load impedances. The PBs are also available in the same 11 impedance ratios from 1:1 to 16:1. Both series units are epoxy encapsulated and weigh about 40 grams (1.5 oz.). (Photo courtesy Palomar Engineers)

ing techniques (#31 and 31A); cold-water-pipe grounds (#32); coax lightning arrestors (#33, 33A, and 33B); grounding coax cable shields (#36); lowpass filters (#42); highpass filters (#43); solving telephone RFI (#46); using anti-oxidants for good interconnections (#60); and DC grounded antennas (#80).

For a detailed listing of the free publications (or to order one of the pubs or a catalog), contact Industrial Communications Engineers, Ltd., P.O. Box 18495, Indianapolis, IN 46218-0495.

Palomar Unun Transformers. These little transformers are an economical answer to many RF matching problems. They are small and lightweight, and they have enough power-handling capability for most modern transceivers and transmitters. Eleven impedance ratios are available from 1:1 to 16:1, matching 50 ohms to 50, 75, 100, 150, 200, 250, 300, 375, 450, 600, or 800 ohms, over the range 1.8 to 30 MHz. The units handle 350 watts PEP or 100 watts CW. Typical applications involve matching Beverages and other unbalanced antennas.

The new UU series Ununs (unbalanced-to-unbalanced) are close cousins of the PB series impedance matching balun (balanced-to-unbalanced) transformers we've discussed previously, and in fact grew out of their popularity. The PBs are also available in the same impedance ratios from 1:1 to 16:1. Both series units are epoxy encapsulated.

Jack Althouse, K6NY, Palomar Engineers' proprietor, notes that one should not try to use the PB baluns as Unun transformers, as some

amateurs have tried to do. Why? If you try to use a PB balun as a UU (Unun) transformer by grounding one output lead, you effectively short out half of the output winding. Use a Unun for matching coax to other unbalanced loads.

Both series devices are \$26.95 from Palomar Engineers, P.O. Box 462222, Escondido, CA 92046.

Soft Topix

MINIPROP PLUS™. In several columns we've observed the steady progress of MINIPROP, a comprehensive propagation prediction program by Shel Shallon, W6EL. Shel recently sent us his latest, MINIPROP PLUS, which like previous versions provides detailed information about the strength of received signals in addition to maximum usable frequency (MUF) predictions.

The program uses a unique method for searching through the several ionospheric modes to find the right combination of signal "hops" that yield the strongest received signal, at each half hour of the day, on each of seven user-selected frequencies. For the strongest mode, MINIPROP PLUS reports predicted signal strength, the radiation or takeoff angle for the mode, the mode configuration, and the predicted mode availability (the percentage probability that the predicted mode actually exists).

The program gives you beam headings from both ends of the selected path, path length, sun-

rise and sunset times for the path terminals, grayline data, and more. Information for both short and long path is displayed on the PC's screen, or you can print it out. A new feature in MINIPROP PLUS is a world map graphics display that shows the day-night terminator (gray line) and the Great Circle path between any two station locations. All screens are in full color on suitably equipped computers. There's also a handy "DX Compass" feature that helps you determine what bands are open in twelve directions from your QTH at any time of day.

You can store your own QTH in a disk file, and the program includes an on-disk atlas of latitudes and longitudes of some 360 locations and all DXCC countries. The program includes utilities that let you add, modify, or delete atlas entries and print a customized table of beam headings to all locations in the atlas.

The program supports Intel math coprocessors, which are recommended but not required. The program runs on IBM PCs and compatibles with at least 512K RAM. A professionally printed manual is included. Price is \$49.95 postpaid from Sheldon C. Shallon, W6EL Software, 11058 Queensland St., Los Angeles, CA 90034-3029. Fig. 2 shows a MINIPROP PLUS quick-look prediction, while fig. 3 shows the DX Compass feature.

More 10-10 Stuff from Hardy Data Systems. Turning to the July 1991 column, we described the K4HAV Contest Logging Program ("1010"), a specialized contesting and record-keeping program by James D. Hardy, K4HAV. It's for handling 10 meter awards and contests sponsored by the 10-10 International organization—you know, the guys who exchange their 10-10 numbers. As we reported then, two 1010 program features are unique. The first of these is the ability to convert stations worked in the first contest to a database available for subsequent 10-10 contests. The second distinctive feature lets you access a built-in master list of all assigned 10-10 numbers while on the air, to know a station's 10-10 number as soon as you enter the callsign.

Jim still offers 1010 for \$25. However, he has greatly expanded his software offerings to include the 1010CH County Hunter program (\$25) for records tracking of the new 10-10 Worked All Counties Award. The new program also provides recordkeeping functions on many other 10-10 awards, prints the various applications, and generally simplifies keeping track of 10-10 numbers. The 1010CH program has all 3076 counties in a text file; counties worked, needed, or all counties can be displayed in a pop-up window for a given state. You also can display a list of new counties worked and, if over 100, you can print out a 10-10 County BAR application. The 1010CH program makes use of various 1010 program features, including the master list of all assigned 10-10 numbers, and a file conver-

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 TERMINAL A: 32.50 N 86.30 W Millbrook AL Bearing to B: 29.0 deg
 TERMINAL B: 7.40 N 80.40 E Sri Lanka Bearing to A: 343.1 deg
 Terminal A Sunrise/Set: 1110/0031 UTC Terminal B Sunrise/Set: 0035/1252 UTC

QUICK-LOOK SIGNAL LEVELS in dB ABOVE 0.5 uV						
UTC	MUF	3.6 MHz	7.1 MHz	14.1 MHz	21.2 MHz	28.3 MHz
0000	16.7		11 a	19 A	18 D	
0200	20.4		-7 a	13 a	16 C	
0400	19.0			5 a	11 D	
0600	17.1			-2 a	8 D	
0800	14.6			-6 b		
1000	16.7			-6 a	6 D	
1200	17.6			-5 a	7 D	
1400	19.1			0 a	9 D	
1600	20.2			3 a	11 C	
1800	20.9			6 a	12 C	
2000	21.2			10 a	14 C	
2200	18.7		-2 a	15 a	16 D	

Signal levels suppressed if below -10 dB or if predicted availability is zero.
 Availabilities: A: 75 - 100% B: 50 - 75% C: 25 - 50% D: 1 - 25%
 a, b, c, d: Same as A-D, with high probability of reduced signal levels.

nfu mAp oom raphs rint emi onq path

Fig. 2—On any path you specify, MINIPROP PLUS mode-searching predictions compute the received signal levels at every half hour of the day on each of seven user-specified frequencies between 3 and 30 MHz. Also MUFs, radiation angles, beam headings, path lengths, sunrise/sunset times, and other useful information is reported. The quick-look report, depicted here, gives faster predictions, but gives somewhat less accuracy and reports less detailed information than do the intensive mode-searching predictions the program is capable of generating.

sion program takes logs from the 1010 program.

That's not all Jim's been up to. He's introduced 10ZIP, the ZIP/County Index Program, an add-in package (\$25) also designed for the county hunter, that works closely with the 1010 and 1010CH programs. The add-in package lets you input a ZIP code and display the city, state, and county, and it offers various search options. Also included with it are a QSL program that displays your contest log and tags the contacts for which you want to print a QSL label, as well as the K4HAV address database of U.S. 10-10 members to give you the county and full name and address of the other station. Using this feature you can print address labels. What more could a 10-10'er want?

Finally, Jim offers another version of 10ZIP that's designed for the CQ-type USA-CA county hunter program; it's \$20. For more details con-



Millie does it! Your columnist's XYL, Millie, is now a new Tech licensee, callsign KD4SHM, thanks to the FCC's no-code Tech, some diligent book study, and the VIS study materials (flash cards). Shown in the photo are Carolyn Van Iderstine, N5MUU, of VIS, standing at left, and a very happy XYL, Millie Thurber, KD4SHM, at right. (W4ADU photo)

tact Hardy Data Systems, P.O. Box 7304, Tifton, GA 31793-7304.

Propagation Path Update. Last June we briefly profiled the *Propagation Path Collection*, a series of calculation and analysis routines for the IBM PC, sent to me by Jim Mills, N5IKJ, and offered by Valle Verde de Rio Grande (VVDRG) Electro. Jim recently forwarded Version 3 which is easier to use since it now is menu-driven.

The toolkit is a collection of propagation tools to improve users' understanding of how to obtain the best possible estimate of HF ionospheric propagation paths in point-to-point communications, especially those which use the E, F1, and F2 layers. Several programs are included which compute Great Circle distances and bearings, determine optimum signal launch angle, calculate the time of high noon for antenna orientation purposes, and estimate signal path attenuation. Various measurement conversion utilities are included, and the user can customize some program defaults. Price is still \$9.50 from VVDRG Electro, 1724 Regal Ridge, Las Cruces, NM 88001.

Short Bursts

HAM-SOFT: Still Going Strong. We've received so much mail on this one that it bears repeating. In last May's column we ran a short blurb on HAM-SOFT, which offers a thick 60-page catalog of amateur radio public domain and shareware software that includes hundreds of programs for the IBM PC and compatible computers. The catalog includes about four pages of Macintosh and once plentiful but now hard to find Commodore 64 software.

Unfortunately, and unknown to us, proprietor Ray McKnight, WB3ABN, moved HAM-SOFT from Louisiana to Texas, and mail forwarding ran afoul of the post office. As a result, CQ's editorial offices and I received many inquiries as to what happened to the firm, since readers'

Sunrise: 1110 UTC Gray line: 342/162 deg Radiation Angle: 1.5 deg
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Fig. 3—One of the niftiest features of MINIPROP PLUS is the handy DX Compass feature that helps you determine what bands are open in 12 directions from your QTH at any time of day. The DX Compass screen display shows the highest MUF you can expect on 12 bearings separated at intervals of 30 degrees from a specified location at a specified time. The feature is useful for planning operations during DX contests.

mail inquiries were returned by the post office. We were at a loss until Ray dropped us a note explaining the postal problem and giving us his new address. For the record, HAM-SOFT now is at P.O. Box 443, Galena Park, TX 77547. The catalog is still \$1. Also, for the record, the entire HAM-SOFT catalog is contained in the *Amateur Radio Mail Order Catalog and Resource Directory*, described below.

Millie Does It! Saving the very best for last, I'm proud to announce that my XYL, Millie, finally obtained her amateur radio license. Although I've been an amateur all the way through our 27-year marriage, Morse always was the stumbling block for her to get serious about obtaining her ham ticket. Sound familiar?

With the scratching of the Morse requirement for the Technician class license, she successfully passed the Tech exam at last July's Atlanta HamFestival and is now KD4SHM. The technical material for the exam was still a stumbling block, but she found one of the books that we reviewed in the column last month (*All About Amateur Radio*, by Harry Helms, AA6FW, published by HightText Publications, Inc., 7128 Miramar Road, Suite 15, San Diego, CA 92121) was a real help to her in understanding the technical and operating side of the hobby. The final stretch of memorization and nuts-and-bolts preparation for the exam was aided immeasurably by the Technician theory study cards sold by VIS Study Guides (119 Comanche Drive, P.O. Box 16646, Hattiesburg, MS 39404).

Wrap-Up

That's all for this month. Next time more Antennas and Accessories topics of current interest. See you then.

Overheard: Most often, a computer program does what you tell it to do, not what you want it to do.

73, Karl, W8FX

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WHAT'S NEW AND HOW TO USE IT

Charging A Battery The Simple Way

This month we will cover a topic that a number of readers have requested—a simple method for charging a battery. We all are familiar with the wide variety of rechargeable batteries that are available today and have probably read about some of the various “pet” ways that experimenters have found to recharge them. Our approach, however, will be rather straightforward and may be dull, but it will work and will not “break the bank.”

First let's consider a couple of facts about chargeable and non-chargeable batteries in general. Both of them have a rated open-circuit voltage when they are new, and a minimum voltage, as they age, below which they will not properly operate the circuit or device in which they are being used. In addition, there is a maximum current that can be drawn from them and a useful life that is a function of the current drawn and minimum desirable voltage. These parameters are most often summed up in the “watt-hour” rating of the battery. A 12 volt battery with a watt-hour rating of 6 ampere hours, for example, will provide 6 amperes to a load for 1 hour, 3 amperes for 2 hours, or 0.6 amperes for 10 hours before the battery voltage drops too low. When this occurs with conventional dry batteries, replacement is the only thing you can do. In the case of “rechargeables,” however, you actually can reverse the chemical process within the device and restore the battery to practically new condition a number of times.

Reversing the chemical reaction in a battery requires that you force current to flow through it in the reverse direction from normal discharge current. The amount of reverse current determines how fast the chemical process will reverse, and as a result, how fast the battery will recharge. Too much current will cause the battery to overheat, however, so battery chargers usually are limited to a value that starts out at roughly the full load current and then tapers off to about 5 to 10% of that value.

Fig. 1 is a schematic of an ultra-simple battery charger that will demonstrate the principles of battery charging. The value of R1 is chosen so that with a fully charged battery, one tenth of the maximum load current (often called the “trickle” current) will flow into the battery from the charging supply. This means that the current flow

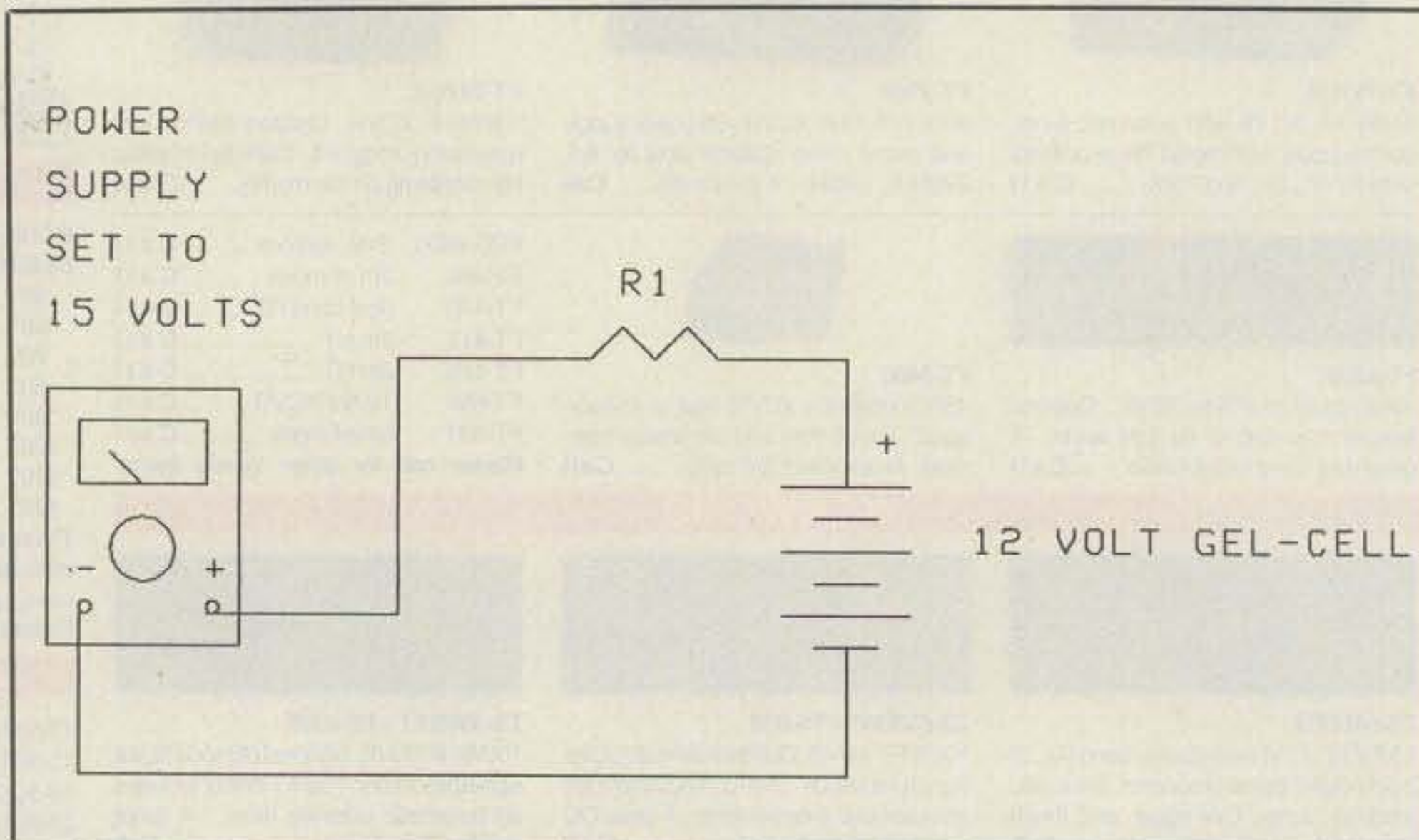


Fig. 1— Simple “battery charger.”

will increase as the voltage across the battery decreases. In the example shown, a 12 volt 6 ampere/hour lead acid or “gel-cell” battery is to be charged from a 15 volt power supply. Since the fully charged open-circuit voltage of such a battery is 13.8 volts and one tenth of the rated maximum current is 600 ma, the resistor is calculated as follows:

$$(V_{in} - V_{batt}) / \text{Trickle Current} = R$$

$$\text{or } (15 - 13.8) / 0.6 = 2 \text{ ohms}$$

The result is that a fully charged battery will be “trickle charged” at about 600 ma,

while a discharged battery—at 10 volts, for example—will initially start charging at 2.5 amperes. Since a discharged battery will draw 2.5 amperes of charging current through the resistor, a high-wattage unit will be required. The power through this resistor will drop as the battery charges, but the large power rating required (12.5 watts in this example) can make this approach somewhat unwieldy. In fact, if the battery voltage at discharge is lower than 10 volts, the current will be even higher.

Fig. 2 is a practical battery charger that can be built by the experimenter at reason-

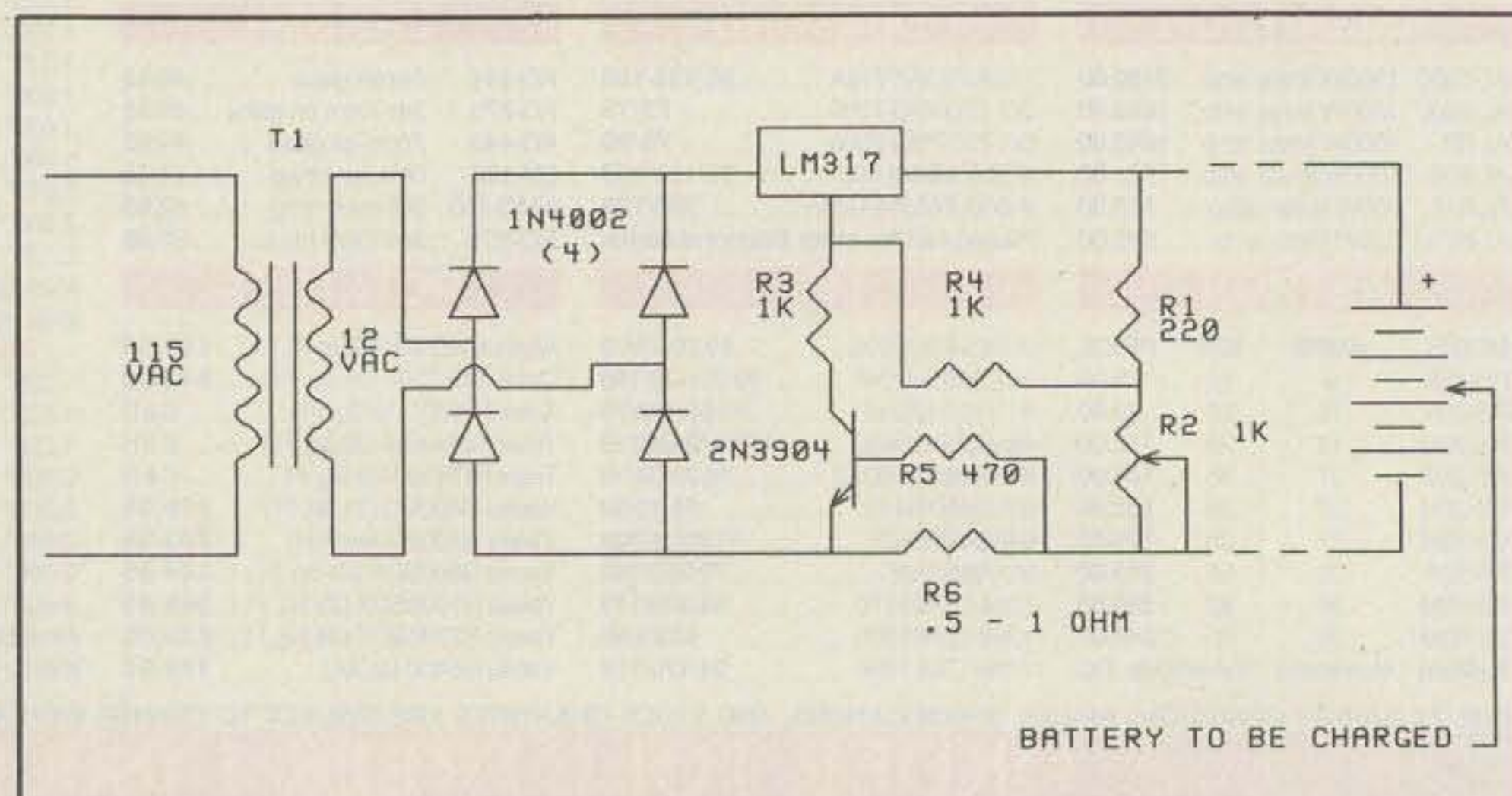


Fig. 2— Simple, easy to construct battery charger.

c/o CQ magazine

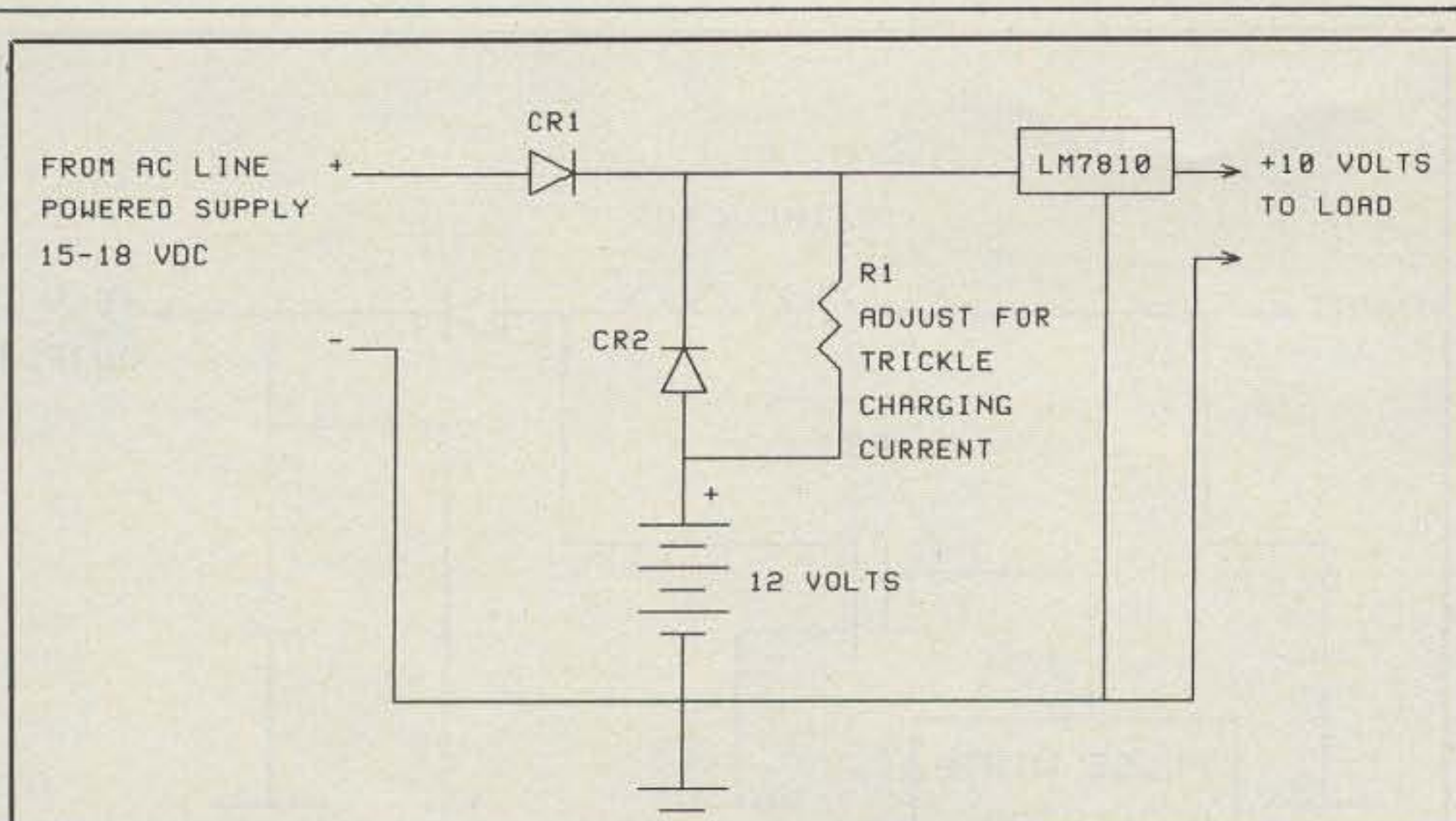


Fig. 3— Battery "back-up" supply with trickle charger.

able cost without the need for a huge dropping resistor. This circuit uses the LM317 adjustable regulator and a few common junk-box parts and will equal the performance of many commercial units. Construction is not at all critical, and the charger can be built in an aluminum mini-box with excellent results. The LM317 will require a heat sink, however, so one of the insulating kits available for that purpose will have to be obtained, as the regulator case must not make electrical contact with the housing.

In operation the bridge rectifier converts

the AC from T1 to pulsating DC. The LM317 senses the output voltage by means of the divider composed of R1 and R2 and maintains this output at the value set by R2. Normally, this value will be slightly less than the open-circuit voltage of the battery. As long as too much current is not drawn, the circuit operates much like the resistor in fig. 1. As the battery charges and its terminal voltage approaches the value set by R2, the charging current will slowly drop to the point where it equals the pre-set "trickle charge" value.

R6 serves as a current limit. Notice that

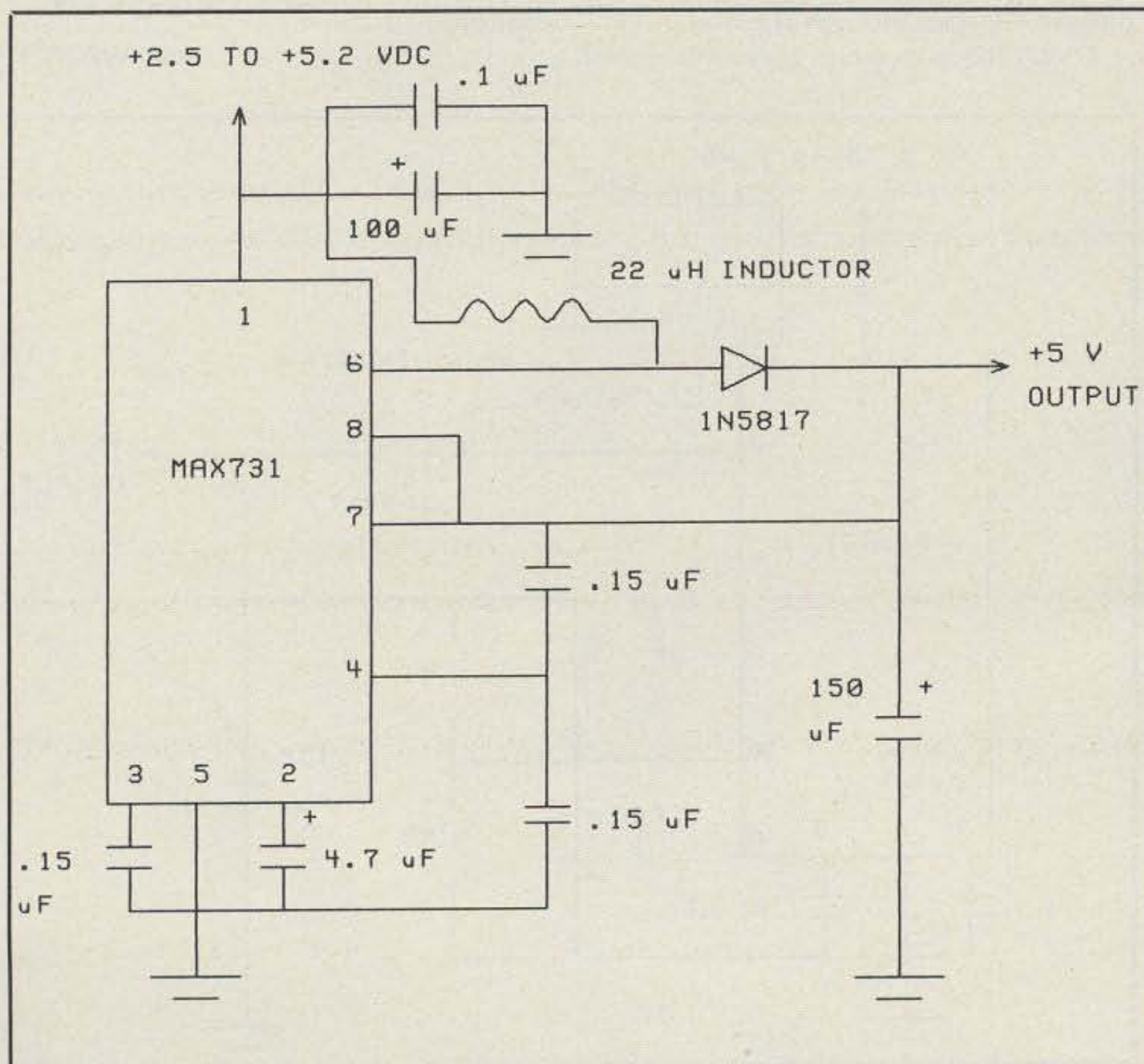


Fig. 4— Basic step-up regulator.

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the current path to and from the bridge rectifier is through R6. With a low level of current, the voltage across R6 is not high enough to turn on Q1 and the regulator operates normally. If the current through R6 becomes too high, such as when a shorted battery is connected to the circuit, the voltage produced will cause Q1 to turn on. When this happens, the regulator output will be lowered to the point where the current again falls below the maximum limit. The value of R6 is chosen so that the maximum output current of the circuit will produce about 0.6 volts across it. A 1 ohm resistor, for example, will limit the current to 0.6 amperes, a 1/2 ohm resistor to 1.2 amperes, and so on.

To set up the circuit, first apply power with no battery connected. Adjust R2 for an output voltage equal to the final open-circuit voltage of the battery. Now connect a fully charged battery, in series with a milliammeter, to the circuit and slightly readjust R2 for the correct value of "trickle charge" current.

Occasionally it would be nice to have a battery "take over" when the AC power line fails. Fig. 3 is a way to do this while having the battery remain at full charge. The DC power supply operates from the AC line and produces enough voltage to forward bias CR1 and reverse bias CR2. This voltage is present at the input of the regulator and provides operating voltage to the circuit. In addition, "trickle current" is pro-

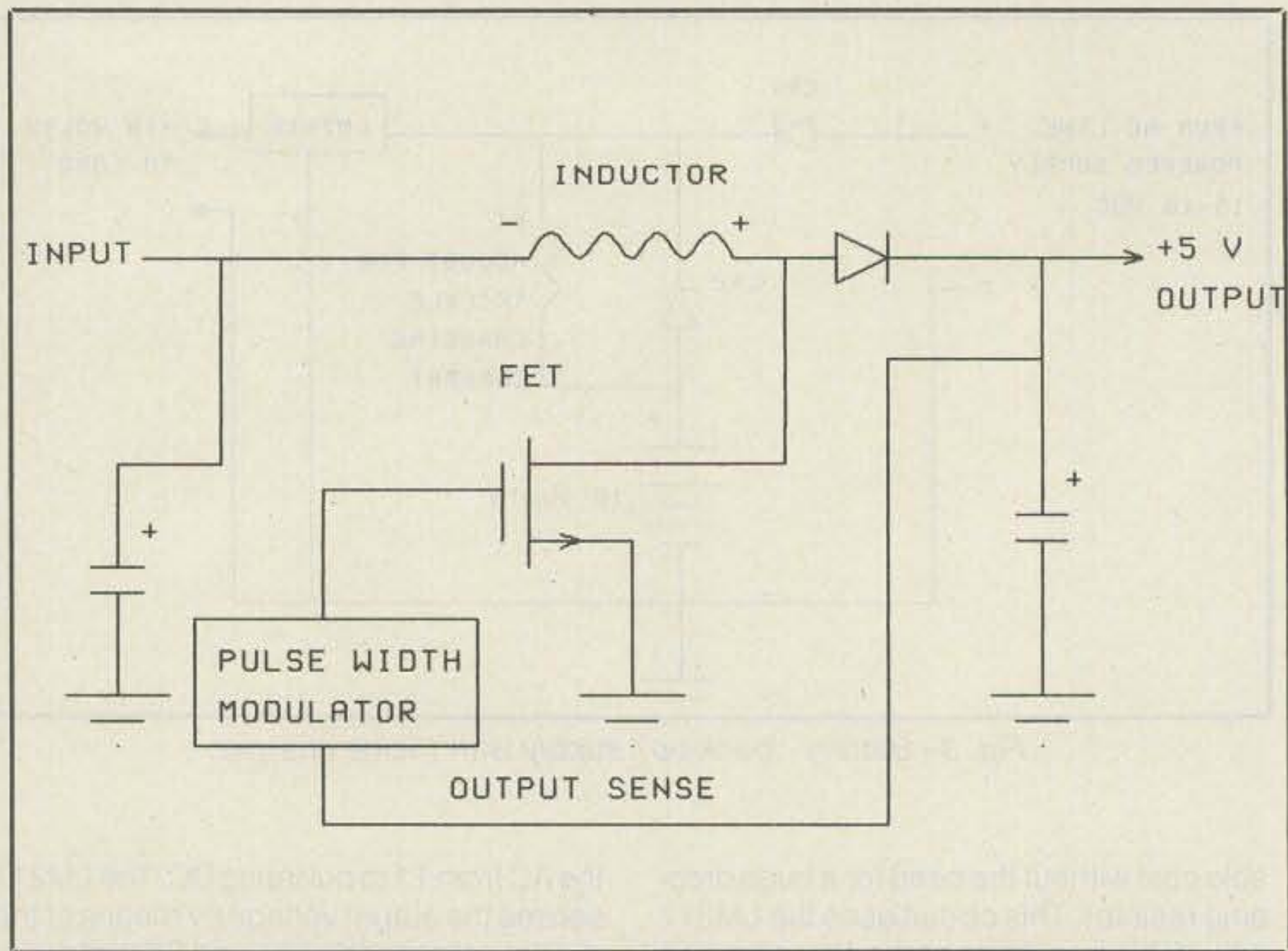


Fig. 5—Basic operation of step-up regulator. As the PW modulator turns the FET on and off, the voltage developed across the inductor is connected in series with the incoming voltage, thereby producing the higher output voltage.

vided via R1 to keep the battery at full charge. If the AC line fails, CR1 becomes reverse biased by the battery, while CR2 becomes forward biased and drives the regulator. The load never even knows anything at all has happened. When the AC line power is restored, the circuit reverts back to its original mode of operation and the battery charges through R1.

I hope the above has given interested

readers an idea of how to charge a battery. Remember, these circuits are only designed for use with rechargeable batteries. Non-rechargeable ones, such as common carbon zinc or alkaline types, will not work in them and may get so hot they leak and may even explode. Therefore, be very careful you only use the proper type of battery.

73, Irwin, WA2NDM

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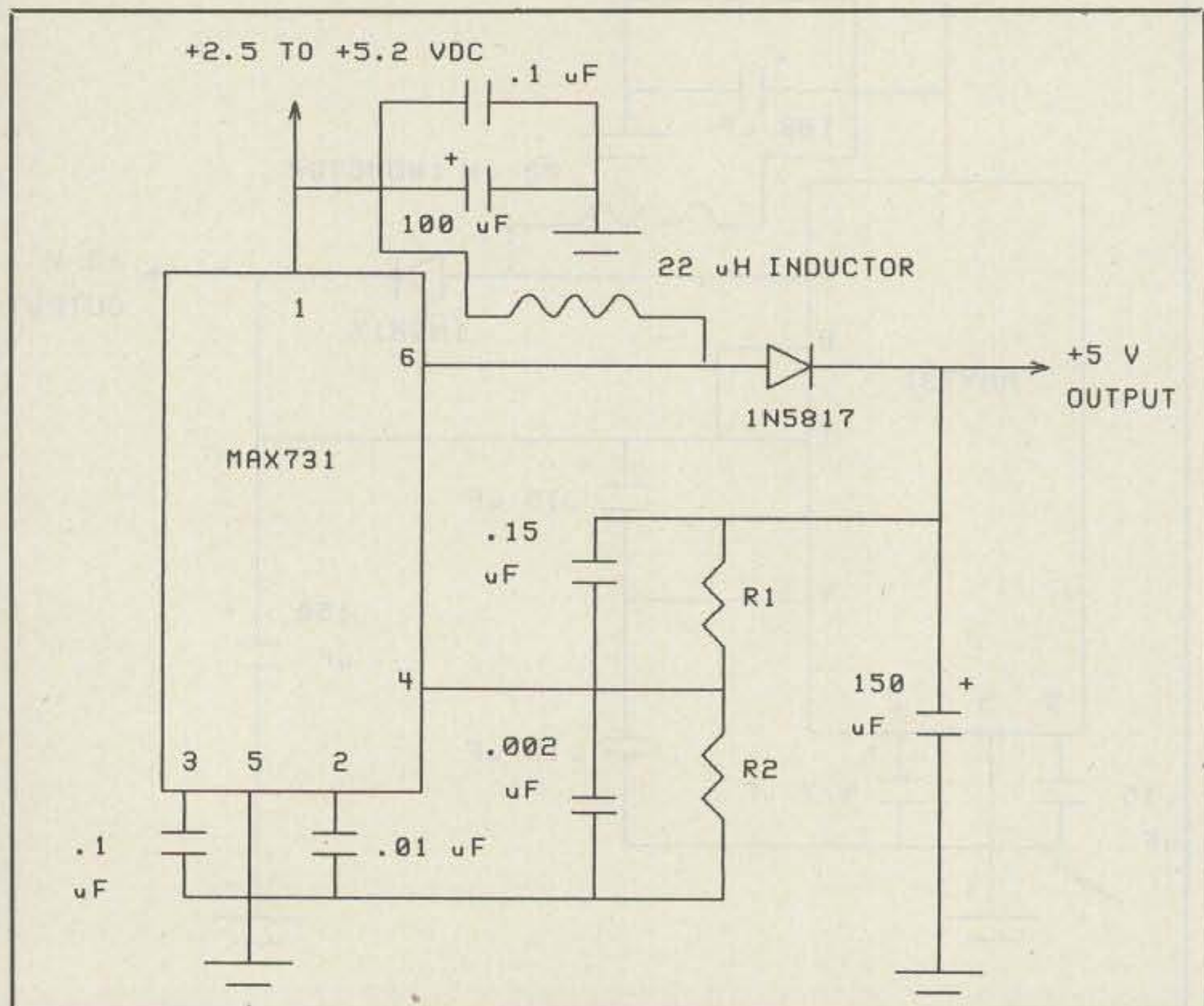


Fig. 6—Adjustable step-up regulator.



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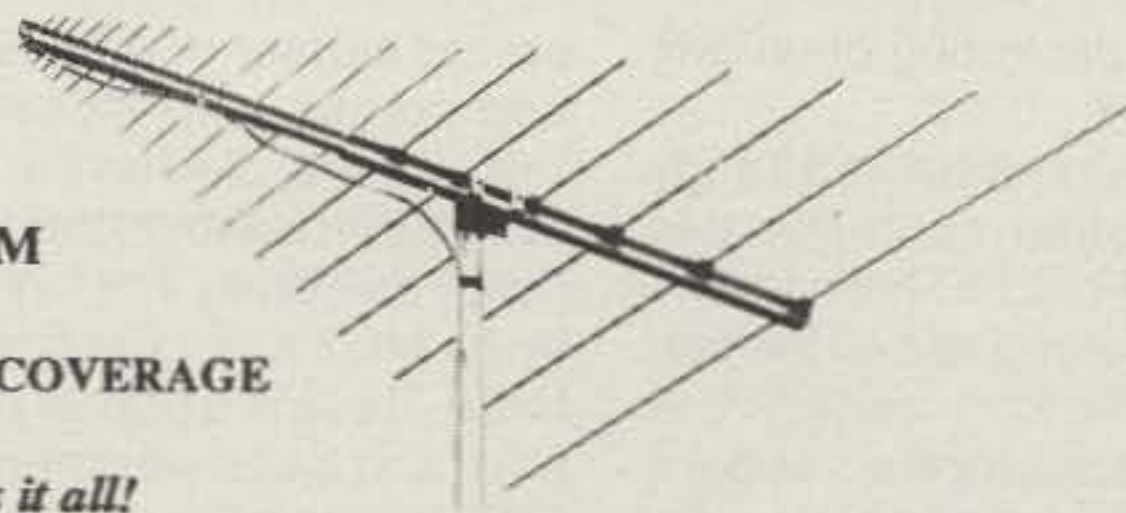
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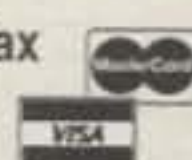
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Portable Packet

While on one of my travels around the country I stayed over in one of the beautiful cities located in the Blue Ridge Mountains of Virginia. I set up my portable packet station and sent a couple of broadcast messages announcing my arrival. It wasn't long before I was in QSO with some local packeteers.

One of the packeteers with whom I connected asked, "How are you doing, Buck?" I answered, "Oh, I'm sitting up taking nourishment." The next response from Jon was "Aren't you feeling well?" That did it. I need to either explain some of my one-liners or stop using them. I had to explain that I was doing great, and that it was only an expression. I also use another one: "I'm touching the high places."

In recent months I've moved into another profession, one that is really made to order for my specialization. In doing so, I've had an opportunity to fly (commute) throughout the United States. Some areas I visited are places I have not visited in some time.

I keep the portable packet station in one of my briefcases so I can set it up and be on the air in short order. This lets me connect with many packeteers from my former Tennessee QTH with whom I would not normally be able to connect. The use of a laptop in my business is almost mandatory, and since there are times when I'm either on an airplane or spending some weekend time in a motel room, this way I



The Tandy 1110 HD fits perfectly in my briefcase with room to spare.

211 Leunburg Drive, Evington, VA 24550

can catch up on my packeting or writing this column.

My new Notebook Computer is a Tandy 1110 HD. It is a laptop that is both portable and affordable. The 1110 HD sells for under a thousand dollars and has all the features that I need while "on the fly." It is completely portable (battery lasts about 4 hours between charges), and it can be op-

erated battery or AC. It is PC compatible and comes with DeskMate™ and MS/DOS 5.0 installed on the hard drive. It has built-in 20 megabyte hard drive, and a 720K floppy disk drive. The high-speed CPU runs at 10 MHz and is supported by 640K of RAM. There is a printer port, a serial port, and a compartment for the optional 1200/2400 bps internal modem. DeskMate

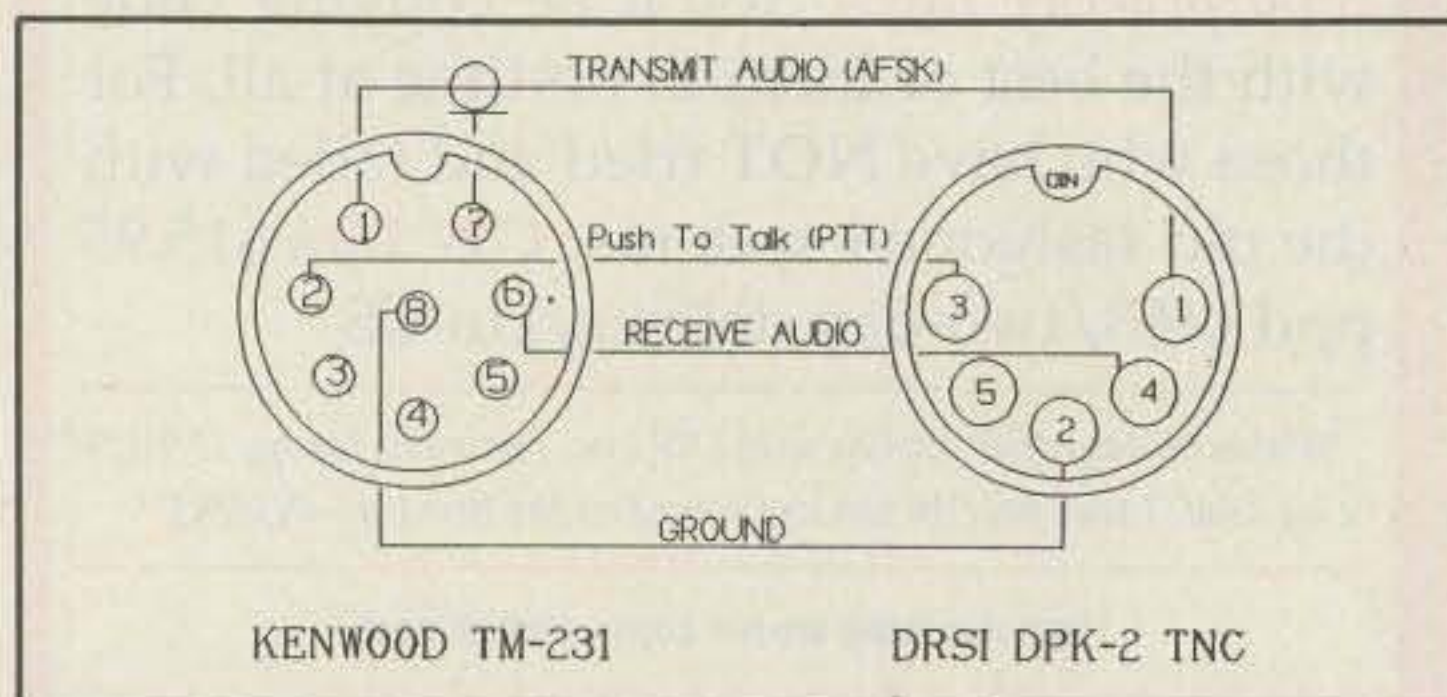


Fig. 1—The TM-231 has receive audio at pin 6 of the microphone connector. The same interface works well with the Alinco DR-1200 DataRadio.

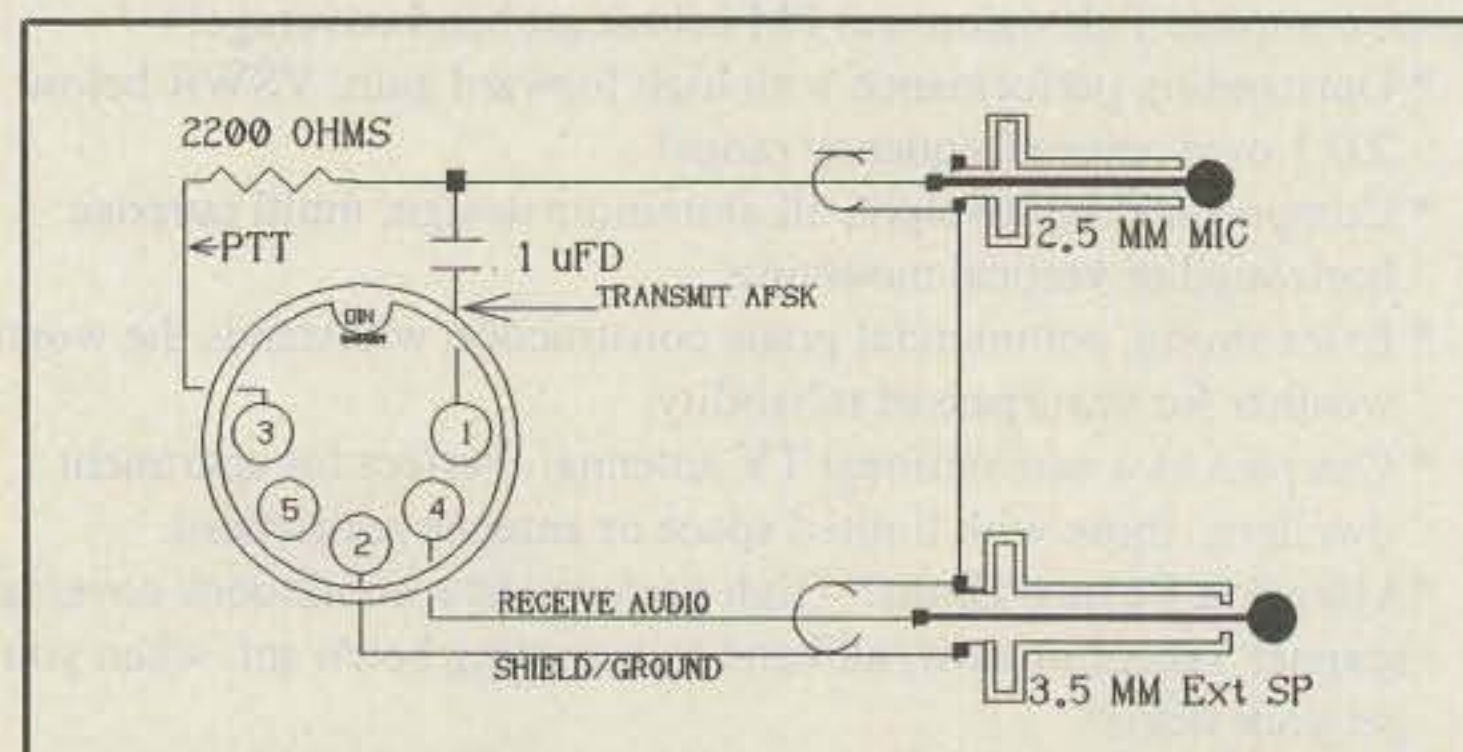
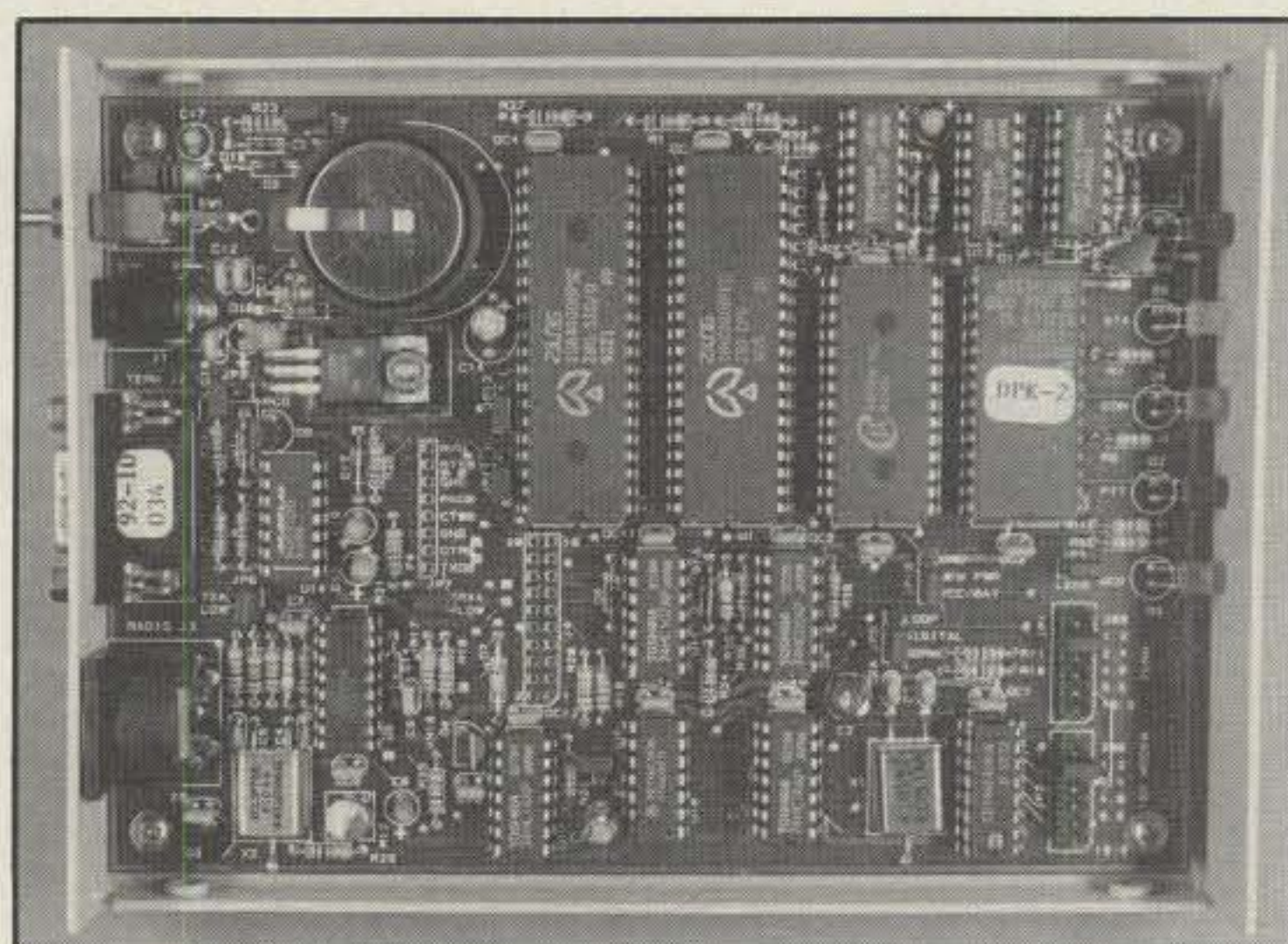


Fig. 2—DRSI DPK-2 TNC to HT interface. The component values shown here are used with the Alinco DJ-F1 and the DJ-580 HTs.



View of the DPK-2 with top cover removed. The DRSI PC boards are among the highest quality PCBs I've seen, and there is no skimping when it comes to the quality of the components attached to the board.

(Top) Front view of the DRSI DPK-2 TNC, which isn't a drain on the pocketbook or the power supply. (Bottom) Rear view of the DPK-2 showing the on/off switch and power supply, RS-232, and transceiver connections.

has a terminal program already resident, so all I needed was the radio (transceiver) and the TNC.

Introducing The New DPK-2 From DRSI

As with all the Digital Radio Systems Inc. (DRSI) products, Andy DeMartini has once again produced another quality TNC. Of all the TNCs I use, the DRSI PC boards are among the highest quality PCB's I've seen. In addition, there is no skimping when it comes to quality components attached to the board.

As I write this column on one of my trips, I am using a new TNC that has just been introduced by DRSI—the DPK-2. The DPK-2 offers users and SYSOPs alike an inexpensive TNC that is not a drain on the packet pocketbook or the power supply. The DPK-2 consumes less than 50 ma, and with the LED's disconnect header removed, the current drain is even less. The latter is most often removed when the TNC is installed at a remote switch or node site where the LEDs are not necessary.

The DPK-2 is TheNET and ROSE compatible. It is similar in some ways to the TAPR TNC-2 clones, where firmware is involved. I've already found some differences, and to my enjoyment, the differences are positive. There are no modification problems in this little powerhouse, as you see in the interface drawings that accompany this month's "Packet User's Notebook."

Shown in fig. 1 is the manner in which I attach the transceiver to the DPK-2, and in fig. 2 is how I attach the DPK-2 to my DJ-F1 HT.

Sporty Little Speedster

The RS-232 port uses the "MAXIM," a new and different kind of RS-232 driver. For my needs the new unit seems to drive the data/terminal speed at a better rate. If you're not sure what I mean, the next time you have your packet station on and you are in the CMD: mode, try holding the Enter key down for a short duration. At the moment you release the key, see if any of the CMD prompts that appear on the screen are out of line, or if there is a horizontal string at the end of the carriage return. With this TNC I have not been able to out run the CMD prompts, so to speak.

No More Mail-Snail

With one TNC we've used we often try a connect only to get the response "NOT WHILE MAIL SERVER IS ON"! Of course we have to go back a step and set the mailbox to OFF and then try the connect again.

With the DPK-2 Personal Mail Server (PMS) set to OFF, the command prompt is displayed as the usual CMD:. When the PMS is set to ON the prompt becomes PMS:. Thus, the operator is advised ahead of a connect attempt that the mail server is ON.

Standard TAPR TNC2 commands are supported in the firmware, and most features are covered. There are other enhancements within the firmware that make this an ideal component in the portable packet environment.

For The ROSE and Node SYSOPs

Since I've already mentioned that the

DPK-2 is ROSE and TheNET EPROM compatible, I've included some serial port interface(s) in fig. 3 to illustrate how easy it is to use the DPK-2's in a gateway configuration. Add to this the new 9600 baud modem that will soon be available for the DPK-2, and we are assured of a smooth transition between LAN and backbone because of the new faster drivers and components. Andy says the new 9600 baud modem is different from the others that are around, but the DRSI will be fully compatible with the current 9600 baud format.

Even at the user level, the DRSI 9600 baud modem can be plugged into the TAPR standard header inside the TNC. The modem (radio port "HBAUD") baud rate can be set for 300, 1200, 2400, 4800, and 9600 bps by JP2. The terminal (ABAUD) baud rate can be set at 300, 1200, 2400, 4800, 9600, or 19,200 baud at JP1. As shipped, the DPK-2 is set for radio port speed of 1200 baud and terminal speed of 9600 baud.

TTL Interfacing—A Lost Art

For the TTL user, TTL connections are made at P4 inside the DPK-2. Pin 1 of P4 is nearest to JP7, and although it may be labeled TXDB, the definition of the connection is actually RxD, or the point where the "receive data" connection is made. The same applies to point number 5 of the P4 connector. Here the PC board might be labeled RXDB, but we attach the "transmit data" (TxD) connection here.

The only other label of P4 that could mislead the TTL user is pin 2. Point number 2 is where we would attach a DCD line if it were used.

Since most terminal programs for the

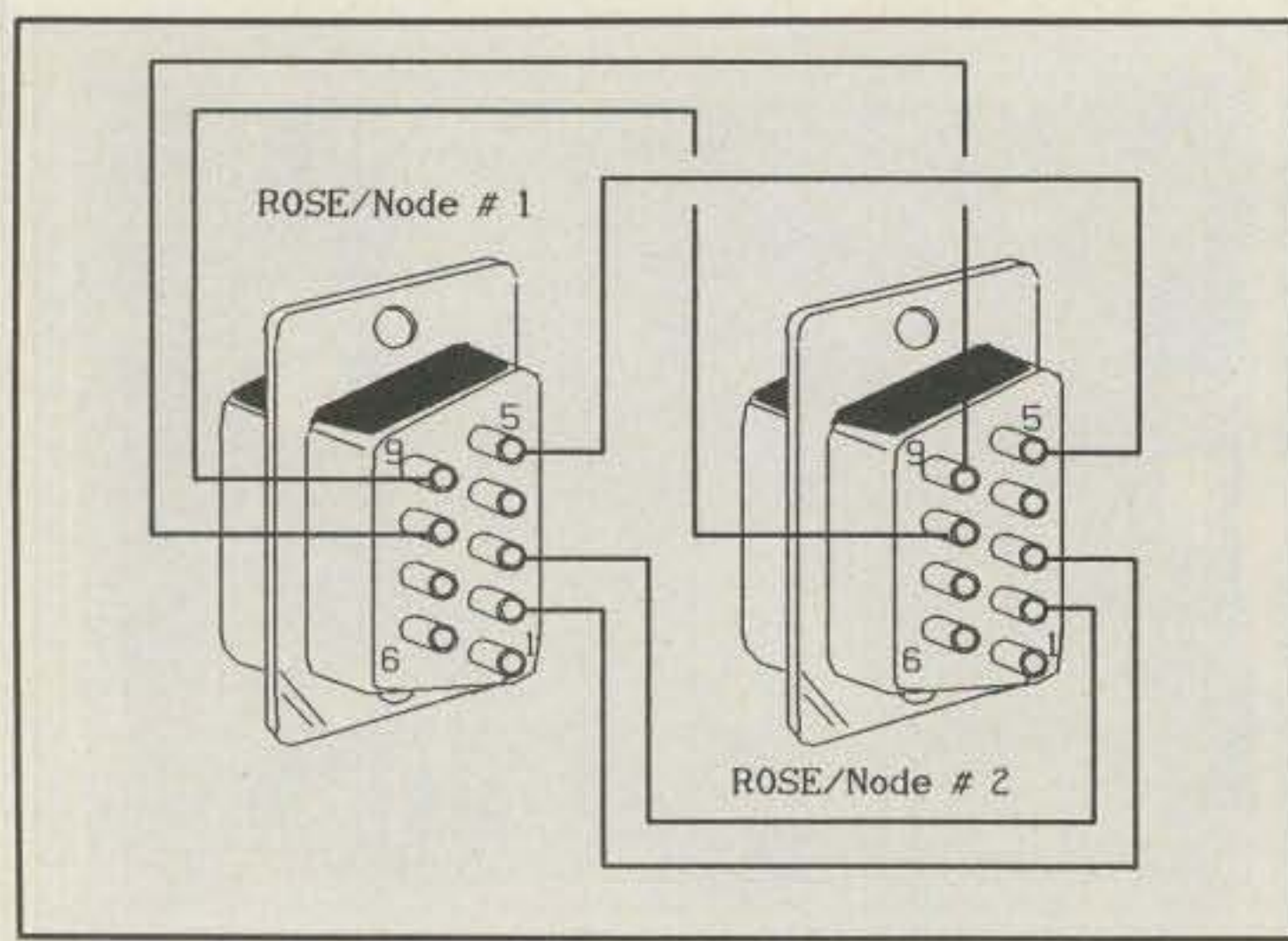


Fig. 3- Interface cable illustrating how the DRSI DPK-2 is used in a gateway application. The terminal speed at JP1 should be set to the same baud rate inside both units. The async port speed can be operating at a higher baud rate (9600) and into a different radio operating on another frequency.

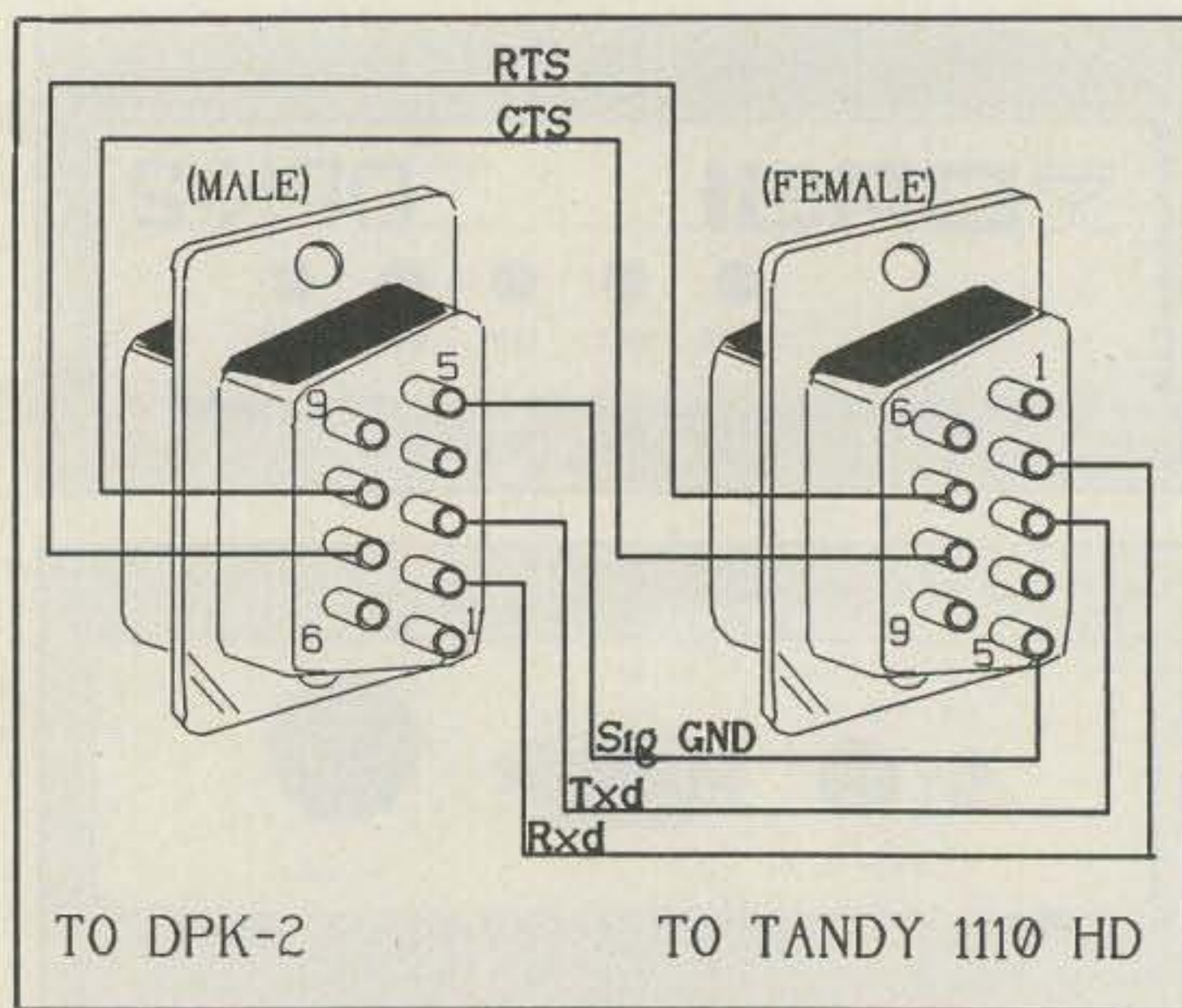


Fig. 4- The Digital Radio Systems DPK-2 connector is "male" and the connector at the Tandy 1110 HD is "female." This wiring configuration supports hardware handshaking.

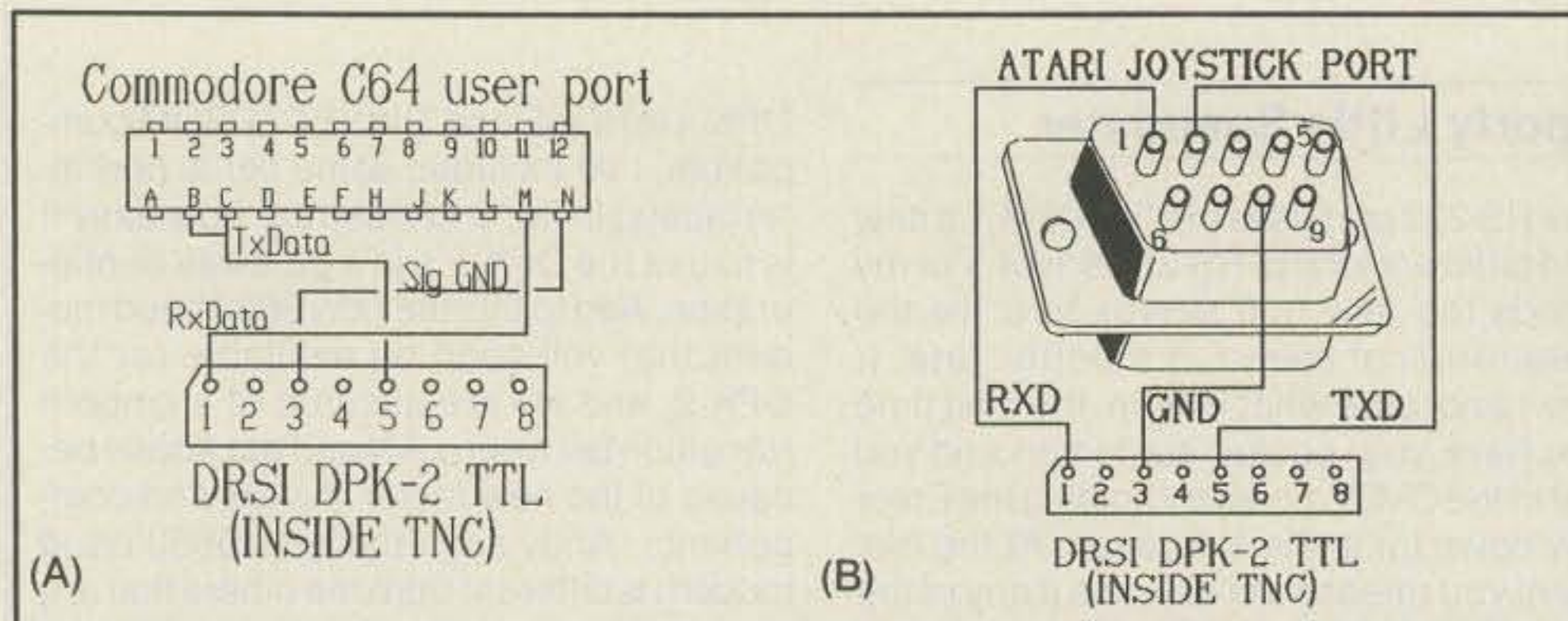


Fig. 5- (A) The TTL port (P4) of the DPK-4 interfaced to a Commodore 64/VIC-20. (B) The DPK-2 connected to the Atari joystick port.

Commodore 64 and Vic 20's enable software handshaking, only the Receive Data (pin 1) and Transmit Data (pin 5) are used (see fig. 5). Signal ground is made at pin 3 or 6 of P4 inside the DPK-2. Another interface to the early Atari is shown in fig. 5B. For the PC and compatible users I've included the interface shown in fig. 4. Note the DB9 connectors on both PC and DPK-2.

A lithium battery maintains the com-

mand memory and the mailbox contents when the DPK-2 is turned OFF. The front panel has no buttons or switches, and there are only five LEDs that identify the DCD, PTT, Connect, Status, and power conditions.

Transmit audio (AFSK) level is controlled by the placement of strapping option JP6. Included in the DPK-2 is a means to control the receive audio level, a feature

not often seen (or used) in a TNC. Receive AF can be set HI or LO with strapping option JP7.

A five-pin DIN connector for the radio port and a power (barrel) connector are included with the TNC. The ON/OFF switch on the rear panel is a very positive miniature toggle (ball-bat) switch. Documentation and schematics are large enough for the user to really read and define the parts.

There are no vacant sockets inside the DPK-2, and the layout is packaged so as to conserve space and reduce EMI. This allows the size of the DPK-2 to be compressed into 6 1/2" x 5" x 1 1/4". With this compact size I'm able to place the Tandy 1110/HD Notebook computer, the DJ-F1 HT, and the DPK-2 easily into my briefcase. There is enough room leftover for my printed material and a small 12 volt, 1.7 amp nickel-cadmium battery which operates the TNC longer than the charge on the battery in the computer.

There is enough room for everyone to have some fun, at home or on the road. More and more packeteers are finding that portable packeting is fun and affordable. If you are like many other packeteers who would like to have a packet station on the fly or be ready in an emergency, look into this or similar systems for portable operating.

For more information about the Tandy 1110 HD (PN 25-3531), see your local Radio Shack store or dealer.

The DPK-2 lists for \$114.95. See your DRSI dealer for more information or contact Digital Radio Systems Inc., 2065 Range Road, Clearwater, FL 34625 (813-461-0204; FAX 813-447-4369).

Happy Packeting!

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X-200A	144/440	6.0/8.0	200	UHF	8.3	112
X-300A	144/440	6.5/9.0	200	UHF	10.2	112
X-510NA	144/440	8.3/11.7	200	N	17.2	90
X-510MA	144/440	8.3/11.7	200	UHF	17.0	90
X-500HNA	144/440	8.3/11.7	200	N	17.8	90+
X-700HA	144/440	9.3/13.0	200	UHF	24.0	90
X-2200A	144/222	6.0/7.8	150	UHF	11.5	112
X-3200A	144/222/440	6.0/7.8/8.0	100/200	N	10.5	112
X-6000A	144/440/1240	6.5/9.0/10.0	100/100/60	N	10.5	112



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445MHz

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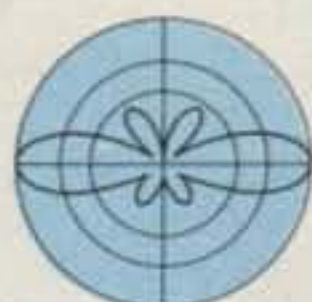
BAND: 144=144 - 148MHz. 222=222 - 225MHz. 420=420 - 430MHz.
430=430 - 440MHz. 440=440 - 450MHz. 1240=1240 - 1300MHz.
* X510NJ :144 - 147 / 430 - 440MHz

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F-22A	144	6.7	200	UHF	10.5	112
F-23A	144	7.8	200	UHF	15.0	90
F-142A	222	5.5	200	UHF	6.0	110
F-718A*	440	11.5	250	N	15.0	110
F-1230A	1240	13.5	100	N	10.5	90
U-200A	440/1240	8.3/11.7	100	N	5.9	135
U-300A	440/1240	8.6/13.2	100	N	8.3	110
U-5000A	144/440/1240	4.5/8.3/11.7	100	N	5.9	135
V-2000A	50/144/440	2.1/6.2/8.4	150	UHF	8.3	110

*F-718A:440 - 450MHz, F-718J:430 - 440MHz, F-718L:420 - 430MHz



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U-300A 1200MHz

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FCC Issues NPRM Concerning VHF + Frequencies

On 4 December 1992 the FCC issued a press release announcing that the Commission was proposing rule changes to the Amateur Service that would essentially combine three petitions (two ARRL, RM-7868 and RM-7869, and one by Dr. Michael C. Trahos) into one proposal. The substance of the proposal is three issues. First, the FCC proposes that repeater operation be prohibited from 222.000–222.150 MHz. Second, the FCC proposes that the Novice class licensee be granted full frequency access to the 222 MHz band. Third, the FCC proposes that Novice privileges would include authorization to be control operators of repeaters in this band and the Novice subband of 1270–1295 MHz in the 1240–1300 MHz amateur radio band. Comment and reply dates were not available as of the writing of this column. However, by the time you read this, that information will have been publicized in other media.

With this NPRM the FCC has stated that they agree that a designated "weak signal" portion of the 222 MHz band seems warranted. It also appears that the FCC is recognizing that volunteer cooperation is not working in all parts of the country. In some of the areas of the country, such as in Texas, repeater coordinating organizations, such as the Texas VHF-FM Society, have gone out of their way to cooperate with the weak-signal community to establish a band plan that accommodates the weak-signal activity within their territories. However, in southern California it is a different matter. Under the leadership of Mark Gilmore, WB6RHQ, in September 1992 the Spectrum Management Association, the southern California repeater coordinating organization, agreed to declare the spectrum of 222.000–222.110 as "weak signal" and thus free from repeaters. However, according to Wayne Overbeck, N6NB, and Chip Angle, N6CA, reports of malicious interference from FM operators to weak-signal operators continue come to their attention. Wayne stated that more than two months after the voluntary band plan was to be effective, weak-signal operators are being subject to deliberate interference from stations operating on FM, with the latter claiming that weak-signal operators are "not allowed" on that portion of the band.

From these examples it is evident that voluntary cooperation has worked for some areas of the country, but it clearly has not worked in southern California.

The repeater operators have stated that southern California has problems unique to its locale. However, many feel that the problems seem to be principally caused by the rationale that states that everyone wants to own his or own repeater.

Another reason given for a regulated portion of the band has to do with uncoordinated repeaters. With the growing desire to place repeaters

VHF Plus Calendar

Jan. 23–25	ARRL VHF Sweepstakes. (See text for details.)
Jan. 26	Approximate beginning of KH1 operation. (See text for details.)
Jan. 31	First quarter moon.
Feb. 7	Full moon and Perigee. Excellent EME conditions.
Feb. 13	Aurora '93. Contact Paul Husby, W0UC, 612-642-1559.
Feb. 14	Moderate EME conditions.
Feb. 15	Last quarter moon.
Feb. 16	Noisy EME conditions. Sagittarius A.
Feb. 22	New moon and Apogee. Poor EME conditions.
Feb. 28	Moderate EME conditions.
Mar. 1	First quarter moon.

on the air and the lack of available spectrum to handle the requests for these repeaters, the temptation exists to establish uncoordinated repeaters. If an uncoordinated repeater were to show up in a portion of the band that clearly prohibits that type of operation, there would be the force of law behind the efforts to silence the offending repeater.

The argument is made, however, that this effort to silence the trespassing repeater is the responsibility of coordinating organizations. When an uncoordinated repeater shows up, all the organization has to do is go to the FCC and force the uncoordinated repeater off the air. Regardless, this action usually only takes place when such a repeater is interfering with a properly coordinated repeater. Unfortunately, rarely is relief via this route available to another type of user of the spectrum. These situations cause Wayne to conclude that an FCC regulated portion of the band is necessary.

Why should there be a weak-signal segment at all? Wayne wrote an interesting paper that he presented to the 1992 West Coast VHF conference (a copy of it is in the *Proceedings* for that conference). In it he gave a history of activity on the band that dates back to 1934. However, the most significant aspects of the paper were the citing of the post World War II accomplishments.

Wayne first reports on the successful contacts that Fred Tuckerman, W3LZD, made with W8DX and W8BFQ via aurora in 1954. The next distance record to fall would be via propagation caused by tropospheric enhancement. Wayne indicated that the extension of the distance record for this mode of propagation was accomplished on this band in 1959 by John Chambers, W6NLZ, and Ralph "Tommy" Thomas, KH6UK. He pointed out that 2 years after Chambers and Thomas made their historic contact on 2 meters, they tried it again on 1.25 meters. By comparison, their contact on 1.25 meters was far easier to accomplish than their contact on 2 meters, having taken only 5 days of schedules on 1.25 meters as compared to 9 months on 2 meters. Wayne recounted that after this contact on 1.25 meters, the federal government, particularly the defense department, took a keen interest in

propagation via tropospheric enhancement. As a result of their investigations they concluded that, among other things, it was conceivable that signals previously thought not receivable on higher VHF frequencies were indeed copyable under the right circumstances.

Following the successful 2 meter meteor-scatter contact in 1954 between Paul Wilson, W4HHK, and Tommy Thomas, W2UK (yes, the same Tommy, only under a different callsign), efforts were made to see if it was possible to make a meteor contact on 222 MHz. Wayne reports that on 9 August during the 1968 Perseids shower another Californian, Mel Baer, W6WSQ, and Don Hilliard, W0EYE (then living in Colorado and now W0PW and living in Missouri), made the first meteor-scatter contact, over an 825 mile path. Surprisingly, that record lasted only two days before being broken by John Perchalsky, K4IXC, in Florida, and Jud Snyder, K2CBA, in New York, when they made a contact over a 1090 mile path. Wayne goes on to report that Mel and Don completed a second contact on 12 August.

Wayne continues by stating that only two years following these firsts on meteor scatter Jud was at it again, this time trying EME communications. At the same time Louis Anciaux, WB6NMT (now KG6UH and HL9UH, in Korea) was working with Lucky Whitaker, W7CNK, in Oklahoma to make a successful EME contact. On 15 March 1970 Lou and Lucky succeeded. The next day Lou completed a second contact, this time with Jud.

Wayne goes on to discuss two other forms of propagation discovered to exist on 222 MHz after repeater operation populated the band. In his first example he states that on 9 March 1983 KP4EOR, near San Juan, Puerto Rico, and LU7DJZ, near Buenos Aires, made a successful CW QSO using sky-wave propagation. In his second example he cites the contact between K5UGM, near Dallas, and W5HUQ/4, near Jacksonville, Florida, via sporadic-E as an example of yet another form of propagation existing on this band.

Clearly, this band has a fascinating menu of propagation forms available to its users. Unfortunately, the cloud of uncertainty has hung over

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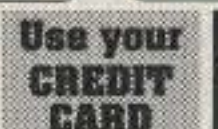
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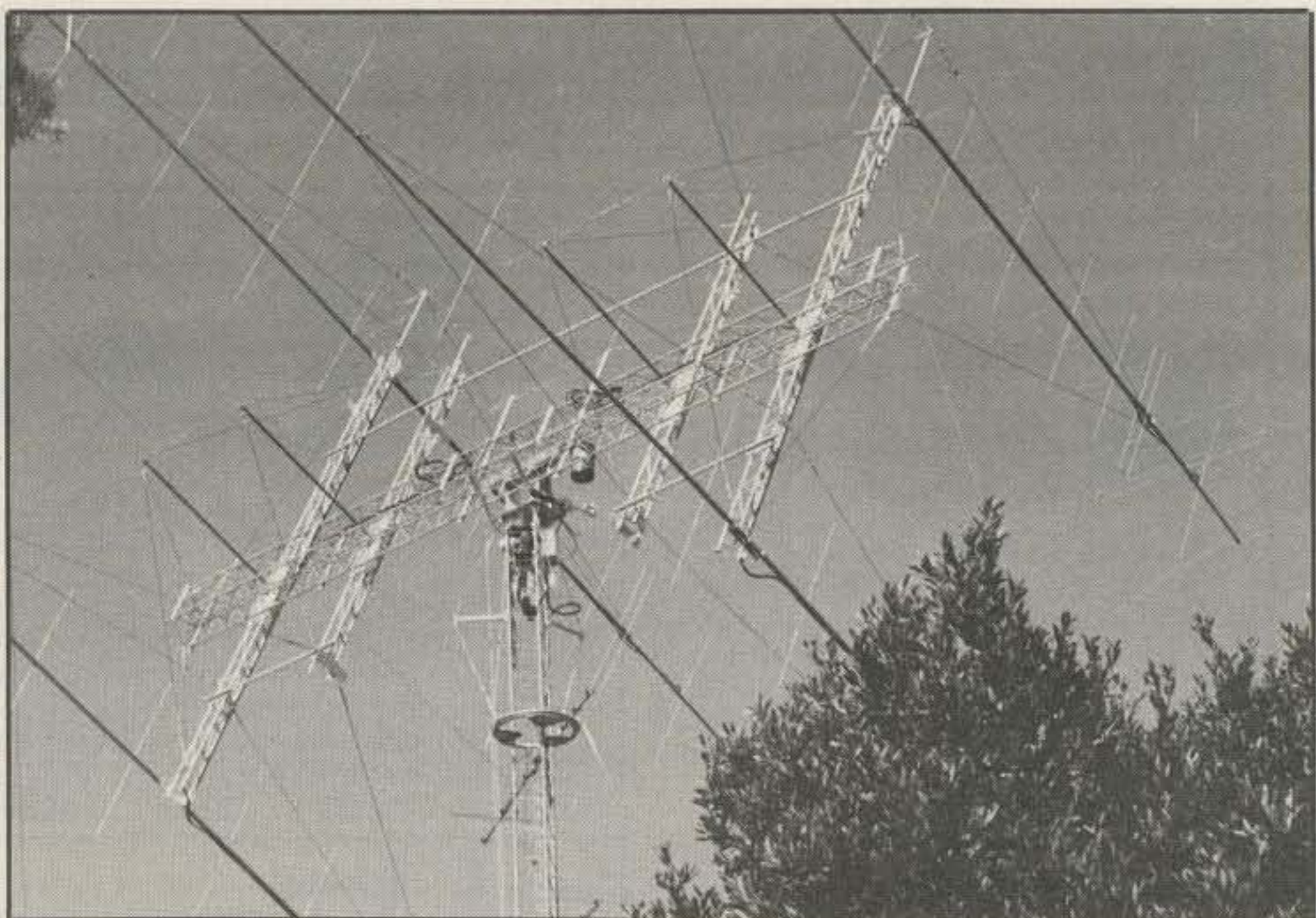
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Bob Magnani, K6QXY, and Al Ferrera, WA6MXA, engineered, designed, and built this beautiful 6 meter EME array. (Photo courtesy K6QXY)

the band far too long. Exploration of its potential has not happened with the necessity required to make even more new discoveries. To the weak-signal community the FCC NPRM is a two-edged sword. If it passes, then we have the protected spectrum. However, it is up to us to use it and make it work for us.

**Joel Paladino, N6AMG,
Silent Key**

On 6 December 1992 Joel F. Paladino, N6AMG, lost his battle with Hodgkin's Disease and the VHF + community lost a valuable friend and contributor. Joel got his most enjoyment in amateur radio by being on DXpeditions. He gave many of us new countries on 6 meters terrestrial and 2 meters EME. Joel wrote of his last DXpedition to Morocco and the Azores in an article entitled "VHF DXpeditioning," which was published in April 1992 *DX Magazine*.

Joel was also a brilliant technician. He worked for Motorola for a number of years as a field site engineer before leaving to start his own consulting business. His last technical work, "An Experimental Solid-State Kilowatt Linear Amplifier for 2 to 54 MHz," appeared in September 1992 *QST*.

Joel made many unselfish contributions to the VHF + community. For example, he loaned almost his entire 6 meter station (including the amplifier described in the *QST* article) to the guys who went to FOOCI, Clipperton, last year. If you worked that DXpedition on 6 meters, you had Joel to thank. Joel also gave unselfishly to others through his labors. In Bob Magnani, K6QXY's photo album showing the progress of his 6 meter EME array is a picture of Bob and Joel on top of the world (on the cross boom of the array).

Joel's last attendance of CSVHF conferences was the 1991 gathering in Cedar Rapids, Iowa. There he presented a paper entitled "A Rapid Deployment Prototype Solid State Kilowatt Linear Amplifier for 2 to 50 MHz Using MRF-154s." (This paper was a precursor to the above *QST*

article and was published in the 1991 *Proceedings*). Because of failing health he was unable to attend the 1992 conference in Kerrville, Texas. Nevertheless, thanks in large part to the efforts of Bill Tynan, W3XO, he was honored at the SMIRK (Six Meters International Radio Klub) breakfast Sunday morning by being awarded SMIRK's Award of Merit for Technical Achievement. (Those in attendance at the conference were able to sign a huge banner that expressed good wishes to Joel).

Mike Staal, K6MYC, a long-time friend, remembers Joel as an enthusiastic amateur who enjoyed working contests from Mike's QTH. He also remembers Joel's enthusiasm toward the hobby in general. Bob Magnani, K6QXY, remembers Joel as one who was always ready to give assistance to his fellow ham. He described Joel as a person driven to do things right and thoroughly.

Perhaps Joel's biggest accomplishment was the establishment of an extensive VHF-microwave repeater system that covers most of California. Bob remembers times when Joel would call up from Australia and control aspects of the repeater system over the phone while away on a trip.

My fiancée, Carol King, K5CPZ, and I last saw Joel when we paid him a visit at the hospital following our trip to Jimmy Treybig's barbecue. Joel's strong love for animals was clearly demonstrated when he insisted on meeting Carol's guide dog, Echo, during our hospital visit.

Joel's loss has been felt worldwide by his friends in the VHF + community. He will be missed by many who knew him and many who benefitted from his contributions. Knowing Joel, though, I think he is trying to plan a DXpedition to some distant part of the universe. We on this planet, though, will miss you very much, Joel.

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Bob Magnani, K6QXY. In the December issue I mentioned seeing pictures of Bob Magnani,

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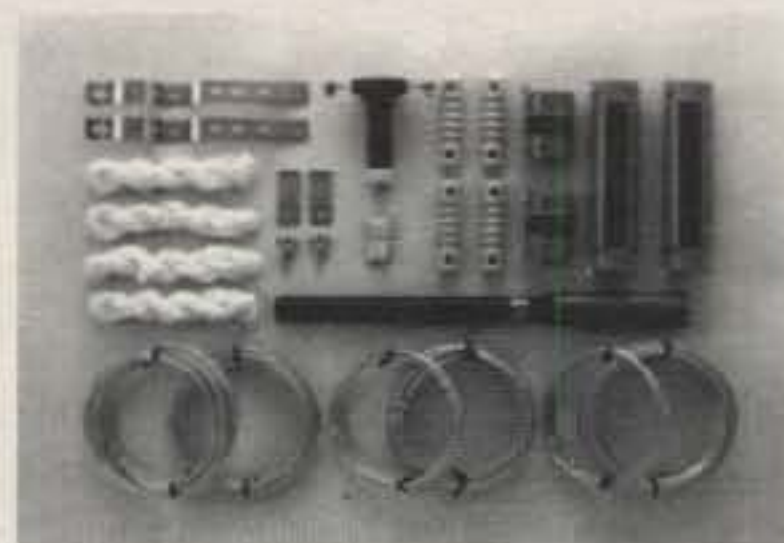
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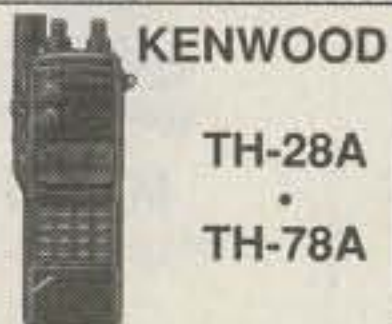
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K6QXY's well-engineered 6 meter EME array. Within this column you can also see a picture of it. Bob and Al Ferrera, WA6MXA, engineered, designed, and built this beautiful array.

The array is installed on top of 50 feet of Tri-Ex T-20 tower that is rotated at the base by a number 100 chain drive linked to a one-quarter horsepower 1750 RPM reversible motor that is coupled to a 3600:1 gear box. Elevation is accomplished using a 24 inch throw, 1 inch recirculating ball nut, "acme" screw, 28 VDC linear actuator. Elevation readout is performed by using a weighted pendulum on a synchro-generator. The antenna can be elevated from -2 to +90 degrees.

The "H" frame consists of two parallel 40 foot sections of Rohn 45G tower. The vertical towers are Alumina towers with 10 inch faces. The antennas are four specially designed 11-element 2.5-wavelength M2 antennas that are stacked 30 feet apart horizontally and 28 feet apart vertically. The antennas are fed with 1/8 inch heliax type cable to the tower and 7/8 inch heliax type cable to the relay box. The rotator and elevation loops use RG-213 type cable.

Bob reports that he plans to install four 20-element 6-wavelength 144 MHz Yagis and a receive-only polarization switch box. When installed, this box will enable vertical and horizontal elements to be combined and delayed accordingly to produce vertical (90°), horizontal (0°), 45°, and 135° polarization.

To date Bob has worked OH2BC, W5FF, K5FF, and W7HAH, and had partial contacts with WA4NJP and KN5S.

Fred and Lee Fish, W5FF and K5FF. The Fishes have built a 6 meter array on a much smaller scale. Their array consists of four 7-element antennas on 24 foot booms. These antennas are similar to the ones Bob Sanders, WW4T, is using on Maude (see last February's column for more information on his array). He feeds the array with 7/8 inch heliax-type cable and uses RG-214 type coax for the feed lines between the antennas.

Fred reports that in spite of the lack of size, during good conditions he can hear his own echoes, even with the antenna pointed straight up. To date he reports working OH2BC, W7HAH, K6QXY, W6JKV, K6MYC, and WA4NJP. Lee has worked OH2BC, K6QXY, and WA4NJP.

Bob and Fred represent a growing number of amateurs interested in 6 meter EME. With the sunspot cycle making its inevitable slide, F2 propagation is becoming increasingly scarce. The serious DXer feels that the only way to work more countries on this band is via the moon.

Is getting on the moon that difficult? Not as hard as one might imagine. It is necessary to have a linear capable of running nearly 1 kw. The minimum antenna would be one that has around 16 dBi gain. Shep Shepard, W7HAH, uses just such a setup, running 1 kw into an M2 2.5-wavelength 11-element beam (the same antenna Bob uses, only a stock version).

Mike Staal, K6MYC, who, through his antenna building expertise and companies, has probably built more antennas that are being used on the moon than anyone else in the world, makes some comparisons between 6 and 2 meters. He reports that ground gain is better because broken terrain has less effect on this band. He says that libration fading is less of a factor on this band and that even though sky noise is more, the path loss is less.

Ray Rector, WA4NJP, who has more contacts than anyone else (40 QSOs, 18 initials, 4 continents, and the only North American to work

FG/W6JKV during Jimmy's stay) reports that it requires a bit of patience to complete a contact. He says that for him the sky noise is very hard to contend with. He made a comparison between the sky noise on this band and 70 cm. He says that he can connect a dummy load to his radio, and the noise from the dummy load is nothing compared with the sky noise on 6 meters. By contrast, the same dummy load is noisier than the sky noise on 70 cm. Presently, Ray is using four 36 foot long W1JR designed Yagis mounted 80 feet high. He says that he is building an array that will consist of nine of these antennas. It will be ground mounted and used to complete his (and hopefully the first) WAC on 6 meters "off the moon." Ray reports that many Europeans, using only 6-element beams, have heard him.

As a way of encouragement to the DXer, Bob suggests that DX stations could also consider building arrays that would be fixed at a position in the sky. Operators who want to work these stations would set skeds that would occur during their common window. Bob suggests that several of the bigger stations that are well-equipped are already capable of operating "on the moon," albeit on their horizon.

Bob and the other operators who are actively on the moon on this band are hoping that others will also take the challenge. To that extent several stations are planning a day early this year that they will be transmitting, hoping to be heard by DX stations. Announcements of the exact date will be made on the EME net, and hopefully operators who have heard these stations will send SWL reports to them. Incidentally, if you are looking to set up a sked with Bob, you can contact him at 707-538-3801, or FAX 707-538-1343.

Another Big Gun On The Moon

After about a nine-year absence, Gerald Williamson, K5GW, has returned to 2 meters EME. Gerald, not known for doing anything halfway, has built a 480-element array. It consists of 48 ten-element 2.5-wavelength boom Yagis that are stacked six high and eight wide. The array produces an incredible 29 dBi of gain. The antennas were designed using the K4VX YAGIMAX 3.23 software, and an individual antenna was range tested to verify the accuracy of the computer program. The 52 by 75 foot antenna array is fed with 575 feet of 7/8 inch heliax type of hardline and over 650 feet of RG-213 type of coax. The tower folds over at the base for ease of maintenance, although once down it requires the assistance of a John Deer tractor to raise it back up.

The array is completely computer controlled, using software that Gerald designed and an industrial A/D converter board that converts the data streams to the necessary 28 volts.

During the first weekend of the operation Gerald kept blowing preamps because of a switching problem. Therefore, his 135 QSOs with 35 multipliers were made using the IC-275 without a preamp. During the second weekend a power divider opened up, thereby shutting down half of the array. Nevertheless, Gerald was able to complete an additional 75 QSOs with an additional 16 multipliers.

Gerald, who owns Texas Towers, reported that because of all the aluminum he used in constructing the array, he has, by default, gone into the aluminum tubing business (have you seen

one of their ads lately? Excellent prices!).

If you are looking for a sked with Gerald, you can reach him "at the office" at Texas Towers (214-422-7306) almost any week day.

VE3ONT Loses Power Just Before Contest

What was hoped to be the biggest signal on the band during the second weekend of the EME contest turned out to be the biggest disappointment for all concerned.

Mike Owen, W9IP, reported that in anticipation of the big event, the team traveled to Pembroke on Thursday, where they spent the night. During the night a violent snow storm came up and resulting winds in excess of 60 mph buffeted the area. The next day they made it to the site, having to use four-wheel drive to get around all the downed trees. Upon arrival they discovered that not only trees were down, but power lines some distance from the site were also down, causing loss of power to the site. The only power available was from a generator that provided enough power to keep warm and test the equipment (during their tests they did hear signals, presumably from one of the side lobes of the dish). During the day the optimistic hams went ahead with the equipment installation. In the wind and blowing snow, Mike, his guardian angel, and other members of the team (and presumably their guardian angels, too) braved trips up the 90 foot extension of the cherry picker to install the equipment in the feedpoint room (well, it is almost as big as a room).

The next day they talked to the power company representative and were told that power would not be restored before Sunday night. Painfully disappointed, they spent the better part of the day taking the equipment back down and packing up for the trip.

While discouraged, they were given assurances that they could return another day. Mike states that they intend to be back sometime this

spring and that they will mount a three-band effort (144, 432, and 1296 MHz) during this year's ARRL EME contest.

More EME Reports

Chuck Smallhouse, WA6MGZ. Chuck reports that he worked 154 stations with 50 multipliers. Among his totals were 4 new countries and 43 initials, raising his totals to 69 countries and 451 initials. He observed that the conditions were up and down. He said that they may have been better than usual. However, for one period lasting six hours he had no echoes. Additionally, he lost AC power for 4 hours. Chuck runs the maximum power into eight 28 foot 15-element homebrew antennas that are optimized using the DL6WU computer program. Chuck reports that he worked Terry, N6CW, while Terry was at KP2A during the contest. He again worked Terry as VP2ECW after the contest.

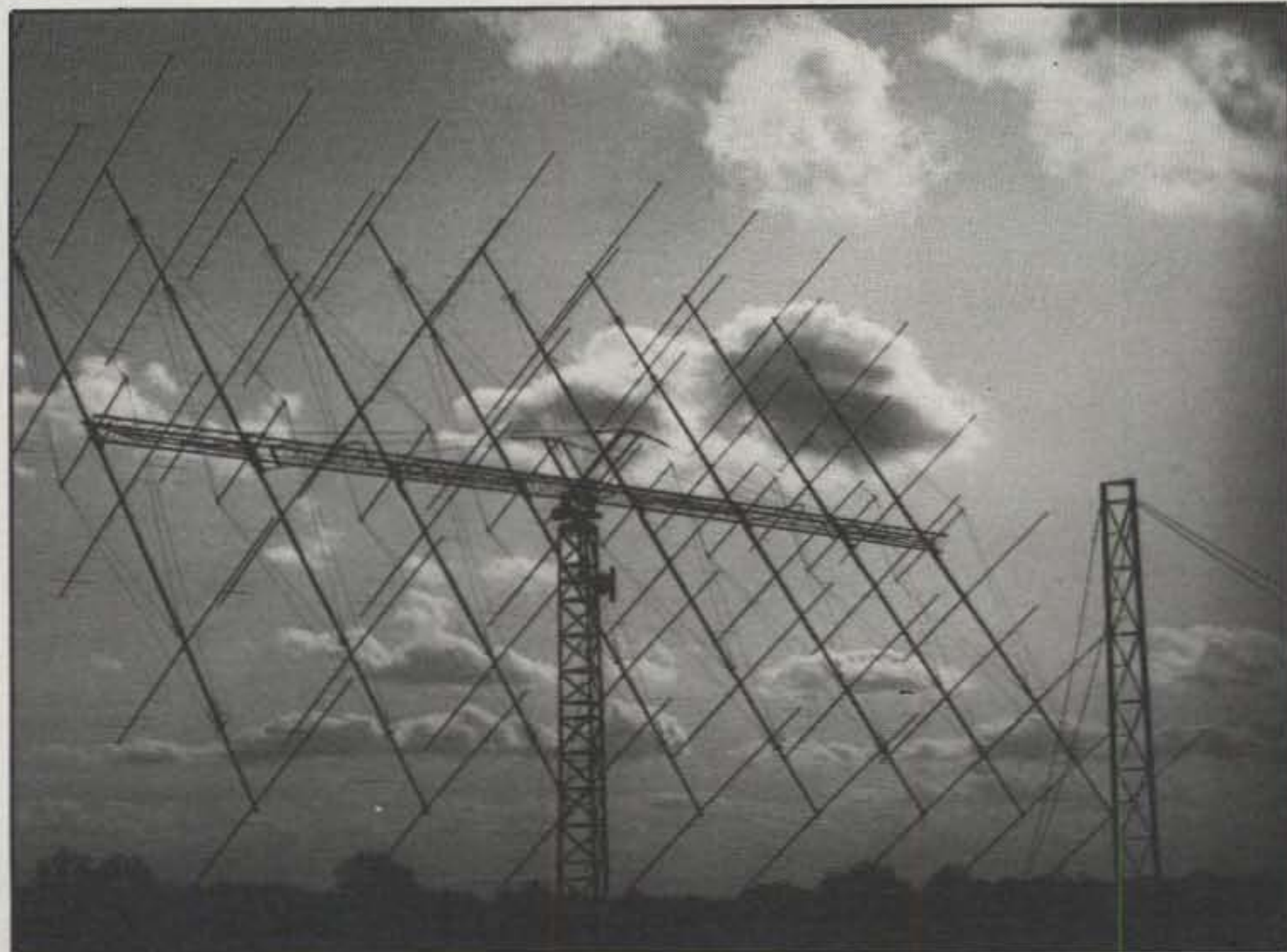
Gary Crabtree, KB8RQ. Gary reported that he worked 237 stations, 56 multipliers. Gary was surprised to work Terry, N6CW, operating at KP2A, for another new country. Gary now proudly displays his DXCC number two for 2 meters. He states that it took him eleven years to work the required number of countries. His first contact was with Lionel Edwards, VE7BQH.

Lionel Edwards, VE7BQH. Speaking of Lionel, he worked 140 stations during the contest with approximately ten initial contacts.

Tobbe Kihlgren, SM5FRH. Tobbe reported 254 contacts with 56 multipliers.

Terry Baxter, N6CW. During the second weekend Terry was at John Ackley, KP2A's QTH. While there he used John's station to make eight contacts during the contest and an additional ten contacts after the weekend.

Joel Harrison, WB5IGF. Joel, operating on 2 meters, worked 46 stations, with 24 multipliers. Among his initials were JL1ZCG, HG1W, LA0BY, RB5PA, and LZ2US. He reports that both weekends were very good for him, with the exception

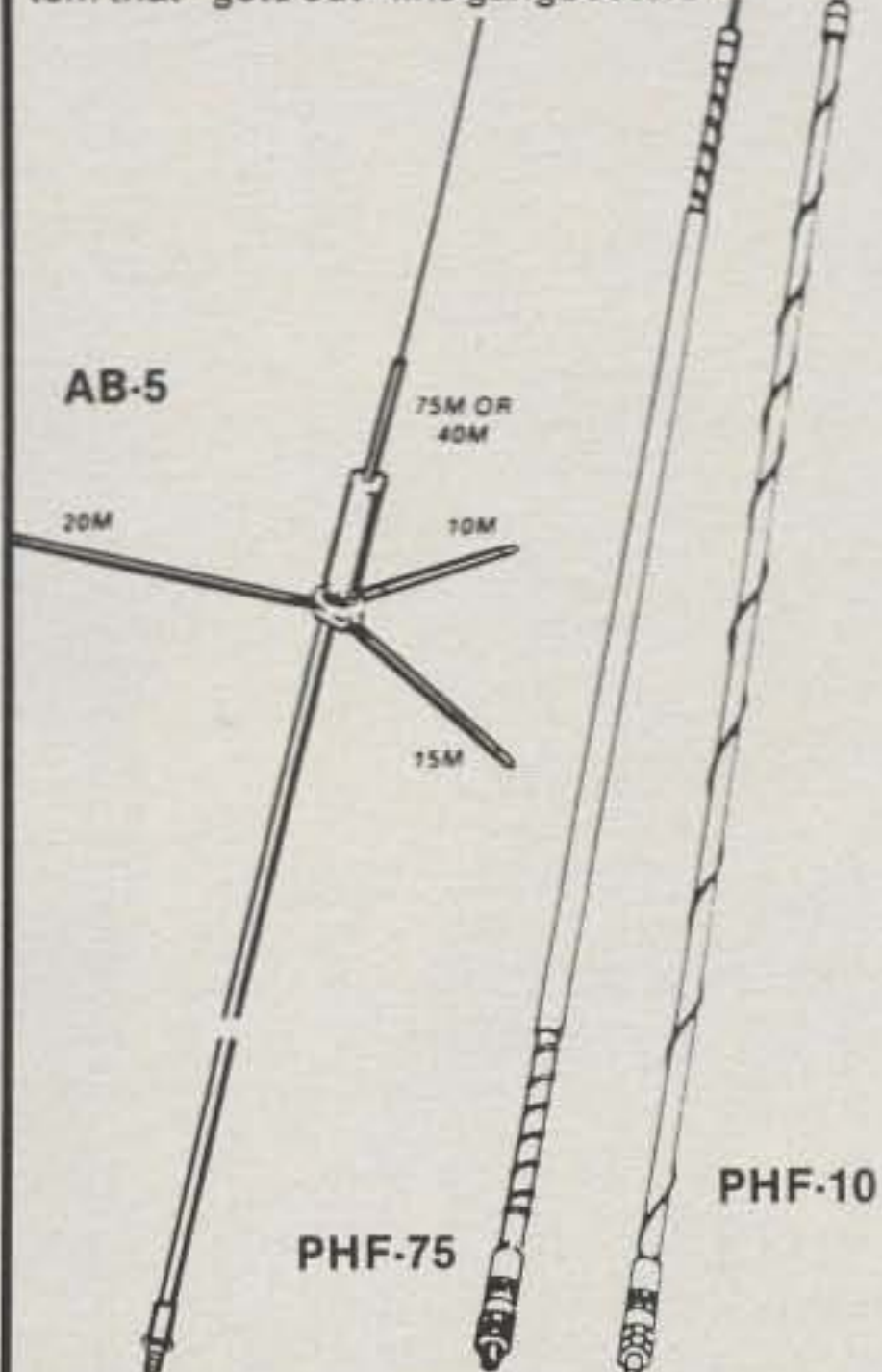


Gerald Williamson, K5GW, has returned to 2 meters EME in a big way with this 480-element array. Look for him on your moon rise (or set) around 144.009 MHz. (Photo courtesy WA5VJB)

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November 18, 1992
FROM: Anthony W. Deprato WA4JQS/VP8BZL
Team Leader, South Sandwich Island
Antarctic DXpedition VP8SSI

TO: GAP Antenna Products
6010 N. Old Dixie Hwy. Bldg. B
Vero Beach, Florida 32967



I would like to take this time on behalf of myself and the entire South Sandwich Island DXpedition Team to thank you for your support in making the VP8SSI Operation a success. I must say that the first time I saw the Voyager-IV was at the Dayton Hamvention and my first thought was that it would not stand up in a high wind area! Well, your antenna has made me take back those words. I was never so fooled by a product in my life! I was sceptical when I first learned from Ralph Koir that we would be taking this antenna along. It was new and I had not heard any reports on it good or bad. I was soon to learn a lesson.

We had been on Thule Island in the South Sandwich group and operating as VP8SSI for about four days before we were able to start setting up for low band operations. We unboxed the Voyager and about two hours later had it assembled on the ice and ready to raise. Two of the team raised the antenna and we used 3/16" Dacron rope to install one set of guy wires about mid way up the antenna.

During the next ten days, we were pounded by storm after storm with constant winds of 50 to 70 mph. We clocked winds at over 132 mph during one very intense storm. During all this, the Voyager never once came down and the last site I saw as we departed Thule Island was your antenna standing where the VP8SSI camp had been!

Looking at the logs upon our return, we noted that we had logged 5,793 QSO's world wide on 40m, 745 QSO's on 80m and even though we only logged 3 QSO's on 160m, I have been informed by hams all over the U.S. that we were heard with a very good signal on 160m, but conditions were just not on our side for receiving. You can be proud of the fact that your antenna went to "the worst place on the earth" (quote from captain's log when Capt. Cook discovered the South Sandwich Islands) and withstood conditions very few hams are ever going to have to face.

At this time, the South Sandwich Antarctic DXpedition Group is working on plans for an operation from "Peter the First" Island and the Voyager will be on our packing list! I will also be installing one for use at my home Qth in Kentucky. It is hard to find outstanding products in this day and age, but the Voyager-IV is definitely one of those products

With best regards,
Anthony W. Deprato
A.W. (Tony) Deprato WA4JQS/VP8BZL
Team Leader, DXpedition VP8SSI

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of Friday night of the second weekend. Joel is using 1.5 kw into four Cushcraft 17B2s. Incidentally, Joel has WAS number 123 (for 2 meters) now hanging on the wall.

Tommy Henderson, WD5AGO. Tommy operated on 2 meters and 70 and 23 cm during both weekends. Tommy uses a 16 foot home-built dish on 70 and 23 cm. He used a 4 by 13 element array on 2 meters, which he has since sold to K5ZXE. He made a total of 98 contacts and 55 multipliers. Among the other operators present during the weekends were Gary Gerber, KB0HH; Carol King, K5CPZ; John Locke, KF0M; and your editor. During a good period on 1296 MHz, Tommy sat Carol down at the station. Carol then made her first EME contact (or, for that matter, her first ever contact on that band) by working F1AQC. While this contact of Carol's represented a contest QSO for Tommy, it was also a new initial on that band for him.

Unfortunately, Murphy was also present at the station. A coax connector on the 2 meter array blew up and a diode chain in the power supply for the 1296 MHz linear also blew up. Even though there were problems, the fun and fellowship made up for the disappointments caused by the difficulties. Incidentally, Tommy is now running a beacon at 1296.193 MHz. It is a 1 watt transmitter fed into a coffee-can antenna pointed east.

Steve Powlisen, K1FO. Murphy also visited Steve the second weekend in a rather peculiar way. After falling asleep at 12:30 AM local time, Steve was awakened by the sound of his door bell ringing. When he finally made it to the front door, he found no one. However, left in their wake on his porch was a Comodore 64 computer, complete with joy sticks.

After puzzling over this event, Steve went back to bed, only to be awakened again at 4:30 AM, this time by the sound of the phone ringing. Now realizing that he had forgotten to unplug it, he got up and disconnected the phone in the bedroom. In his dazed state he forgot to unplug the other phones. Sure enough, the phone rang again at 5:00 AM, this time the one down the hall. Steve did not get up. Obliging, the phone rang again at 5:30 and again at 6:00, each time three rings. Finally, he got up and disconnected every phone in the house.

Now it was the cat's turn. The cat, being used to a feeding time of 6:30 AM, was not to be denied. One who has ever had a pet cat can know the persistency of its howl and scratching. The battle was won by the cat and the sleep was lost by Steve. In spite of the predicaments, Steve did manage to work 153 stations with 36 multipliers, including fellow Oklahoman, Larry Hazelwood, W5NZS.

Allen Katz, K2UYH. Al also was visited by Murphy, when for the first time in over 20 years he was struck by lightning a week before the contest. Allen reports that most of the damage was done to his 10 GHz equipment and the digital readouts for the dish.

Murphy was not through. Al goes on to report that about an hour after the end of the first night's activities a transformer in the dish control caught fire, starting a small secondary fire. Fortunately, his fire alarm system went off, enabling him to extinguish the fire before much damage was done. Then, near the end of the contest his 1296 MHz brick blew up. Nevertheless, he was able to put in a respectable score of 148 contacts and 51 multipliers between 70 and 23 cm.

Tim Marek, NC7K. Tim made his first contact on the moon when he worked Dave, W5UN,

during the second weekend. Tim is using a 170 watt amplifier. He is using pressurized 7/8 inch heliax type cable to feed a single M2 2M5WL.

Emil Pocock, W3EP. Emil also worked his first contacts on the moon: W5UN, K5GW, and KB8RQ.

Herman Cone, WB4DBB. Herman also reported his first contact on the moon, also with Dave, W5UN.

Mike Abbot, KM4ID. Mike also made his first contacts on the moon. His was with Gary, KB8RQ.

Other Rumored Scores. Thanks to Paul Kelley, N1BUG, your editor has a few of the rumored scores for 2 meters. The results follow-

ing the callsign are the total QSOs followed by the number of multipliers. W5UN/332/55; SM5FRH/254/56; KB8RQ/234/56; DL8DAT/224/53; SM7BAE/156/54; LA8YB/156/44; WA6MGZ/151/48; AF9Y/132/40; SM5MIX/131/44 (a four Yagi station); LZ2US/115/36; DL5MAE/113; SM2CEW/107/42; F1JTA/100/38; N1BUG/98/36 (for only one half of the contest); OE5JFL/98/37; F1GHP/98; F6IRF/94/38; SM2CKR/78/33; N8AM/72/33; RA6HHT/66/31; VE1BVL/63/32; G4SWX/63/32; GM4YXI/49/26 (running only four 9-element Yagis and 600 watts); W7VXW/43/23; SM4RNA/43; EA2AVY/42; DK9ZY/40/22; UA9FAD/38/23; PA0JMV/38/24 (two Yagi); EA3DXU/36/22 (a two Yagi station); DK1KO

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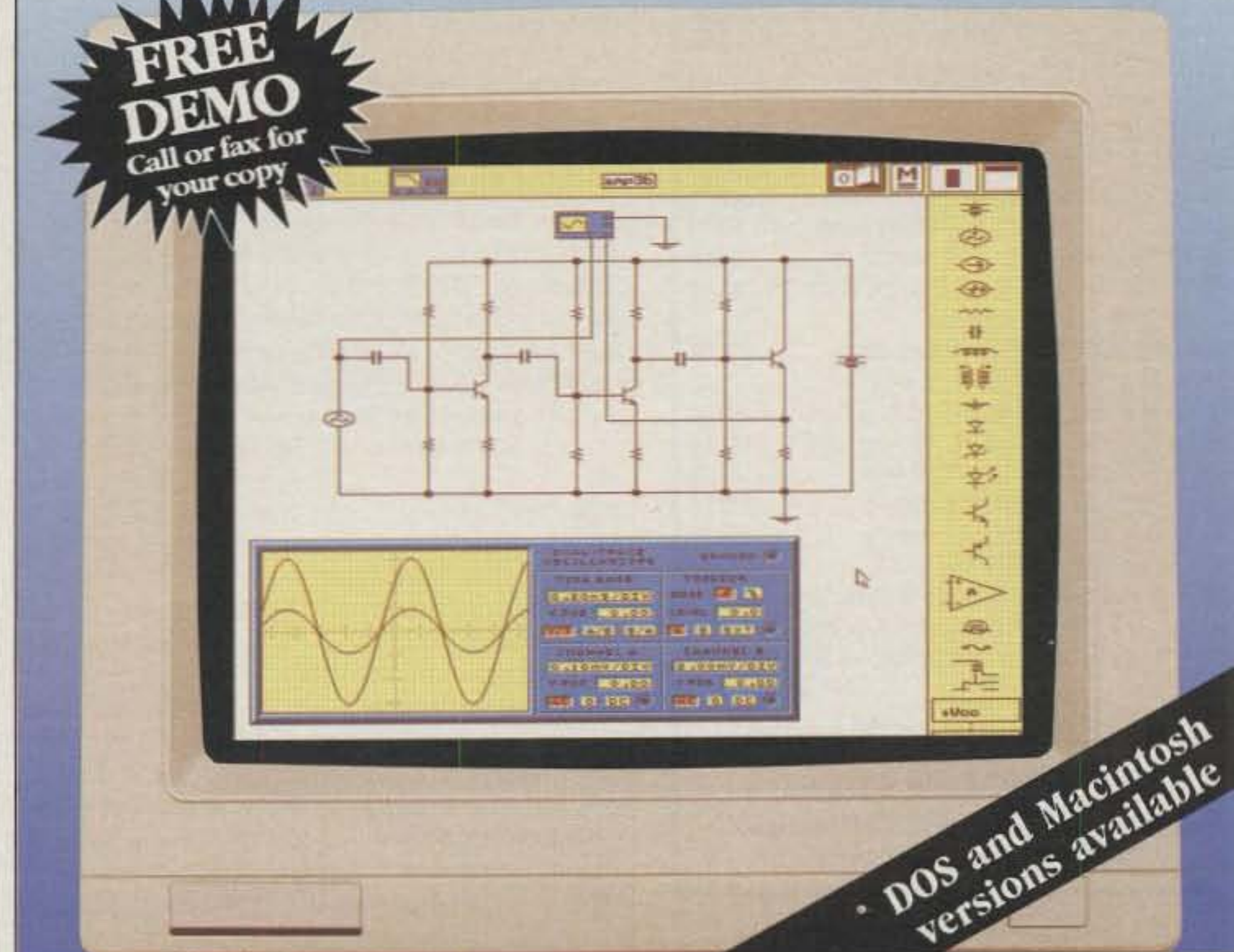
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Thanks to Allen Katz, K2UYH, your editor has a few of the rumored scores for the microwave bands: SM4IVE/174/38; DL9KR/163/38; K1FO/153/36; OH2PO/150/34; OE5JFL/98/37 (on 2 meters), 141/36 (on 70 cm), 48/25 (on 23 cm), for a total of 287/98; K4QIF/105/31 (on 70 cm), 13/8 (on 23 cm); K2UYH/107/29 (on 70 cm) and 41/22 (on 23 cm); N2IQU/83/27 (on 70 cm) and 30/15 (on 23 cm); K0RZ/82/30; F1ELL/80/31 (on 70 cm) and 35/18 (on 23 cm); UT5DL/73/29; SM2CEW/66/26 (on 70 cm) and 30/15 (on 23 cm); DL9NDD/65/28; DL3BWW/50/20; OE9ERC/49/24 (on 23 cm); and OE9XXI/49/23 (on 23 cm).

Roger Webb, WB4WTC. During the contest Roger made 68 contacts with 29 multipliers. He topped off the second weekend by receiving a call from ZL1BVU for a new country. Roger is using eight 17-element M2 2.5-wavelength antennas and one kilowatt. He is looking for EME skeds and meteor skeds to be able to complete his WAS. He is in North Carolina (EM95) and his phone number is 704-827-6246.

Manford Kubat, DL8DAT. Manford now has the cards for DXCC. He has worked (as of this writing) 101 countries. It is rumored that a couple of SM stations are also very close to the magic number, with a number of others, including Lionel, VE7BQH, over 90 countries. The ARRL DX desk better be prepared for the inrush in the next 12 to 18 months.

EME and other VHF Nets. Both the microwave and the 2 meter EME nets are on Saturday on 14.345 MHz. The microwave EME net begins following the relinquishing of the frequency by the Veterinarian Net, somewhere around 1500-1600 UTC. The 2 meter EME net begins right after the end of the microwave net, somewhere around 1715-1730 UTC. There is also a Russian language net that meets on 7.095 MHz on Saturday and Sunday at 1200 UTC. The mid-west VHF net meets on 3.843 MHz at 0200 UTC Tuesdays (Monday nights). Check-ins from the west coast are recognized around 0400 UTC. An informal net from the west coast meets every night on 3.818 MHz around 0300-0400 UTC. A Maritime VHF net meets at 0100 UTC Thursdays (Wednesday nights) on 3.765 MHz.

Dave Meier, N4MW. Dave was among the hopefuls who were looking for VE3ONT. The first night of the second weekend he was in Monroe, Louisiana. With the help of Charlie Chennault, WA5YOU, and another local amateur he set up a single Cushcraft 424B on a camera tripod. He used an ICOM 475H and an ICOM mast-mounted preamp. Both the antenna and rig were loaned to him by N4HKS. He heard signals from six different stations, including DL9KR calling CQ. On the second night he was back home in his backyard. There he heard SM4IVE. He tried to get a QRZ from Lars, but with no luck. Even though Dave made no contacts, he did feel his efforts were a success. He says that he will be looking again for VE3ONT.

EME Conditions. Excellent EME conditions are predicted for the weekend of 6-7 February. The moon will be close to perigee and in a quieter portion of the sky. Use the above-mentioned nets to set up schedules. Remember, even if you are a "low power" station, there are plenty of operators willing to help you get your feet wet.

Some 6 Meter Notes

ZP6CW Now QRT, ZP5AA (Maybe) QRV. Doug Woolley, ex-ZP6CW, is now back in the U.S. after working 103 countries on 6 meters. He reports that he left his equipment behind for use by the Radio Club of Paraguay. Hopefully, ZP5AA will take up the slack left by Doug's absence. It is anticipated that the ZP5AA beacon on 50.025 MHz will remain active. If you still need a QSL card for his operations, you may send to Doug Woolley, N4PW, P.O. Box 688, Culpeper, VA 22702.

Frank Brooker, 9Y4VU. Frank now has an IC 551D and is active on SSB. He had a brief opening into the states, working around eight stations in the midwest on 24 November. QSL Frank direct or via his manager, W3EWW.

Jim Langdon, J37AE. On the same day that Frank had his brief opening, Jim also worked over 60 stations in the U.S. Jim will be on Grenada until April, when he will once again return to Arkansas. QSL Jim direct via his *Callbook* address.

Terry Baxter, N6CW. During Terry's stay on Anguilla he signed the callsign VP2ECW. Between 23-24 November Terry worked over 60 stations in North America. Additionally, Terry worked five stations on 2 meters EME. QSL via his home call.

OD5SIX Beacon on the Air. According to Ted Collins, G4UPS, the OD5SIX beacon went on the air in early December. It is located in Tripoli (KM75), runs 10 watts, and transmits on 50.078 MHz into an omni-directional antenna. Additionally, a 150 watt brick has been donated to Samir, OD5SK, thereby boosting his signal.

TU2VHF Beacon on the Air. Again, according to Ted, the TU2VHF beacon is now on from the Ivory Coast. The beacon operates on 50.094 MHz and its grid locator is EJ76am.

Antarctica on the Air. VK0AQ, operating from Casey Basin, came on the air on 28 November for one year. They are using an IC-505 and a 3-element beam. QSL via VK3OT.

Other DX stations Activated. VQ9QM is back on the air. UL7GCC is active. XU0DX may be active by the time this is published.

6 Meter Propagation. While F2 propagation was scarce in the states, I have received reports from other parts of the world. On 1 November, between 0830 and 0910 UTC, VK6PA worked 9H1BT, 9H5ET, 9H1PA, 9H1ET, and 9H1AZ. Also, on 1 November PY5CC worked FGW6JKV. On 5 November PY5CC worked BV2DP. On 6 November JA1VOK worked KH6IAA. On 7 November JA1VOK worked VK9NS. On 11 November VK3OT worked PE1JKW. On 15 November JA1VOK worked 9M6HF. On 21 November JA1VOK worked ZL2KT and ZL2TPY and heard four other ZLs. On 23 November JA1VOK worked T30JH and heard four ZLs and the ZL2MHF beacon. Hatsuo has now worked 135 countries.

Meanwhile, here in the U.S. sporadic-E was the mode of propagation. Tom Moore, K5ZXE, reported sporadic-E openings on 22, 23, 24, 27, 29, and 30 November. That one on 30 November was a big one, with double hop reported by many in the bay area of California and the mid-Atlantic to Florida portion of the east coast. Among the participants were KM4ID, KD4S, WB5KYK, WA5UUD, WB7REL, W7RV, N9MSS, W7/DL1UF (who was put out on packet without the W7/), N0JRN, W0JRP, WA0X, N4MW, K0RI, N5UYI, KF5IU, WW7B, K5HC, KB5DRD, N5WJB, N4TWX, KQ4CG, KD4BWQ, KC4YO,

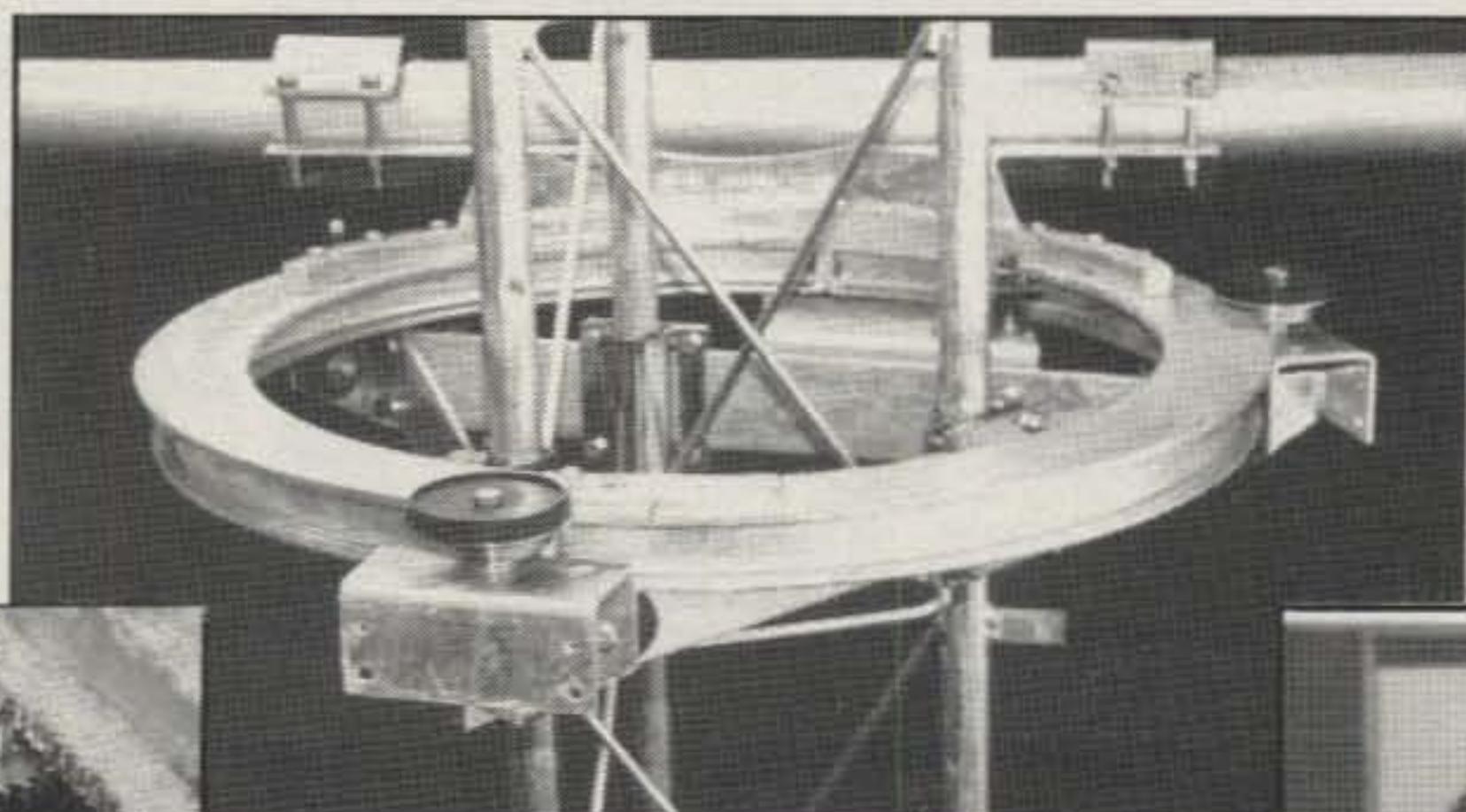
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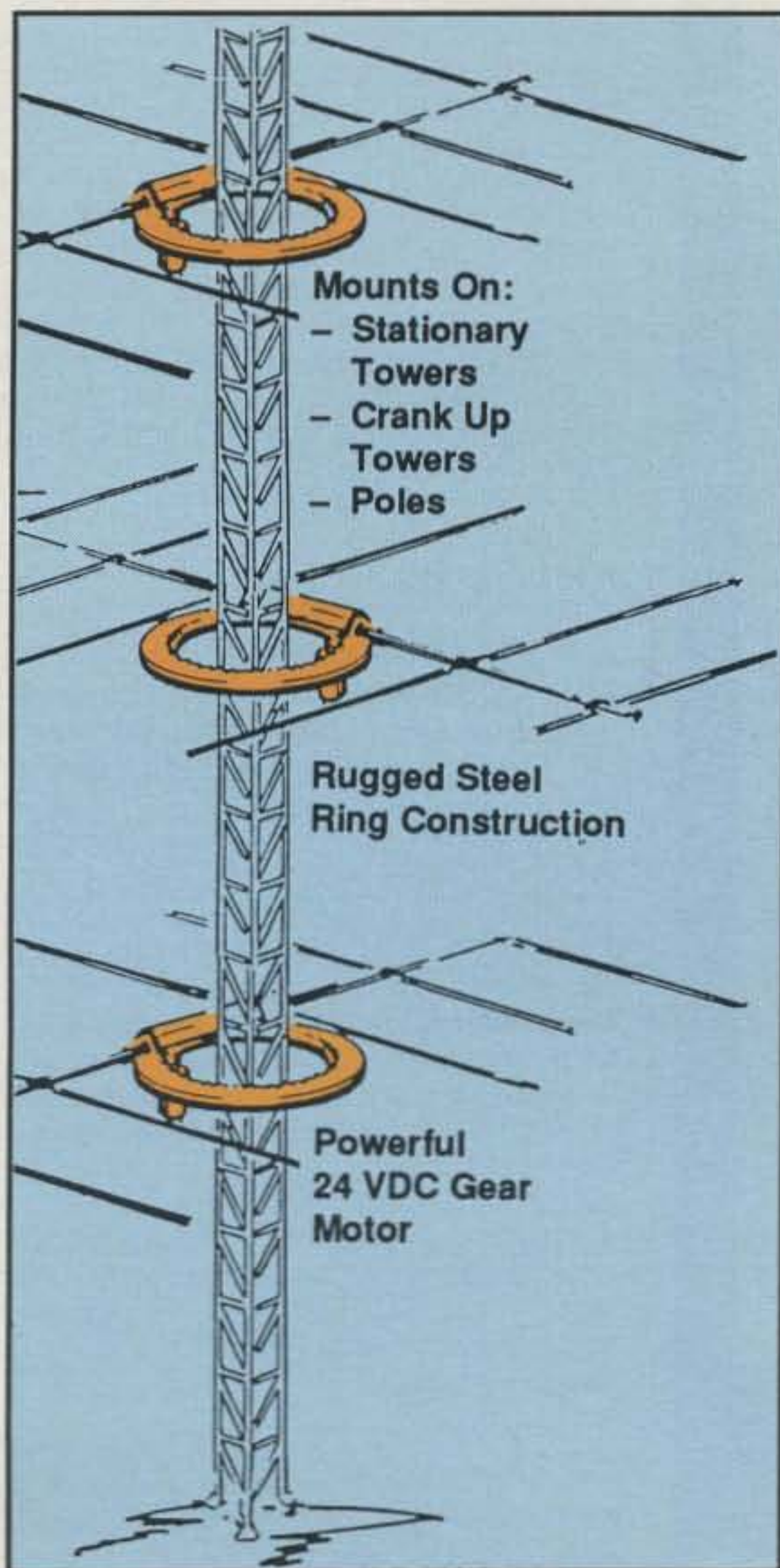


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CIRCLE 161 ON READER SERVICE CARD

KG6I, KC4RDP, W5FF, KF7NP, WA6BYA, AJ6T, NC7K, WB9GKA, N6RMJ, WA8WZG, WB4JEM, W6EMD, and N8DEF, all of this activity taking place between 0300 and 0500 UTC, with some beacons still being reported as being received as late as 0530 UTC at NC7K's QTH. Yet another report of sporadic-E came to your editor's attention, this one occurring on 8 December around 1700 UTC. Among the participants in this one were W5FF, KC4UVM, WA5UUD, and N6RMJ.

Some Microwave Reports

Dave Meier, N4MW. Dave reports receiving VUCC #32 for 3456 MHz. He says that he has

Al Ward, WB5LUA, to thank for motivating him. His first contact was with Al parked across the street. His second contact was again with Al, this time 420 miles away at his home. He then assembled a rover station and talked John Coons, KC4BQX, into operating it. John gave both Dave and his wife, Joyce, N4ZRW, a contact from EM45. Jim Butler, KB4LJV, operating from the 135 foot tall Dover Elevator test tower EM44 gave Dave another grid and the first Tennessee to Mississippi 3456 QSO. Finally, WI3B gave Dave a contact from EM54 to complete the required five QSOs.

Dave also reports that he purchased two 5760 MHz no-tune boards at the Microwave Update

conference. He is using one to drive his TWT to 5 watts. He reports that Paul Wilson, W4HHK, has located a source for 6.5 GHz elliptical waveguide. He says that it is made by Cablewave Systems and is marked 16733-810261-WE65-260. He wants to know if it is usable on 5760 MHz. Finally, he reports that N4HKS, WA0WQI, and he are on 23 cm ATV. He hopes to use it to support public-service events and to spur others to be interested in ATV on this band.

Dave Felgar, NJ7A. Dave reports on the activities from Utah. He says that 10 GHz activity is being revitalized. He reports that Paul Larson, WA7PXD (DN30), and Clint Turner, KA7OEI (DN40), worked each other over a 65 mile path last June using Gunn oscillators and feeding 2 foot dishes. Dave also reports that Buzz Miklos, WA4GPM (DN40), completed a 1296 MHz contact with Jeff Bishop, W7ID (DN13), at 1447 UTC on 21 November. He says that Buzz is running 200 watts into four 31-element loopers and Jeff is running 75 watts into two 45-element loopers. Dave goes on to report that Utah is represented on all bands from 50 MHz to 10 GHz, with the exception of 222 MHz. The grid squares covered are DN30, DN31, DN40, DN41, DM38, and DM49. Dave does work meteors. So if you need Utah, or DN30, give Dave a call at 801-966-0150.

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Results 1992 SMIRK Contest

Thanks to Ray Clark, K5ZMS, the following are the results of the 1992 SMIRK contest. Ray reports that he received 13 logs. However, he noted that there were approximately 322 participants, of which 137 were SMIRK members. The top score was W0KEA with 25,192 points. Second place was W5OZI with 5,292 points. The section leaders were as follows: Arizona, WB7OHF, 384; Colorado, W0KEA, 25,192; Florida, KC4SUS, 128; Kansas, N0LL, 3,330; Eastern Massachusetts, K1DAT, 288; Nebraska, K0US, 1170; Ohio, N8AXA, 756; South Texas, W5OZI, 5292; Utah, WB7QBC, 2960; Maritime (New Brunswick) VE1SLM, 396; and British Columbia, VE7FEI, 3120.

KH1 To Be Activated

A group to include Arie, PA3DUU, will activate KH1 on all bands from late January to early February. Arie plans to man the VHF/satellite station. Look for liaison activities on 28.885 MHz.

And Finally

January. The dates listed in last month's column for the ARRL VHF Sweepstakes are incorrect. The correct dates are 23-25 January. Spurred on in part by some rivalry between the Rochester VHF Group and the North Texas Microwave Society, which was evident at the Microwave Update conference, the NTMS is planning an all-out assault on the records. It is not certain where this rivalry got its beginning. However, sources close to your editor say it has something to do with Dave Hallidy, KD5RO, a few years back, switching his loyalty from NTMS to RVHFG. Watch out, Dave.

I want to thank the RVHFG, the Packrats, K2UYH, WB4WTC, G4UPS, W3EP, and G8ROU for input to this column.

73, Joe, N6CL

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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for February is:

James J. Curtis, N8HAM
USA-CA All Counties #682
All SSB Mobile, 11-6-90

"My interest in radio probably started about 1958 while watching my father put together an EICO kit for the then emerging CB radio hobby. When I started the extensive traveling that I do, this interest in radio reawakened, but I soon became disillusioned with CB and dropped that altogether.

"In 1980 I took initial steps to become licensed in amateur radio, figuring that this was a better method of radio communication. Not knowing any other amateurs at the time, and having some difficulty with the code, I let this effort lapse. In 1985 I again took up the crusade and received my license in December of that year.

In the intervening time I met only one other amateur, and that was just a few days before I took my test. Terry, KA8UZZ, turned out to be a member of my softball team and invited me into his shack. This redoubled my desire to pass the test.

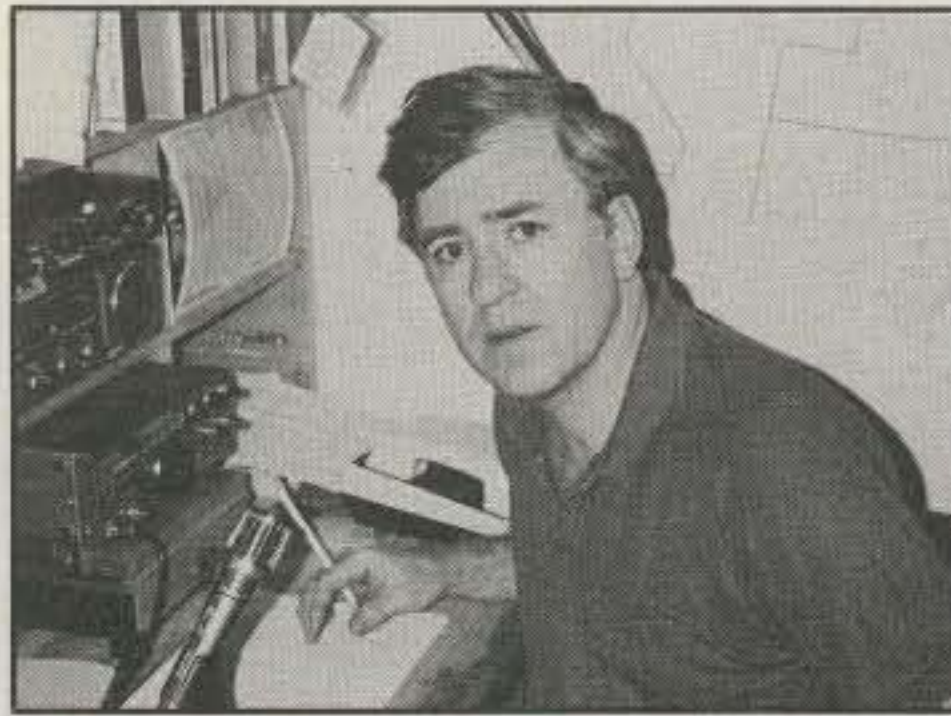
"I started out only on 2 meters, working parades, marathons, and other public-service events. After a short while I bought the HF gear that I presently have.

"The day I built my shack and installed my antenna was the day that I found 14.336 MHz—October 9, 1987, with a contact with K5KZL. My initial reaction was that I had found a good place to work all states, but this soon expanded into working all counties.

"With the amount of traveling I do, it soon became apparent that working all counties would be a lot easier if I could work mobile and have the pleasure of putting out the counties at the same time. I started going mobile about five months later. I have enjoyed putting out the counties, even putting together a mobile station to take with me on airplanes and to be installed in rental cars.

"The people I have met either on the radio or in person at conventions, at Dayton, or in eyeball QSOs have been very enjoyable and have become good friends.

"I want to thank all the other mobile stations and net control operators who have assisted me in finishing and in qualifying for USA-CA All Counties #682. I worked the last county just about three years to the



Jim Curtis, N8HAM, USA-Ca All Counties #682, poised for action.

day after I started when I worked George, KD8HA, in Crawford County, Ohio. Along the way, my family put up with quite a bit when I wouldn't answer the dinner call because I wanted to work one more mobile, or stayed up late because someone was going to be in a county I needed.

"I do plan to continue working the counties and hope to be able to put out all of Michigan, Ohio, and Indiana soon.

"To those of you who haven't asked but have thought about it, the call was just the luck of the draw, and I do plan to take it to the grave with me!—73, Jim, N8HAM"

Awards Issued

Gary R. Long, KD2Q, filed his completely filled and certified Record Book and qualified for USA-CA All Counties #785, USA-CA 3000 #810, USA-CA 2500 #889, USA-CA 2000 #964, USA-CA 1500 #1053, USA-CA 1000 #1253, and USA-CA 500 #2636, All SSB, dated 10-13-92.

Harlan F. Jones, KM8U, did it all in one giant leap, claiming USA-CA All Counties #786, USA-CA 3000 #811, USA-CA 2500 #890, USA-CA 2000 #965, USA-CA 1500 #1054, USA-CA 1000 #1254, and USA-CA 500 #2638, Mixed, dated 10-19-92.

Jack D. Cale, N8FEB, completed all of his paperwork and received USA-CA All Counties #787, and USA-CA 3000 #812, All SSB, dated 10-19-92.

Michael Moss, AA9CW, made a clean sweep and was awarded USA-CA All Counties #788, USA-CA 3000 #813, USA-CA 2500 #891, USA-CA 2000 #966, USA-CA 1500 #1055, USA-CA 1000 #1253, and USA-CA 500 #2639, All SSB, dated 10-24-92.

Carol I. Morkrid, N0LDT, filed her good application for USA-CA 3000 #814, USA-CA 2500 #892, USA-CA 2000 #967, USA-CA 1500 #1056, USA-CA 1000 #1256, and

USA-CA Special Honor Roll

Gary R. Long, KD2Q
 USA-CA All Counties #785
 All SSB, 10-13-92

Harlan F. Jones, KM8U
 USA-CA All Counties #786
 Mixed, 10-19-92

Jack D. Cale, N8FEB
 USA-CA All Counties #787
 All SSB, 10-19-92

Michael Moss, AA9CW
 USA-CA All Counties #788
 All SSB, 10-24-92

USA-CA 500 #2640, All 20M SSB Mobile, dated 10-26-92.

USA-CA 500 certificates went to:
 Hiroshi Hidaka, JA1JTR, USA-CA 500 #2633, Mixed, 9-21-92.

Bobo Koch, DL8AK, USA-CA 500 #2634, Mixed, 9-21-92.

Jim Watkins, VO1SF, USA-CA 500 #2635, Mixed, 10-1-92.

Gary R. Long, KD2Q, USA-CA 500 #2636, All SSB, 10-13-92.

Larry Cahoon, WD3P, USA-CA 500 #2637, All CW, 10-14-92.

Harlan F. Jones, KM8U, USA-CA 500 #2638, Mixed, 10-19-92.

Michael Moss, AA9CW, USA-CA 500 #2639, All SSB, 10-24-92.

Carol I. Morkrid, N0LDT, USA-CA 500 #2640, All 20M SSB Mobile, 10-26-92.

Awards Available

Worked EUCW Award. The Worked EUCW Award is offered by the European CW Association. The award is available to all licensed radio amateurs and shortwave listeners anywhere in the world. Only contacts made on or after 27 April 1991 (the 200th anniversary of the birth of Samuel F.B. Morse) are valid for this award.

Applicants should submit a list of contacts made (or SWLs, stations heard) for which QSL cards have been received. The list must be certified by a licensed amateur who is a member of an EUCW Club, who should state the name of his/her club and membership number. The list must include date of contact, callsign of station worked or heard, band, name of operator, QTH, EUCW Club, and club membership number.

333 South Lincoln Ave., Mundelein, IL 60060

USA-CA Honor Roll

3000		1500	
KD2Q	810	KD2Q	1053
KM8U	811	KM8U	1054
N8FEB	812	AA9CW	1055
AA9CW	813	NØLDT	1056
NØLDT	814		
		1000	
		KD2Q	1253
2500		KM8U	1254
KD2Q	889	AA9CW	1255
KM8U	890	NØLDT	1256
AA9CW	891		
NØLDT	892		
		500	
		JA1JTR	2633
2000		DL8AK	2634
KD2Q	964	VO1SF	2635
KM8U	965	KD2Q	2636
AA9CW	966	WD3P	2637
NØLDT	967	KM8U	2638
		AA9CW	2639
		NØLDT	2640

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to CQ is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801 USA for \$2.00. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Norm Van Raay, WA3RTY, USA-CA Custodian, Star Rt. 40, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

EUCW clubs are AGCW-DL (Germany), BQRP (Benelux QRP), BTC (Belgium), FISTS (UK), FOC (First Class CW Operators' Club), G-QRP (UK), HCC (Spain), HSC (High Speed Club), INORC (Italy), SCAG (Scandinavia), SHSC (Super High Speed Club), UFT (France), and VHSF (Very High Speed Club).

Separate certificates will be issued for each class of award. The fee for the award is DM10, or US\$8, or 12 IRCs. Applications



European C. W. Association

THIS IS TO CERTIFY that _____ has communicated with, or heard, 100 members of EUCW Clubs by means of Morse telegraphy via Amateur Radio in accordance with the rules of the EUCW Award.

Class of Award _____ EUCW Awards Manager _____

Certificate No. _____ Date _____

Classes of Award - QRP, up to 5 watts output; Standard, any legal power; SWL, stations heard using any power.

SAMPLE ONLY

Worked EUCW Award sponsored by the European CW Association.

for the award should be sent to the EUCW Award Manager, Gunther Nierbauer, DJ2XP, Illinger Strasse 74, D-6682 Ottweiler/Saar, Germany. The award manager's decision is final on all applications.

Requirements for the Award: Confirmed CW-only contacts (SWLs, CW stations heard) with 100 different stations who are members of EUCW clubs, over 3 different amateur bands with a minimum of 20 stations worked or heard in each band. The total of 100 stations worked or heard over 3 bands must include at least 3 members of 6 different EUCW clubs. To encourage activity on the 200th anniversary of the birth of Samuel F. B. Morse, up to 40 stations worked or heard on 27 April 1991 will

BB	Bielsko Biala	SP9	OP	Opole	SP6
BK	Bialystok	SP2	OS	Ostroteka	SP5
BP	Biata Podlaska	SP8	PI	Pila	SP3
BY	Bydgoszcz	SP2	PL	Plock	SP5
CH	Chelm	SP8	PO	Poznan	SP3
CI	Ciechanow	SP5	PR	Przemysl	SP8
CZ	Czestochowa	SP9	PT	Piotrkow Tryb.	SP7
EL	Elblag	SP2	RA	Radom	SP7
GD	Gdansk	SP2	RZ	Rzeszow	SP8
GO	Gorzow Wilk.	SP3	SE	Siedlce	SP5
JG	Jelenia Gora	SP6	SI	Sieradz	SP7
KA	Katowice	SP9	SK	Sierniewice	SP7
KI	Kielce	SP7	SL	Slupsk	SP1
KL	Kalisz	SP3	SU	Suwalki	SP4
KN	Konin	SP3	SZ	Szczecin	SP1
KO	Koszalin	SP1	TA	Tarnow	SP9
KR	Krakow	SP9	TG	Tarnobrzeg	SP7
KS	Krosno	SP8	TO	Torun	SP2
LD	Lodz	SP7	WA	Warszawa	SP5
LE	Leszno	SP3	WB	Walbrzych	SP6
LG	Legnica	SP6	WL	Wloclawek	SP2
LO	Lomza	SP4	WR	Wroclaw	SP6
LU	Lublin	SP8	ZA	Zamosc	SP8
NS	Nowy Sacz	SP9	ZG	Zielona Gora	SP3
OL	Olsztyn	SP4			

Table 1—Abbreviations denoting WOJEWODZTWOs/provinces of Poland.

count as double contacts. All other requirements remain unchanged.

Classes of Award: Standard award—100 two-way contacts made using any authorized transmission power; QRP award—100 two-way contacts made with the applicant using not more than 5 watts RF output transmission power; SWL award—100 stations heard using any power.

PZK Awards Program. Awards are available to licensed amateurs and SWLs. All contacts, any band CW, phone, or mixed, are valid for these awards. QSLs need not be sent. However, the GCR list must be certified by the awards manager of your society, or by a radio club, or by two licensed amateurs. The fee is 10 IRCs each. Send applications to PZK Awards Manager, Monika Wasowicz, SP5NOW, P.O. Box 320, 00-950 Warszawa, Poland.

AC-15-Z Award (All Countries of the 15th Zone). This award is issued for contacts with at least 23 countries or call areas located in CQ Zone 15: OHØ, ZA, OE (2 call areas), TK, OK, UR, OH (3 call areas), HA, I, UA2, UQ, UP, 9H, OJØ, SP (4 call areas), T7, IS, IT, HV, and YU (3 call areas). Contacts with 4 call areas of Poland are obligatory. All contacts are valid from 1 January 1955.

W-21-M Award (Worked with 21st Meridian). This award is issued for contacts with at least 16 countries situated on the meridian 21 degrees east: OHØ, D2, A2, TL8, TT8, OK, UR, UQ, UP, UA2, OH, SV, HA, ZS3, LA, SP, ZS, YO, JW, SM, YU, 5A, 9Q. Contacts with Poland are obligatory. All contacts are valid from 1 January 1955.

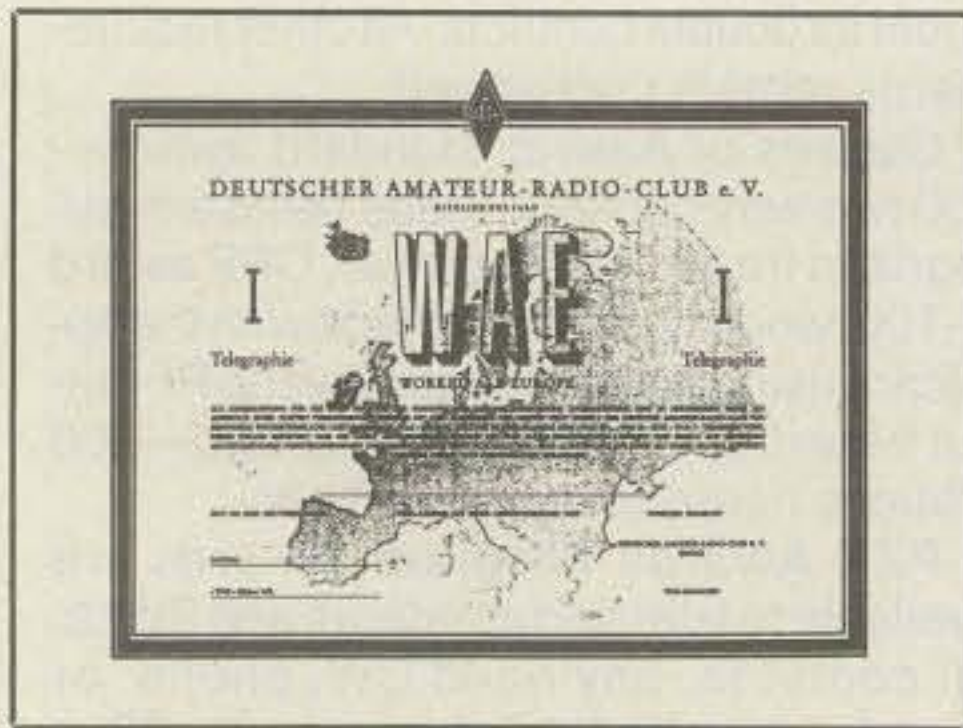
Polska Award. This award is available in three classes: Class 1—for contacts with 49 (all) provinces of Poland; Class 2—for contacts with 35 provinces of Poland; Class 3—for contacts with 20 provinces of Poland. All contacts are valid from 1 June 1975. When applying for a higher class, supply the number of your lower class diploma and a list of your additional contacts.

Abbreviations denoting WOJEWODZTWOs/provinces of Poland are shown in Table 1. The applicants are asked to give the abbreviations denoting Polish provinces in alphabetical order.

Notes: The Polska Award can be received if special application is added to the contest log. Only QSOs made within one SP DX contest year are valid for award credit.

DARC (Deutscher Amateur Radio Club) Awards. The following information about awards offered by the DARC is courtesy of Ralph M. Hirsch, K1HR. Ralph is the North American check point for all of these awards. Anyone desiring further information and the mandatory forms should enclose a business-size SASE and \$1.00 to help cover costs. Ralph's address is 172 Newton Road, Woodbridge, CT 06525. The following general requirements are applicable.

Processing: Original application fee



Worked All Europe, Class I, Telegraphie (Telefonie), a DARC award.



Europa-DX Diplom available annually from the Deutscher Amateur Radio Club.



Europa Diplom offered by the DARC for specified cumulative annual Europa-DX scores.

\$6.00; endorsement \$4.00. These processing charges include airmail return of awards from DL3RK, except for the EU-DX-D 1000 Point Plaque, which costs an additional \$10.00.

Postage: Actual cost. If first-class mail, 29 cents for the first ounce and 23 cents for each additional ounce. Figure return postage at what it costs to send the card to the check point.

Fees: For registered mail, add \$4.85 per package. For certified mail, the cost is only 85 cents per package and this is recommended.

General: You may use any of the following bands authorized in your country: 1.8, 3.5, 7, 10, 14, 18, 21, 24, and 28 MHz. The same cards may be used for any of the awards.

Country List: The following countries may be used for the DARC awards: C31,

CT1, CT2, DL, EA, EA6, EI, F, G, GO, GI, GJ, GM, GM (Shetland), GU, GW, HA, HB, HB0, HV, I, IS, IT, JW (Bear), JW (Spitzbergen), JX, LA, LX, LZ, OE, OH, OH0, OJ0, OK, ON, OY, OZ, PA, SM, SP, SV, SV5 (Rhodes), SV9 (Crete), SV (Athos), T77, TA (European), TF, TK, UA1346, UA2, UA(FJL), UB, UV, UN/UK1N, UO, UP, UQ, UR, Y22-99, YO, YU, ZA, ZB2, 1A0, 3A, 4U1 (Geneva), 4U1 (Vienna), 9H1.

The awards may be obtained by licensed radio amateurs and SWLs in the USA, Canada, and Mexico. All contacts must be made from the same country.

WAE (Worked All Europe) Award: The WAE is a certificate awarded to amateur radio stations for contacts with European countries on different bands. It is issued in two divisions—Telegraphy (2 x CW) and Telephony. Each European country counts one point on each band. For USA, Canadi-

an, and Mexican stations, contacts on 80 and 160 meters count two points. A maximum of five bands per country may be used.

Classes are: WAE III—at least 40 countries and 100 points; WAE II—at least 50 countries and 150 points; WAE I—at least 55 countries and 175 points.

Holder of WAE I get a special WAE Badge.

EU-DX-D (Europa-DX Diplom): The EU-DX-D is an award that may be claimed annually. The EU-DX-D is issued in the following classes: Telegraphy, SSB, or Mixed modes. For Mixed class, at least 30% of the contacts must be made in a different mode.

A minimum of 50 points is required for the EU-DX-D per year. Twenty points must be obtained by contacts with European countries, and 30 points by contacts with countries outside Europe. All bands can be used, but each country can be used only once per year on just one band, which counts for one point, unless claimed on 80 or 160 meters, when two points are given. Stickers are available for each additional block of four European and six non-European points within the same calendar year.

The EU-DX-D may be claimed anew every year. Each year's score may be added to obtain the EU-DX-D 500 Badge and the EU-DX-D 1000 Trophy. There is no limit to the number of years.

Europa Diplom: The Europa Diplom is awarded for working (or hearing) amateurs in European countries. Applicants must prove a total score of at least 100 points.

Annual score: Each confirmed European country counts one point per year on each amateur band.

Total score: The sum of the annual scores for the year of application and the five preceding years.

Europa 300 Trophy: Owners of the Europa Diplom may obtain the Europa 300 Trophy. Applicants have to prove 300 country points when counting each country on each band only once in all the years. The service charge is \$10.00 for the trophy when applied for together with the Europa Diplom.

73, Dorothy, WB9RCY

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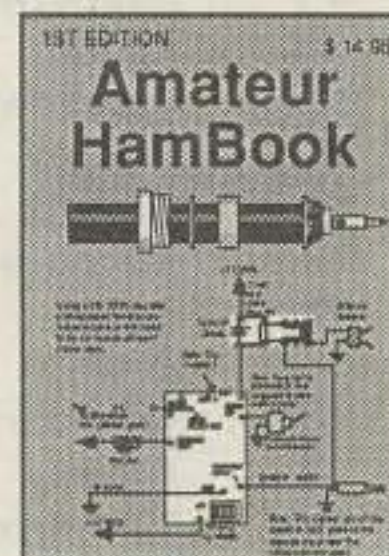
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CIRCLE 71 ON READER SERVICE CARD

February 1993 • CQ • 85

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Help Wanted

I receive many letters from people who read this column. New and prospective amateurs usually include comments telling me how much trouble they had/have getting started in amateur radio. They say that they have a difficult time determining where and when local amateur radio clubs meet. When they finally succeed in attending a club meeting, their reception is seldom a glad one. Established, long-time amateurs must know that the newcomers are seeking help, but such assistance is rarely offered. These troubling comments are common in most of the letters I receive from new and prospective amateurs.

About one half of our American amateurs are Novices or Technicians. Many of these amateurs have been operating almost exclusively in the 10 meter Novice voice segment. Ten meters had poor operating conditions during this past summer, and it will become even less useful next summer. These amateurs need your help in switching over to code operation prior to the time when 10 meters is completely dead. They are unlikely to continue operating without your help. If they do not operate, there is little chance that they will upgrade. In fact, it is very likely that many of today's Novices and Technicians will have given up on amateur radio by the time 10 meters peaks again. There are no "they" who will keep these people in amateur radio; there are only you and me to get this job completed successfully.

The prospective amateur is even worse off than the Novices and Technicians. Those people who are already licensed probably know where and when licensing examinations are held. If these licensed amateurs are lucky, they may also know where and when licensing courses are conducted, and other amateurs may have given them some information about station accessories and equipment. The prospective amateur has the necessary desire to become licensed, but she/he has very little real assistance in getting started in our hobby.

Your help is essential to the future growth and vitality of our Amateur Radio Service. Your help is needed right now. It is time to get involved with new amateurs



Seven-year-old Casey Haley, KB5UEO, of South Houston, Texas shares a radio shack with his father (Marty, AB5GU) and his mother (Wende, KB5TNU). Their station includes a Kenwood TS-940S transceiver with a dipole antenna. Casey's uncle (Barry, KI5WE) gave him a 10 meter Yagi-Uda beam antenna, and his dad gave him a 50 foot tower to hold it. His mom received a Kenwood TH-27A transceiver as a birthday present. Casey averages about two contacts per day, including many in other states and foreign countries. Casey is a straight A student in the third grade. He is a Cub Scout, a Little League baseball player, and a rodeo rider. He collects baseball cards, football cards, gems, minerals, and Spiderman comic books, and enjoys swimming and bicycling. He is active in his church.

instead of just *thinking* about doing this essential work.

I offer an extensive assortment of article reprints which instructors are welcome to distribute to their students as-is, or they may be revised as desired prior to duplication and distribution. That offer is frequently included in this column. Individual students are also welcome to get a set of reprints for their own use. This set of printed aids includes a lot of highly useful operating information that is essential to new operators.

I have a set of 15 code training cassettes which have been used successfully by several thousands of my ex-students. They take the student from no knowledge of the International Morse Code to a receiving speed of about 13 words per minute. In-

structors are welcome to copy these tapes for distribution to their students. These tapes allow a student to progress at her/his own rate. Many students do not have computers, but most of them do have a cassette player available for their use. If you want information regarding these tapes, send your self-addressed, stamped envelope to my California address, as it is shown on the first page of this article.

I work more than 1000 contacts every year in the Novice bands, and I understand Novice band problems quite well. I am the recipient of an Edison Award and a deForest Award. My licensing course efforts were the main reason I received these awards. I have helped license more amateurs (since 1948) than most amateurs have ever contacted on the air. However, amateur radio cannot reach new heights with just the efforts of a few fanatics such as myself. We need the active participation of every willing and able amateur to upgrade the thousands of existing Novices and Technicians, and to license additional thousands of prospective amateurs. Your help is desperately needed now.

My September 1992 column provides a good review of current band conditions, and it includes suggestions regarding some of the things individuals and groups can do to help upgrade our Novices and Technicians. If you are just now getting interested in helping these operators, I advise you to read that article.

If you are not associated with an amateur radio club, do everything possible to let people know that you are an amateur radio operator. Have your callsign on T-shirts, sweatshirts, caps, jackets, license plates, and other items. When people ask you what the callsign is, tell them about our Amateur Radio Service. Invite them to your shack to see and hear your station in operation. Do not dazzle visitors with highly sophisticated operation. Keep your demonstrations simple and easy to understand. Invite prospective and new amateurs to your shack. Let them see and hear you operate, and put them on the air at your station. Offer to help new amateurs select the accessories and equipment they need to set up initial stations, and help them get their stations ready to operate. There are thousands of amateurs who are not on the air because they need the help of an experienced amateur. Won't you please help them?!

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Here are (left to right) Al Folsom, KY3T, and Doc Murein, KA3RAU, of the Warminster Amateur Radio Club. They are shown operating WA3DFU as a special-event station at the Union League Building in Philadelphia. The Union League was created in 1862 to support the policies of Abe Lincoln during the Civil War. More than 350 contacts were made 27-28 March last year. A special certificate is available to all stations contacted. Send contact data and an SASE to WA3DFU, P.O. Box 113, Warminster, PA 18974.

If you are a member of an organization which could conduct amateur radio licensing courses, please urge the group to provide such training on a regular basis. The following paragraphs contain information that should be helpful to amateurs who want to initiate or upgrade licensing courses. Individual amateurs are urged to bring the following information to the attention of local club officials.

Objective. It is our job to pass knowledge to people who are interested in amateur radio. They may persevere and become operators, or they may decide that the time and effort involved in becoming an amateur is too much to suit them. All we should do is provide the required information to those people who are willing to do the work that is required to become licensed operators. Amateur radio is not for everyone, and a course should not be degraded to retain students who are unwilling to study. Make it clear to prospective amateurs (and license upgrade candidates) that they are expected to do their part in the licensing effort.

Instruction should be tailored to emphasize operating. Amateur radio has too many licensees who seldom (if ever) get on the air. License holders are of very little benefit to our amateur radio service. What we need are license *users* (operators). Stress good operating procedures. Give examples of both good and bad operating procedures, with explanations of why each one is good or bad. The quality of amateurs is more important than the quantity.

Instructor Qualifications. The single most important feature of an instructor is her/his desire to help people get a good start in amateur radio. You do not have to



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Here is Henry Kotowski, SMØJHF (left), operating portable from Provence, France. His son, Gabriel (right), expects to become an amateur soon now that Sweden's minimum amateur radio licensing age has been reduced from 14 to 10. Their home QTH is Kista, Sweden



be an expert in all facets of amateur radio to be an effective instructor. The most effective way to learn a subject is to teach it to others. I have run licensing courses for 44 years (about 200 courses), and each one has given me additional knowledge. Instructors must serve as a means of imparting information to students. It is counterproductive to do (or say) anything intended to impress students. I believe that a single instructor is more effective than a team of instructors, because she/he knows what has been covered and what material still needs to be covered. Continuity and uniformity enhance the student's learning experience. Keep explanations simple and easy to understand. The least effective co-instructor I ever worked with knows more about electronics than I will ever know. However, he made everything seem more complicated than it was, and he confused the students.

Recruitment. Local newspapers have helped me recruit thousands of students. I have used radio announcements, but they are less effective than newspaper articles. Course notices can also be posted at local radio stores, schools, and businesses. I have run several courses for youngsters, and they are effective for certain age groups. Basically, one has to attract boys and girls before they become acutely aware that each other exists. Senior citizens are better prospects than youngsters, but they usually have more trouble acquiring the required knowledge and code proficiency; they may also be limited in their ability to purchase gear. My best prospect has always been the middle-aged person who has established a family, job, and lifestyle. Such people are willing to expend the time, effort, and money needed to become

active amateurs. Keep recruitment material simple; excessive sophistication and complexity turn away prospective amateurs.

Course Location. Access is important. Try to obtain a location with plenty of parking and nearby public transportation. Heating, cooling, and lighting should be good. Student comfort is very important. Tables, chairs, and space should be adequate. A large chalkboard (or similar) is essential. If they are available, it is useful to have projectors, a screen, a VCR, and similar aids. It is helpful to have storage facilities for printed aids, tests, and other course materials. Recruitment becomes almost unnecessary after courses have been conducted several years at the same location. Other amateurs, clubs, and radio stores will direct prospective amateurs to your courses. The single best possible feature of a course setting is to have it include a station. It has been highly effective for me to use club stations to get new (and prospective) amateurs on the air. If you have enough room to do so, establish a reference library for use by your students.

Class Size. I have found that the most effective class size is 20 to 40 people. When I had classes with more than 200 students, they felt inhibited and would not ask questions. When I started courses with less than 20 people, a few dropouts depressed the remaining students. A course fee provides some additional motivation for students to complete courses, and the income can be used to purchase supplies needed to enhance the course. I believe in doing things first class, and that takes money.

Course Materials. I have recorded a series of cassette tapes that can take

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5/8 wave x 5
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UHF (SO-239)

FL-62S
Gain & Wave:
146MHz 3.5dB
1/2 wave
446MHz 6.0dB
5/8 wave x 2
Max Power: 150 watts
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UHF (PL-259)

FL-67S
Gain & Wave:
146MHz 4.5dB
5/8 wave
446MHz 7.2dB
5/8 wave x 3
Max Power: 150 watts
Length: 4' 11"
Connector:
UHF (PL-259)

CX-224
Gain & Wave:
146MHz 2.15dB
1/2 wave
222MHz 3.6dB
5/8 wave
446MHz 6.0dB
5/8 wave x 2
Max Power: 100 watts
Length: 3'
Connector:
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CA-2x4MB
Gain & Wave:
146MHz 4.5dB
7/8 wave
446MHz 7.0dB
5/8 wave x 3
Max Power:
150 watts FM
Length: 4' 10"
Connector:
UHF (PL-259)

CA-2x4SR
Gain & Wave:
146MHz 3.8dB
5/8 wave
446MHz 6.2dB
5/8 wave x 2
Max Power:
150 watts FM
Length: 3' 4"
Connector:
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B-20
Gain & Wave:
146MHz 2.15dB
1/2 wave
446MHz 5dB
5/8 wave x 2
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NMO (B-20 NMO)

B-10
Gain & Wave:
146MHz 0dB
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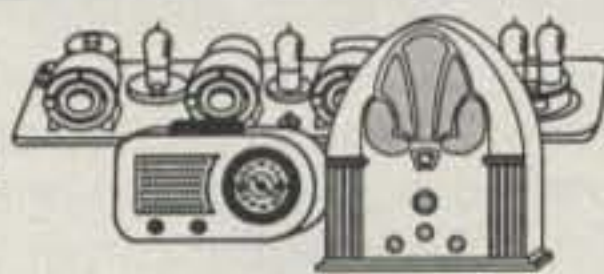


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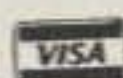
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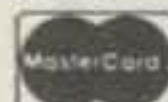
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CIRCLE 23 ON READER SERVICE CARD

someone from no knowledge of the International Morse Code to a receiving proficiency of about 13 wpm. It is advisable to have such material available to students on a loan basis. I use about 250 pages of printed handouts which allow students to supplement in-person class instruction with individual home study. Much of this printed material is also useful for reference purposes, when students subsequently start operating. Each printed aid should be discussed at the time it is distributed. New instructors should follow prepared course outlines and lesson plans, such as the ones that are issued by the League. As you become experienced in conducting courses, it is normal to alter material to do the job more to your liking.

Testing. Let your students know when and where FCC amateur radio licensing tests are conducted. If possible, give students information regarding several local test sites. Provide your students with complete information regarding what they should expect to encounter at a test site. Make sure that your students know what they should bring with them to a test session, such as identification, writing instruments, and a license copy (if already licensed). If you have the material available, it is a good idea to conduct a realistic sample test session as the concluding class of the licensing course.

Students' Stations. The most important thing an instructor can do is to help a student (or ex-student) get on the air. Discuss station equipment and accessories briefly during course sessions, but restrict detailed discussions to one-on-one talks with individuals. Encourage them to obtain the best station they can afford. Experienced operators can achieve remarkable results with junk equipment, but inexperienced operators are likely to remain active on the air only if they start with good gear that provides good communication results. It is unwise to advise newcomers to build kits or homebrew equipment for their initial station. Those activities are better suited to experienced amateurs. I ran homebrew gear for many years. However, I know that homebrewing is almost dead. The sophistication of modern components and tools has just about killed homebrewing.

If you have a suitable location, it is advisable to check students' equipment there using known antenna and ground systems. I have found that doing this provides me with an excellent opportunity to teach the student the function of each control under actual operating conditions. I usually have the student work a couple of contacts with her/his new gear at the conclusion of the check session. This increases the student's confidence in the equipment and him- or herself. I often check the new amateur's initial station installation. This allows me to make suggestions which she/he is welcome to implement or ignore. A station installation check



Arshad H. Quadri, leader of a group of about 60 potential amateurs in the Sindh province of Pakistan, advises that help is needed in the form of training material and/or equipment (see text).

provides another opportunity to get the new amateur on the air. Stress the importance of a good ground system and antenna system for each station, with special emphasis on safety. Encourage new amateurs to become active in local amateur radio clubs; they need exposure to other amateurs.

Amateur Radio Home-Study Courses Needed

Donald Ashdown, 6Y5DA, knows several prospective amateurs in Jamaica. Poor transportation and long distances between students make in-person instruction relatively ineffective in Jamaica. If you have a homestudy amateur radio course that you no longer need, please consider mailing it to the Mandeville Chapter of the Jamaica Amateur Radio Association. The mailing address is 18 Villa Road, Mandeville, Jamaica, West Indies.

Pakistan Group Seeks Help

Arshad H. Quadri is the leader of a group of about 60 potential amateurs in the Sindh province of Pakistan. He advises that most of Pakistan's amateurs live in the Punjab province, which is inhabited by richer people than those who live in the Sindh province. The International Amateur Radio Union (IARU) sent some books to this group, but Arshad advises that a lot more help is needed. This would be a very worthwhile project for some Canadian or American amateur radio club.

If you are interested in supplying train-

ing material and/or equipment, please contact Arshad c/o the Larkana Shortwave Technical Library, 1989/A-1 Shaikh Street, Karma Bagh, Larkana 77150, Sindh Province, Pakistan.

Help Request From The Philippines

Rainier R. Bautista, DY9CKQ, advises that the OSCAR-MARBEL organization needs training material to be used with a group of potential amateurs. In addition to printed training data, they need books, club newsletters, code practice tapes, magazines, pictures, posters, and video tapes. If you have any item(s) of interest to this group, please contact them directly. Their address is the Organization of South Cotabato Amateur Radio (OSCAR), Marbel Paterpan, Koronadal, 9506 South Cotabato, Philippines.

Printed Aids

My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10) self-addressed and stamped envelope to my California address. Licensing course instructors are welcome to revise and/or duplicate these items to suit their requirements.

73, Bill, W6DDB

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A LOOK AT THE WORLD AROUND US

More QRP Notes, Rig Views, and Projects!

Heads up, gang. This month's column features another return visit to the always popular area of low-power communications, and we have some good notes, philosophy, and circuit ideas to share with you. We will discuss DXing with QRP and milliwattting, briefly look at the Argonaut II and new Backpacker I transceivers, plus highlight some very interesting British endeavors in QRP. Hold on to your key and soldering iron as we once again move at our usual fast pace. There is always so much to say and so little time, so let's get started!

Reviewing the mailbag, newer amateurs continue to visualize QRP as an ultra-low budget way to get started in HF operating and ask my opinion on a particular rig or circuit that can be assembled quickly. I must thus re-emphasize that any interest you pursue on a shoestring budget yields only shoestring results, and stand-alone QRP is not an ideal introduction to the fascinating world of low-band action. Newcomers need to start out by experiencing the real thrill and "glitz" of working faraway lands with a good 100 watt output transceiver before delving into the challenge of using low power. Until operating expertise is perfected, reaching DX with even a "big rig" and fine-tuned antenna can be difficult. Pursuing that goal with 5 watts and a dipole is definitely not easier!

Understand I am not advocating you bypass QRP activity completely, but consider it a special-interest expansion to enjoy on a just-for-fun basis. If you are presently operating 10 meter SSB with a 25 watt transceiver and dipole or ground-mounted vertical antenna, you are almost experiencing QRP action (and challenges!) as-is. By analogy, a 2.5 or 5 watt CW rig on 40 meters will probably give you the same results or success ratio as you realize with the 25 watt transceiver on 10 meters during weekends, especially during contests.

Let's now assume you have worked and confirmed 100 or more countries and you are interested in new challenges such as DXing with QRP. Jolly good show! You have probably acquired a self-taught DXing technique that works well for you, so let's discuss some additional ideas to increase your success. First, move away

from packet-cluster DXing assistance. Such wide-area listings of "who is on what frequency" are fine if you are using a high-power rig and enjoy wading through pile-ups, but why be a follower when you can be a leader (even with QRP)! Your contacts-per-call ratio will be higher by diligently tuning a band right as it opens (or right before it closes) and spotting/working DX stations before their presence is revealed to everyone via packet clusters.

Second is the ability to copy through heavy on-frequency QRM. Thinking like the DX station you are trying to contact, and mentally placing yourself behind his/her rig will make the big difference. You must time your call precisely when the DX operator is listening. Only last night, for example, I heard three stations miss their reply and contact with a rare DX station because they could not copy through other (long winded!) callers. As a result, they called again (generating more QRM) while the DX operator was "QRZing" for the next station, and the scenario repeated. Tisk, tisk. One well-timed QRP call snagged a QSO right from the jaws of sharks. As I have said before, the operator rather than the rig makes the difference, especially when using QRP. If you wish to hear more (plus study QRP rigs and homebrew circuits), however, check out my new book *How To Get Started In QRP* (fig. 1) available from N.A.R.A. (1-800-GOT-2-HAM) or from amateur dealers nationwide.

One of the most recent trends in QRP is milliwattting, and this area of using less

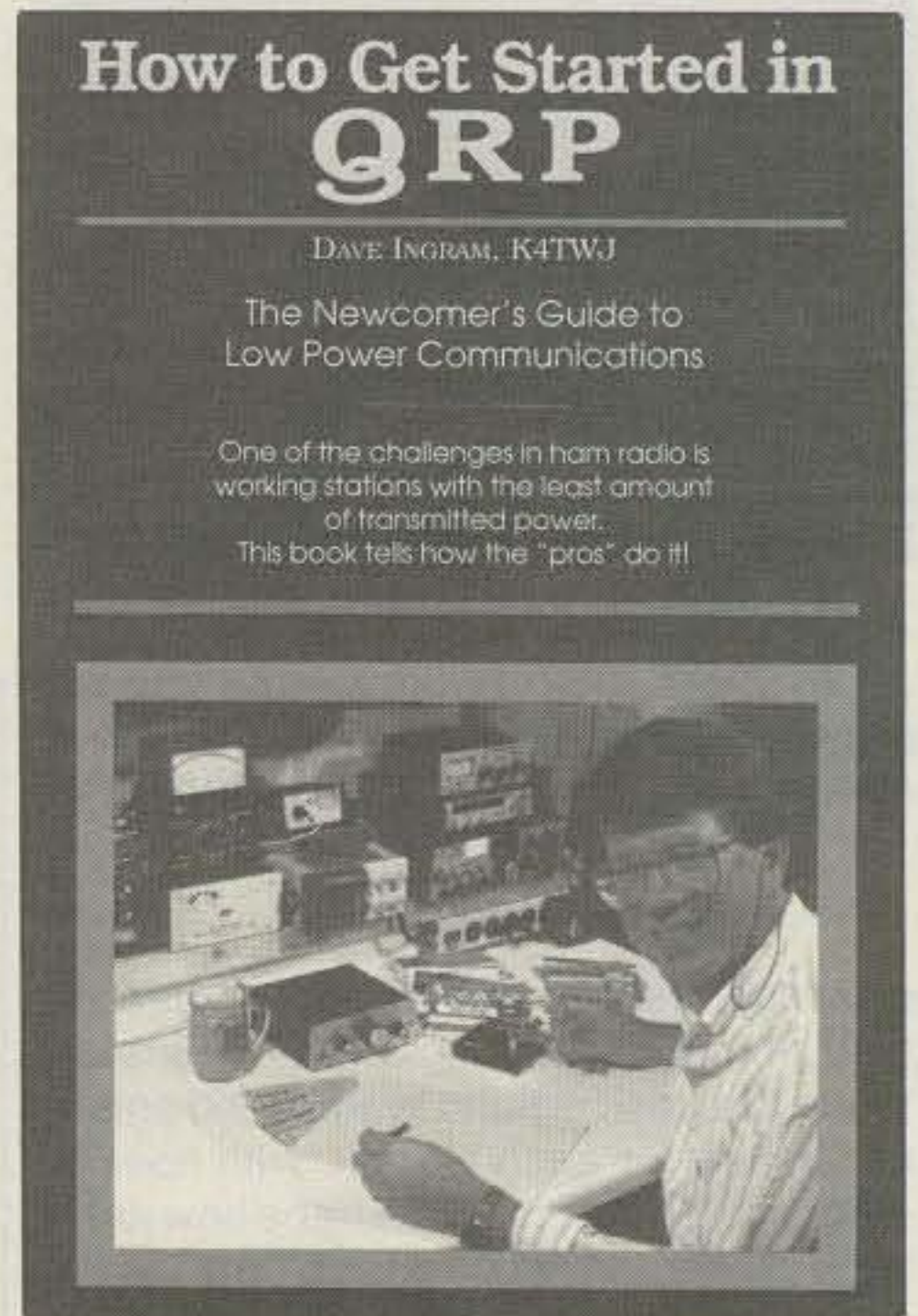


Fig. 1— More good information on QRP has just been released. K4TWJ's new book *How To Get Started In QRP* is now available from amateur dealers nationwide. Do not be tricked by the title, as it is loaded with circuits and ideas everyone can use!

than 1 watt of power really brings out the sharp operators. I thought my own accomplishment of contacting western Australia while running only 250 mw was quite a feat,



Fig. 2— Continuing the QRP legend is Ten-Tec's Argonaut II. This photo was shot while we were on our IOTA DXpedition to St. George Island (NA-85).

4941 Scenic View Drive, Birmingham, AL 35210



Fig. 3- The recently introduced Backpacker I monoband QRP transceiver. This little rig is a hot performer!



Fig. 4- The famous little "Oner" transmitter built by G3RJV. Complete rig is 1 inch square and produces 1 watt output.

but it does not hold a candle to contacts logged by some of the pros. Michael, WA8MCQ, in Maryland, for example, worked Colorado on 10 meters while using only 24 mw, Puerto Rico while running 12 mw and an attic dipole, and Maine on 40 meters while using only 5 mw. During the 1992 Michigan QRP Contest, WA8MCQ ran between 29 mw and 480 microwatts and made 20 contacts on 40, 20, and 15 meters. As an encore, Michael wrangled 22 QSOs with 10 states plus France while running between 2 and 37 mw during the last 10 meter contest. He also pointed out his milliwatt efforts are not final "words" and have been superseded by others. Big-time QRP for sure!

Hot Rigs For Serious QRPers

As mentioned in our Fall column featuring HF mobiling, we recently embarked on a long overdue break and IOTA expedition to St. George Island (NA-85). We carried several rigs and antennas, including a new Ten-Tec Argonaut II and a Tejas Backpacker I transceiver (watch for the full expedition story in a future column). I used the

Argo II with a Cushcraft R5 vertical, and it worked like a little champ on all five upper HF bands (fig. 2). In fact, operating this top-of-the-line QRP transceiver with its totally silent QSK, super-sensitive receiver, and continuously adjustable bandwidth control was absolutely marvelous. Did the Argo II's 5 watt signal reach out? You bet! We worked stations on all continents the first day! I honestly felt like I was using a 100 watt rig. If you are looking for a super-elaborate, all-band transceiver that no one can question as being total QRP, the Argonaut II cannot be beat!

The recently introduced Backpacker I single-band QRP transceiver (fig. 3) also proved terrific on our expedition. My particular model worked 30 meters, and its 2.5 watt signal got out like a champ. I have described how good 30 meters is for QRP in past columns, so I will not repeat those statements again here. Too many alligators can fill a pond and make fishing difficult. The little Backpacker I has some impressive features for CW operating such as solid state and mouse-quiet QSK, RIT, and three levels of front-panel selectivity. I used battery power with the Backpacker

I so I could operate it outdoors, and although subjected to varying temperatures plus instant switch-on-and-go conditions, the transceiver was stable and a barrel of fun to use. If you really take QRP and/or milliwatt seriously, take a close look at the Argonaut II or Backpacker I. They are real gems!

British-Style QRP

A creditable number of our amateur friends in England are true QRP devotees, and nearly every issue of the G-QRP Club's magazine *SPRAT* features advertisements or modifications for their favorite little transmitter known as the "Oner." This little delight is a 1 watt output transmitter built on a 1 inch square PC board. The Oner is available as a complete kit from Kanga Products in England or via Kanga's U.S. liaison, Bill Kelsey, N8ET, for \$10 (3521 Spring Lake Drive, Findlay, OH 45840). You add a crystal and output filter circuit for a band of choice, install the completed kit in a tiny enclosure, and bingo: a genuine postage-stamp-size QRP transmitter!

Rev. George Dobbs, G3RJV, the guru of QRP in Europe, assembled his Oner as a cube (fig. 4), and the little critter has received worldwide recognition. Look closely at the photo and you will see the Oner's circuit board on the cube's bottom. The crystal is mounted on the right side, and rear phono sockets are used for antenna and receiver connections. The cube, incidentally, is made of PC board material. Now this is a real QRP showpiece!

The Oner's schematic, shown in fig. 5, is now commonplace yet quite interesting and worthy of discussion. TR1 is an oscillator/buffer, TR3 is a VMOS power amplifier, and TR2 is the keying transistor. The oscillator section varies from typical U.S. designs by using a single resistor for for-

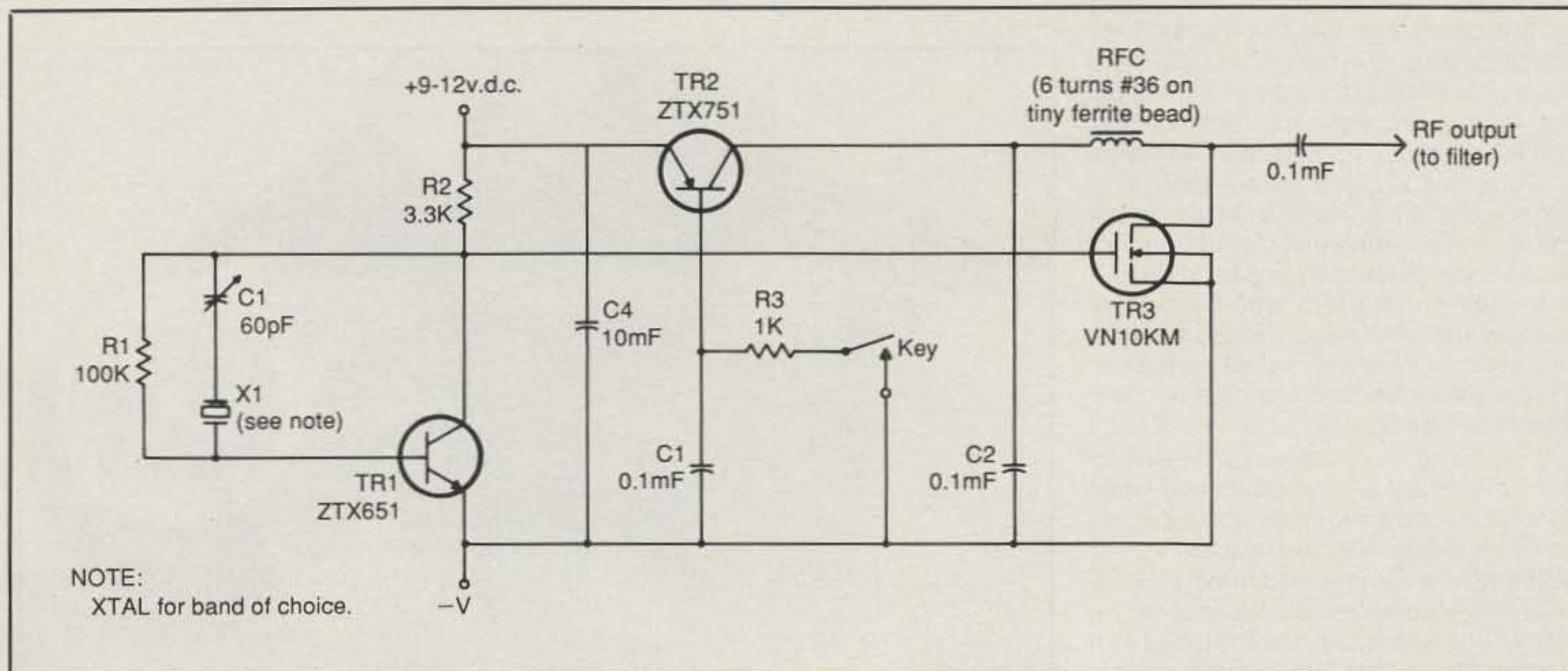


Fig. 5- Circuit diagram of popular "Oner" transmitter. (See discussion in text.)

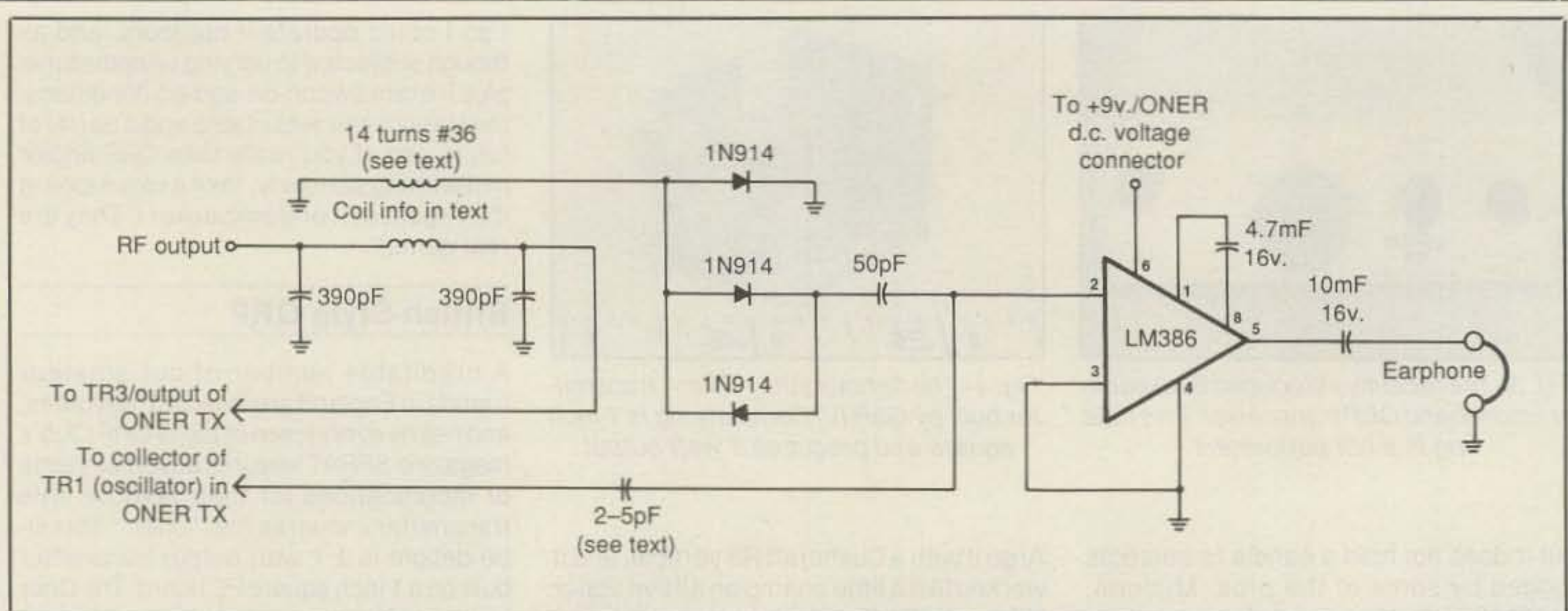


Fig. 6- Circuit diagram of Sweet Nuttin' 30 meter pocket transceiver.

ward bias. A small trimmer capacitor in series with the crystal is used for frequency warping, whereas U.S. circuits usually employ a combination coil and capacitor. TR3 is a VN10KM, a plastic-cased device that resembles a 2N2222 with a small heat-sink on the top. Although the heatsink is quite small, it keeps the transistor cool at an even 1.5 watts output.

I assembled my own Oner transmitter approximately a year ago using super-thin solder and a 10 watt pencil iron, and working under a large magnifying glass. It proved to be one of the neatest little QRP rigs I have played with in many moons. After making several good contacts with the Oner on 30 meters, I decided to homebrew a mating 1 inch receiver. After working out details of that design so it would squeeze into a 2" x 1" x 1/2" plastic box, N8ET informed us that Kanga also offers a complementing Oner Receiver that features a sharp five-transistor circuit on a 1 inch square board just like the transmitter. Component count is high, so resistors are mounted vertically for space conservation. The receiver requires an external oscillator/VFO for frequency selection, so Kanga now also has a 1 inch square Oner VFO and a similar 1 inch square Oner antenna changeover switch with sidetone monitor kit available. Assuming you build all four kits, they can be laid side-by-side or stacked and will fit into a wide variety of enclosures. Who knows? Maybe soon someone will assemble a four-stack "Oner High Rise" transceiver!

Continuing our discussion of British QRP, I received a very interesting letter from Richard Marris, G2BZQ, describing his newly designed 9 inch square indoor QRP antenna for 80 or 40 meters. Richard's milli-loop antenna uses four ferrite rods wound with small wire and tuned with a variable capacitor. We understand he is now perfecting a "Mark II" version, and

details will be released in the future. Can you imagine an HF antenna small enough to sit on top of your rig? Yes, and G2BZQ reports he has made some good contacts using it with a 5 watt transmitter. Gusto QRP indeed! Full details are not available at this time, but Richard says they will be coming in the future.

Sweet Nuttin'

Since assembling the previously mentioned pocket transceiver, several homebrew enthusiasts have asked me to share information on its circuit design. I must emphasize this is strictly a tinkerer's project, but you will probably overload my mailbox with requests for the circuit if I do not include it herein (SASEs please!), so the diagram is shown in fig. 6.

One brief glance explains why I dubbed the project "Sweet Nuttin'." It is ridiculous-

ly simple! First, a separate winding on the Oner Transmitter's output coil couples incoming signals to a dual diode detector, and resultant audio is amplified by a single LM386 IC. Second, a 2-5 pF capacitor connected between the collector of oscillator transistor TR1 in the Oner Transmitter and Pin 2 of the LM386 is used for BFO injection. Finally, a single 1N914 diode is connected between the receive pickup coil and ground to prevent burn-out of the back-to-back-connected 1N914 diodes in the detector. Incoming signals thus coupled to the pickup coil undergo detection and mixing to produce an audio output which is amplified by the IC and applied to an earphone. The complete transmitter and receiver are then powered via a regular 9 volt battery to reduce IC gain below the self-oscillation point and to drop the Oner Transmitter output to approximately .5 watts, thus avoiding cremating the receiver.

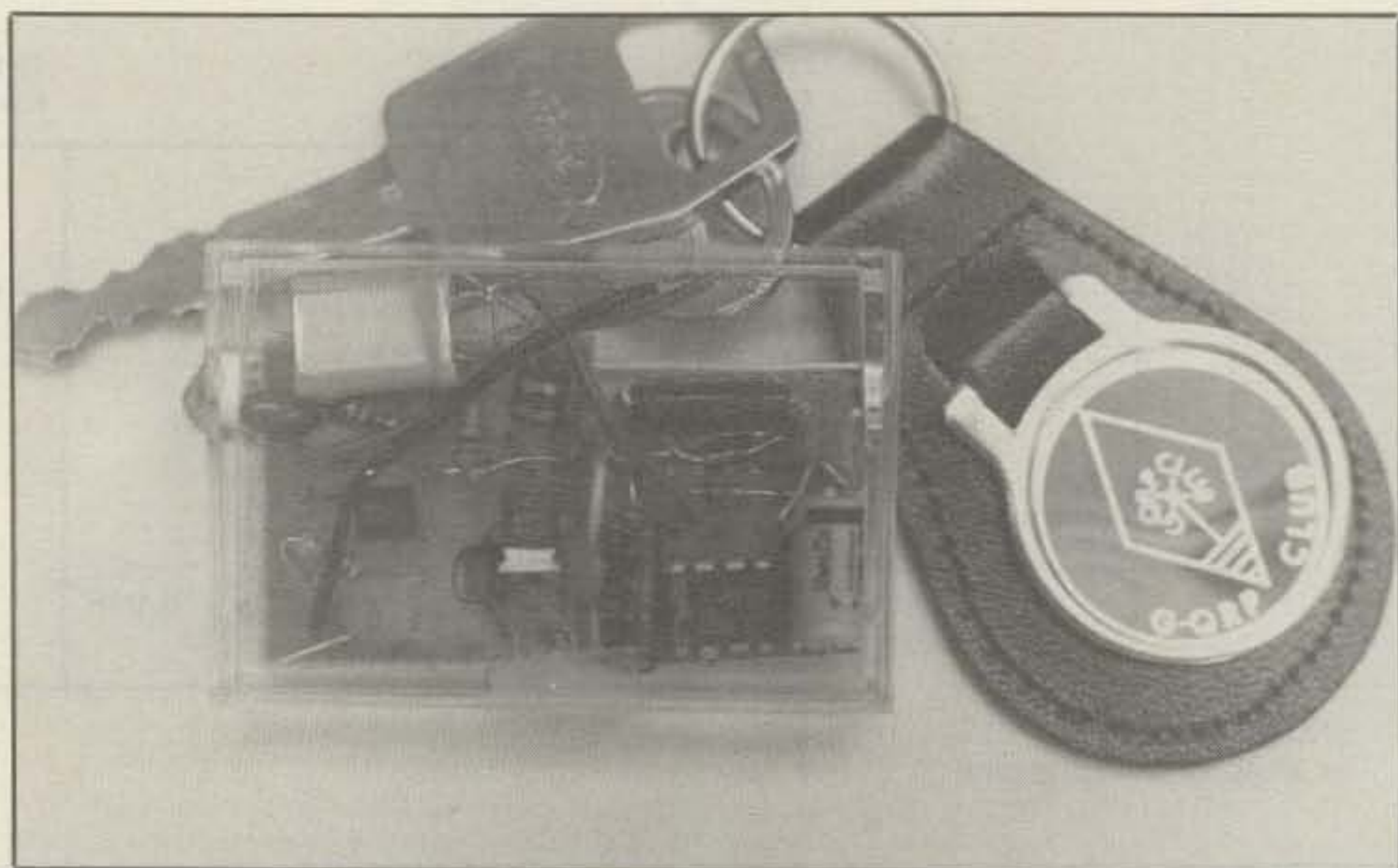


Fig. 7- Photo of Sweet Nuttin' transceiver. Compare size with keyfob.

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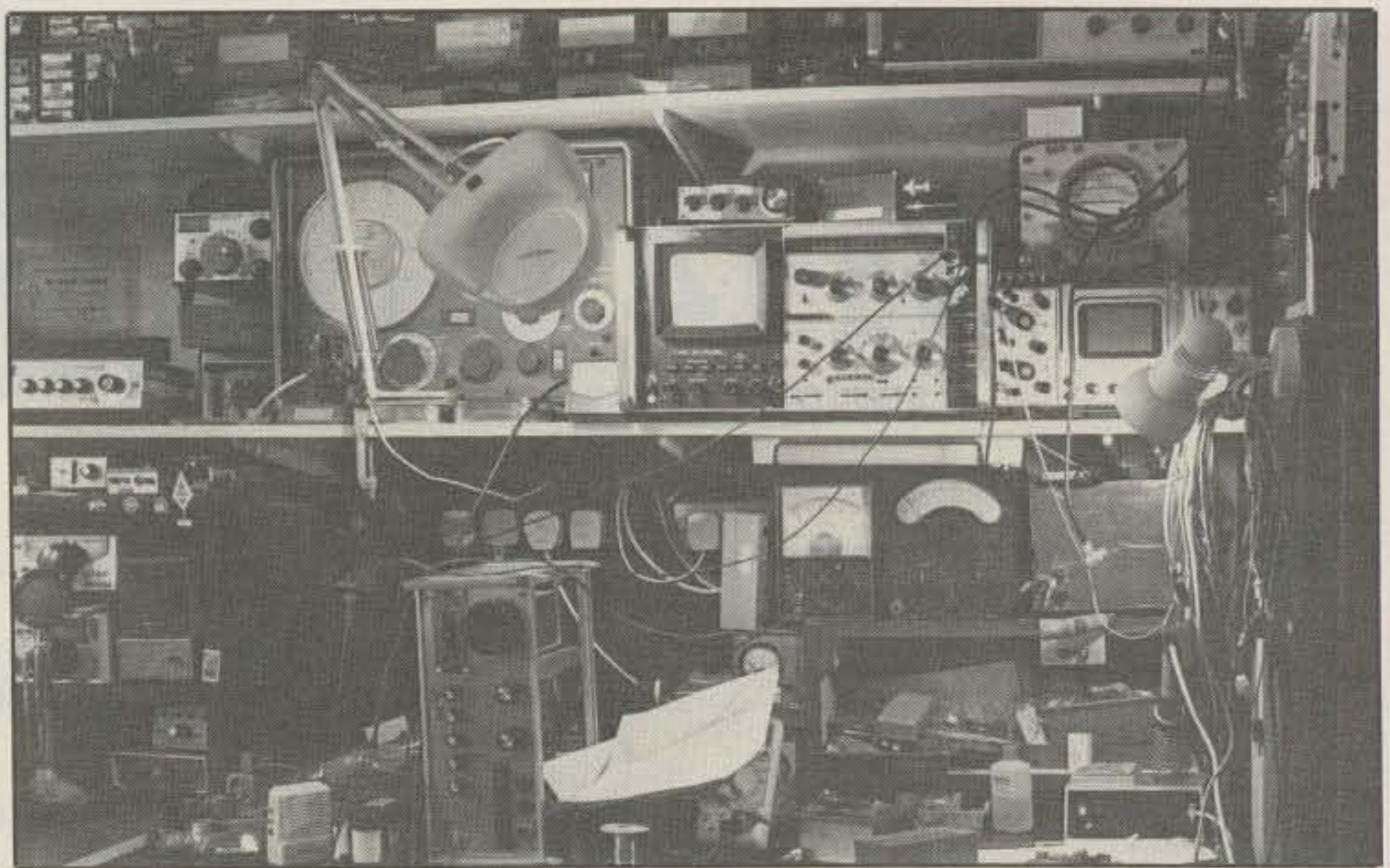


Fig. 8- Home is where the ham gear is! Workshop of QRP guru Rev. George Dobbs, G3RJV, reveals plenty of test equipment for checking out circuits.

My Sweet Nuttin' is built for 30 meters, so the Oner's output filter consists of two 390 pFd capacitors separated by a very small coil obtained from Radio Shack. I am not sure if the number is 273-101 or 273-102, but the coil is approximately ½ inch long by ⅛ inch diameter with 30 or 40 turns of fine wire. My pickup coil (wound directly over the top) is ultra-fine wire (#36) and has approximately 14 turns. Substitution of other super-small coils should work fine.

Just "dink" with capacitor values and number of turns until output is clean and above 100 mw. Room permitting, I also suggest dual RF protection diodes rather than the single diode shown in my schematic. Acquiring the proper level of oscillator injection is tricky. Experiment with the coupling capacitor value of 2-5 pFd, and consider twisting a couple of small wires together if oscillation is a problem. If the size is not a major consideration, substituting a Oner Receiver is heartily encouraged! My receiver circuit is not sensitive to weak signals, and selectivity strictly de-

pends on gray matter between the earphones!

A photo of Sweet Nuttin' is shown in fig. 7. This picture was taken after I installed the rig in a micro cassette box. I later installed sockets in the right top area for key, power, earphone, and antenna. I used miniature three-conductor jacks, so the power and antenna leads were connected to one socket and the earphone and key connections routed through the second socket. Needless to say, there is no room to spare! Sweet Nuttin' makes a nice keyfob, and it actually works!

The Wizard's Den

Many QRPers have read articles written by G3RJV or listened to his fascinating discussions at hamfest forums, so I invited Rev. Dobbs to share his picture and views of natural home habitat with us. Rev. Dobbs was a mite camera shy, so he sent a picture of his shack and workshop (fig. 8). I am guessing, but it looks as if the camera moved (actual shack must be to left) and focused on the workbench. Ah, but there are some unique items buried in all those cables, and many neat projects evolve from that table. As an example, check out G3RJV's neat 80 meter transceiver shown in fig. 9. I understand this transceiver (and several other projects) is now also available from Kanga U.S. Our G-friends definitely know how to enjoy QRP in high style!

Summary

That wraps up the column for this month, gang, and we look forward to seeing you on 20 or 30 meters QRP-style in the near future. In conclusion, I remind you the real secrets of QRP success are sharp operating techniques and a big outdoor antenna.

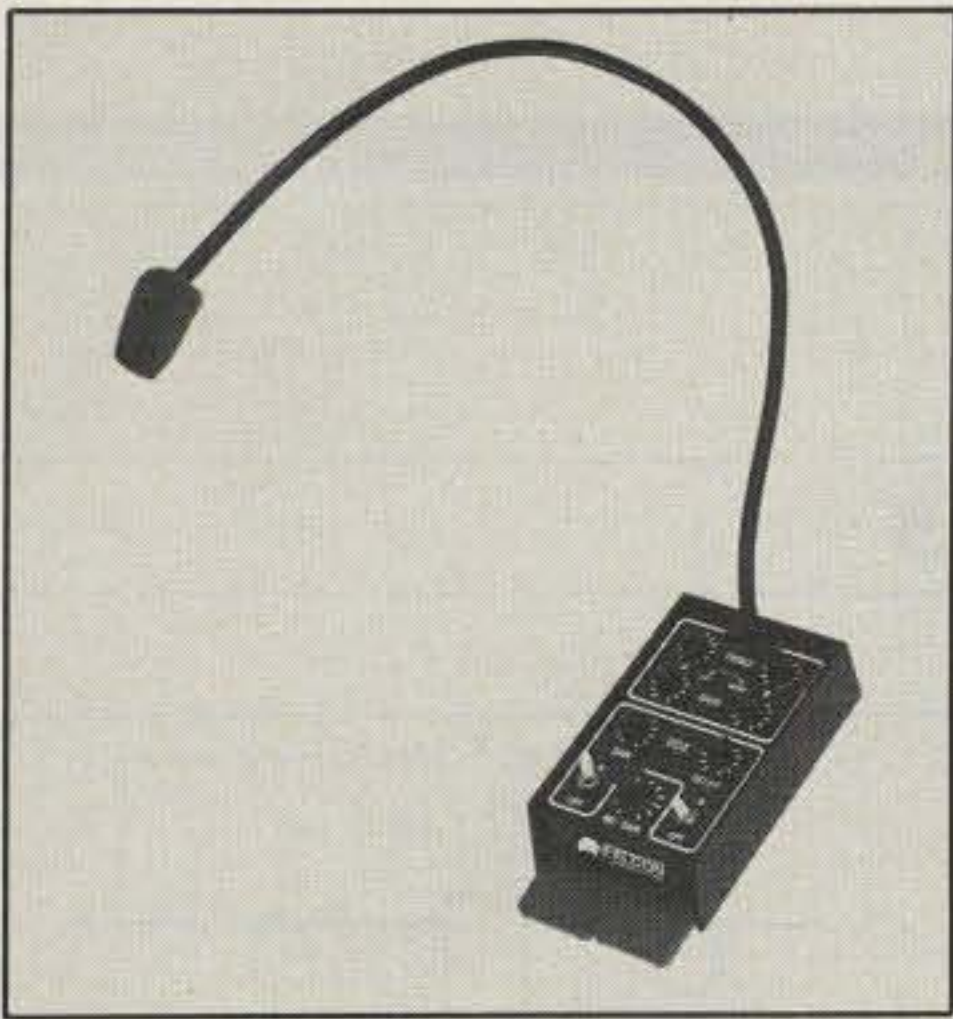
73, Dave, K4TWJ



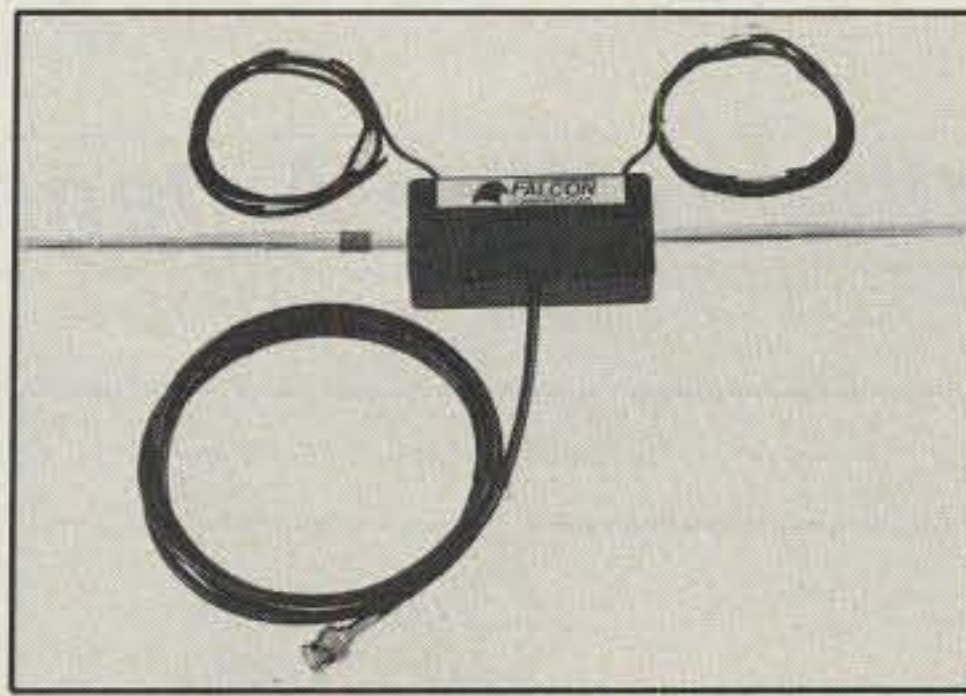
Fig. 9- A recent product of G3RJV's workshop: a compact 80 meter transceiver that works great.

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THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Multiband Wire Antennas

My last few columns discussed popular multiband wire antennas: the G5RV/ZS6BKW design and the off-center-fed (OCF) dipole. These simple skywires, aided by an antenna tuning unit (ATU), permit the user to skip from band to band and enjoy the waning days of the present sunspot cycle.

Of course, one of the most versatile multiband antennas is the center-fed "Zepp," a pre-WWII favorite (fig. 1). This simple antenna can be used on any frequency between 1.8 and 30 MHz, provided a suitable balanced antenna tuner is used with it. Alas, the days of the balanced tuner seem to be gone. I've described one¹ and there is one shown in the *ARRL Antenna Book*.² Unfortunately, modern store-bought ATUs are single-ended devices and use a balun to convert to a balanced line. This approach is okay, provided the balanced line has a low value of SWR on it. This is usually not the case in a multiband antenna, and the ferrite balun just won't do the job. I hope one of these days a manufacturer will bring out a link-coupled, balanced ATU that will do the job as it should be done! That will open the door for more interesting multiband antenna designs.

Build a balanced ATU yourself? If you can find the components and have the time, go to it! You'll be glad you did.

A 7 and 21 MHz Dipole Antenna

A center-fed half-wave antenna will work on odd harmonics of the fundamental frequency. That is, a 7 MHz dipole will operate on 21 and 35 MHz, the third and fifth harmonics of 7 MHz. However, the physical length of a harmonically operated antenna is not the same as the electrical length, and therein lies the problem. The approximate resonant frequency of a harmonic antenna in free space can be determined by the following formula:

$$f \text{ (MHz)} = \frac{492 (N - 0.05)}{L}$$

where L is length in feet and N is the number of half-waves on the antenna.

Let's examine a dipole cut for 7 MHz and see what the third harmonic relation is. By formula $(468/f)$, a dipole cut for 7.000 MHz is 66.857 feet long. Plugging this number

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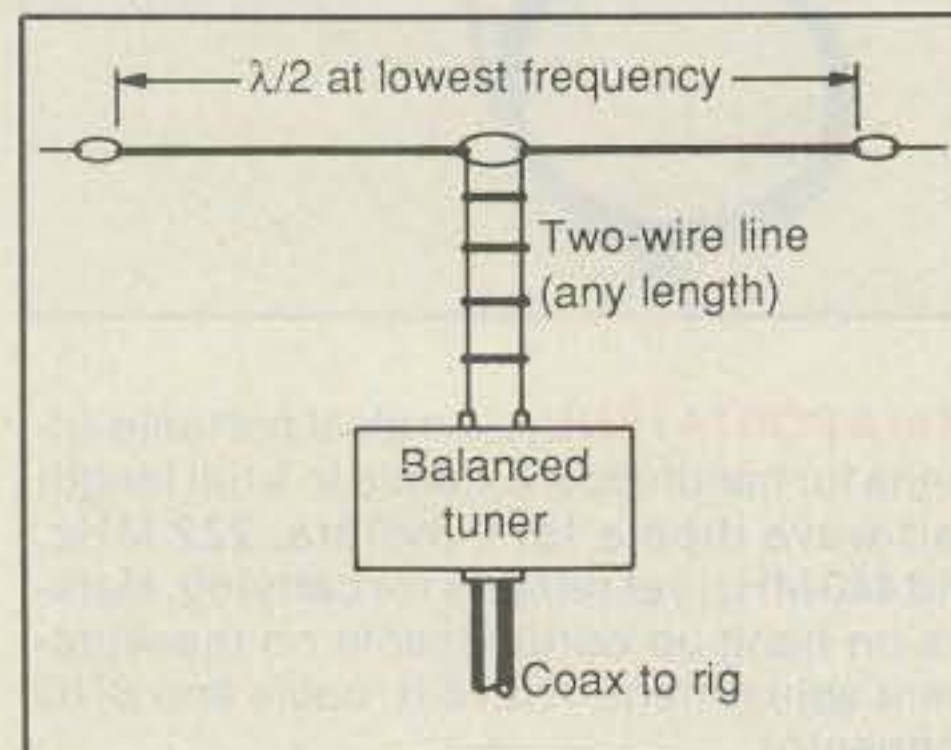


Fig. 1—Most versatile multiband antenna is the center-fed "Zepp." For 80–10 meter service the recommended antenna length is 136 feet.

into the harmonic equation, we find that third harmonic resonance falls at 21.709 MHz. That's a long, long way from the 21 MHz band!

The problem is to lower the third harmonic resonant frequency into the 15 meter band without disturbing the fundamental frequency resonance point. This has been attempted by the addition of loading loops, placed at 21 MHz high potential points on the antenna (fig. 2). Unfortunately, loading loops are large and unwieldy and must be adjusted by cut and try.

The WA3T Inductively Loaded Antenna

In the September 1992 issue of *Radio Communication*, Robin Moseley, WA3T, approaches harmonic resonance in a different manner. He says, "Another solution is to use a small amount of inductive loading, positioned approximately at the center of each of the 'outside' half-waves of the 21 MHz, 1.5 wave dipole (fig. 3). The inductors should be positioned near the maximum-current points in the 21 MHz dipole. When operating on 7 MHz they carry only half the maximum current. Taking this and the frequency difference into account, the inductors present about six times more loading effect on 21 MHz than they do on 7 MHz. Thus, they increase the electrical length correspondingly more on 21 MHz.

"In a practical antenna, the two design and adjustment variables are the inductance of the loading coils, and the overall length of the dipole. Rather than worry too much about putting the inductors at the ex-

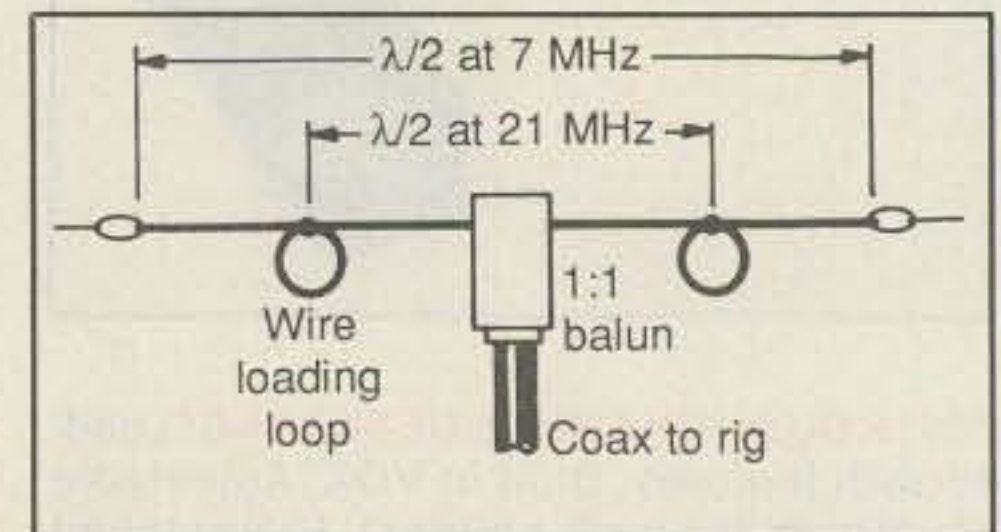


Fig. 2—Loading loop placed at 21 MHz end points lowers third harmonic resonant frequency.

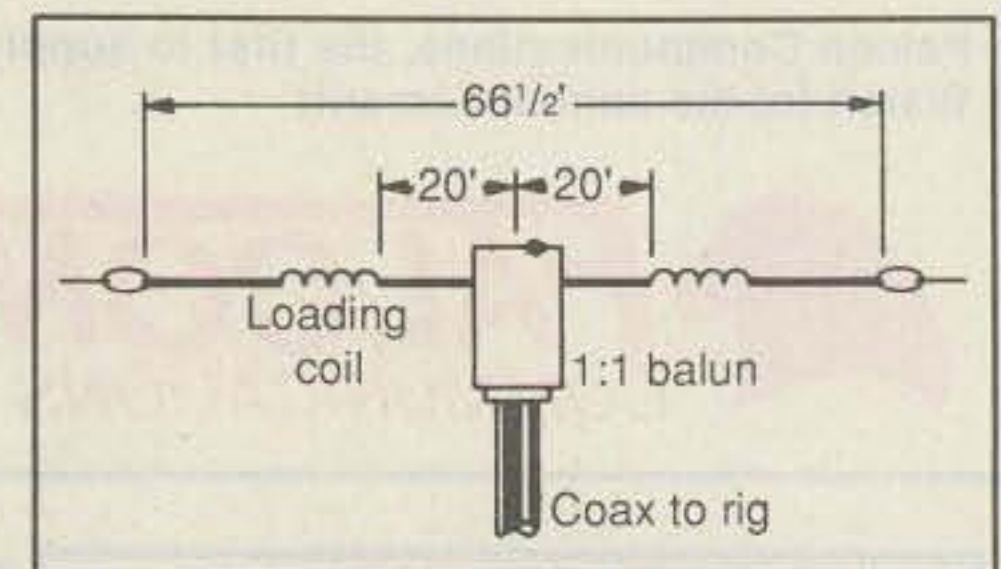


Fig. 3—The WA3T dual-band antenna places loading coils at points of maximum current for 21 MHz. Coils are 0.5 uH.

act maximum-current points for 21 MHz, I suggest they be positioned 20 feet from the center, and the final length adjustment be made in the outer section without changing the position of the inductors.

"A good value for the inductors is 0.5 uH, corresponding to four turns on a 1.5 inch plastic tube, spaced about 1.3 inch. A good starting point for the overall length is 66.5 feet.

"For an antenna height of 30 feet, MINI-NEC predicts a 21 MHz resonant impedance of 82 ohms, giving an SWR of 1.65 on a 50 ohm line

"Note that these inductors are not 'traps,' merely slight loading to adjust the electrical length. The bandwidth of the antenna is not significantly affected by their presence."

Building a 7-21 MHz Dipole

Well! There was nothing to do but to try out this simple antenna. Being a contrarian, my antenna is slightly different from the WA3T design. It has an overall length of 65 feet and instead of using inductors, hairpins made out of #12 wire were used (fig. 4). It is suspended in an inverted-V con-

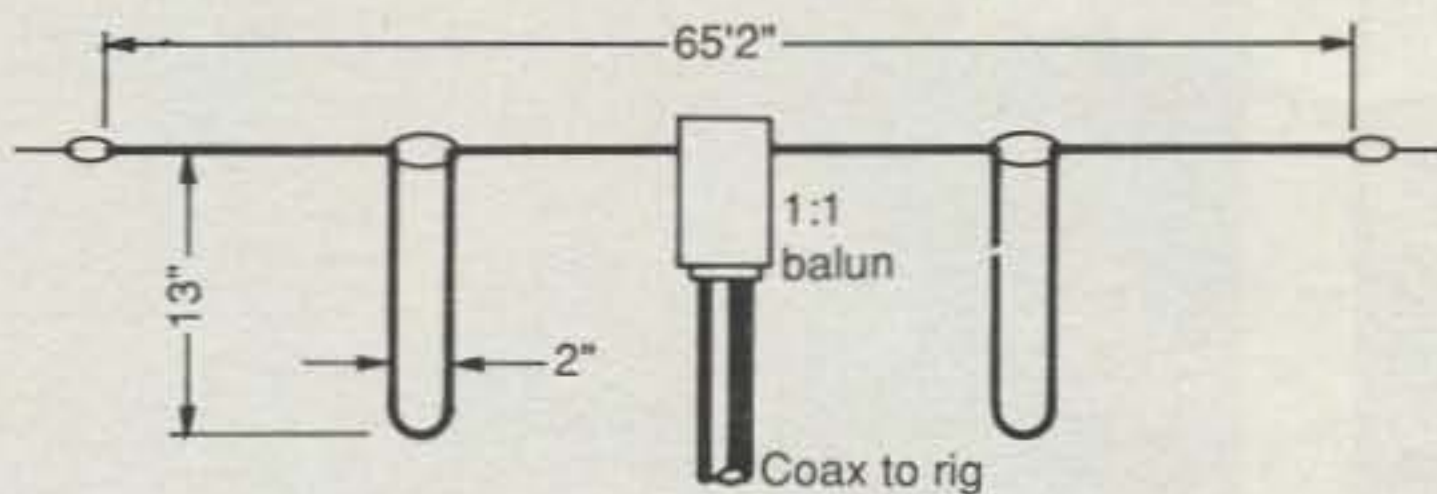


Fig. 4— Hairpin inductors are made of #12 wire spaced 2 inches, 12 to 14 inches long.

figuration, with the apex at 40 feet and the ends at 21 feet. And it worked right off the bat!

As with any antenna, the resonant feed-point impedance varies with height above ground. In my case it turns out to be about 62 ohms on 40 meters and about 80 ohms on 21 MHz. The corresponding SWR curves are shown in figs. 5 and 6.

It is possible to move the 7 MHz SWR curve higher in the band by trimming the antenna tips, but this seems unnecessary, as the ATU drops the SWR to unity at any point in the band.

All in all, it is a nifty antenna for today's low sunspot propagation. Fifteen meters is still open for good DX, and 40 meters is great for rag-chewing within the U.S. I recommend this simple skywire for easy, two-band operation.

The WA2YYI Trap Design

Lots of amateurs like the trap-dipole configuration for multiband operation. John, WA2YYI, is one of these amateurs, and he's designed a nifty trap assembly for a compact 160-80 meter dipole (fig. 7).

Building a tuned trap is always a messy business, and waterproofing it is a pain. John's approach sheds a new light on this problem. This arrangement places the coil in a vertical position and uses a short length of RG-8/U coax inside it for the capacitor. The trap coil is wound on a section of 1 inch white PVC water pipe (actually 1 1/4 inch outside diameter), 4 inches long. The coil consists of 66 turns #21 enamel wire, close-wound to 2 5/8 inch long. This works out to about 75 uH, and in conjunction with a 9 1/8 inch length of coax, resonates at approximately 3.7 MHz.

Both ends of the coax can be protected from the weather by dipping them in black plastic sealant used to coat the handles of tools (pliers, screwdrivers, etc.) and obtainable at a hardware store. The trap is adjusted to frequency with the aid of a dip oscillator in the time-proven manner.

The coil is given a heavy spray of acrylic to protect it. When wet, the water runs off the coil and the whole assembly seems waterproof. It will be interesting to see what this design does in a heavy snow-storm! Time will tell.

Jerry's Place

Old timers living in the New York area pre-WWII fondly remember "Jerry's Place," otherwise known as Gross Radio. Located at 51 Vesey Street in the heart of "Radio Row," it was a popular hangout for enthusiastic amateurs.

You could buy a 6 foot relay rack complete with all panels for \$16.95, 866 rectifier tubes for 99 cents, a genuine carbon plate 203A tube for only \$8.75, and a kilowatt plate transformer for \$11.70! Meters were \$3.35, and a good "bug" key was \$6.00. In a word, it was "ham heaven" for the lean purse.

Jerry Gross, W3AAE, was one of the first distributors to bring out a low-cost transmitter kit. The CB-25, a 30 watt transmitter for 80-40-20 meters, sold for \$13.95. A lot were sold, but very few of these antiques can be found today.

John Rollins, W1FPZ, has a unique hobby: he locates these old rigs and refurbishes them into working models. His CB-25 is shown in fig. 8. It has the original coils, wound with green, silk-covered wire and is ready to go on the air!

John also built up another look-alike Gross transmitter which uses a pair of Taylor T-20s (similar to a 210) in the final stage (fig. 9). A pair of 816 mercury vapor rectifiers supply high voltage for this 100 watt rock crusher.

These two transmitters bring back fond memories of Jerry's place and other inhabitants of radio row: Leeds, Wholesale Radio Service Company, Blan, the Radio Man. . . . Oh boy, I could go on for hours. John helps to keep these happy memories alive with his meticulous recreation of some of amateur radio's glorious past.

The Amateur Radio Library

Every once in a while a book comes along that I wish I had read a lot earlier in my life. Unfortunately, this book wasn't around when I really needed it! I refer to *The Art of Science* by Joe Carr, K4IPV. Joe has written over 80 books in the scientific field and was well-known as a contributing author to *Ham Radio* magazine.

This book covers the "nuts and bolts" of real-world scientific inquiry. It covers

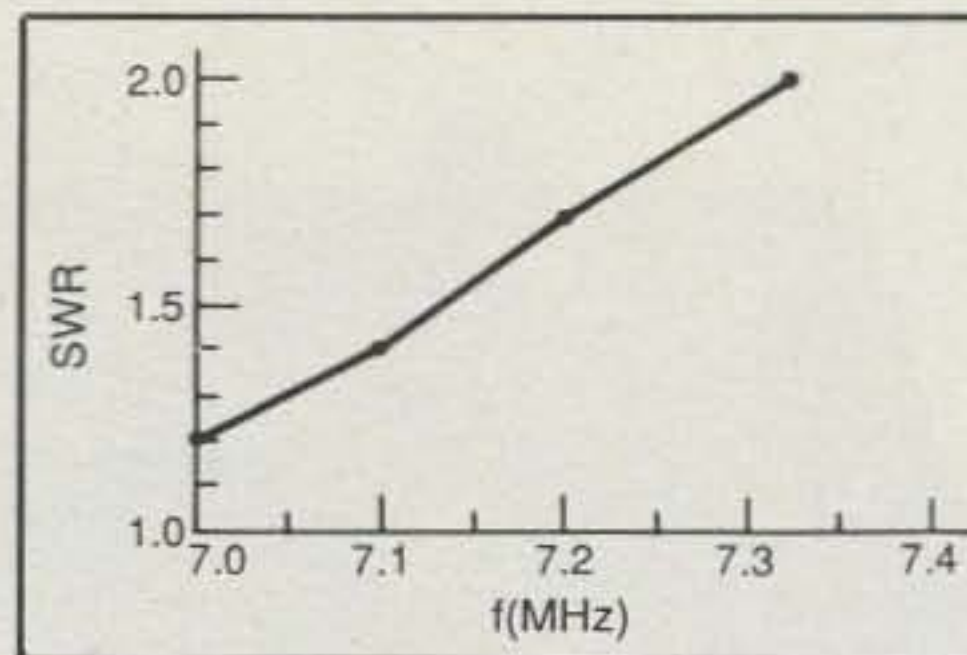


Fig. 5— SWR curve for antenna cut to resonate at 7.0 MHz.

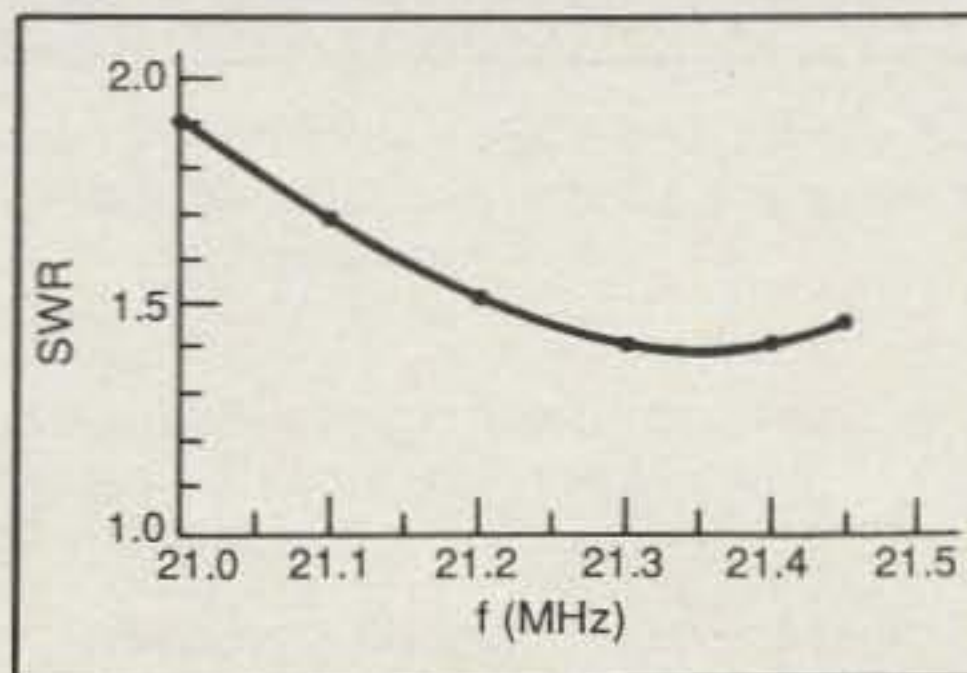


Fig. 6— SWR curve for 21 MHz band.

logical thinking and is a bible for any young student thinking of going into the modern world of computer science or business administration. In my case it is a helpful companion for an older person to help codify his thoughts and establish an analytical thinking technique that benefits all walks of life.

The book was especially helpful in the last presidential election in which the politics of counterfeit and deception reached new heights. The book lists and explains 26 arguments used in everyday politics that delude the voter into reaching conclu-

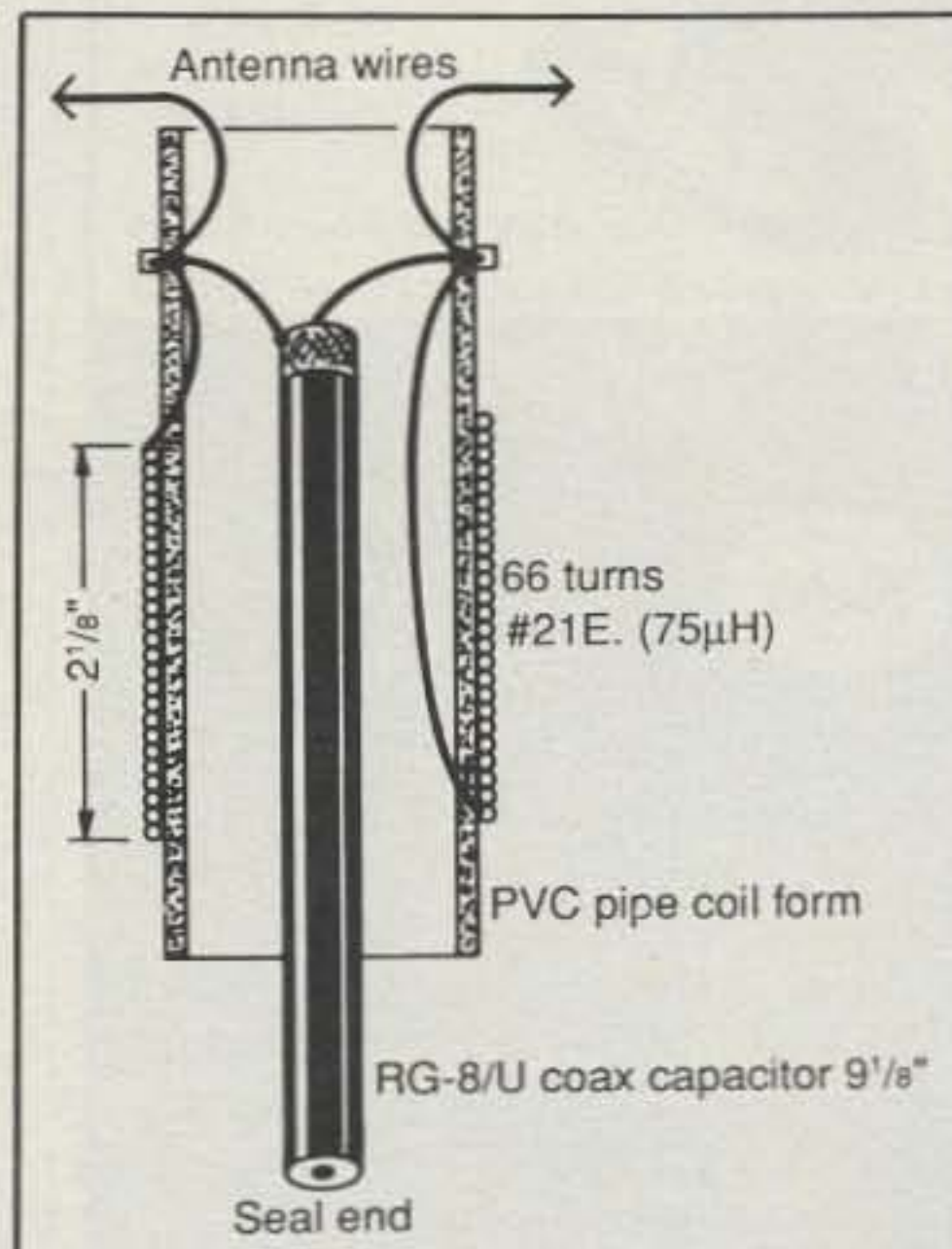


Fig. 7— Cutaway view of compact 80 meter trap. Capacity of coax is about 22.5 pF.

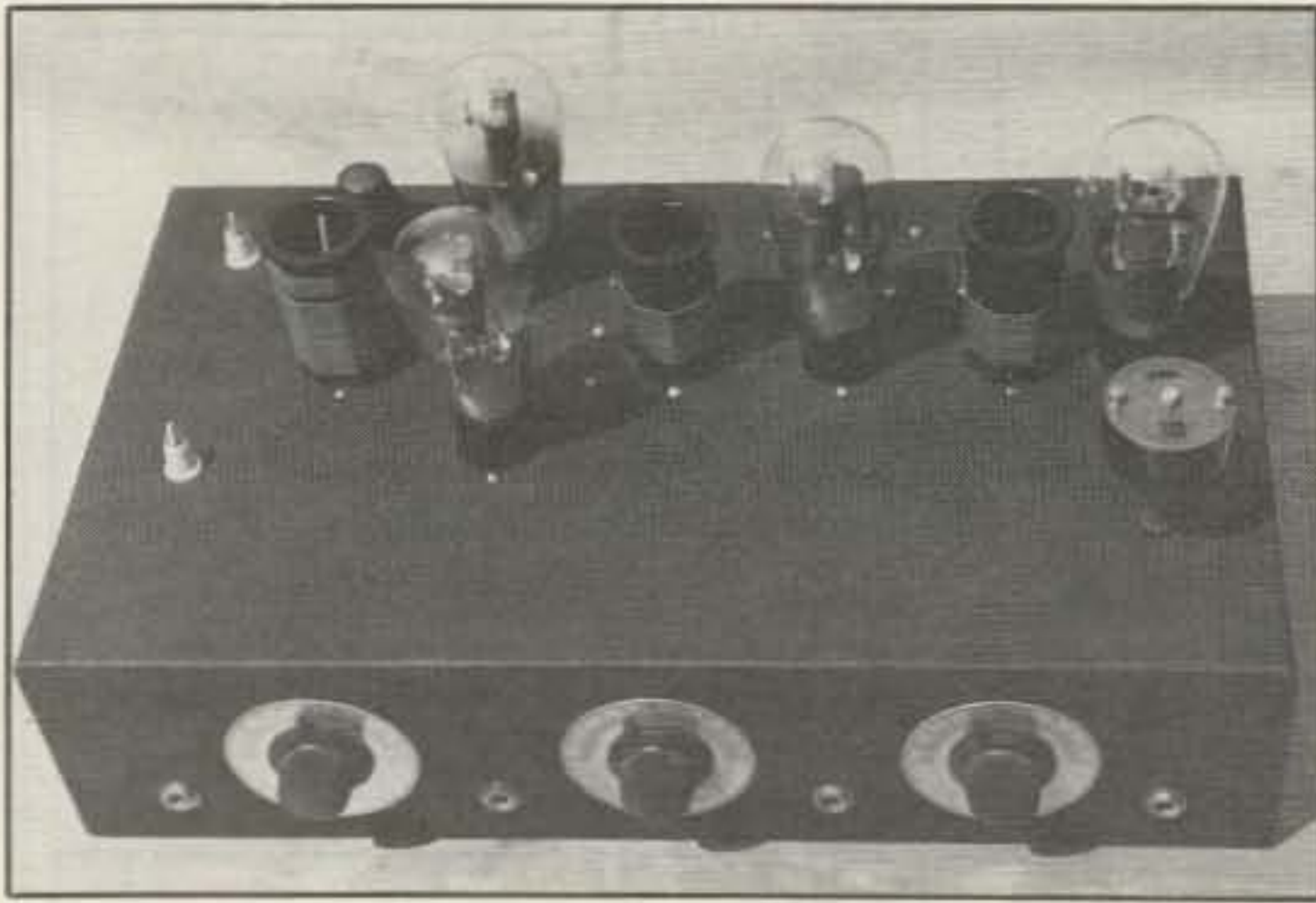


Fig. 8—Refurbished CB-25 transmitter of John Rollins, W1FPZ. The line-up is 47 crystal oscillator, 46 buffer, and two 46's in the final amplifier.

Fig. 9—One-hundred watt Gross transmitter built by W1FPZ uses two Taylor T-20 tubes in final amplifier.

sions that are false or biased. It was very helpful during the various TV debates. The XYL and I listened to them with book in hand. "Aha! He's using Argument by Oversimplification!," or "He's using an Incomplete Comparison argument!" I must say it was very satisfying to catch the rascals right in the act!

Political obfuscation extends into sci-



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ence and engineering and even into amateur radio. While this book doesn't deal with amateur radio *per se*, it deals with everyday life. Reading it helps to overcome and understand some of the maddening and confusing events that continually surround us.

In a nutshell, the book is a practical guide to experiments, observations, and handling data of all types. Fifteen chapters cover theory, records, measurements, probability, sampling data, and other subjects important in today's competitive world of business, science, and industry. It is a fascinating discourse on the world around us. I recommend this book, *The Art of Science*, by Joseph Carr, High Text Publications, 7128 Miramar Rd., Suite 15, San Diego, CA 92121.

The Dead Band Quiz

My recent remarks on retarded technology, or technology in reverse, drew cogent comments from W2FZ and W8YFB, who had noted the same phenomena. The quiz about the voltmeter, which read zero volts, and the little poem about the "Scarlet Pimpernel," brought correct replies from SM5GW, W2DFZ, OH2DT, N2EBG, N7VZB, VE7IIT, K1RD, KI6IS, W3ZLK, N3EID, WA4DTE, ex-K2UKT, KF9HG, W4HYY, N4OFV, VE7BS, and KA1ADF.

Also thanks for the comments about the

demise of Heathkit and other personal thoughts from WA0KKC, K9AY, K5BDZ, KH6GI, VE4AKM, W2YYI, W5QJM, W6PYK, K9BXG, WA3EOQ, WA8MCQ, W8JI, W8UOF, W1PXL, KJ6GR, and W8ARM. I wish I had time to reply individually to each one of you! Thank you for your comments and suggestions.

A New Dead Band Quiz

The writer of this story was Eric Blair. Born in India in 1903, he became a famous political writer. What is his "pen name" and from which of his books comes this quotation?

"It was a bright cold day in April, and the clocks were striking thirteen."

Footnotes

1. Orr and Cowan, *Simple, Low-cost Wire Antennas for Radio Amateurs*, published by Radio Amateur Callbook, Box 2013, Lakewood, NJ 08701 (1-900-905-2961).

2. *The ARRL Antenna Book*, published by the ARRL, Newington, CT 06111.

Correction

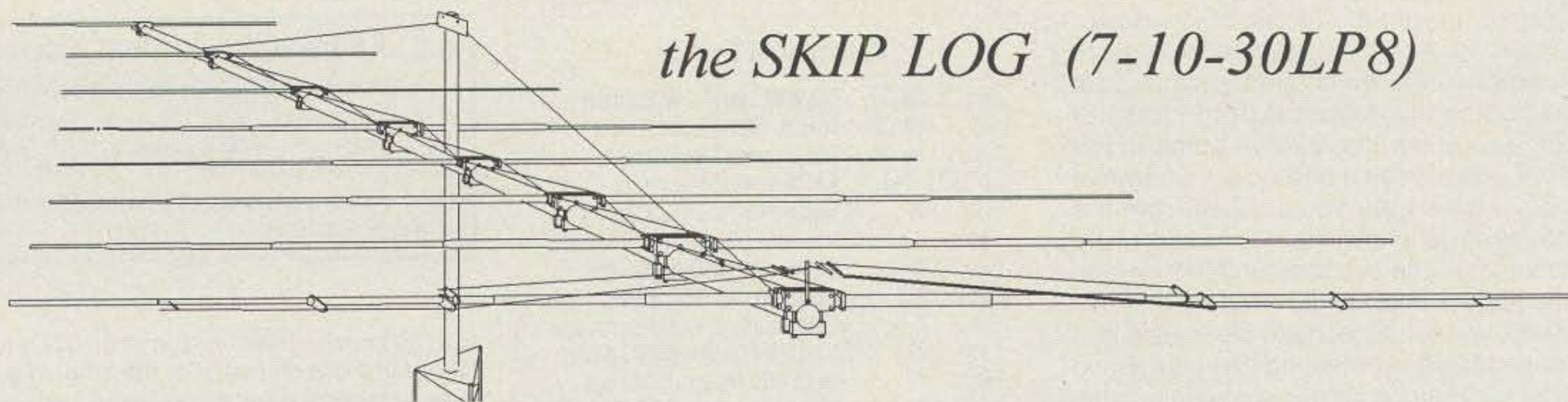
In fig. 1B (page 74), November 1992 issue, the correct length of the 300 ohm feedline is 29 feet 6 inches, not 26 feet 9 inches.

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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Strategies for QRP Contesting

In keeping with the theme of low-power contesting, which we have been discussing over the past few contest columns, I am concluding this month with the topic of QRP operating. I've always admired the QRP contester as a person drawn from a special breed. As you can tell from the comments to follow, there is no lack of enthusiasm in the successful QRP'er's attitude about contesting. I suspect that like myself, you will be left with the feeling that a dose of QRP contesting just might give us a new outlook on our operating styles and tactics. It can become too easy to develop poor operating techniques which tend to be obscured behind our KW amplifiers. In my book, successful QRP contesting brings out some of the best operating around! And now to the experts.

Contesting with QRP

By Christopher J. Page, G4BUE

In many ways QRP contesting is the same as contesting with high power, but by other measurements things are very different indeed. I will be concentrating on those areas of contesting that in my experience (since the late '70s), I have found to be either unique to QRP or very much more important than when using high power.

I have found that setting goals and objectives for this mode of operation is very much a personal thing, depending on how ambitious you are feeling at the time! Trying to beat the score of last year's winner or an existing record is no different from QRO goals and objectives, but trying to see how close you can come to the QRO guy in the same class as you is unique to QRP. An example was my goal in our National Field Day this year. A new QRP Class (5 watts output) was introduced for 1992, but in all other aspects the rules were identical to the existing 100 watts Restricted Class. Although the results have yet to be announced, the claimed scores were quite encouraging. The leader of the Restricted Section claimed 5121 points from 1042 QSOs and I claimed 2801 points from 571 QSOs!

The majority of the major contests now include a QRP class. The rules are identical to the regular class(es) except for the power limitation, which is usually 5 watts output, the QRP standard agreed by QRP clubs worldwide. Nothing is more rewarding than to see your callsign listed in the QRP class with a higher score than a station listed in the corresponding QRO class. Believe it or not this is easier to achieve than you might think.

Many QRP contesters are also DX-chasers. They not only go for DXCC, WAZ, WAS, and the other major DX operating awards, but for the more difficult ones such as 5BDXCC, 5BWAS,

c/o CQ magazine

Calendar of Events

Jan.	29-31	CQ WW 160M CW Contest
Jan.	29-30	U.B.A. SSB Contest
Jan.	30-31	REF French CW Contest
Jn.	30 - Feb.7	ARRL Novice Roundup
Feb.	6	North American CW Sprint
Feb.	6	Vermont QSO Party
Feb.	6-7	QCWA CW QSO Party
Feb.	6-7	YL-ISSB CW QSO Party
Feb.	7-8	1993 Classic Radio Exchange
Feb.	13	North American SSB Sprint
Feb.	13	Utah 160 Meter Challenge
Feb.	13-14	New Hampshire QSO Party
Feb.	13-14	YLRL YL-OM CW Contest
Feb.	13-14	Dutch PACC Contest
Feb.	13-14	EA RTTY Contest
Feb.	20-21	ARRL DX CW Contest
Feb.	26-28	CQ WW 160M SSB Contest
Feb.	27-28	RSGB 7 MHz CW Contest
Feb.	27-28	REF French SSB Contest
Feb.	27-28	U.B.A. CW Contest
Feb.	27-28	YLRL YL-OM SSB Contest
Feb.	27-28	North Dakota QSO Party
Mar.	6-7	ARRL DX SSB Contest
Mar.	13-14	QCWA SSB QSO Party
Mar.	13-14	YL-ISSB SSB QSO Party
Mar.	14-15	Wisconsin QSO Party
Mar.	20-21	Bermuda Contest
Mar.	20-21	B.A.R.T.G. Spring RTTY Contest
Mar.	27-28	CQ WW WPX SSB Contest
Apr.	10-11	JA Int'l CW Contest (High Bands)
May	29-30	CQ WW WPX CW Contest

etc. Contests are an excellent method of increasing your band/country/mode scores, and therefore another goal could be to work 10 new countries on 40 meters and/or 20 new countries on 20 meters. Obviously, your operating strategy for this type of goal would be quite different from that, if you were trying to achieve a big contest score.

Needless to say, your operating strategy will depend on your goals. The difficult decision of whether to try and "run" stations or "search and pounce" is dealt with separately, but there are several strategies that apply whatever your goal may be. These also apply to QRO contesting, but come under the heading of being more important in QRP contesting.

Accuracy is absolutely essential. When your signal is several S points down from others and perhaps the victim of deep QSB, you cannot afford to make mistakes. On CW this not only means sending accurate code, but well-spaced code. Every QRP'er knows Murphy's Rule #1: If you send your callsign three times making only one mistake, and the other station only copies your call once, it will be the one when you made the mistake!

Because you are a QRP station, don't make the mistake that some QRP'ers do and send very slow CW to make up for your low power. Listen

February's Contest Tip

Even though there seems to be a focus on the "band edges," don't be afraid to use the high end of the bands as well. In one hour during a run in the 1992 CQ WW SSB Contest, I had HS, 8Q7, 4S7, TL8, and 9K call me while operating on 14318 kHz!

to a QRO contest station "running" QSOs (that is, working one station after the other in quick succession on the same frequency). He is working to a rhythm and stations are calling him with the same CW speed that he is using. If you use a slower speed, then you break his rhythm, and in addition to making it more difficult for him to copy you, you slow down his rate and will not be popular with him—something to remember if you want his QSL card later!

Accuracy on SSB is also important. Use clear phonetics that cannot be confused with other words or letters. Remember that phonetics which sound clear to English-speaking amateurs may not be so clear to those whose natural language is other than English.

A good strategy, as with QRO contests, is to work the highest band that is open. But I have also found that when working DX on the HF bands with QRP, you can obtain some enhancement in signal strength from being on the appropriate band that the MUF is rising or falling through. This phenomena appears to be more distinctive when the MUF is falling. It probably occurs when using QRO but seems much more noticeable when using QRP. In the CQ WW and ARRL contests when 10 and 15 meters are beginning to close to the west, I have often been able to "run" USA stations at 2 or 3 a minute for 20 or 30 minutes just before the band finally dies completely.

Can I please make a big plea for a strategy that you should never adopt? That is appending /QRP to your call. The callsign G4BUE/QRP or your own call /QRP can never legally exist, so why use it? In addition to being more letters for the other station to copy, it can be construed that you think you should be given some sort of favor or special treatment because you are a QRP station. I know several top-class QRO contesters who interpret the use of /QRP that way and refuse to answer (unless they are really desperate for the QSO!). Apart from those contests where you are obliged to give your power, nothing about your operating should indicate that you are using QRP.

One of the most-asked questions in QRP operating is whether to "run" stations or "search and pounce." Naturally this depends on many things, but mostly hinges again on your goals and objectives for the contest. If you are trying to build up band/mode/country scores, then searching and pouncing is your best tactic. However, if you are trying to achieve a "big" score, then you have the same dilemma as the QRO

contesters. Decisions are usually influenced by the scoring system for the contest, band conditions, the QSO rate when running stations, the number of multipliers worked, how far through the contest you are, and how tired you are.

When using QRP you have to be realistic. That means you don't start the CQ WW CW Contest on 14025 calling "CQ Contest." Generally speaking, I have found the best tactic in the major 48 hour contests is to search and pounce at least for the first 24 hours and usually for the first 36. During the last 12 hours the majority of the "big guns" have worked each other and the pile-ups on the DX stations have slowed to a trickle or even dried up altogether. This is the time when some of the big guns and even some of the DX stations themselves are often searching and pouncing. They are listening for the weak stations calling "CQ Contest," as chances are they have already worked the louder ones. This is when the QRPer can run stations, perhaps not as quickly as the QROers, but with QSOs going in the log that he would probably not otherwise have made.

I have discovered several useful techniques when searching and pouncing with QRP. It virtually goes without saying that you must be able to zero beat accurately. QRPer's don't have big signals to draw the station to them. They must therefore ensure they transmit exactly on the frequency the other station is listening on. If the first call or two are unsuccessful, I have often found that moving the transmitter VFO 10 Hz or so at a time can eventually get you through. It can mean the difference between your QRP signal being in the clear and being heard and being swamped by a much louder one.

How long do you spend calling a particular station? This question could be debated amongst contesters almost as long as the running vs. search and pounce question. Contest scores are composed of QSOs being entered into the log. Obviously, time spent unsuccessfully calling a station does not contribute to the score. Some form of self-discipline has to be introduced. This can depend on several factors, the most influential of which is whether the station is a multiplier (or a double multiplier—zone and country, as in the CQ Contests) and if so, the likelihood of working the multiplier again.

In any case don't just tune away from a station after unsuccessfully calling it. Make a note of the call and frequency (e.g., use those 100 memories you have in our new transceivers!) and come back half an hour or so later. In many instances conditions will have changed, the size of the pile-up may have grown smaller, or the station may have altered the direction of his antenna. Any of these changes can make a big difference when running QRP—the difference between getting through and not getting through. I have often called a station unsuccessfully for longer than I should, tuned away in frustration, and then gone back a short while later and raised him on the first call! My scratch pad is usually full of callsigns and frequencies when searching and pouncing in earnest.

After spending considerable time searching and pouncing with QRP in several major contests, you begin to learn the art of calling in pile-ups and realize that one of the reasons you are getting through against the kilowatt boys is due to the way you call. Almost without realizing it, you begin to adopt a different calling technique. It cannot be described in words, but any QRPer will tell you it happens. If you use full break-in (QSK), then you will learn the technique that much quicker, as it will enable you to hear the state of the pile-up while you are calling. I have

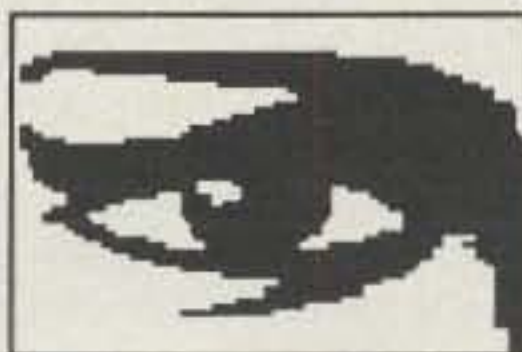
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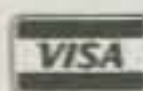
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always used Ten-Tec Argonauts for QRP contesting (initially the 509, then the 515, and currently the 535, Argonaut II). In my opinion, Ten-Tec has the best QSK in the world, and the thought of searching and pouncing in contests with QRP without full break-in makes me shudder! The other reason I use Argonauts is that they are a "proper" QRP rig. You will never be tempted to turn up the gain and give people the opportunity to accuse you of cheating.

After a couple of years of regular QRP contesting I found I was able to assess the size of a pile-up and, combining this with the propagation conditions, was able to accurately forecast how long it would take me to get through. This "seasoning" has enabled me to save a lot of otherwise wasted time in unsuccessful calling. This, of course, comes with experience and cannot be learned overnight. It also depends on a good knowledge of propagation, which is another aspect that is more important to the QRP contest.

A critical secret of successful QRPing is the antenna, and in contesting this can help make up for some of the disadvantage you have with regard to the QROers. Obviously, a full-size, multi-element, monoband Yagi on top of a 200 foot tower would help, but most of us have to be more realistic! What is more important than the type of antenna you are using is how well it is working.

QRPers can never be content with their antenna just working. It has to be working the very best way possible. For any antenna to work properly requires sound construction, good-quality low-loss coax and connectors, efficient and well-constructed antenna tuner (if used), and perfect adjustment to ensure the maximum amount of RF is being radiated in the desired direction. Once this has been achieved, all unnecessary accessories should be removed from the line between the transmitter and the antenna. Every antenna switch, SWR bridge, etc., has some attenuation. Individually it isn't much, but when added together it can mount up to a dB or two. When you are only starting with 5 watts from your transmitter, you cannot afford to waste any RF on its way to the antenna!

The quality of your transmission is more important with QRP. Your CW note must be T9 with no hint of a chirp or click. Use a good-quality microphone on SSB and ensure your audio is as clear as possible. Although speech processors can do wonders for an SSB QRP signal, they can be more destructive to a QRP signal when over-driven.

In addition to those skills you need for general contesting, you need to have extra reserves of patience and perseverance when using QRP. In return you stand to receive more satisfaction, fun, and sense of achievement. Breaking a big pile-up when running 5 watts cannot really be described. You have to do it to discover the sense of achievement. One of the things I enjoy about the ARRL contest is giving my power on CW. I used to give "005" and then receive the inevitable "not nr but pwr pse." The sense of pride you have when you then send "5W 5W" again cannot be described in words. Sometimes you have to repeat it and add the letters "QRP" before the other station eventually realizes you are only running 5 watts!

An aspect of QRP contesting that has given me a lot of fun is "milliwattting," and more recently "microwattting." Milliwattting is using mw power levels instead of watts. Output RF power levels can be accurately adjusted using a simple stepped attenuator. Ten-Tec make the model 290 for the Argonaut, which reduces 5 watts in

steps down to just 10 mw. If you are not trying to achieve a big score, it can be real fun trying to see how far you can work with the lowest power or how many US states you can work in the ARRL contest with 500 mw or so.

Milliwattting is a very good method of "testing" the antennas and operating skill of the big DX contest stations, as well as your own antenna. As any European knows, during the late afternoon of a major contest the HF bands are usually full of USA stations, evenly spaced all running stations on their own frequency. Most of them are very similar in signal strength, but which of them are achieving their big signal through good antennas and which through high power? Milliwattting can tell you, as antennas work two-way and high power only works one way!

I usually start by calling at the 10 mw level and gradually increase power until the station copies me, logging the power. I generally find that those stations who copied me with the lowest power levels on, say, 20 meters are the same stations who copied me with the lowest power on 15 and 10 meters. If further confirmation was needed, after repeating this in several contests I usually find it is the same stations who continually copy me with the lowest power levels, thus reducing any differences in conditions, etc. (What am I bid for my list of USA stations who never hear me until I have increased my power quite considerably?!)

More recently I have taken milliwattting one step further into microwattting. By adjusting the output of the Argonaut to 50 mw output, the attenuator allows me to use power levels down to 100 microwatts! These power levels really test the operating skill and antennas of contest stations. In the 1992 Radio Sport Contest I was able to work two YU stations when only running 100 uw and an HA station with 500 uw. I had to increase power to 2.5 mw to achieve my best USA contact with WZ3Q and then 5 mw to work WJ9B. This season I shall be looking to beat this and make my first ever USA contact with microwatts. Will you be ready in case I call you? See you in the next contest!

QRP Contesting

By Tom Russell, N4KG

After years of QRP DXing, I stumbled into QRP contesting in the ARRL SSB DX contest of 1982 when my multi-single partner failed to show for the contest. Dismayed, I began calling some new band countries QRP only to discover that I could actually break pile-ups and work people with just 5 watts output in a contest situation. What a revelation! I was off and running. EA9, TF, and 5Z4 in the first 5 minutes. This was FUN! Twenty-eight hours and approximately 500 contacts later, my lady friend arrived with dinner. Yearning for a respite, I succumbed to awake just after sunrise. After 35 hours of operation, I finished with 617 contacts in 202 band countries using only 10, 15, and 20 meters; good enough for third place behind KA1VQ and KN8P. Just think, another 3 or 4 hours and... Skip the desert!

It never ceases to amaze me to have stations from all around the world answering my CQ calls while the needle of my wattmeter is just barely coming off its resting position. But perhaps that shouldn't be such a big surprise. We know that 100 watts will work the world, and that's only 2 S-units (12 dB) below the 1500 watt legal limit. Well, 5 watts is only 13 dB, or another 2 S-units, below the 100 watt level. If you are S9 with your 1500 watt amplifier, lowering your power to 100

watts should produce an S7 signal, and 5 watts will still be a respectable S5. On a quiet band, with typical receiver sensitivity, it should be possible to hear a 5 watt signal when KW signals are only S5 or 6!

By now you're probably thinking, "That's fine for you to say; you probably have giant antennas. What about the little guy with a tri-bander on a 50 foot tower?"

Well, it's time to debunk a few popular myths about antennas.

First, higher is NOT always better. As a matter of fact, on the high bands while the sun is up, my LOW antennas (35 to 45 feet) outperform my high antennas by as much as 20 dB! They are almost always better than the high antennas to Europe and Africa. To the Caribbean, the low antennas perform well in midday but the high antennas are better in late afternoon and early evening as the MUF drops and those of us in the Southeast must make it in one (low angle) hop. High antennas DO enjoy an advantage under marginal conditions and during the hours of darkness.

Second, big antennas are not all that much better than small antennas. Without going into the analysis, it can easily be verified with any of the popular computerized antenna analysis programs that a good 5-element Yagi is only 2 dB better than a good 3-element wide-spaced Yagi and that stacking in typical configurations only provides an additional 2 dB gain over a single antenna. Yes, these small gains can make big differences under marginal conditions and in big pile-ups, but as a QRPer, these situations are not productive places to spend your time.

Third, even the badly maligned dipole is actually a very efficient antenna when installed at the proper height to match the wave angles that are propagating. The free-space gain of a wide-spaced 3-element Yagi is only 6 dB over a dipole. Over ground, the dipole may show somewhat more or less than this 6 dB difference, depending on height. Tribanders and short-boom Yagis will have less than 6 dB gain over a dipole. On the higher bands (10-20 meters), a horizontally polarized dipole is 6 to 12 dB stronger than a vertically polarized signal, when installed in the 35 to 50 foot height range.

So, now that you are beginning to suspect that competing with low power and modest antennas just might be a real possibility, you might be wondering, "What can I do to optimize MY performance?"

Versatility is the key. A high and low tribander is a much better combination than any single beam at any single height. Multiple antennas can give you not only height and wave-angle diversity, but directional diversity, saving that all-important element, TIME, by allowing you to change direction with the flick of a switch instead of waiting for a rotor to come around (and back!). If you can't put up a second tower, stick two beams on a tall (70 foot or higher) tower, or put a simple trap dipole (driven element from an old tri-bander) parallel to the boom of your tri-bander. This way you will always have an antenna at plus/minus 90 degrees from your beam. That makes picking up a KP4 or KL7 a snap when your beam is on Europe.

No-tune radios with multiple VFOs are a real plus. So is computerized logging. Send away for logging programs such as K1EA's CT. I guarantee that you'll never go back to paper logs again!

"Search and Pounce" is the name of the game for the QRPer—at least for those of us more than two saltwater hops away from Europe. I know, I said you could be heard all over the world with 5 watts and a dipole, but holding



Tom Russell, N4KG, standing in front of his impressive antenna farm.

a frequency and running DX stations is another matter. There are a couple of reasons for this. Obviously, the big guns will walk all over you, so a clear frequency is necessary. ("On 20 meters? Are you kidding?" Now you're beginning to see the light.) Many, if not most, of the DX stations with good antennas are going to be calling CQ themselves. These are the guys with the best chance of pulling your signal through. So even though you may be able to get an occasional answer to a CQ, I find it more productive to run around calling stations. Rates of 40 and even 50 contacts per hour into Europe have been reported by QRPers during peak times. Steady rates of 20 to 30 contacts per hour can be maintained with good activity.

"So, if I can't CQ, how am I ever going to crack these pile-ups?" On SSB timing is everything. Wait for that pregnant pause in the pile-up and dump your FULL callsign in there. Watch the S-meter for dips and listen for quiet gaps in the pile-up. Sometimes you'll just be lucky and the skip will be with you. In one SSB DX contest HZ1AB was holding forth on 10 meters with a gargantuan pile-up. On a lark I called anyway. You can't imagine the exhilaration I felt as he came right back to me. Propagation can be a great equalizer. When you have it, you can work anything. When you don't, you'll be the first to know! Then change bands.

Generally, the highest band that is open will

Search and Pounce

Practice good timing in pile-ups
Try tailending the better operators
Speak clearly
Don't stay long in pile-ups
Leapfrog pile-ups with 2 VFOs
Follow propagation
Change bands when going gets slow
Have multiple antennas for each band
Use computer logging

Table I- Tom Russell, N4KG's top ten QRP operating tips.

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ELNEC is just \$49.00, postpaid to USA/Canada. MaxP is \$25.00. (Add \$3.00 per order for air mail to other countries.) VISA AND MASTERCARD ORDERS welcome -- include card number and expiration date. Specify coprocessor or noncoprocessor version and disk type preference. Order or write for information from

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1991 ARRL SSB DX CONTEST

Band	QSOs	Countries	Score
160	1	1	
80	4	3	
40	38	27	
20	193	60	
15	235	75	
10	397	79	
Total	868	245	633,570

1991 ARRL CW DX CONTEST

Band	QSOs	Countries	Score
160	3	3	
80	47	30	
40	97	46	
20	194	62	
15	231	65	
10	291	61	
Total	863	267	690,462

1990 CQ WW CW DX CONTEST

Band	QSOs	Zones	Countries	Score
160	10	6	5	
80	23	10	16	
40	68	20	44	
20	137	25	63	
15	204	27	73	
10	249	26	75	
Total	691	114	276	748,410

1990 CQ WW SSB DX CONTEST

(Single Band 10 Meters)				
Band	QSOs	Zones	Countries	Score
10	481	31	113	197,424

Table II—Recent N4KG QRP DX contests high scores.

have the least path loss, but it is often productive to drop down one band for a quick sweep to pick up a few contacts on what may be a less crowded band.

Also, be sure to enunciate clearly. Don't mumble and don't speak too fast. Project your voice and use readily understood phonetics. And give your full callsign! I can't emphasize this enough. How would YOU like to have to backup your computer to enter the prefix and take an extra transmission to complete the exchange for every contact?

On CW timing is also very important, but there are a few additional tricks you can utilize to make yourself heard among the throng. Listen carefully to the stations the DX station is answering. Are they exactly on frequency or are they a little higher or lower? What speed does he seem to prefer? Is the DX operator a top-notch operator? The good operators will pull you through. Skip over the guys who have difficulty managing their pile-ups. Note their frequency or put them in memory and check on them later.

Most of the time I send my call twice. It drives my "Have Key, Will Travel" friends from California nuts, but the average operators seem to need the second shot to verify my call to themselves. With guys like ZD8Z, I crank up the keying speed to 40 WPM and let it rip, once, between calls of the big guns. Jim always pulls me through. I don't know if he actually copies my call or just knows that crazy guy going like a bat with such a puny signal must be N4KG running QRP!

Same story with Trey, WN4KKN. Last year when he first fired up on 15 meters from ZP0Y, the pile-up was totally out of control. No way was I going to break through that with 5 watts. So I listened to the stations he worked, and just as they sent their zone number I reached for the memory button. BANG! N4KG at 40 wpm right in the pause at the end of the report. Another multiplier in the log. Thanks, Trey. Good ears.

To keep the rate up, I leapfrog two VFOs through the band, always working two pile-ups at a time. If I can't break a pile-up after a few calls, I load the frequency into a memory and move on. Multipliers usually come quickly except for the terrible pile-ups on Sunday afternoon when new Africans seem to always show up and create havoc. The best way to boost your multiplier is to work as many easy ones on as many bands as possible. This means heading for the low bands after dark.

Yes, the low bands! With good antennas you can accumulate a sizable multiplier on 40 meters and there are always some easy ones on 80 and even 160. With my two-element delta loop at 120 feet, I have been able to work lots of Europeans on 40 CW and even twenty or so split frequency on 40 SSB! It blew my mind. But not as much as the 80 meter conditions during the 1991 ARRL CW DX Contest when I was able to work 30 countries on that band, including 29 Europeans in 15 countries. That may not impress the Northeast contest machines, but I live in Alabama, less than 100 miles from W5-land, and Europe is a long way away on 80 meters. Special thanks to UZ2FWA for pulling me through that long haul over such a considerable land mass!

If you can't put up high antennas for the low bands, a vertical with lots of radials or a simple elevated ground plane will amaze you. For Europe I use a high dipole on 80 meters, but my simple elevated ground plane does wonders into the Caribbean and Pacific, including even an occasional JA. Sound like fun? You bet it is!

The all-band QRP contester can hope for 500 to 1000 contacts in 200 to 280 band-countries with 30 to 40 hours of operating time. I try to get 3 hours sleep the first night, just before sunrise, and I try to limit myself to 5 or 6 hours the second night! I confess, I'm a low-band addict and whenever conditions are really hot it's difficult to pry myself from the radio the first night. This sometimes makes the second sleep goal very difficult to achieve (which accounts for so many second-place finishes to my younger competitor, AA2U!). Like me, many of the single operator DX operators can't make it through the second night either, which creates something of a dilemma for the QRP contester, namely, which night to emphasize. Friday night has much more activity but more competition. By Saturday night many of the DX stations are begging for contacts, but many more are working the pillow!

If all-day and all-night contesting is not your forte, a single-band entry can provide lots of action with a chance for a little rest to boot. In the SSB contests, the highest band that is open is always a fun way to go. Ten meter single band can easily yield over 500 contacts and DXCC in a fun-filled weekend. QRP contesting is not for the feeble hearted. However, it can be one of the most exhilarating operating classes that contesting can offer. Above all remember to have fun and see you in the pile-ups!

(N4KG won the 1990 ARRL SSB DX Contest QRP category and has several second-place QRP finishes in the ARRL and CQ WW DX contests on both modes. Tom has been an active QRP DXer and contester since 1981 and has achieved 311 DXCC countries and 8 Band DXCC [80 through 10 meters, including WARC bands] with 5 watts output. Stressing versatility, he has 20 antennas to select from including 4 tribanders and at least 2 monobanders per band. He rarely touches a rotor control, as six directions are available at the flick of a coax switch on each of the high bands! Tom emphasizes the importance of low [35 to 45 foot] antennas for daytime operation on 10, 15, and even 20 meters.—ed.)

Final Comments

I hope you have enjoyed the excellent input we have received about low power and QRP contesting over the past few months. While you may not have the advanced station layout of some of our contributing authors, most of their operating tips and strategies can apply to even the smallest of stations.

I want to thank those of you who replied to my 1992 Contest Survey. Next month I'll reveal the results, which will prove to be very enlightening.

By now many of you have learned that I have taken a full-time position here at CQ headquarters. In the future, please submit your Contest Calendar information directly to our offices in Hicksville. As always, please remember that the deadline for the June issue is April 1st.

73, John, K1AR

Vermont QSO Party

0000-2359Z Sat., Feb. 6

This is the 30th annual Vermont QSO Party and a great opportunity to work this rare one on several bands. Participation is open to all licensed radio amateurs worldwide on 160-10 meters.

Classes: Single or multi-operator all bands.
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county (14 total). Others send RS(T) and state/province/DXCC country.

Frequencies: Phone—first 25 kHz up from the beginning of the General band and Novice 10 meter band. CW—40 kHz up from the bottom edge of the bands and 20 kHz up from the bottom of Novice portions.

Scoring: Credit 1 point per phone QSO and 2 points for CW, Digital, ATV, etc. Non-Vermont stations multiply total QSO points by the number of VT counties and special-event QSOs with W1BD and/or W1KOO. Vermont stations follow similar format with the addition of states/provinces/DXCC country multipliers. Stations may be worked twice per band (SSB and one other mode).

Awards: Vermont stations submitting a log will receive a Special 30th Anniversary QSO Party Certificate. Plaques will be awarded to the

three highest scoring Vermont stations. Special certificates will also be awarded for the highest scoring station in each state, province, and DXCC country. The Worked All Vermont award is provided to stations working at least 13 of the 14 Vermont counties in the contest.

Send your postmarked entries no later than March 1, 1993 to: Bob DeForge, K1HKL, RR1, Box 271, Brookfield, VT 05036. Be sure to include an SASE for final results.

North American "Sprint"

CW: Feb. 6 SSB: Feb. 13
Sunday 0000Z to 0400Z (Sat. night)

This is the spring edition of the "Sprint" run by the National Contest Journal. As the name implies, it's a shorty, only four hours long.

North Americans will be contacting other North American stations as well as stations in other countries, single operator only. North American boundaries are as defined by the rules used in the CQ WW DX Contest.

Exchange: Call, QSO no., name, and QTH (state, Canadian area, or country).

Scoring: Multiply total QSOs by the sum of states, Canadian areas, and other North American countries worked for your final score (U.S. and VE not countries; KH6 not a state). There are eight Canadian multipliers: VE1/VO1/VO2, VE2-VE7, VY1/VE8. Non-North American countries do not count as a multiplier.

Frequencies: Three bands only: 80, 40, and 20 meters. CW—3540, 7040, 14040. SSB—3850, 7225, 14250. (Plus or minus QRM.)

Awards: A trophy to the highest scoring entrant. Certificates to the top scorer in each U.S. call area, Canada, and North American country. Also to the ten top scores, to each member of the winning team, and the highest scoring entrant on each team.

Team competition is limited to a maximum of 10 operators as a single unit. Pre-contest registration is required for each team before the start of the contest—with WN4KKN for the CW and K7GM for the SSB.

There are other detailed rules, a special QSY rule, disqualifying penalties, etc. I suggest you write to WN4KKN or K7GM if you do not have a copy of the *National Contest Journal*.

Entries must be received no later than 30 days after the end of each "Sprint."

The CW go to: Trey Garlough, WN4KKN, P.O. Box 563, Santa Cruz, CA 95061.

SSB go to: Rick Niswander, K7GM, Box 2857, College Stn., TX 77841.

YL ISSB QSO Party

CW: Feb. 6-7 SSB: Mar. 13-14
0001Z Saturday to 2359Z Sunday

The party is open to all, but the emphasis is on membership participation. Rules and logging format are much too lengthy and complicated to list here. I strongly suggest you send a large SASE to KØETA for more details.

Categories: Single operator, DX-US Partners, and YL-OM Teams.

Exchange: Call, name, QTH (state, province, territory, district or country), name, ISSB number, YL-OM teammate, DX-US partner.

Points: One point for non-member contacts, 3 points for member contacts on the same continent, and 6 points if in a different continent.

Multiplier: Only contacts with member stations count as a multiplier. In addition, credit one multiplier for working both DX-W/K partners, each YL/OM team, US state, VE province, DXCC country, and each VK, ZL call area. Use multiplier of 5 for low power (less than 200 W).

Frequencies: The General portions of the CW and phone bands, 10 through 80 meters. Avoid 14332 used by ISSB Net. Check 40 and 80 hourly.

Awards: Category and QTH area winners. Special certificate to the top combined CW and Phone score.

Logs: Should be set up as outlined in the exchange and should indicate at least two 6-hour rest periods. A summary sheet showing the scoring and other essential information would be helpful.

Mailing for all entries is April 30th, and they go to: Fred Kujawa, KØETA, RR 4 Box 213-6, Stockton, MO 65785.



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QCWA QSO Party

CW: 0001Z Sat. to 2400Z Sun., Feb. 6-7
SSB: 0001Z Sat. to 2400Z Sun., Mar. 13-14

This is the 36th annual edition of QCWA's fun and traditional QSO Party, which is open to QCWA members worldwide. Please note that CW QSOs are only valid in the CW section and visa versa for SSB.

Classes: Single operator, all bands.

Exchange: QSO number, operator's first name, chapter identification (members not belonging to a chapter should send "AL"), and state or DXCC country.

Scoring: Final score equals the total number of stations worked times the multiplier. Multipliers are the number of QCWA chapters worked during the contest (credit a chapter multiplier only once). Frequencies: CW: 3530-3560, 7025-7055, 14030-14060, 21040-21070, 28040-28070. SSB: 3900-3930, 7230-7260, 14260-14300, 21350-21380, 28530-28560. No QSOs on WARC bands. Check 160 meters at 0400-0500Z and 1200-1300Z.

Awards: Plaques will be awarded to the top scorer worldwide on each mode.

Separate logs and scores must be submitted for both modes. All logs must be received by April 16, 1993 and sent to: Bill Bergan, NU4X, 1308 East 8th St., Stuart, FL 34996-3221.

EA RTTY Contest

1600Z Sat. to 1600Z Sun., Feb. 13-14

This is the 1993 edition of the Spanish RTTY Contest sponsored by U.R.A.D. It is open to participants worldwide on 80-10 meters.

Classes: Single operator, all bands and single band, multi-single, and SWL.

Exchange: Signal report and Spanish Province (for EA stations). All others use CQ zone.

Scoring: For non-EA stations: On 10-20 meters credit 1 point for contacts in your continent, 2 points for QSOs outside your continent. On 40 and 80 meters triple your QSO points (e.g., 3 within your continent). QSOs between stations in the same country are only valid for multiplier credit and have no QSO point value.

Multipliers: Non-EA stations count each DXCC country and EA province (maximum 52) per band. Spanish stations use CQ zones and DXCC countries per band.

Final Score: Multiply total QSO points times multiplier.

Awards: Trophies to the top entries in each class. Certificates will be awarded to winners in each class for every DXCC country and EA district (50 QSOs minimum).

Send your entries to: EA RTTY Contest, c/o EA1MV, Antonio Alcolado, P.O. Box 240, 09400 Aranda de Duero (Burgos), Spain. The mailing deadline for entries is April 10, 1993.

Dutch "PACC" Contest

1200Z Sat. to 1200Z Sun., Feb. 13-14

It's the world working The Netherlands on all six bands, 1.8 through 29.7 MHz, in the band sections recommended for contest operation by the IARU. The same station may be worked on each band, but on one mode only, phone or CW, for QSO and multiplier credit. Note that SSB QSOs are not allowed on 160 meters.

Categories: Single operator, multi-operator, and SWL.

Exchange: RS(T) plus a QSO number starting with 001. Dutch stations will add two letters to identify their province. There are 12 provinces: DR, FR, GD, GR, LB, NB, NH, OV, UT, FL, ZH, and ZL.

Scoring: Each QSO with a PA/PB/PI station counts one point. DX stations determine their multiplier by the number of provinces worked on each band (maximum of 72).

Final Score: Total number of QSOs times the number of provinces worked on each band.

Awards: Certificates to the top scoring station in each category in each country and call areas of JA, LU, PY, UA9/0, VE/VO, VK, W/K, ZL, and ZS. Also second-and third-place awards if returns justify.

SWL's must log the call of the Dutch station as well as the station being worked and both serial numbers. Scoring same as above. Indicate the multiplier in a separate column in your log only the first time it is worked on each band. Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration.

Mailing deadline is March 31st to: PACC Contest, Att: F. Th. Oosthoek, PA0INA, P.O. Box 499, 4600 AL Bergen op Zoom, The Netherlands.

New Hampshire QSO Party

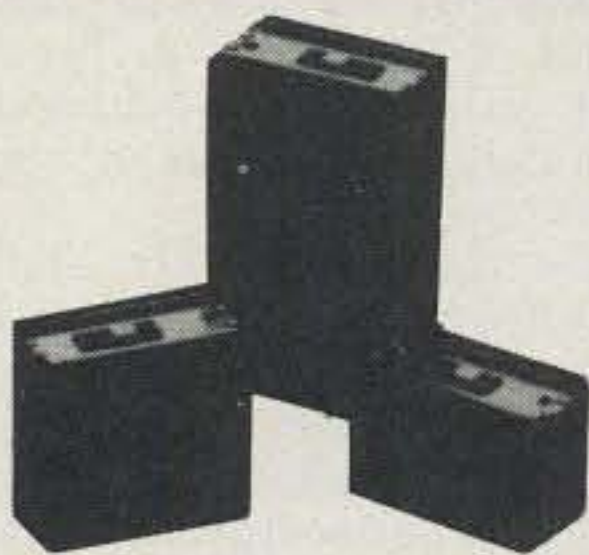
1900Z Sat. to 0700Z Sun., Feb. 13-14
1400Z Sun. to 0200Z Mon., Feb. 14-15

This year's party is again sponsored by the NH Amateur Radio Association. It is New Hampshire stations working all others. As with most QSO Parties, the same station may be worked once on each band mode.

Exchange: RS(T) and QTH. County for NH

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stations; state, province, or country for others.

Scoring: All stations credit 1 point/SSB QSO and 2 points digital QSO. (RTTY, CW, Packet). NH stations multiply QSO points by number of NH counties, states, provinces, and DXCC countries. Others simply use counties. Twenty (20) bonus points/QSO may be added to your final score for working NHARA members: WB1CAG, NY1Z, W1GUA, W1WQM, WW1G, N0CUH, K1RD, WB1ASL, WK1P, N1LT, K1BKE, W1OC, W1ET, N1ICK, KC1OX, and NE1K.

Final Score: Final score is calculated by multiplying QSO points times total multiplier and adding bonus points.

Frequencies: CW—1810, 3535, 7035, 14035, 21035, 28035; SSB—1875, 3935, 7235, 14280, 21380, 28320, 50115, 144205.

Logs must be received by March 31st, 1993. Be sure to include an SASE for final results. Send logs and comments to: Conrad Ekstrom, WB1GXM, P.O. Box 1076, Claremont, NH 03746-1076.

ARRL International DX Contest

CW: Feb. 20-21 Phone: March 6-7
0000Z Saturday to 2400Z Sunday

This is a great DX contest that you should not miss. I strongly recommend that you study the announcement in the December issue of QST for more details. Also send a large SASE (2 IRCs for DX) for sample log and entry forms.

All bands may be used, 1.8 through 28 MHz, but not 10, 18, or 24 MHz. Aeronautical or maritime mobile stations cannot be worked for contest credit. Following is a brief outline.

Categories: Single operator, both single and all band, and single operator assisted. Multi-operator, one transmitter and two transmitters. Also multi-operator, multi-transmitter. Also QRP, all band only (5 watts or less output). Multi-transmitter stations must remain on a band at least 10 minutes once a contact is made.

Exchange: RS(T) and state or province for WVE; RS(T) and power input for DX stations (three-digit number).

QSO points: WVE stations earn three points for each DX contact. DX get three points for each WVE contact.

Multiplier: Each DXCC country worked on each band for WVEs. DX stations use US states (48), District of Columbia (DC), and VE provinces (13) for their multiplier. (Maximum multiplier of 63 per band.)

Final Score: Total QSO points times the sum of the multiplier from each band. Entries with 500 or more QSOs must include a QSO check sheet.

Awards: Certificates given in each category, in each country, and in each ARRL section, plus a wide selection of plaques. Also certificates to DX stations making over 500 QSOs.

Log entries are accepted on 5 1/4" MS-DOS formatted diskettes. Submit an ASCII file along with a signed summary sheet. No paper logs are required with this method.

Disqualification regulations will be strictly enforced and are listed in the official rules. Mailing deadline for all entries is April 7th, and they go to: ARRL DX Contest, 225 Main Street, Newington, CT 06111.

CQ WW 160 Meter SSB Contest

2200Z Fri. to 1600Z Sun., Feb. 26-28

Just a reminder that the SSB section of our 160 Meter Contest will be coming up the last full weekend of this month.

Extensive coverage has been given to this event, with complete rules in the November issue. They are the same rules that have been used these past many years and are well known worldwide.

Mailing deadline for your entry in last month's CW contest is February 28th, and March 31st for this month's SSB section.

They can be sent directly to the 160 Contest Director, David L. Thompson, K4JRB, 4166 Mill Stone Court, Norcross, GA 30092. And, of course, they can always be sent to the CQ office. CQ 160 Meter Contest, 76 North Broadway, Hicksville, NY 11801. **(Be sure to indicate CW or SSB on the envelope.)**

North Dakota QSO Party

0000-0800Z & 1600-2400Z Sat., Feb. 27
0800Z-1600Z Sun., Feb. 28

This is a great opportunity to work another rare U.S. state in the North Dakota QSO Party sponsored by the Red River Radio Amateurs.

Classes: Single- and multi-operator all bands.
Exchange: Signal report and QTH (county for ND stations, state/province/DXCC country for others).

Frequencies: Phone—1875, 3935, 7235, 14280, 21380, 28380. CW—1810 and 35 kHz up from band edges. Novices operate 35 kHz above their band edges.

Scoring: Credit 1 point per phone QSO and 2 points for CW/RTTY. ND stations multiply their total QSO points by states/provinces/DXCC countries worked. Others use the total number of ND counties worked (53 maximum). Stations may be worked once per band and mode.

Awards: Awards will be provided to the top scores for CW, Phone, and mixed mode. ND stations will receive separate awards.

Multi-operator stations must list all operators and their callsigns. The postmark deadline for log entries is March 28th. Logs should be sent to: Mike Olsen, K10E, 305 27th Ave. North, Fargo, ND 58102.

RSGB 7 MHz CW Contest

1500Z Sat., Feb. 27 to 0900Z Sun., Feb. 28

Like the 21 MHz CW Contest, the activity in this one is between the British Isles and the rest of the world. Competition is limited to single operator stations only. There is a separate QRP section in which power input must not exceed 10 watts, and there is also an SWL section.

The following rules are for areas other than the British Isles.

Exchange: RST report plus a progressive QSO number starting with 001. U.K. stations also send their county codes.

Scoring: Each contact with a B.I. station is worth 5 points (Europe), 15 points (NA, SA, AF, AS), and/or 30 points (OC). Multiply total QSO points by the number of U.K. counties worked.

Unmarked duplicate contacts for which credit has been taken will be penalized ten times the points claimed. Logs containing more than five unmarked duplicates will be disqualified.

Only British Isles stations are to be logged by overseas SWLs. The same call may be reported only once in every three contacts, unless the logged station is a new multiplier. Scoring is the same as above.

Frequencies: 7000-7030 kHz, CW only.
Awards: Certificates to the sectional leaders and highest multi-op, and at the discretion of the committee, to the leading station in each country.

Include a summary sheet with a list of multipliers worked, station description, the usual signed declaration, and your name and address in block letters.

Logs must be received by April 19, 1993 and go to: RSGB Contest Committee, c/o G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England.



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NEWS OF COMMUNICATION AROUND THE WORLD

Howland Island KH1

A multi-national team is set to operate from tiny Howland Island KH1 for about seven days, beginning around January 26. The team includes several DXpedition veterans, and other experienced operators, under the leadership of Mike McGirr, K9AJ. Mike organized the successful Kingman Reef KH5K and Palmyra Island KH5 operations in 1988. Other planned operators include WRLX, F6EXV, W9IXX, K4UEE, G4LJF, WCP, KEU, PA3DUU, and ON6TT. They will have four HF stations, and one satellite/VHF station on the air.

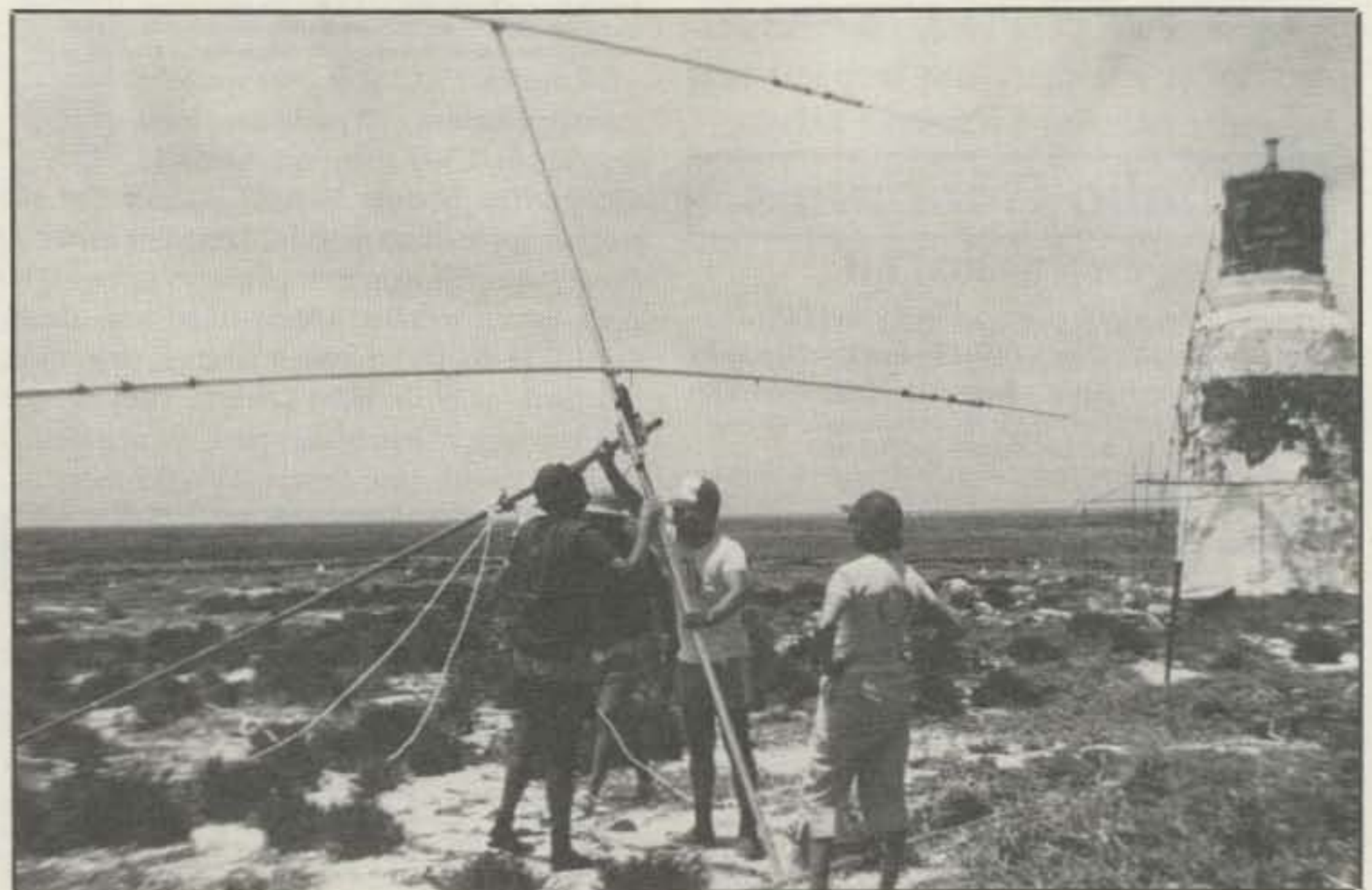
As of press time the organizers were actively seeking financial assistance to help with this expensive undertaking. The boat charter from Christmas Island T32 alone is over \$37,000. Each operator has already committed \$6000 each, and several equipment and antenna manufacturers are helping, but more funds are needed. While it is probably too late to send donations before they get on the air, a little something extra in with the QSL request would be greatly appreciated. The exact callsign, operating frequencies, and QSL route will be announced closer to departure. See the DX newsletters, computer BBSs, and W1AW's DX report for the latest information.

Howland Island is a low-lying, wind-swept coral island about one mile long and a half-mile wide. It sits just north of the equator about midway between Hawaii and Australia. The only landmark is the battered Earhart Light, a lighthouse erected in 1937 in honor of Amelia Earhart (see below). Two runways constructed in the 1930s are unusable for any aircraft, so any landing must be by ship through the narrow fringing reef.

For such a tiny Pacific island, Howland has a long and fascinating radio history, from the early days of radio in the mid-1930s until the last amateur operation from Howland in 1988.

History of Howland

Howland Island fell under US jurisdiction in 1856 under the Guano Island Act, along with nearby Baker, Jarvis Island, and Navassa, in the Caribbean. (This act said that the US asserted rights to mine guano from these islands, and was a major factor in



The Earhart Light will help anchor antennas in the 1993 Howland Island operation, as it did in 1988. (Thanks to VK9NS for photo.)

future US claims.) Howland Island saw little activity other than limited guano mining until the early 1930s.

At that time, to counter, or at least keep an eye on, the Japanese imperialistic expansion in the region, the US sought an excuse for increasing our presence in the area. The famed Pan American Airlines China Clippers provided the perfect justification to establish semi-permanent observation stations from Hawaii to China. Howland Island was selected as one of the Clipper stops, and a small base was set up there. Then in 1937 Howland Island became the center of the world's attention. Amelia Earhart disappeared on one of the last legs of her around-the-world flight, while aiming for Howland.

Amelia Earhart

Amelia Earhart, or AE as she preferred to be called, was one of the most accomplished aviatrixes of the era. She gained fame as the first woman to cross the Atlantic in a airplane in 1928, while she was only a student pilot. (She was not allowed to touch the controls.) Future husband George Putnam set AE onto a long-lasting and very successful publicity run, pushing her flying and her books. She soon learned

to fly for real, and matured into a daring, if not particularly talented pilot. She was the first person to fly solo over any part of the Pacific, flying from Hawaii to California in 1934. She chose that direction be-



Ian Shepherd, G4LJF, will take two months off from his job as an airline pilot to join the Howland Island DXpedition.

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1586	Y33VL		

SSB

2345	I0FDH	2347	WB2ABD
2346	N4LGX	2348	KC7V

CW

2761	EA2CIN	2763	WB2ABD
2762	N11R	2764	KC7V

Endorsements

Mixed: 450 F5ZI, HP2CWB, Y33VL, JA1-20762/BV, RB5MT, WT3W, KC7V, VE6OA. 500 F5ZI, HP2CWB, JA1-20762/BV, RB5MT, Y33VL, WT3W, KC7V. 550 F5ZI, HP2CWB, JA1-20762/BV, CT1EEB, Y33VL, WT3W, KC7V. 600 F5ZI, HP2CWB, WJ7H, CT1EEB, G5MN, Y33VL, WT3W, KC7V. 650 F5ZI, HP2CWB, WJ7H, CT1EEB, Y33VL, WT3W, KC7V. 700 F5ZI, HP2CWB, WJ7H, CT1EEB, Y33VL, WT3W, WM2U, KC7V. 750 F5ZI, HP2CWB, WJ7H, JE1RRK, CT1EEB, Y33VL, WT3W, WM2U, KC7V. 800 F5ZI, HP2CWB, WJ7H, JE1RRK, Y33VL, WT3W, WM2U, KC7V. 850 F5ZI, Y33VL, HP2CWB, KC7V. 900 F5ZI, HB9BHY, Y33VL, KC7V. 950 F5ZI, HB9BHY, Y33VL, KC7V. 1000 OZ1ACB, F5ZI, HB9BHY, Y33VL, KC7V. 1050 OZ1ACB, Y33VL, KC7V. 1100 Y33VL, KC7V. 1150 K9BQL, Y33VL, KC6X, KC7V. 1200 Y33VL, KC7V. 1250 Y33VL, KC7V. 1300 Y33VL, K13L, KC7V. 1350 Y33VL, I2EAY, WB2ABD. 1400 Y33VL, WB2ABD. 1450 Y33VL, WB2ABD. 1500 Y33VL. 1550 Y33VL. 1600 Y33VL. 1650 Y33VL. 1700 W9IL, Y33VL. 1750 Y33VL. 1800 Y33VL. 2200 HA0HW. 2400 I8RFD. 2450 I8RFD. 2800 W2FXA.

SSB: 350 I0FDH, N4LGX, WB2ABD, KC7V. 400 I0FDH, DL2KDW, WB2ABD, KC7V. 450 I0FDH, DL2KDW, WB2ABD, KC7V. 500 I0FDH, WB2ABD, KC7V. 550 I0FDH, CT1EEB, WB2ABD, KC7V. 600 I0FDH, CT1EEB, WB2ABD, KC7V. 650 I0FDH, CT1EEB, KC7V. 700 I0FDH, CT1EEB, KC7V. 750 I0FDH, KA9MOM, CT1EEB, KC7V. 800 I0FDH, KA9MOM, HP2CWB, KC7V. 850 I0FDH, HP2CWB, KC6X, KC7V. 900 KC6X, KC7V. 950 KC7V. 1000 K9BQL, KC7V. 1050 I3UBL, K9BQL. 1100 OE6CLD, I3UBL. 1150 OE6CLD. 1200 OE6CLD, W5ILR. 1250 OE6CLD, K0REF. 1300 K0REF. 1350 K0REF. 1900 W4UW. 2050 I8RFD.

CW: 350 EA2CIN, N11R, WB2ABD, KC7V. 400 EA2CIN, N11R, EA2CKP, WB2ABD, KC7V. 450 EA2CIN, N11R, WB2ABD, KC7V. 500 EA2CIN, K9BQL, N11R, WB2ABD, KC7V. 550 ZS6NT, WJ7H, EA2CIN, N11R, WB2ABD, KC7V. 600

WJ7H, EA2CIN, N11R, WB2ABD, KC7V. 650 WJ7H, EA2CIN, WB2ABD, KC7V. 700 EA2CIN, KC6X, WB2ABD, KC7V. 750 EA2CIN, KC6X, KC7V. 800 KC7V. 850 KC7V. 900 KC7V. 1000 K2PK. 1050 K2PK. 1150 I2EAY. 1300 I8RFD.

10 Meters: OZ4ZT, I2VRF, Y33VL, WB2ABD, N6IBP, KC7V

15 Meters: OZ1ACB, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

20 Meters: I2VRF, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

40 Meters: I2VRF, Y33VL, KC6X, WT3W, N6IBP, KC7V

80 Meters: OE6CLD, Y33VL, WT3W, KC7V

160 Meters: Y33VL, N6IBP, KC7V

Asia: WJ7H, DL2KDW, I2VRF, Y33VL, HB9BHY, WB2ABD, N6IBP, KC7V

Africa: KF7RU, Y33VL, WB2ABD, KC7V

No. Amer.: HB9BHY, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

So. Amer.: OE6CLD, Y33VL, WB2ABD, N6IBP, KC7V

Europe: HB9BHY, WJ7H, I2VRF, G5MN, Y33VL, WT3W, WB2ABD, N6IBP, KC7V

Oceania: Y33VL, WB2ABD, N6IBP, KC7V

Award of Excellence Plaque Holders: I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GO, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMO, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9ORF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DOE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VE3FXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCV, F1HWB, KC8PG, NE4F, VE3MS, K9LJN.

Award of Excellence Plaque Holders with 160 Meter Endorsement: FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, HI8LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9ORF, NN4Q, W4UW, K9QFR, NX0I, G4BUE, LU3YL/W4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCV.

Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to: "CQ WPX Awards," 880, CR13, Clovis, NM 88101-9511 USA.



Eric, SM0AGD, and his lovely wife, Eva, SM0OTG, recently operated from Easter Island CE0Y, the site of Eric's first-ever DXpedition, 20 years ago. Eric operated from Canton Island, alternately signing T31AF and SM0AGD/KH1. (DK7PE photo)

had made it 20,000 miles of her 27,000 mile journey. This time AE flew west-to-east, to avoid crossing the Atlantic at the peak of the hurricane season. Her flight path took her to Miami, San Juan KP4, Venezuela YV, Dutch Guinea (now Suriname PZ), Brazil PY, and across the Atlantic to Senegal 6W.

This first long oceanic leg of the trip revealed AE's unfamiliarity with radios, her navigator's unreliability, and AE's lack of faith in her navigator. First, AE complained that the direction-finding (DF) radio didn't work. The problem was a blown fuse. (Shouldn't someone attempting to fly around the world be able to replace a fuse in flight?) Then AE arrived at the Senegal coast a bit north of Dakar, her target. But instead of following her navigator's advice and turning south, she turned north on a hunch, and had to put down for the night at a tiny, remote airstrip. AE even turned down an offer from Pan-Am to use their extensive radio network for support communications and DFing. She didn't want to sacrifice any of the limited crystal positions in her rig. (Or maybe she was saving a "secret" frequency for communications with US military near Howland, as part of the "secret mission" many feel AE was on at the time of her disappearance.)

AE had no navigational problems over the next legs of the trip, across Africa. The most risky leg was an all-water route from Assab in Eritrea to Karachi, Pakistan, the first time that flight had ever been attempted. However, AE had an entire continent to run into in both her Atlantic and her Indian Ocean crossings; she didn't have that luxury on the leg to Howland.

At 0000Z on July 2 AE and navigator Fred Noonan eased the Electra into the air from Lae, New Guinea, for the 18 hour, 2500 mile flight to Howland. Considering that this was the first time AE had ever flown toward a tiny island landing site with neither broadcast stations nor alternate landing sites, she seemed to have little concern about the radio communications

cause "It's easier to hit a continent than an island." These words proved to be an ill omen for her more hazardous around-the-world flight.

By 1937 AE felt comfortable enough with a dual-engine aircraft (a Lockheed Electra) to attempt a flight completely around the world, at the equator. This flight was to be AE's last major flight before settling down. She never completed the trip.

AE's flight got off to a very poor start. In March 1937 AE and her navigators flew from Oakland, California to Hawaii on the first leg of a west-to-east trip. The next day AE ground-looped the big Electra while attempting to take off from Luke Field for the trip to Howland. The plane had to be taken apart and sent back to the mainland for repairs.

As far as the United States government

was concerned, however, the flight was already a success. The US used the AE flight as reason to construct two long runways on Howland and to station a Coast Guard cutter off shore to aid in navigation. (Of course, the real reason the US went to the expense of improving Howland and committing a Coast Guard cutter to the area was to monitor Japanese activity and to "raise the flag" in the area. The US was unlikely to go to that much trouble for a private publicity stunt unless it had other irons in the fire.) The delay in the flight meant that the cutter and land-based personnel could continue their monitoring. Incidentally, K6GNW was among the group on Howland, and his was probably the very first amateur radio operation from the island.

AE tried again in May, and in one month

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5 Band WAZ

As of October 31, 1992, 347 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

None

The top contenders for 5 Band WAZ are:

N4WW, 199	K6EID, 199
SP9PT, 199	IK8CNT, 199
K6YRA, 199	W1JR, 199
PY7ZZ, 199	W8SEY, 199
DL9WW, 199	N7RT, 199
K0CS, 199	VE7AHA, 199
KB0G, 199	W1FZ, 199
AA4KT, 199	IK2GNW, 199
K7UR, 199	I8IGS, 198
K9EL, 199	SM6AHS, 198
NA0Y, 199	K1ST, 198
VE7DX, 199	4X4DK, 198
W0PGI, 199	UA3AGW, 198
W2YY, 199	KL7Y, 198
W9WAQ, 199	VO1FB, 198

The following have qualified for the basic 5 Band WAZ Award:

IK2GNW, 199 Zones
WA8SXM, 179 Zones

802 Stations have attained the 150 zone level as of October 31, 1992.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

and DF of her aircraft. She had the long, trailing-wire antenna ripped out earlier to save weight. An even more serious mistake was when AE had the lone telegraph key pulled from the airplane. Neither AE nor her navigator had any proficiency with Morse code, but she could have used the key to send a series of dashes that would permit radio location.

In any case, AE called in on schedule for the first few hours of the flight on her "day" frequency of 6210 kHz. She passed her last daylight landfall on time and noted the bright lights of the round-the-clock guano mining on Nauru C2. Nauru reported hearing the plane and AE's radio carrier, but could not copy her words. (If she had known CW, she probably could have communicated with Nauru at the time.) Also, against the advice of her land-based radio operator, she QSYed at sunset to her "night" frequency—3105 kHz. Her announcement that she was changing frequency was the last two-way communication anyone had with the ill-fated flight.

Exactly what happened to AE after that point is the subject of much speculation and numerous books and articles. Vincent Loomis firmly believes that AE backtracked to Mili Atoll in the Marshall Islands,

The WAZ Program

Single Band WAZ

10 Meter SSB

444 WA6APQ

15 Meter SSB

433 WA4APM

20 Meter SSB

905 WA4APM

20 Meter CW

427 ND6G

160 Meters

71 WB9Z (36 zones)

WNZ

51—10M SSB N8JOA

All CW

18 WD4JHY 19 NW8F

RTTY

77—Mixed WA4MCZ

All Band WAZ
SSB

4008 ND6G 4011 OE7XMH
4009 YV5DEH 4012 JH1AFD
4010 IK2CFH 4013 IK7CSA

CW/Phone

7285 SM0KRN (CW) 7291 OK1FPG (CW)
7286 OE2BZL 7292 SP2DX
7287 DJ7BP 7293 JA1AVV/QRP
7288 IK2MRZ (CW) 7294 PT2NP
7289 CT4AH (CW) 7295 KN4UB
7290 PA3CJS 7296 N1IR

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

some 700 miles back to the west. Richard Gillespie says Nikumaroro Island in the Phoenix chain was the site of AE's final landing. Whatever the actual fate of AE on the way to Howland, DXers can regret that AE didn't spend a few minutes brushing up on her CW, and a few more learning a bit about radio propagation in the tropics. She might well have made it safely to Howland, with the help of radio.

An interesting sidelight of AE's last flight is to look at the radio propagation between New Guinea and Howland. Thanks to historical solar records and MiniPropPlus, a propagation prediction program from W6EL, we can say that AE should not have QSYed to 3105 at her sunset.

July 1937 was very near the peak of sunspot Cycle 17, with a 13-month smoothed sunspot count of about 120 (compared to a Cycle 22 peak of almost 160 in June 1989). MiniPropPlus says that

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The AL-811 gives you a powerful punch at a price that's easy on your wallet.

All band, all mode coverage

The AL-811 covers all HF bands (10/12 meters with easy user mod). There's no compromise on WARC and most MARS bands — you get a 100% rated output.

You can operate the AL-811 on all modes. You get 600 watts output PEP SSB and 500 watts output CW. You even get 400 watts on demanding continuous carrier modes like RTTY, SSTV, FM and AM.

How the low cost 811A tube resists premature failure - even when your amplifier is mistuned

811A tubes resist premature failure in two ways.

First, they're constructed with widely spaced elements that minimize the chance of elements touching and causing a short — even if the plate gets hot enough to melt.

Second, they use a directly heated thoriated tungsten filament cathode that prevents the electron emitting layer from instantly stripping off — even if mistuning causes a sudden, severe current overload.

Indirectly heated oxide cathode tubes (like the \$400 3CX800A7) can be rendered instantly useless if their electron emitting layer is stripped off because of a severe current overload due to mistuning.

The Ameritron AL-811 is excellent for the newcomer because it's tough enough to withstand momentary mistuning. And the tubes are so inexpensive that you can replace one for mere pocket change.

The Ameritron advantage: extra heavy duty power supply that gives you peak performance year after year

The heart of the AL-811 power supply is its heavy duty power transformer with a high silicon steel core weighing a hefty 17 pounds.

A full wave bridge using 52.5 ufd of total capacitance (four 210 ufd, 470 volt capacitors) produces 1500 volts under full load and 1700 volts no load. That's excellent high voltage regulation!

Full height computer grade filter capacitors with screw terminals are used — not short stubby, light duty soldered-in "high technology" capacitors that can't dissipate the heat generated by high current.



The rectifier diodes are rated for a massive surge current of 200 amps. They won't blow even if you accidentally short the high voltage supply.

Wire wound, 7 watt, 50 K ohm equalizing resistors safely protect each filter capacitor — not 2 watt, 100 K ohm carbon composition resistors that can open and cause your filter capacitors to explode or fail.

The Ameritron AL-811 power supply is built tough so you get peak performance year after year.

Tuned input provides excellent load for any rig

A Pi-Network tuned input provides a 50 ohm load for your rig. Even fussy solid state rigs can deliver their full drive to AL-811.

Low loss slug tuned coils — tunable from the rear panel — let you optimize performance. High quality low drift silver mica capacitors maintain proper tuning.

Two illuminated meters

Two illuminated meters give you a clear picture of your AL-811 operating conditions so you can tell right away if something is wrong.

The Grid Current meter continuously checks for improper loading. The other meter switches between high voltage and plate current to warn of abnormal conditions.

Ameritron exclusive Adapt-A-Volt™ power transformer

Too high line voltage stresses components and causes them to wear out and fail. Too low line voltage causes a "soft-tube" effect — low output and signal distortion.

Ameritron's exclusive Adapt-A-Volt™ power transformer has a special buck-boost winding that lets you compensate for stressful high line voltage and performance robbing low line voltage.

This makes your components last longer and gives you peak performance — regardless of your line voltage.

Plus more . . .

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A transmit LED tells you when your rig is keying your AL-811.

A 12 VDC keying relay makes it compatible with all solid state and tube rigs. A built-in back-pulse cancelling diode protects your rig's keying circuit.

Shielded RF compartment. One year limited warranty. Compact 16" D x 13 3/4" W X 8" H. 30 pounds. UPS shippable. Shipped with transformer installed and wired for 120 VAC. Draws 8 amps at 120 VAC. Export model AL-811X wired for 240 VAC and includes 10 and 12 meters.

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A powerful 20 CFM computer grade blower — not an open frame phonograph motor — draws in cool air to pressurize the cabinet and efficiently cool your 811A tubes for extra long life.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

Output tank: optimum Q on each band

The low loss pi-network output tank of the AL-811 has been carefully designed for optimum Q on each band and built with quality RF components.

The result is peak performance over each band, wide impedance matching range and exceptionally smooth tuning with efficiencies close to 70%. Even a 3:1 SWR load won't damage the tubes or tank components.

A ball bearing vernier reduction drive makes plate tuning precise and easy.

Quiet pressurized ventilation keeps your tubes safely cooled

A quiet fan pressurizes the cabinet with over 20 cubic feet per minute of cool air.

This large volume of air flow keeps the 811A tube temperature safely below the tube manufacturer's rating — even with a key down carrier at 500 watts output.



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The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ master prefix list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or confirmation of, present total. If no up-date, file will be made inactive. Lifetime Honor Roll fee is \$4.00 (U.S.) for each mode, with no fee for additions.

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3397	EA2IA	2709	W2FXA	2205	SM0AJU	1861	WB2YQH	1626	SM6CST	1332	YU3PG	1032	I1ZQD
3275	K6JG	2707	IT9TQH	2163	K2POF	1855	W8UMR	1589	K5DB	1325	KC7V	1025	NH6T
3231	VE3XN	2704	W1BWS	2148	HA0HW	1835	WE2L	1572	NV9S	1323	YU1PJ	920	WB2PCF
3175	K6XP	2694	I1EEW	2141	YU4EXA	1829	K9AGB	1553	VE1RJ	1300	CT1QF	915	W4USW
3101	N4NO	2667	KA5W	2133	3A2LF	1812	K2OLG	1549	W3KH	1298	KI3L	913	HP2CWB
3056	N6JV	2659	IN3ANE	2132	N4UU	1797	VE3MS	1548	LA7JO	1282	LU8DY	904	WK0B
2996	N9AF	2637	YU7SF	2132	K9QFR	1793	YT7WW	1524	WB2ABD	1266	I2EAY	813	WT3W
2983	W4BOY	2628	9A2NA	2106	K5UR	1789	YU7RU	1499	IK2ILH	1241	TF1MM	778	VE3OMM
2965	PY1APS	2546	YU7BCD	2075	I2EOW	1788	YU1GR	1497	W7CB	1229	KS0Z	755	CT1EEB
2904	I2PJA	2530	HA0DU	2062	4N7ZZ	1776	W6OUL	1485	YB0TK	1165	K9BQL	750	JN3SAC
2876	N4MM	2508	N2AC	2052	KL7AF	1768	HA5NK	1483	PY2DBU	1164	W9IAL	720	EA3CWK
2845	WA8YTM	2499	YT7DX	2040	W0SFU	1709	G4OBK	1417	I0AOF	1164	CT3CU	714	VE6BMX
2840	SM3EVR	2498	SM7TV	2023	W4UW	1668	W9IL	1405	CT1YH	1149	NJ1T	670	WK3Z
2817	YU1AB	2470	K9BG	1970	HA0IT	1662	WB4RUA	1405	DF4ZL	1146	N7JXS	640	JR3TOE
2801	K0BLT	2339	UA3FT	1956	K8LJG	1648	KB0G	1375	WB3DNA	1132	N6IBP	635	JA4DUD
2797	ZP5JCY	2301	KF2O	1956	YU1GR								

SSB

3780	I0ZV	2362	I1EEW	1869	W4UW	1471	YU7SF	1258	IBWYD	1050	KB2DE	855	HP2CWB
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3170	VE1YX	2303	EA9AKN	1811	KD9OT	1392	KE6KT	1227	KB0C	1036	K9BQL	814	KE7UH
2980	K6JG	2282	W4BOY	1797	K5UR	1391	HA0IT	1206	W5ILR	1035	IT9SVJ	806	I6KYL
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2676	ZP5JCY	2089	HA8XX	1703	WE2L	1350	LU8DY	1152	W5AWT	1003	DF4ZL	755	CT1EEB
2612	IT9TQH	2046	9A2NA	1689	CT1BY	1345	IT9JKY	1151	G4OBK	998	IK2AEO	751	EA3EOT
2608	CT4NH	2041	WA4QMO	1686	SM6DHU	1335	EA1AK	1135	OE2EGL	990	NG9L	750	NM5Y
2563	N4MM	1994	YU7BCD	1654	IK5ACO	1315	CT1UE	1117	FE6FNA	976	I8IYW	736	EA1IF
2494	EA2IA	1971	K9QFR	1645	IK8GCS	1305	WN5MBS	1116	CT1BWW	962	VE3MS	728	YU1PJ
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2395	PA0SNG	1883	HR1KAS	1508	I2TZK	1267	G4MVA	1054	K8MDU	869	DK7NP	610	KI6PG
2371	NJ0C	1871	PY4OY	1480	N4UU								

CW

3349	K2VV	2128	LZ1XL	1673	K5UR	1476	G3VQO	1306	LA9XG	1059	AI6Z	807	W4UW
3244	WA2HZR	2042	YU7BCD	1656	G4UOL	1468	IK0ADY	1305	W5AWT	1036	KA1CLV	794	LA7JO
3034	N6JV	1948	KA5W	1623	G4SSH	1461	ZS6EZ	1304	VE3MS	1019	IK2ECP	760	EA2CIN
2674	N4NO	1938	N4MM	1618	K2POF	1442	K8LJG	1293	I1EEW	1013	WB8ZRL	758	4X6DK
2666	IT9TQH	1802	N4UU	1608	N6FX	1428	I7PXV	1280	IK3GER	1010	YU1PJ	754	KA5TOF
2491	W3ARK	1801	I2UIY	1599	KL7AF	1408	HA5NK	1244	DL2HBX	988	AH6JF	749	W8LRY
2473	EA2IA	1745	9A2NA	1556	SM0AJU	1405	CT1YH	1187	YU3PG	954	W9IAL	700	EA1MV
2464	K6JG	1744	KA7T	1555	W9PWM	1398	VS6UW	1151	ZP5JCY	949	IS0FIC	700	VE3OMM
2407	YU7LS	1715	W8IQ	1536	KF2O	1362	I2IWM	1141	LU2YA	923	DF4ZL	699	JN3SAC
2381	YU7SF	1710	N4YB	1526	HA0IT	1359	HA8XX	1138	I2EAY	908	KC7V	659	TF1MM
2373	K6XP	1692	IT9VDO	1525	VE1RJ	1330	KB0G	1133	JA9CWJ	900	3A2LF	617	DK7NP
2340	W4BOY	1686	EA7AZA	1517	SM6CST	1327	DJ1YH	1085	NJ1T	883	K9QFR	606	I5OOV
2275	N2AC	1681	SM6DHU	1511	W1WAI	1319	W6OUL	1063	KS4S	862	EA6AAK	601	N5GFY
2147	WA8YTM	1678	TI4SU	1490	OZ5UR	1310	G4OBK						

the east-west 2500 mile path between P29 and KH1, at a solar flux of about 160, would have a maximum usable frequency (MUF) above 30 MHz during the day, dipping to a low of 10 MHz at 1800Z, sunrise at Howland. AE really should have used an even higher frequency during the day. (The closer one transmits to the MUF, the stronger the signals. Also, the signal strength of the 6210 kHz was weakest during the day. The New Guinea based radio operator may have noticed the increasing signal strength when he tried to prevent AE from QSYing to the lower frequency. In fact, 6210 kHz would have been an excellent frequency to use that particular night.

After AE

The US maintained a presence in the area long after the search for AE had ended unsuccessfully. However, the Navy decided it needed a more suitable base for their operations and moved to nearby Canton Island in 1935. Except for the erection of the Earhart Light in 1937, Howland seems to have been forgotten.

Other events in the region, however, produced a unique event in amateur radio: a location that could count for two different DXCC countries! From the start of post-WWII DXCC until 1985, an operation from Baker, Howland, or any of the Phoenix Is-

lands (including Canton) could count for either American Phoenix Islands KB6 (later KH1) or British Phoenix Islands VR1 (later T31). For example, Eric Sjolund, SM0AGD, operated from Canton using the callsign SM0AGD/KH1 one UTC day, and T31AF the next. Both operations were from the identical radio shack! How did this strange situation come to be?

Beginning near the end of the nineteenth century Great Britain asserted sovereignty over most of the individual islands comprising the groups known as the Phoenix Islands and the Line Islands. In 1937 Britain extended the boundaries of its Gilbert and Ellis Islands colony to formally en-



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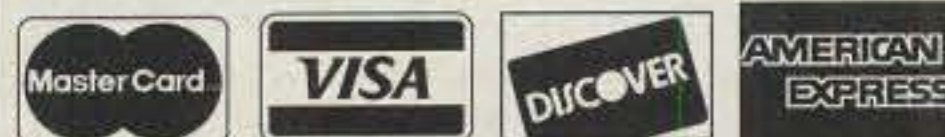


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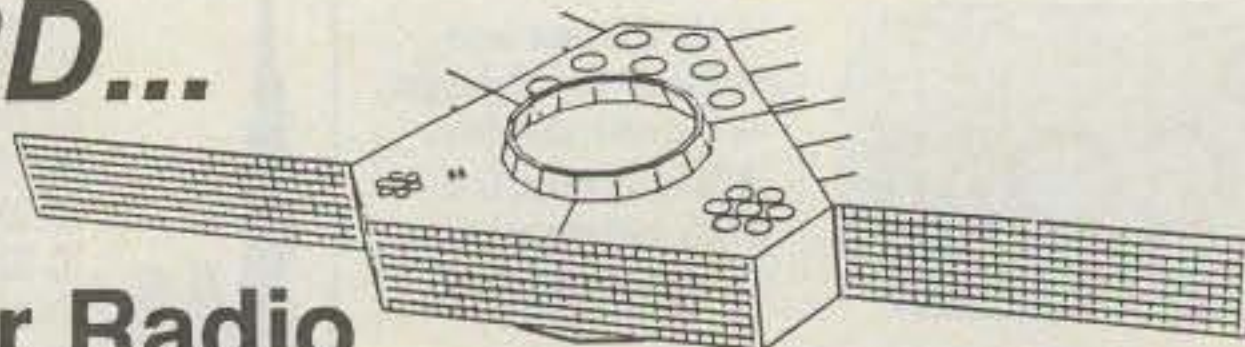
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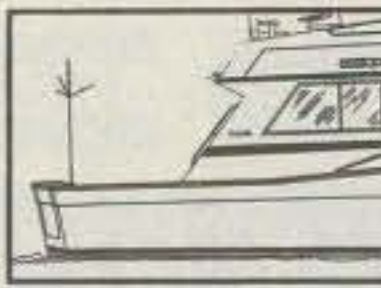
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compass the Phoenix and Line Island territories, including Baker and Howland.

In 1939 the United States asserted its own sovereignty over eight of the islands claimed by Britain in the Phoenix group. These islands were Canton, Enderbury, Hull, Birnie, Gardner, Phoenix, Sydney, and McKean. The US claim to these islands initially was based upon a claim of discovery and the issuance of United States guano mining bonds in the nineteenth century. Additionally, US personnel were posted on Canton from 1937 until mid-1979.

To resolve the diplomatic dispute between the United States and the United Kingdom over conflicting claims to Canton and Enderbury Islands, the two governments signed an agreement on April 6, 1939 providing for joint administration without prejudice to the claim of either party. In 1970 the US Air Force became the sole administrator of Canton, Enderbury, and Hull Islands under a second agreement with the British, but in recognition of the continuing British interest in the islands, the US agreed to compensate the United Kingdom for ten years.

On July 12, 1979 the Republic of Kiribati was created upon the independence of the Gilbert and Ellis Islands Colony. The new republic encompassed the Gilbert Islands, the British Phoenix Islands, and the Line Islands. Only the names were changed in the DXCC country list, with the former DXCC country of British Phoenix becoming Central Kiribati (T31). The conflicting territorial claims between the US and the UK thus became conflicting claims between the US and the Republic of Kiribati.

In the Treaty of Friendship between the US and Kiribati, signed at Tarawa on September 20, 1979, the US renounced, among other things, all claims to the eight islands in the Phoenix group. The treaty was forwarded to the US Senate on January 24, 1980 by President Carter with a recommendation for its ratification. The treaty was finally ratified by the Senate on June 21, 1983.

Note that Baker and Howland Islands are not affected by this treaty. Baker and Howland are now wildlife refuges, currently administered by an agency within the US Department of the Interior.

In 1984 a group of Northern California DXers petitioned the DX Advisory Committee (DXAC) to delete the old DXCC country of Baker, Howland, and the American Phoenix Islands, and start a new DXCC country of Baker and Howland alone. They reasoned that the removal of 90% of the land area and 100% of the population of the DXCC country constituted such a major change that the DXCC status of the country should also be changed. The group planned to stage the first-ever operation from the new DXCC country, and even obtained the callsign AH1A for same. (Go ahead; look it up in the *Callbook!*)

As it turned out, the DXAC decided



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ZS9A to ZS1IS
ZW8DX to PS8DX
ZW8ET to I0WDX
5H3TY to Tak, P.O. Box 972, Kilimanjoro, Tanzania
A718V to P.O. Box 2260, Doha, Qatar
CEBYAA to P.O. Box 7, Easter Island, via Chile
EL2PP to P.O. Box 2274, Monrovia, Liberia
J28FO to P.O. Box 2419, Djibouti
J28GG to P.O. Box 1076, Djibouti
S51VQ to P.O. Box 146, Celje, Slovenia
SV9BAI to P.O. Box 92, Chania 73100, Greece
ZA1Z to P.O. Box 569, Tirana, Albania
ZD8G to P.O. Box 2, Ascension Island, South Atlantic

against deleting the previous country and starting a New One. Instead, they simple redefined the boundaries of KH1 to exclude the Phoenix Islands, now solely central Kiribati T31. This made KH1 a much more difficult country to work. Freighters call regularly at Canton Island, and there is even a usable airstrip. When an operation from Canton counted for either T31 or KH1, Canton was the natural focus of all KH1 DXpeditions.

Once KH1 was limited to Baker and Howland islands, it began to move quickly up the Most Wanted list, up to 39th in 1987. Finally in 1988 five DXpeditioners operated as NO1Z/KH1 and VK9NL/KH1. The operators—7J3AAB, TR8JLD, NO1Z, VK9NL, and VK9NS—made some 27,000 QSOs, including the first RTTY, 160 meter, YL, and 6 meter contacts from Howland. Since that operation there have been several T31 operations, but no KH1. Baker, Howland has moved up to 18th in the 1992 Most Wanted survey. If all goes according to plan, that will change this month, thanks to K9AJ and company.

DXers in the western half of the US should have no trouble making a Howland QSO. Even with very low solar flux levels, the path between California and Howland should be open on 17, 15, and probably 12 meters during the day: 1900-0100Z. There is a good chance of a 10 meter opening near 2100Z. The low bands should be open most of the night.

Stations on the east coast will find a much shorter "window" of time to work Howland. The sun rises at Howland about 1800Z, and it sets in Philadelphia about 2215Z. The higher bands should be open for at least part of that time, especially 20 and 17 meters at 1830-2100Z. Should solar flux increase significantly during the operation, look for openings on 15 and 12 meters near 1900Z. (Even a dramatic increase in solar flux doesn't make a great deal of difference in openings, contrary to popular belief; we'll explore the relationship between band openings and solar flux in a future column.)

For those DXers planning the next Howland Island trip, here are some helpful facts. Howland is under the jurisdiction of the Fish and Wildlife Service of the US Department of the Interior. As it is a national wildlife refuge, access to the island is limited. Visitors must obtain a permit from the Fish and Wildlife Service, and take a naturalist from the Service with them. This makes an operation by an individual amateur impractical.

For larger groups, carrying an additional non-operator is a small price to pay for the privilege of operating from Howland. By the way, this writer stopped by the Fish and Wildlife Service office in Honolulu to investigate operations from the French Frigate Shoals. I discussed the logistics of operating from some of the islands under their control, including Howland. I started to



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310	W7CNL/316	3.5/7 MHz	G4BWP
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Total number of active countries is 323. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

launch into a long explanation of amateur radio, DX, DXCC, etc., when the naturalist laughingly stopped me and pulled out the Howland file. In it were 22 inquiries about landing on Howland, every single one from an amateur radio operator! I recognized about 20 of the callsigns. "It seems that you hams and the booby birds are the only ones who care about Howland," the naturalist chuckled.

There are no special licensing requirements for Baker, Howland; anyone with a stateside license may operate /KH1. The nearest jumping-off spot for Howland is Canton, but that is almost as difficult to get to as Howland. The K9AJ team will sail from Christmas Island T32, about 1300 miles to the east. The trip will take about six days each way, plus about seven days on the island. Add in the weekly flights between Christmas and Honolulu, and getting to and from Honolulu, and you will find the DXpeditioners must take at least a month off from work for the trip. Airline pilot Ian Shepherd G4LJF must take two months off to join the crew! Once there, the DXpeditioners will put up with equatorial heat and high winds, the stench of bird guano, boobies ruining antennas, and probably DX policemen. It should be an interesting trip! And don't forget the donations to help pay for the trip!

[Special thanks to W6CF, the Northern California DX Foundation, Amelia Earhart

—The Final Story by Vincent Loomis, Mini-PropPlus by W6EL, The "DX Bulletin" Special Report March 1988, and VK9NS.]

Other February Operations

The Howland Island DXpedition is not the only one scheduled for this month. Veterans (survivors?) of the last Clipperton FOC and South Sandwich VP8SSI operations will be on from Kingman Reef KH5K for 8 to 9 days beginning in late February. They'll also send an operating team to Palmyra KH5 for a few days. The multi-national crew includes NAFW, N9NS, W7KNT, AH9B, V73CT, and some others, with up to 12 ops in all. They are especially interested in raising funds for this expensive undertaking; contact Pete Myers, NAFW, for details. Interestingly, the last operation from Kingman Reef was by Mike McGirr, K9AJ, in 1988, and the 1993 Kingman group will use the same boat the Howland gang is chartering. It's a small world out there!

A little closer to home, Silvano Amenta, KB5GL, will operate SSB and RTTY HK0/ from San Andres Island February 27 to March 7. Don, AA5AU, will accompany Silvano on CW and RTTY. They'll be on the higher bands, including the new bands. QSL to KA6V.

A couple of Islands On The Air operations are also set for this month. Art Phillips, NN7A/V31JZ, and Mike Sharp, NG7S/V31RL, will operate February 22-24 from Southwater Cay in the Belize Caribbean Sea Coast South group, a New One for IOTA. Before the island trip they'll be active from the Belize mainland in the ARRL CW test. QSL V31JZ via NN7A and V31RL via NG7S. Also, Bob Schmieder, KK6EK, who put the Farallon Islands on the air for the first time ever earlier this year, is planning a return to **Rocas Alijos XF** in mid-February. This is another New One for IOTA. He has asked for a special XF call.

DX News

Al Slater, G3FXT, passed away on November 11 at age 65. Al was elected to the CQ Contest Hall of Fame in 1988. Al was a world-class CW operator, and held several offices in the First Class Operator Club (FOC). He was a regular winner in CQ and RSGB Commonwealth contests. Al hosted hundreds of radio visitors at his Sussex shack, and nurtured dozens of budding amateurs and DXers. Our condolences to Al's wife, Maud, and his family.

The ARRL Awards Committee voted unanimously to accept the DXAC recommendations to add **Croatia 9A**, **Slovenia S5**, and **Bosnia-Herzegovina 4N4** to the DXCC Countries list. Croatia and Slovenia are added for contacts made June 26, 1991 or later, and Bosnia-Herzegovina for contacts made October 15, 1991 or later. The DXCC Desk will accept cards from

these three countries after January 1, 1993. The Awards Committee did not vote on, nor even schedule a vote on, adding **Macedonia 4N5** to the DXCC Countries list, as the DXAC also recommended. DXCC Specialist Bill Kenamer, K5FUV, says the following operations have been accepted for DXCC credit: 7Q7CW, C9RAA, D2/F6BLQ, D2CW, D2FGC, ET3BC/YL, JT1/K7HDK, KP5/NTG, PYTSN, S21ZC, S79CW, TA/DK7PE, AHG/TF/P, TU4EF, VS6/DK7PE, ZB2/IKFVC, ZS9/DK9PE, 9D0RR, and cards from Iranian contacts made on or after August 20, 1988. Previously rejected Iranian cards may be returned for DXCC credit. Cards for these operations may be submitted for DXCC credit.

QSL Notes

QSL **VP2MR**, **VP2MBM**, and **VP2MCX** via N5DXD. QSL **VP2MCX** via Robert Giese, N5KXN, P.O. Box 7681, Houston TX 77270-7681.

QSL **SV5BOP** direct to Tharenos (Ross) Tharenou, P.O. Box 22, Lardos 85109, Rhodes Island, Dodecanese, Greece.

AM3DU/AM6/p operated from the Balearic Islands in September; QSL to EA3DU or EA3DXD.

The Oklahoma DX Association (OKDXA) is the QSL route for **AH9B/VO2**, **V7MHZ**, and **V73SG**, all active in CQWW SSB. Address is Box 88, Wellston, OK 74881.

Some Cayman Island QSL routes: **ZF2JI** via KG6AR; **ZF2TB** via KJ6HO, and **ZF2SZ** via WB6OKK.

QSL **3D2ZC** from Fiji via operator Martin Bayes, G4DZC, at his stateside address: Box 620674, Newton, MA 02162, or via the UK RSGB bureau. (His *Callbook* addresses are wrong.)

PZ1DY reports that the third postage increase in six months in Suriname has pushed the cost of airmail return to the US to US\$1.50. One "green stamp" isn't presently enough; send US\$2, or add an IRC.

Direct QSL routes for some Slovenia stations: **S59WA**, **S59AB**, and **S51HB** via Box 1, 65282 Cerklje, Slovenia; **S52CD** via Tone Crv, Bukovo 3, 65282 Cerklje, Slovenia; **S54DL** via Darko Laharnar, Trg 31. Divizijeg, 65282 Cerklje, Slovenia; and **S51XE** via Boris Tusek, Jerebova 9, 65282 Cerklje, Slovenia.

QSL **JU830C** via the headquarters station of the Mongolian Radio Sport Federation JT1KAA, P.O. Box 639, Ulaanbaatar-13, Mongolia. QSL **JT1T** and **JU1T** via the same address.

JX7DFA is on Jan Mayen until April; QSL via the Norway bureau to home call LA7DFA, or direct to Box 300, 1202 Oslo, Norway.

QSL the October **V63SM** Micronesia operation via Manami Shimazaki, JQ1EEL, P.O. Box 88, Moriguchi, Osaka 570, Japan.

QSL the **OK1DTG/P5** North Korean operation via Josef Zabavik, Ohradni 1361, 14000 Praha 4, Czechoslovakia. (This op-

eration does not presently count for DXCC.)

DXers still needing a **YI1BGD** confirmation may try Christian Steger, OE6CRD, Haus Nr. 104, A-8132 Pernegg, Austria. Christian has YI1BGD and **YI1RJ** logs from 1989.

QSL **TL8DF** via FE1LBM, P.O. Box 265, F-67504 Haguenau, France (not in the *Callbook*.)

QSL **RI10A** via Jack Staats, KB8RJ. However, please be patient; Jack hasn't received any logs yet.

QSL the 1992 operation of **PW2A** and **PW2N** via Vitor Luis Aidar Dos Santos, PY2NY, P.O. Box 145, 18001-970 Sorocaba SP, Brasil. (QSL the **1989** operation of **PW2A** via operator PT2BW.)

QSL **R0H** via the European DX Foundation, P.O. Box 620260, 5000 Koln 60, Germany.

S79KMB's QSL manager, Anita Keighley, KN2N, has moved. Her new address is VA Medical Center, Building 21, Martinsburg, WV 25401.

Not Managers

HP2CWB and special-event call **H92A** should be confirmed via Jose N. G. Lee, N4YWY, FIT Box 6758, Melbourne, FL 32901. (Not via W6JOX.)

TU2BC was a slim; don't QSL via DL7BC.

3L1A does not QSL via LA1K.

QSL Manager Volunteers

Arnold Pedersen, KK4VN, Route 3, Box 221, Cumberland, VA 23040.

David Tucker, NU4N, 1500 Massac Church Road, Paducah, KY 42001.

Luc Glarey, I1YRL, via S. Martino 11, 10091 Alpignano, offers QSL managing services to a CW operator from the Pacific or Africa.

And Teddy Barczyk, DL4DBR, Pappelstr. 34, D-W-5800 Hagen-1, Germany, offers his services.

QSL Help Wanted

WA9CDY worked **S79QZ** in 1991, who said to QSL via DJ0QZ. Letters to DJ0QZ's 1992 *Callbook* address are returned marked: "unbekannt verzogen." Any help?

VE3XO seeks help getting a QSL from **RW9USA** for a 75 meter QSO. Several direct, registered letters to the *Callbook* haven't worked. Any suggestions?

Bill Sullivan, N5AFH, is trying to locate a current QSL route for **9G1WS** from 1979. Operator Will Stilley said he was an engineer for Kaiser Aluminum, and said to QSL via the 1979 *DX Callbook* address. Any ideas?

W9EVI wants to find logs for **VQ1ERR** from January 1959. VQ4ERR was operator, and W4IYC was then QSL manager. "His widow, now in England, does not have the logs," Mac reports.

KA1NCN seeks to confirm an ARRL DX test contact with **KG6DV/KH6** on 75 meters. Return receipt, SASE, and ready-made QSL weren't enough to get a confirmation. Ideas? KA1NCN also needs QSL info for **LT4U** and **RB4IZ**.

WB5LLM needs a QSL route for **FO0N** on CW in May of 1990.

KM9J seeks any info on **CE0ZJF** and **3A2NU**. (The 3A rings a faint bell as a possible pirate.)

K5KDG lost some old QSLs in a fire. He's trying to replace confirmations from **KH6BCB/KS4** from 1966, and **KZ5ZWN** from 1963. Any help?

KA8OUT seeks a QSL route for **LW4LN**. N1HKH seeks QSL routes for **JZ3WW** and **JT1BS**.

KA3NIL wants help with **F0SSB**, **VU1PH**, and **VR4SF**.

N4UU says a card to **G3MTL**, QSL manager for RO200T, was returned marked "Gone Away." Anyone have a better address?

KF4TA worked 7J4LK on Ogasawara, but a QSL card to *Callbook* address of **JA3ABD** was returned marked insufficient address. Any help?

AB4WB seeks help with **I74XO**. Broken call?

K4QVK needs QSL routes for **3D2GT** (July 1983) and **ZC4AB** (May 1985).

Ex-USSR QSL Information

UC2LR has a new QSL manager: Dick Corp, K2POF, who has a new address: 10 Cary Road, Mechanicville, NY 12118.

UW6HS can help with QSL cards to Russia. He is manager for numerous ex-USSR stations and DXpeditions. He asks for registered mail to Vasil Kasyananko, P.O. Box 20, Georgievsk, Stavropolskogo KR 357800, Russia.

QSL the August operation of UL11/UW9AM, UL21/UA9AT, RL31/RA9ABK, and UL41/UZ9AWD via Igor Finogenov, Box 49, Magnitogorsk 455044, Russia.

QSL the RTTY contest call of RO0Q via UO5OLW, Box 112, Kishinev, Moldova 277012, Europe.

Stephen Licht, WF2S, has been QSL manager for UF6VBZ/UF6VM since 1990. He has logs until October 27, 1991, but nothing after that date. He can't confirm the 1000+ outstanding QSL requests until he gets Vladimir's logs; please be patient.

QSL Help Provided

9Y4H cards will (eventually) be out, according to Glenn, K6NA.

And Marv, K2VHW, QSL manager for 5B4ADA and YU200/5B4, says that the QSL delays were "caused by several circumstances of which one was the special QSLs Ivo requested. The cards are on the way out, about 100 per week as I catch up."

73, Chod, VP2ML

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International Amateur Radio Law

The Amateur Service is an internationally recognized radio communications hobby. In the United States amateur radio exists for purposes such as providing a means by which radio enthusiasts may provide voluntary communications for themselves and others, especially public-service and emergency communications. Ham operators also learn about and contribute to electronics technology and make up a very important pool of trained operators in the event of a national emergency.

Since radio waves know no boundaries, the various nations of the world periodically agree on the broad guidelines for accessing the radio spectrum. This is primarily accomplished at meetings called World Administrative Radio Conferences (WARCs), which are scheduled by the Geneva-based International Telecommunication Union. The ITU, a specialized agency of the United Nations, consists of delegations representing more than 150 different countries.

The ITU got its start in Europe in 1865 as the International Telegraph Union to expedite message handling across national borders. They primarily address radio frequency bands and the guidelines for accessing them. Once ratified by Congress, these international agreements have the force of law and provide the framework under which our Federal Communications Commission must operate.

*National Volunteer Examiner Coordinator,
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(817-461-6443)*

There are not many international laws which apply to amateur radio. From a technical standpoint, all nations must verify that their amateur operators are qualified to operate their equipment and that they can manually send and receive Morse code if the operation takes place below 30 MHz. There also must be a relationship between privileges (such as power levels, frequencies, and so forth) and operator proficiency. These rules exist primarily to reduce unwanted interference to other services.

Current international amateur service communications are limited to technical or unimportant personal matters. And the amateur bands must not be used to transmit international third-party messages unless agreed to by the countries involved. The International Radio Regulations also state that amateur stations shall transmit their call signs at short intervals. There are no other international limitations.

International regulations requiring telegraphy proficiency in the amateur service have existed from at least 1938. Article 8, Section 197 (Cairo WARC 1938) required "... any person operating amateur and private experimental station apparatus, either on his own account or for another, must have proved his ability to transmit passages in the Morse Code and to read in telegraphy reception by ear, passages thus transmitted. He may be replaced only by authorized persons possessing the same qualifications."

In 1947 (Atlantic City WARC) the regulations (Article 42, Section 1003.3) included for the first time a frequency limit above which a test in Morse code may be waived and set this limit at 1000 mc/s. In 1959 (Geneva WARC) this frequency limit was dropped to 144 MHz and in 1979 (another Geneva WARC) to its current 30 MHz.

This cut-off point has been lowered at every general WARC since 1947, and it is wondered what will happen at the next general WARC, which should take place around the end of the century. Many believe that the amateur radio Morse code requirement will be totally eliminated.

While code-free amateur radio operation isn't supposed to take place on the shortwave HF bands under 30 MHz, Japan allows it by creatively interpreting the

rules. They maintain that any radio operation is legally permitted under the International Radio Regulations provided it does not cause interference to others. No country has complained to the ITU about the code-free operation of the Japanese "voice-class" license. Japan has over one million "voice class" amateurs using 10 watts on the HF amateur bands *without Morse code proficiency*.

Morse Code Standards

There are no international Morse code speed standards. Theoretically, just recognizing the Morse sounds and being able to hand send the characters meets all international requirements. It is our FCC that provides for the three different levels of telegraphy proficiency—5, 13, and 20 words-per-minute. All FCC rules are made in accordance with the Administrative Procedures Act, which requires the public to be involved in the rule-making process. Actually the amateur radio telegraphy regulations exist the way they are because that is the way we as amateurs want them.

Back on June 22, 1982 the FCC published a Public Notice detailing the specifications used by the FCC for amateur radio Morse code test tapes. This has more or less become the defacto standard used in Morse code testing. Here is the text of that FCC Bulletin:

The international standards for the relative duration of elements and spacing employed in the Morse code are defined in CCITT Recommendation R.140 as adopted by the VIIth Plenary Assembly in November 1980. The 13 and 20 word-per-minute amateur radio test tapes conform to these standards.

The 5 word per minute amateur radio test tapes are constructed using Morse letters sent at 13 words per minute, but with additional spacing between characters and words to provide an effective rate of 5 words-per-minute. This method [commonly referred to as the Farnsworth system] is favored for slow telegraph speeds because it is believed to facilitate the attainment of higher speed.

Specifications:

For the 5 words per minute tapes, the modulation rate and duration of unit interval are calculated using 13 words per minute as the desired code speed.

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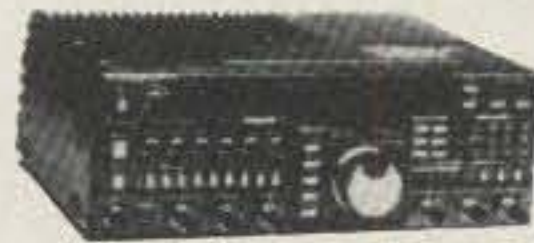
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Duration of spacing for 13 and 20 words per minute

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Space between characters—3 unit intervals
Space between words—7 unit intervals

Duration of spacing for 5 words per minute

Space between elements—1 unit interval
Space between characters—15 unit intervals
Space between words—39 unit intervals

Accuracy

Notwithstanding accuracy implied by the above formulas, the timing accuracy of actual test tapes may vary +/− 2%.

Audio frequency range (pitch of CW note)

The audio frequency used is no lower than 700 Hertz and no higher than 1000 Hertz.

Message duration

All tapes run for at least 5 minutes but no longer than 6 minutes.

Message content

The test messages transmitted simulate one side of a typical amateur radio conversation using code (CW QSO). Common telegraphy abbreviations, Q-signals, and amateur conventions (such as RST signal reporting system) are used.

The average word in the English language has been determined to be 50 units long. Since the word PARIS contains exactly 50 units, code speed can be accurately calculated by sending that word a specified number of times. Since numerals, prosigns, and punctuation marks contain more character elements, they count as two characters (see Part 97.507e). Dot spacing should normally be about 10 per second.

Taking The Morse Code Test

All W5YI-VEC prepared telegraphy examinations match these FCC standards. The American Radio Relay League telegraphy examinations are slightly different. While their 20 wpm examination conforms to the FCC standard, the ARRL's 5 and 13 words-per-minute Morse code examinations are transmitted at 18 wpm character speed with the spaces between the characters and words spaced out to yield 5 and 13.

It is a matter of opinion as to which Farnsworth spacing is best. The ARRL uses 18 wpm because they believe it makes it easier to attain the 20 wpm Extra Class level if you learn at a faster character speed to begin with. Volunteer examiners are allowed to prepare their own telegraphy examinations. In actual practice, any spacing may be used as long as the overall speed conforms to the telegraphy element standards specified in §97.503. Some VEs who use a computer to generate the code test will even let you decide which Farnsworth spacing you want.

The rules require knowledge of 43 different characters: all letters of the alphabet, numerals 0–9, four punctuation marks (period, comma, question mark, and slant bar) and prosigns \overline{AR} , \overline{BT} , and \overline{SK} . A pro-

sign is a special operating character made up of sending two characters together. \overline{AR} means "End of Transmission," \overline{BT} "Break" (or hyphen), and \overline{SK} for "End of Contact."

A telegraphy examination must consist of a message sent at no less than the prescribed speed for a minimum of five minutes. Every examination message must contain at least one of the 43 required characters, and no message known to the examinee may be administered in a telegraphy examination. Neither may the same telegraphy examination be readministered to an examinee.

The VECs, at their annual conferences, have consistently declined to adopt a code test transmission and answer standard, instead leaving it up to the individual VEC and VE team to use whatever standard they feel appropriate. Any answer format may be used, including one minute solid copy, fill in the blanks, multiple choice, answering seven out of ten questions about the examination text... even true/false.

The rules simply state that an applicant must prove to the examiners that he or she is able to copy the International Morse code by ear. Some VEs give the applicant two chances to pass the code test by asking questions about the text if the applicant fails to copy 25 characters in a row.

Morse code tests may be taken in reverse order if desired—that is, 20 wpm before 13 wpm. If the 20 wpm is failed, then the applicant may try the 13 wpm. As a general rule, Morse hand sending examinations are not administered, since the FCC has taken the position "Passing a telegraphy receiving examination is adequate proof of an examinee's ability to both send and receive telegraphy." See §97.509(d). The administering VEs, however, may also include a sending segment if they feel it important.

Is The Morse Code Necessary?

Technology has progressed to the point where the reasons for retaining the code as a prerequisite for amateur radio operation are becoming outdated. Newer digital communications modes now can do what code traffic handled by humans cannot—that is, assure accurate delivery of important traffic.

Automatic message correction through electronic "handshaking" circuitry has made the last stronghold of hand sent/received telegraphy, the Maritime Radio Service, unnecessary. Large ocean-going vessels are in the process of being tied into digital networks relayed by satellites. Simply stated, ship-to-shore shortwave communication is fast becoming part of the romantic past history of ships at sea.

In 1988 the International Maritime Organization made a decision to end Morse code on the high seas. The IMO is the United Nations agency dedicated to the

safety of ocean shipping. They represent some 97 percent of the world's ocean-going vessels. This ruling basically signals the demise of radio operators and manual telegraphy aboard ocean-going vessels.

Maritime radio first used Morse code to enhance the safety of life at sea. Now a new, automated satellite-based Global Maritime Distress and Safety System will allow the crew to send a distress signal simply by pushing a button. Ships will also carry a radio beacon which would give the ship's position via GMDSS if it were to sink suddenly. Morse code, which had been the foundation of maritime distress and safety messages since the turn of the century, now becomes obsolete. Ship owners are expected to phase out radio operators when the new equipment is installed in ships starting this year.

Telegraphy can, however, be an interesting and fun way to communicate. It allows more amateurs to use the bands at one time due to its efficient use of spectrum. CW is also an international language understood by most amateurs of the world.

What Is The Best Way To Learn Morse Code?

To many people the Morse code requirement is simply a barrier to HF privileges. It need not be. It merely requires the discipline to practice code for a few minutes every day to be able to learn enough Morse to pass the 5 wpm and faster code exams. Today most amateurs are learning the code after first passing the (No-Code) Technician requirements.

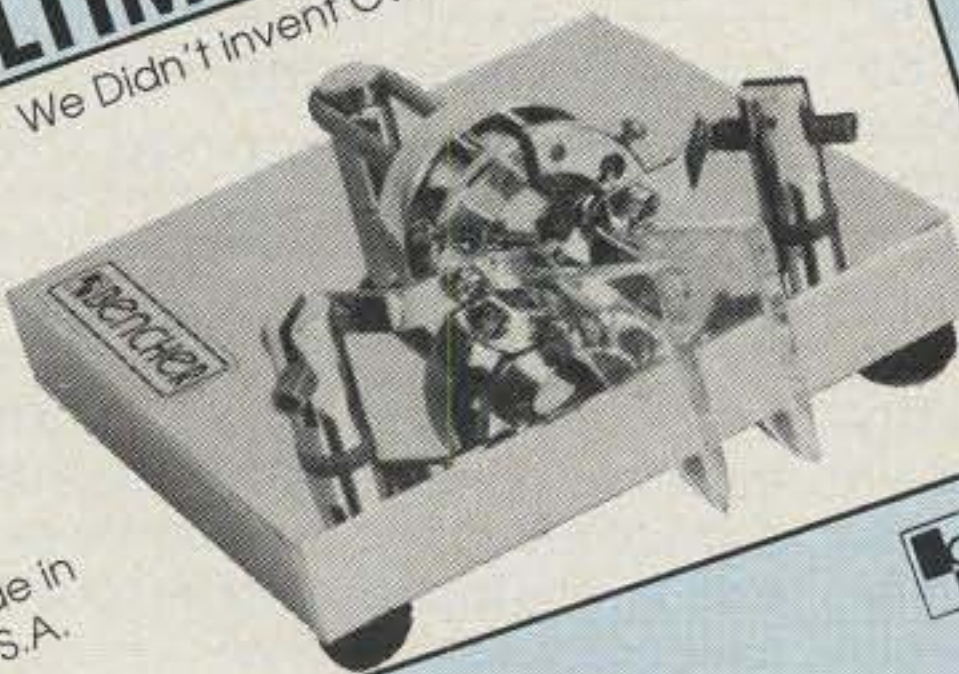
There are several good Morse code courses on cassette tapes available in the license preparation marketplace. I personally believe the best way, however, to learn Morse code is with a personal computer. We distribute a program called Morse Academy, which does everything from teaching the characters to building up speed past the Extra Class level. (Cost is \$9.95; VISA/MasterCard order toll-free 1-800-669-9594.)

Morse Academy is a Computer Aided Instruction (CAI) based program that teaches Morse code through various games and sessions. The Learning Session introduces characters from the keyboard and through a flashcard mechanism that communicates the sounds and images of the characters. The Receiving Game provides immediate feedback for characters sent and copied. The Endurance Session helps the student extend his skills by playing against the computer in an attempt to build the length of time he can copy correctly. The Proficiency Session allows longer sessions copying text either on the computer keyboard or with paper and pencil. Actual telegraphy tests generated by Morse Academy can be used for practice, and the program can be configured to match any speed, tone, and spacing.

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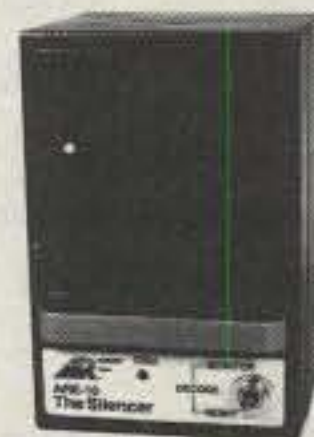
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Listening to W1AW, the ARRL headquarters station, or other code-practice stations, or listening to other amateurs, is also a good way to learn CW operating procedures. Practice at least 30 minutes a day sending and receiving. Once you learn the code, try copying a station sending much faster than you can actually copy—and try copying behind. That is, don't write down a letter until the next letter has been transmitted. One of the best ways to become proficient at Morse code is to simply get

on the air once you pass 5 wpm. Don't be concerned that you don't know enough to carry on a conversation. There will be many others in the same situation.

Code Exemptions For The Handicapped

Not only has the FCC dropped the code requirement to enter amateur radio, they also have relaxed the code requirement for handicapped amateurs. Disabled amateurs who have passed at least the 5 wpm code requirement can now be exempted from having to pass a higher speed in order to upgrade their license.

It is up to the applicant to prove that he or she has passed the 5 wpm code requirement. This is usually accomplished by presenting a Certificate of Successful Completion of Examination (CSCE) showing Element 1(A) telegraphy credit received during the past year or a current operator license of any class except the Codeless Technician.

Administering VEs are required by the rules (97.509h) to accommodate all applicants whose physical disabilities require a special examination procedure. Any special needed equipment must be supplied by the examinee. Volunteer examiners may not eliminate the 5 wpm test requirement because of a disability. If the disability is not clearly evident, they may require a physician's certification indicating the nature of the handicap before determining which, if any, special procedures are to be used.

You will find that VE teams will go to great lengths to accommodate any legitimately disabled person. The examination may be administered at a place convenient and comfortable to the examinee, even bedside. For a deaf person, the dots and dashes may be sent to a vibrating surface or a flashing light. Examiners may read the questions to blind persons or write for the examinee where the examinee is unable to do so.

Where warranted, the examiners are even authorized to pause the telegraphy test tape after each sentence, each phrase, each word, or even each character to allow the applicant additional time to absorb and interpret what was sent. Also, a sending test may be substituted for a receiving test where the examinee's particular handicap precludes a telegraphy receiving examination.

Once the 5 wpm code exam is passed in some manner, a 13 and 20 wpm telegraphy exemption is available to the severely disabled. The Physician's Certification of Disability and Patient's Medical Information Release on the back of the FCC application Form 610 must be completed to obtain credit for the 20 wpm code exam. The certifying physician must be a medical doctor or a doctor of osteopathy. This code credit is valid for a period of one year—enough time for applicants to pass any needed written examinations.

Volunteer examiners are not permitted to question the medical judgment of the certifying physician. However, if the VE team has substantial evidence that the 20 wpm telegraphy exemption is being granted improperly, they may attach a signed letter to the Form 610. The application is then referred to the FCC's Personal Radio Branch for further investigation.

No handicapped person is required to apply for an exemption from the higher speed telegraphy examination, nor is anyone denied the opportunity to take the telegraphy examination.

73, Fred, W5YI

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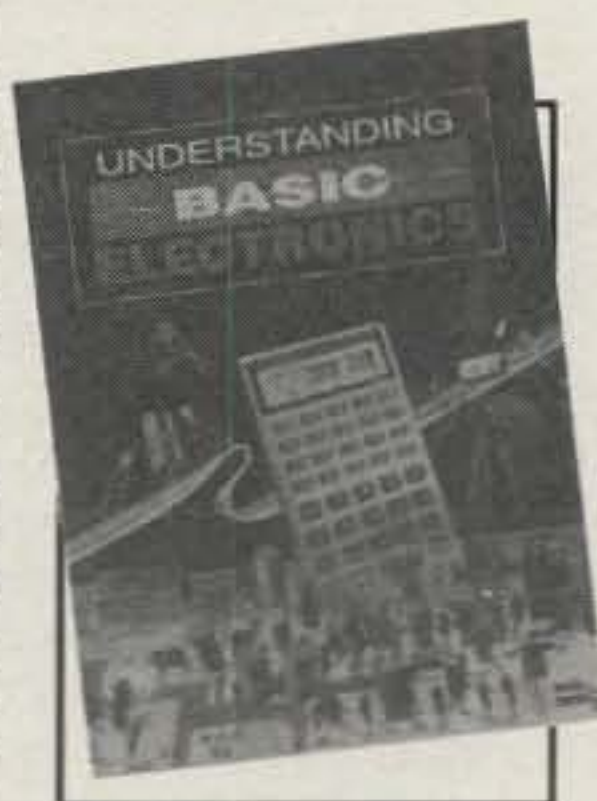
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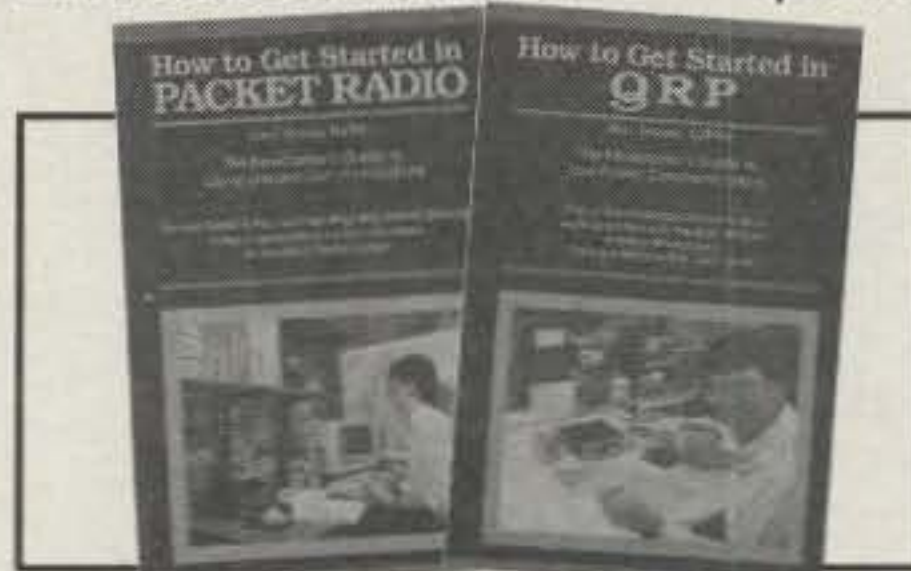
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Flash!

Mother Nature cooperated with amateur radio during the CQ World-Wide DX Contest CW weekend of November 28 and 29. In fact, conditions on the HF bands were somewhat better than expected. While my forecast called for normal conditions ranging between Low Normal and High Normal, early results from the contest weekend indicate conditions were mainly High Normal, and may have even climbed into the Above Normal range at times. A 10.7 cm solar flux level of 149 was reported for November 28th, dropping slightly to a level of 140 on the 29th. This corresponds to approximate sunspot numbers of 107 and 90, respectively. The world-wide index for geomagnetic activity (A_p) was reported as 5 on November 28th and 4 on the 29th. These indicate an exceptionally quiet and stable ionosphere. All in all, the 1992 CQ World-Wide DX Contest periods, both phone and CW, enjoyed relatively good propagation conditions, despite the decline in the solar cycle.

Sunspot Cycle 22 Progress

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot number of 88 for October 1992. This results in a smoothed running sunspot number of 103 centered on April 1992. The present sunspot cycle is continuing to decline at a relatively rapid rate. A smoothed index of approximately 73 is forecast for February 1993.

Canada's Dominion Radio Astrophysical Observatory in Penticton, B.C. reports a corresponding mean 10.7 cm solar flux level of 132 for October 1992. This results in a smoothed level of 163 centered on April 1992 and a predicted level of approximately 140 for February 1993.

February Conditions

In the Northern Hemisphere during February, expect a seasonal decrease in the range of frequencies that will propagate long distances during the daylight hours (i.e., 10 and 12 meter bands) and an increase during the hours of darkness (i.e., 30 and 40 meter bands).

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for February 1993

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 7-8, 17, 19	A	A	B	C
High Normal: 4, 6, 9-10, 16, 18, 24-25	A	B	C	C-D
Low Normal: 2-3, 5, 11, 14-15, 22-23, 27	B	C	D	D-E
Below Normal: 1, 12, 20, 28	C	C-D	D-E	E
Disturbed: 13, 21, 26	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.
 B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.
 C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.
 D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.
 E—No opening expected.
 3 dB per S-unit.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be fair-to-poor (C-D) on February 1st, fair (C) on the 2nd and 3rd, good (B) on the 4th, fair (C) on the 5th, etc.

Towards the end of February and continuing through March and early April, an equinoctial effect should be noticeable on the HF bands. This usually means an improvement in conditions for openings between the Northern and Southern Hemispheres—for example, between the United States and South America, southern Africa, Australasia and Oceania, and the southern areas of Asia. Equinoctial propagation occurs during the spring and fall months, when the sun is most directly overhead at the equator. This results in similar ionospheric characteristics over large areas of the world. It tends to maximize during sunrise and sunset periods and over both short and long paths.

While fewer 10 and 12 meter DX openings are expected during February, some very good ones should be possible to many areas of the world during the daytime hours. The 15 meter band is forecast to be the best band for world-wide DX propagation conditions during the daylight hours.

Excellent openings are predicted to most areas of the world, with generally strong signals and little fading or noise. The band should open towards the east shortly after sunrise, peak towards the north and south during the early afternoon hours, and towards the west during the late afternoon and early evening. Good openings world wide are also forecast for the 17 and 20 meter bands from shortly after sunrise through the early evening hours. The 20 meter band is expected to remain open well into the hours of darkness for paths towards the south and west.

Fairly good DX propagation conditions are expected on the 30 and 40 meter bands from late afternoon and continuing through the hours of darkness until shortly after local sunrise. Fairly high signal levels are expected during many DX openings. A seasonal increase in static levels is expected to result in somewhat poorer DX propagation conditions on 80 meters. Despite weaker signals and higher static levels, some fairly good DX openings are forecast to many areas of the world during the hours of darkness. Some DX openings may also be possible on the 160 meter band during the hours of darkness and the sunrise period.

For short-skip openings less than 250 miles, 80 meters should be best during the daylight hours, followed by 40 meters, while 160 meters is expected to be optimum during the hours of darkness, with 80 meters as a follow-up. For distances between 250 and 750 miles, try 30 and 40 meters during the day and 80 meters at night. The best band for openings between 750 and 1300 miles during the daytime hours of February should be 20 meters, with 30 and 40 meters optimum from sundown to midnight and 80 meters recommended from midnight to sunrise. For short-skip openings between 1300 miles and the one-hop limit of 2300 miles, check and 15, 17, and 20 meters during the day and 30, 40, and 80 meters at night. Good short-skip openings between approximately 1000 and 2300 miles are expected on 10 and 12 meters throughout much of the daytime period.

VHF Ionospheric Propagation

Auroral displays tend to occur somewhat more frequently during February than dur-

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YAESU FT-890 • 100W 160-10m all mode transceiver with 100kHz-30MHz receiver. Optional internal automatic antenna tuner. 13.5VDC @ 20A. 9 1/2"w x 3 3/4" x 9 1/2"d, 12.3 lbs..... **LIST \$1339.00**

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YAESU FT-747GX (left) • 100W, 160-10M SSB/CW base or mobile transceiver with 100kHz-30MHz receiver, and optional FM transmit7 receive. 12V DC @ 20A. 3 3/4"h x 9 1/2"w x 9 1/2"d, 7 lbs **LIST \$899.00**

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FT-5100 • Like 5200 w/o remote cap. ... **LIST \$695.00**

FT-6200 • 35/10w, 440MHz/1.2GHz **LIST \$799.00**

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YAESU FT-470 (B) • 2m/440MHz, 2.3w, FM handheld. Similar to FT-411 and 811 above. Simultaneous receive on both bands, 21 memories for each band. 6 1/2"h x 2 1/4"w x 1 1/2"d, .88 lbs..... **LIST \$499.00**

YAESU FT-415 (D) • Compact 2m FM HT. 2w, 130-174MHz/rx (140-150MHz tx). Dual VFOs, 41 tunable memories. 2 1/2"w x 5 1/4" h x 1 1/2"d, 12 1/2 oz..... **\$409.00**

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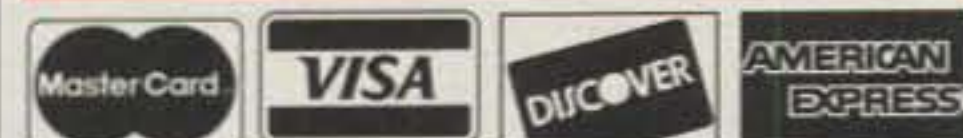
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HOW TO USE THE DX PROPAGATION CHARTS

1. Use Chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8 KP4, KG4 and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9 and 0 areas; the Western USA Chart in the 6 and 7 areas, and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 Meters) for a particular DX region as shown in the left-hand column of the Charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in () after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the Charts are in the 24-hour system, where 00 is midnight, 12 is noon, 01 is 1 A.M., 13 is 1 P.M., etc. Appropriate standard time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts c.w. or 1 kw. p.e.p. on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado, 80302.

**February 15 - April 15, 1993
Time Zone: EST (24-Hour Time)
EASTERN USA To:**

Reception Area	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-11 (1) 11-13 (2) 13-14 (1)	07-08 (1) 08-09 (3) 09-12 (4) 12-13 (3) 13-15 (2) 15-16 (1)	04-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-17 (3) 17-19 (2) 19-21 (1)*	17-19 (1) 19-20 (2) 20-01 (3) 01-02 (2) 02-03 (1) 19-21 (1)* 21-22 (2)* 22-23 (3)* 23-00 (2)* 00-01 (1)*
Northern Europe & European USSR	08-12 (1)	07-08 (1) 08-11 (2) 11-14 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-13 (3) 13-14 (2) 14-18 (1)	18-20 (1) 20-22 (2) 22-02 (1) 20-00 (1)*
Eastern Mediterranean	09-13 (1)	08-09 (1) 09-11 (3) 11-13 (2) 13-15 (1)	07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 16-18 (3) 18-22 (2) 22-23 (1) 04-07 (1)	19-20 (1) 20-22 (2) 22-23 (1) 20-22 (1)*
East Africa	10-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-18 (2) 18-21 (3) 21-23 (2) 23-01 (1)	19-00 (1) 21-23 (1)*
West & Central Africa	11-14 (1) 14-16 (2) 16-17 (1)	07-08 (1) 08-09 (2) 09-11 (3) 11-14 (4) 14-16 (3) 16-17 (2) 17-19 (1)	07-09 (2) 09-12 (1) 12-13 (2) 13-15 (3) 15-18 (4) 18-19 (3) 19-22 (2) 22-07 (1)	18-20 (1) 20-22 (2) 22-01 (1) 21-23 (1)*
South Africa	10-11 (1) 11-12 (2) 12-14 (1)	07-09 (1) 09-13 (2) 13-15 (3) 15-17 (2) 17-18 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-23 (1) 23-01 (2) 01-03 (1)	21-23 (1) 23-00 (2) 00-01 (1) 23-01 (1)*

Central & South Asia	Nil	07-09 (1) 18-20 (1)	07-10 (1) 19-22 (1)	05-07 (1) 19-21 (1)
Southeast Asia	Nil	07-09 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-10 (1) 19-21 (1)	06-08 (1) 17-20 (1)
Far East	17-19 (1)	07-09 (1) 16-17 (1) 17-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-20 (1) 20-22 (2) 22-00 (1)	05-08 (1) 06-07 (1)*
Guam & Pacific Islands	13-15 (1) 15-17 (2) 17-18 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	01-07 (1) 07-10 (2) 10-19 (1) 19-01 (2)	00-02 (1) 02-06 (3) 06-07 (2) 07-08 (1) 02-03 (1)* 03-05 (2)* 05-06 (1)*
Australia & New Zealand	16-18 (1)	08-12 (1) 15-17 (1) 17-20 (2) 20-22 (1)	00-03 (2) 03-07 (1) 07-09 (3) 09-10 (2) 10-13 (1) 13-15 (2) 15-19 (1) 19-22 (2) 22-00 (3)	03-05 (1) 05-07 (2) 07-09 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Northern & Central South America	08-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-11 (3) 11-14 (2) 14-15 (3) 15-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	00-03 (2) 03-06 (1) 06-07 (2) 07-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-22 (4) 22-00 (3)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1) 19-21 (1)* 21-02 (2)* 02-06 (1)*
Southern Brazil, Argentina, Chile & Uruguay	09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-10 (3) 10-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	04-06 (1) 06-08 (2) 08-15 (1) 15-16 (2) 16-17 (3) 17-19 (4) 19-01 (3) 01-04 (2)	19-21 (1) 21-03 (2) 03-07 (1) 21-06 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-16 (2) 16-18 (1)	08-10 (1) 15-17 (1) 17-19 (2) 19-21 (1)	04-07 (1) 07-09 (2) 09-12 (1) 15-18 (1) 18-21 (2) 21-00 (3) 00-04 (2)	23-05 (1)

Central & South Asia	17-19 (1)	07-10 (1) 18-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 19-22 (1)	06-08 (1) 19-21 (1)
Southeast Asia	09-11 (1) 16-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 17-18 (1) 18-10 (2) 20-22 (1)	06-08 (1) 17-19 (1)
Far East	15-18 (1)	07-09 (1) 14-16 (1) 16-19 (2) 19-21 (1)	07-09 (2) 09-11 (1) 17-20 (1) 20-00 (2) 00-07 (1)	02-05 (1) 05-07 (2) 07-09 (1) 05-07 (1)*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	10-13 (1) 13-16 (2) 16-19 (3) 19-20 (2) 20-21 (1)	06-07 (2) 07-09 (3) 09-11 (2) 11-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-06 (1)	22-01 (1) 01-06 (3) 06-07 (2) 07-09 (1) 00-03 (1)* 03-06 (2)* 06-07 (1)*
Australia & New Zealand	15-17 (1)	09-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	07-09 (2) 09-17 (1) 17-20 (2) 20-00 (3) 00-03 (2) 03-07 (1)	02-04 (1) 04-07 (2) 07-09 (1) 04-05 (1)* 05-07 (2) 07-08 (1)*
Northern & Central South America	09-11 (1) 11-13 (2) 13-14 (3) 14-15 (2) 15-17 (1)	06-07 (1) 07-08 (2) 08-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	06-07 (2) 07-11 (3) 11-14 (2) 14-16 (3) 16-20 (4) 20-22 (3) 22-02 (2) 02-06 (1)	18-19 (1) 19-20 (2) 20-02 (3) 02-04 (2) 04-06 (1) 20-21 (1)* 21-02 (2)* 02-06 (1)*
Southern Brazil, Argentina, Chile & Uruguay	08-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	07-08 (1) 08-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (2) 08-15 (1) 15-16 (2) 16-18 (4) 18-22 (3) 22-04 (2) 04-06 (1)	19-22 (1) 21-03 (2) 03-06 (1) 21-05 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-15 (2) 15-18 (1)	13-16 (1) 16-18 (2) 18-20 (1)	07-09 (2) 09-12 (1) 15-18 (1) 18-20 (2) 20-23 (3) 23-03 (2) 03-07 (1)	00-06 (1)

**Time Zone: PST (24-Hour Time)
WESTERN USA To:**

Reception Area	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-11 (1)	08-10 (1) 10-12 (2) 12-15 (1)	23-01 (1) 06-08 (1) 08-12 (2) 12-14 (3) 14-16 (2) 16-20 (1)	18-00 (1) 20-22 (1)*
Northern Europe & European USSR	Nil	08-12 (1)	23-01 (1) 06-07 (1) 07-09 (2) 09-13 (1)	19-23 (1) 20-22 (1)*
Eastern Mediterranean & East Africa	Nil	07-11 (1)	06-09 (1) 09-11 (2) 11-15 (1) 18-21 (1)	18-21 (1)
West & Central Africa	11-16 (1)	06-08 (1) 08-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	05-10 (1) 10-15 (2) 15-18 (3) 18-20 (2) 20-22 (1)	18-22 (1) 19-21 (1)*
South Africa	10-13 (1)	08-10 (1) 10-14 (2) 14-16 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-20 (1) 00-02 (1)	19-22 (1) 20-21 (1)*
Central Asia	17-19 (1)	07-09 (1) 16-17 (1) 17-19 (2) 19-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 17-19 (1) 19-20 (2) 20-22 (1)	05-08 (1)
Southeast Asia	16-19 (1) 09-11 (1)	08-09 (1) 09-10 (2) 10-14 (1) 14-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	07-08 (1) 08-10 (3) 10-11 (2) 11-21 (1) 21-00 (2) 00-02 (1)	00-02 (1) 02-06 (2) 06-08 (1) 02-06 (1)*

**Time Zones: CST & MST
(24-Hour Time)
CENTRAL USA To:**

Reception Area	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	09-12 (1)	07-08 (1) 08-09 (2) 09-12 (3) 12-14 (2) 14-15 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-14 (3) 14-17 (2) 17-20 (1)	17-19 (1) 19-22 (2) 22-02 (1) 20-21 (1)* 21-22 (2)* 22-00 (1)*
Northern Europe & European USSR	08-11 (1)	07-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-11 (1) 11-13 (2) 13-17 (1)	19-01 (1) 20-23 (1)*
Eastern Mediterranean	09-12 (1)	07-09 (1) 09-12 (2) 12-14 (1)	23-02 (1) 07-12 (1) 12-17 (2) 17-22 (1)	19-23 (1) 20-22 (1)*
East Africa	10-15 (1)	07-10 (1) 10-15 (2) 15-17 (1)	06-12 (1) 12-17 (2) 17-20 (3) 20-21 (2) 21-23 (1)	19-21 (1) 20-22 (1)*
West & Central Africa	11-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-10 (2) 10-12 (3) 12-14 (4) 14-15 (3) 15-16 (2) 16-18 (1)	07-12 (1) 12-13 (2) 13-15 (3) 15-17 (4) 17-20 (2) 20-00 (1)	18-19 (1) 19-21 (2) 21-00 (1) 20-22 (1)*
South Africa	10-13 (1)	07-09 (1) 09-13 (2) 13-14 (3) 14-16 (2) 16-17 (1)	05-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-21 (1) 00-02 (1)	23-00 (1) 23-00 (1)*

Far East	14-15 (1) 15-16 (2) 16-18 (1)	12-14 (1) 14-18 (2) 18-20 (3) 20-22 (1)	08-10 (2) 10-20 (1) 20-22 (2) 22-00 (3) 00-04 (2) 04-08 (1)	00-02 (1) 02-06 (2) 06-08 (1) 02-08 (1)*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	08-12 (1) 12-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (1)	09-10 (2) 10-12 (4) 12-16 (3) 16-19 (4) 19-20 (3) 20-00 (2) 00-09 (1)	19-20 (1) 20-22 (2) 22-06 (4) 06-08 (2) 08-09 (1) 21-23 (1)* 23-06 (2)* 06-07 (1)*
Australia & New Zealand	11-15 (1) 15-17 (2) 17-18 (1)	10-12 (1) 12-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-17 (1) 17-18 (2) 18-20 (3) 20-22 (4) 22-00 (3) 00-02 (2) 02-04 (1)	00-03 (1) 03-05 (3) 05-07 (2) 07-08 (1) 02-03 (1) 03-05 (2) 05-07 (1)
Northern & Central South America	10-12 (1) 12-14 (2) 14-16 (1)	06-07 (1) 07-08 (2) 08-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (2) 07-09 (3) 09-10 (2) 10-14 (1) 14-16 (2) 16-18 (4) 18-22 (3) 22-00 (2) 00-06 (1)	18-20 (1) 20-00 (3) 00-03 (2) 03-05 (1) 20-21 (1)* 21-01 (2)* 01-04 (1)*
Southern Brazil, Argentina, Chile & Uruguay	08-12 (1) 12-13 (2) 13-15 (3) 15-16 (2) 16-18 (1)	00-02 (1) 07-11 (1) 11-13 (2) 13-15 (3) 15-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	20-05 (2) 05-15 (1) 15-16 (2) 16-18 (4) 18-20 (3)	18-19 (1) 19-23 (2) 23-03 (1) 20-02 (1)*
McMurdo Sound, Antarctica	11-13 (1) 13-15 (2) 15-17 (1)	12-15 (1) 15-18 (2) 18-20 (1)	05-06 (1) 06-08 (2) 08-11 (1) 16-19 (1) 19-20 (2) 20-23 (3) 23-02 (2) 02-05 (1)	00-06 (1)

*Indicates best times to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.

For 12 meter openings interpolate between 10 and 15 meter openings.

For 17 meter openings interpolate between 15 and 20 meter openings.

For 30 meter openings interpolate between 40 and 20 meter openings.

ing the earlier winter months. Unusual short-skip conditions often occur on the VHF bands during such displays as a result of the ionization associated with auroras. Openings over distances of several hundred miles and up to as much as 1300 miles may take place by means of reflection from such regions. Auroral-type openings are characterized by flutter fading and multi-path echoes. To take maximum advantage of such openings, antennas should be pointed towards the auroral display, if it is visible, or in a generally northerly direction.

The sun's energy, which causes auroral displays in the earth's atmosphere, often is also responsible for producing large areas of sporadic-E ionization. Reflection of VHF signals from such regions can make possible short-skip openings between distances of approximately 750 and 1300 miles. Unlike auroral-type propagation, signals reflected by sporadic-E ioniza-

tion are often strong and stable.

Auroral activity usually takes place during periods of radio storminess. Check the Last Minute Forecast at the beginning of this column for those times during February which are likely to experience radio storminess.

No significant meteor showers are expected during February, but there should be an improvement in trans-equatorial, or TE, VHF openings. The best chances for such openings are between the southern tier states and South America on paths approximately at right angles to the equator.

They are more likely to occur on 6 meters, but an occasional 2 meter opening also may be possible. The best time to check for TE openings is between 7 and 10 PM local time. TE openings are characterized by very weak signals with considerable flutter fading.

This month's propagation charts contain band-opening predictions for major DX paths for the period February 15 through April 15, 1993. A short-skip propagation forecast for February appeared in last month's column.

73, George, W3ASK

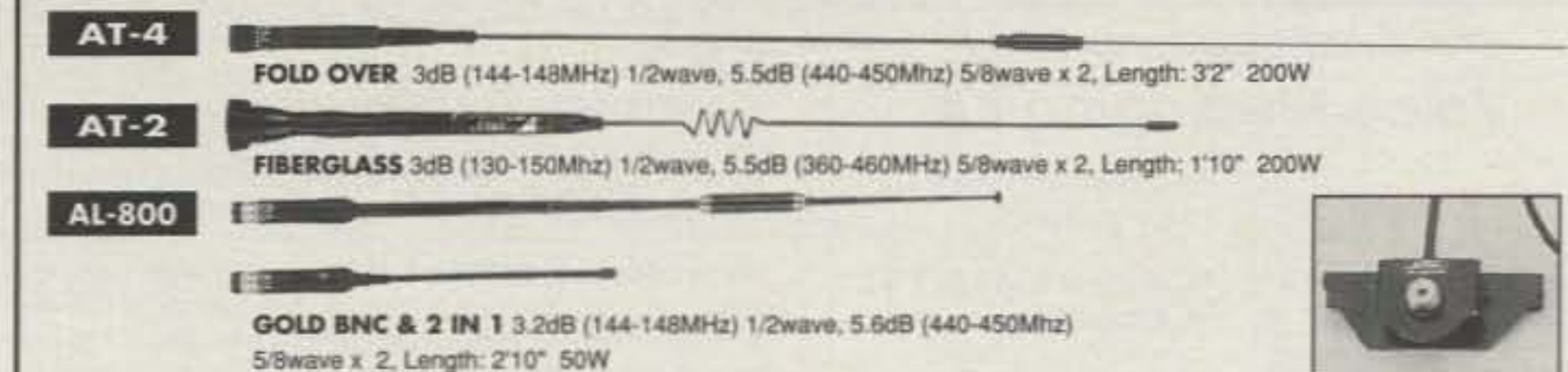
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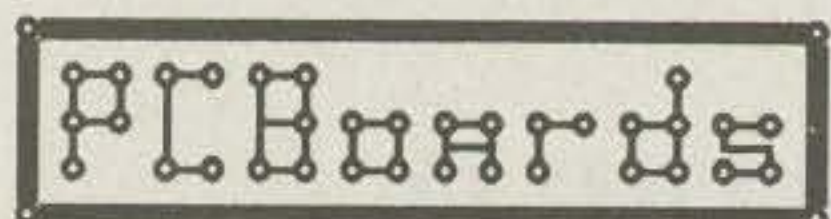
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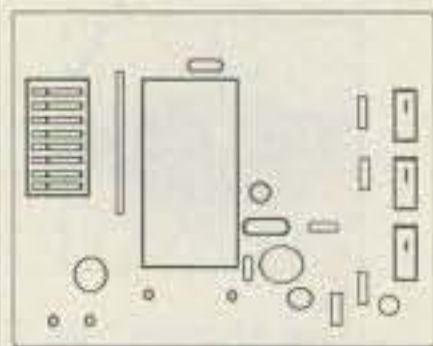
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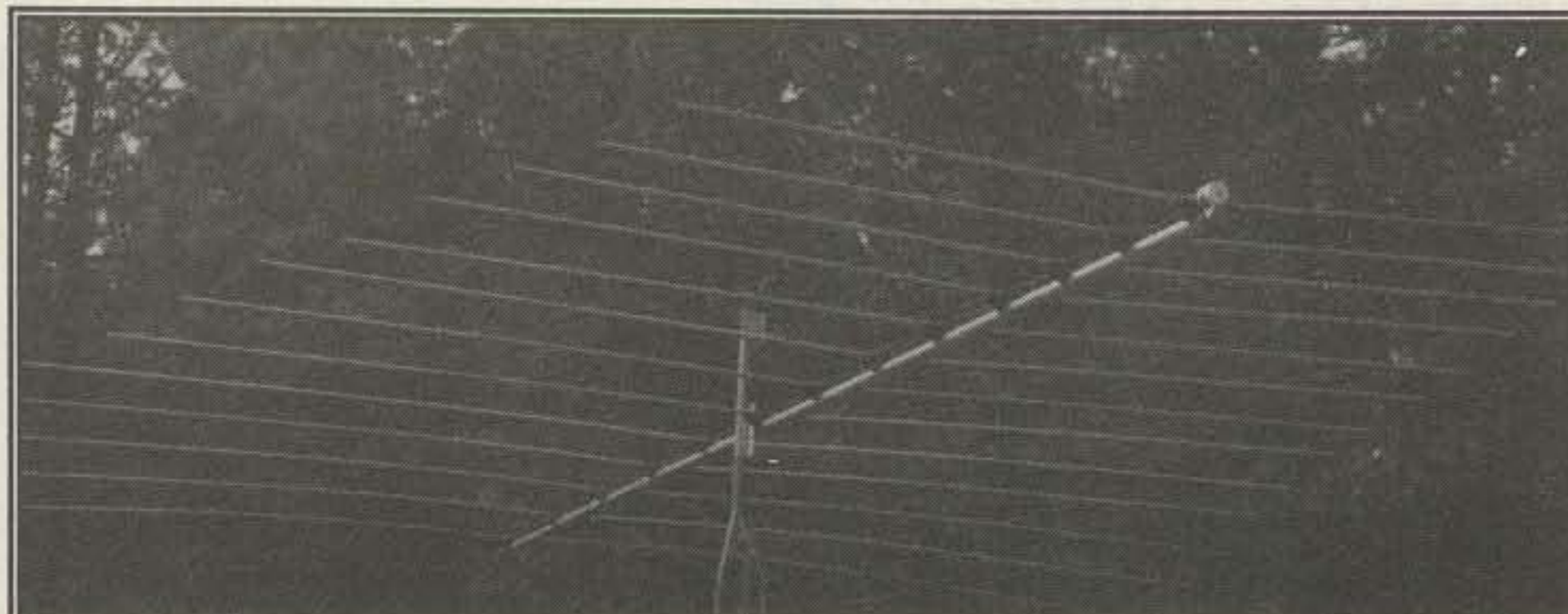
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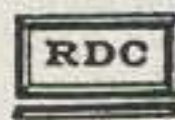
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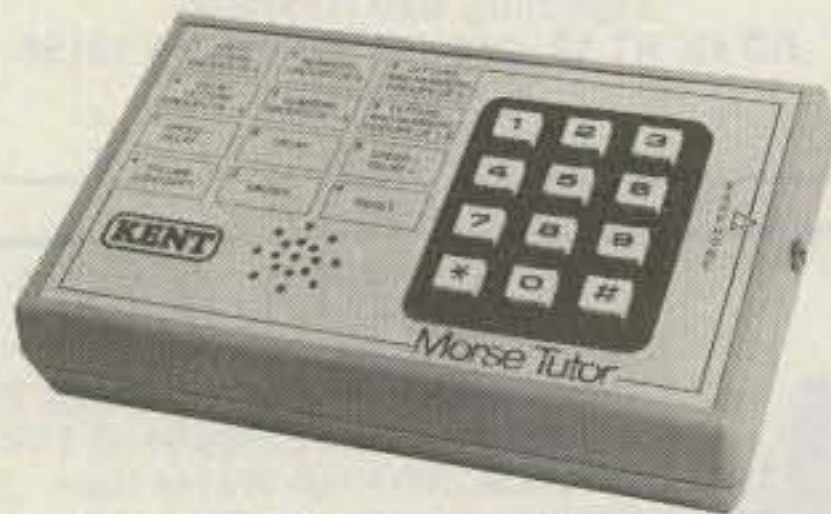
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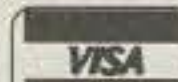
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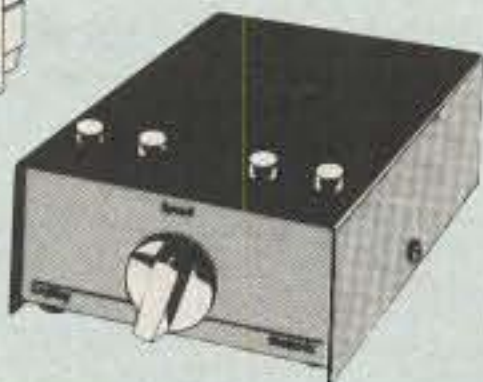
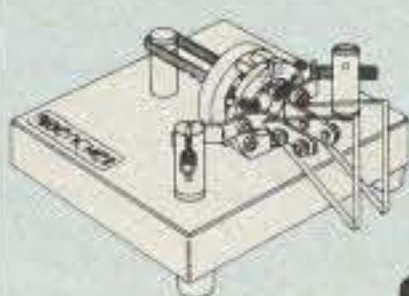
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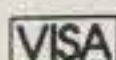
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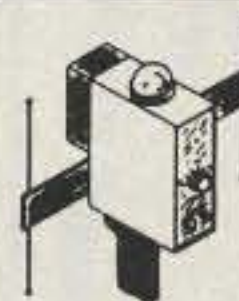
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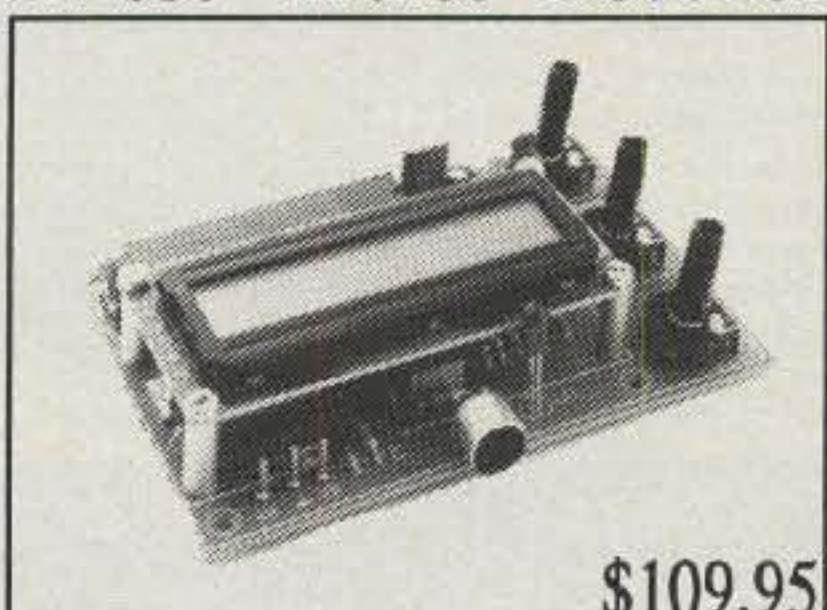
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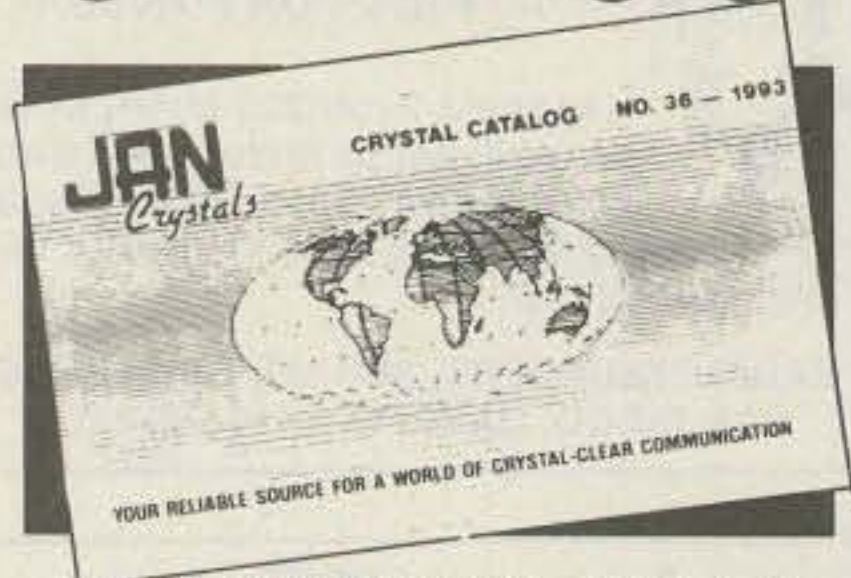
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DX	de W10I	3797.5	T12CC
To ALL de W01L (82272) 1 good 8512 pass at about			
DX	de W73A	7885.8	388CF
DX	de W11U	3588.1	Z81JK

DX	USERS	DX DE	SH/GSL
MSGS	Connect	SH/WWW	SH/BUCH

MMDDYY	DATE/TIME	Award Type	Node	168	88	48	30	28	17	15	12	10	8
08/11/92	Call	DXCC	RIHQ	4	CM								
02:24:58	HJBYGJ	589	589	7	0830	CW	750						

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CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

WANTED: Screw-base flashbulbs #22, 50 etc. T.N. Colbert, WA8MLV, General Delivery, Burton, OH 44021.

CLEANING SHACK: Must go, Drake TR7, TR3, MN-2000; Kenwood TS-711A, TR-2500 w/base stand charger; Microlog ATR-6800 w/monitor, others. Bill, 904-282-9925.

FOR SALE: DJ-160 2 mtr HT covers 130-173, has not had mod done to it. Comes with RD, standard battery and 2 HD batteries, and manual, one extra antenna, \$300.00. More info. Send SASE to P.O. Box 518, Whitehouse, FL 32220.

FOR SALE with manuals, clean and working, \$50 each you pay shipping. Heath: DX-60B, HR-10B, HG-10B VFO, VHF-1 Seneca RME-45 Com. Rec. RCA 3" scope. \$10. each you pay shipping. RCA VOM, CQ Mag. 1990, 91, 92, boxes of various tubes (250 in each box). WA2MCF, Charlie, 718-445-0558 after 6 PM.

ART-13B. Who has technical information about plug-in Crystal Oscillator Unit CDA-T? Fred Gunther, K7FG, 1307 Shaw St., Moses Lake, WA 98837-3133 (509-762-9294).

HEATH ETW-1000 analog/digital circuit design trainer. New, factory wired. \$100. Schultz, 302 Glasgow Lane, Greenville, NC 27858.

WANTED: Manual/schematic for Palomar Electronics Corporation 10-40 meter 115V Amplifier. KB4VLO, 6799 Incachee Rd. Wood Bine, GA 31569.

NATIONAL HRO-60 FOR SALE. Excellent with 12 coils (only "J" missing), 100 KC calibrator. FM unit, and original manual. Matching speaker included. Offers? Write KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338, or call Charlie, KD4AJ, 404-396-0276 in the evenings for more information.

CRYSTALS: SASE for my list. K8LJQ, 2023 Lannen Rd., Howell, MI 48843.

IC2AT/4AT, HW-99, HW-16, tiny HF CW xcvr wanted. Trade for 6A 14V PS, SBE-34, LED's, IC's, etc. KC8HF, 5354 Foxridge, W. Bloomfield, MI 48322.

SELL: CQ/HR/QST/73 Magazines. Send SASE for list. KA1VY, E. Guimares, 401 Bedford St., Lakeville, MA 02347.

SWAN 700CX TRANSCEIVER W/SPKR PS, VFO/600R RCVR, PHN PATCH, D104 mike, 800 watts PEP, excl. condx., \$475. Prefer local deal. Call Al at 201-445-8034 (K2DNF).

FOR SALE: Kenwood TS-930S with antenna tuner, excellent condx, basic unit, \$1,000. Kenwood SM-220 station monitor scope (NO PAN), \$300. Yaesu FT-7 transceiver, 10-80 meters, 20 watts, \$275. Contact: Tony Musero, K3UKW, 1609 S. Iseminger Street, Philadelphia, PA 19148-1010 (215-271-8898).

DRAKE R4/T4X \$475, R4B/T4XB \$500, R4C/T4XC \$600, TR4 \$295, TR4C \$350, Cabinets \$55, 1525EM \$35, SPR4 \$450, NB \$79, CAL \$45. List \$1/SASE. J. Bedlovics, P.O. Box 139, Stratford, CT 06497.

IBM COMPATIBLE KEYBOARD, BTC 39/69 series; PC/XT/AT compatible, 102 keys. \$15.00. Walt Grosch, KZ9F, 1735 Stoneway Ct., Richfield, WI 53076.

WANTED: OLD RECEIVERS. I am looking for the older "ham" type receivers manufactured in the 50's thru 70's. Also am searching for a good 6 meter transceiver. If you have any of the above equipment and would like to sell it, you can call me at 404-396-0276 or write me at 1968 Huntington Hall Ct., Atlanta, GA 30338. Charlie, KD4AJ.

ICOM RIG: Air time less than 6 hours, mint as-new condition in original boxes, 751A, PS30, AT500, SP3, SM8, \$1650. Will consider selling pieces separately. Bill, K3CRC, 717-222-9390.

WANTED: DFC-230 Kenwood digital frequency controller, radio in trunk, no room in car. WD6EJN, P.O. Box 1716, La Jolla, CA 92038.

WANTED: TS-520SCW filter, ARRL VHF Manual, ARRL Mobile Manual. Q.R. Galbraith, 4303 Kingsway, Farmington, NM 87402.

FOR SALE: SBE-34. Excellent condition. With original mike, manual, and power cord. \$110, OBO. Ken Lowrey, KF8BC, 7716 Oceola Lane, West Chester, OH 45069.

WANTED: FT-101E, FL-2100B, FB-101B, FTV-250, FTV-650B, YC-601, YP-150, FT-221R, or TS-700S, TS-711A. Gyongyosi, 1044 Riverton St., No. Brunswick, NJ 08902.

FOR SALE: Alinco DJ-160 2 meter HT covers 130-173.995, comes with standard battery and two heavy-duty batteries, comes with manual, RD and one extra ant. Price \$300. More info send SASE to P.O. Box 518, Whitehouse, FL 32220, or FAX for more info to 1-904-777-5936 Monday thru Friday until 5 PM.

WANTED: Ham Key Paddles, anything Brown Brothers, WRL SS-3 Q-multiplier (1965), MFJ-40 QRP VFO, Kantronics Rock-Hound, Philmore CR-5, Ameco R5A. Gary, K3OMI, 11124 Oak Hollow Rd., Knoxville, TN 37932 (615-690-4217 days).

Announcements

(from p. 6)

Feb. 20, **1993 Ham Fair**, Polk County Fairgrounds, Salem, Oregon. Contact Salem Repeater Assn., P.O. Box 784, Salem, OR 97308.

Feb. 21, **Livonia ARC Swap 'n Shop**, Dearborn Civic Center, Dearborn, Michigan. Contact Neil Coffin, WA8GWL, Livonia ARC, P.O. Box 2111, Livonia, MI 48151 (SASE), phone 313-427-3905. (Exams.)

Feb. 21, **LIMARC Hamfest & VHF Tune-up Clinic**, Nassau County Police Activity League, New Hyde Park, New York. Contact Neil Hartman, WE2V, 516-462-5549.

Feb. 21, **Burnaby ARC Fleamarket**, Westminster Armories, New Westminster, BC, Canada. Contact Burnaby ARC, P.O. Box 80083, Postal Station South, Burnaby, BC V5H 3X1 Canada, or the club net Monday nights 8 PM local time.

Feb. 22, **Davenport, Iowa ARC Hamfest**, OCCA Expo Center, Rock Island, Illinois. Contact Kent Williams, K9UQI, 4245 Tenth St., East Moline, IL 61244. (Exams, info contact Al Broendel, N9OK, 2712 38th St., Rock Island, IL 61201; exam talk-in on W0BXR 146.04/.64 repeater.)

Feb. 27, **Northern Vermont/New York Winter Hamfest**, Milton High School, Milton, Vermont. Contact Mitch Stern, WB2JSJ, 802-879-6589. (Exams at 9 AM and 2 PM.)

Feb. 27, **Orange Fest '93**, VFW Hall, Hwy 87, Orange, Texas. Contact Paul Tullier, N5QGO, 409-769-1231. (Exams, walk-ins welcome.)

Feb. 27, **Appalachian AR Group Hamfest & Computer Show**, Lebanon Area Fairgrounds, south of Lebanon, Pennsylvania. Contact Ron, WB3HNX, 717-345-8667. (Exams 8:30 AM, pre-registration required by Feb. 12, contact Wilson Hein, WJ3G, 717-273-6334.)

Feb. 27, **LaPorte, Indiana ARC Hamfest**, LaPorte Civic Auditorium, LaPorte, Indiana. Contact LPARC, P.O. Box 30, LaPorte, IN 46350 (SASE).

Feb. 27-28, **ARRL 1993 Great Lakes Division Convention**, Cincinnati Gardens Exhibition Center, Cincinnati, Ohio. Contact Stan Cohen, WD8QDQ, 513-531-1011. (Exams.)

Feb. 28, **Mattapoiset, Massachusetts Amateur Radio Fleamarket**, Rt. 6 Knights of Columbus Hall, Mattapoiset, Massachusetts. Contact Kenneth Rapoza, K1NSX, 19 Golf St., Fairhaven, MA 02719 (508-993-3993).

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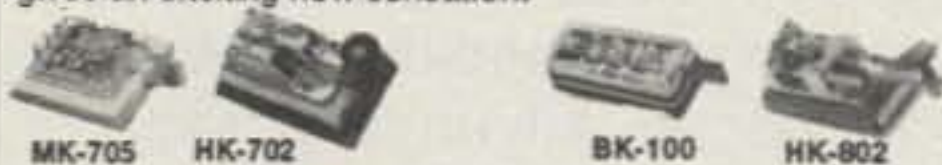
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3KD CLASSIC desk top. 1500 W PEP, 80 to 15 meters, 3.5 to 30 MHz. (10 meters available on export

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2002-A desk top. 1200 W SSB, 400W continuous operation, 220 to 225 MHz.

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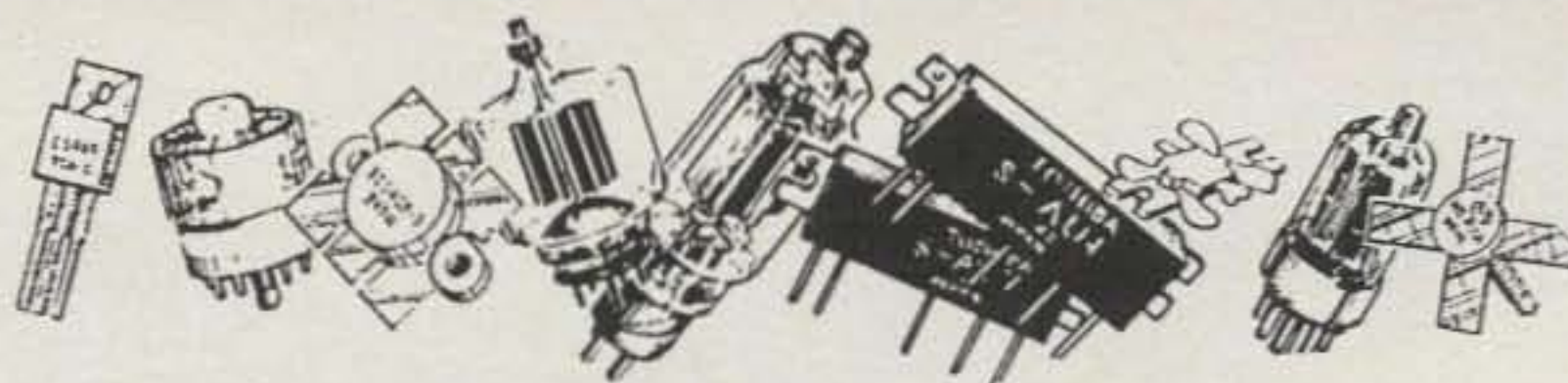
Advertiser's Index

AA7AN QSL Manager.....	129
AEA/Adv. Elec. Applications.....	5
AMSAT.....	120
ARRL.....	110
ARRL-VEC.....	6, 7
ASA.....	139
AVC Innovations Inc.....	128
Ace Communications.....	125
Alfa Electronics.....	103
Alinco Electronics.....	2
Amateur Electronic Supply.....	27, 69, 88, 119, 133
Amateur Radio Engineering.....	129
Amateur Radio Specialists.....	104
Ameritron.....	117
Amidon.....	42
Anli International.....	135
Antenna Mart.....	105
Antenna Specialists.....	55
Antennas West.....	120, 139
Antique Electronic Supply.....	138
Antique Radio Classified.....	89
Arts Publications.....	84
Astron Corp.....	46
Austin Amateur Radio Supply.....	72
Azimuth Communications.....	57
Barry Electronics.....	127
Beezley, Brian, K6STI.....	50
Bencher, Inc.....	129
Bilal Co./Isotron Ants.....	138
Bird Electronics.....	38
Black Belt Systems.....	138
Buckmaster Publishing.....	42, 114, 139, 140, 141
Burghardt Amateur Center.....	23
Butternut Electronics.....	25
CB City International.....	139
CQ Video Productions.....	8
C & S Sales.....	120, 130
Cable X-Perts.....	89
Carrizo Solar Corp.....	104
Colorado Comm. Center.....	80
Command Productions.....	62
CommPute, Inc.....	91
Communication Electronics.....	111
Communications Concepts Inc.....	90
Component Sales Inc.....	48
Cushcraft Antennas.....	10
DRSI, Inc.....	95
DX Engineering.....	138
Delaware Amateur Radio Supply.....	76
Diamond Antennas.....	67
EDCO/DAIWA.....	63
EDE.....	143
Echotrak.....	140
Electronic Engineering.....	139
Electronic Specialists.....	85
Engineering Consulting.....	95
Enterprise Radio Applications.....	49
Ft. Worth Computers.....	61
Fair Radio Sales.....	97
Falcon Communications.....	97
GAP Antennas.....	76
Get-tech.....	101
Grapevine Group, The.....	104
HR Bookstore.....	131
Ham Companion.....	97
Ham Radio Outlet.....	12, 15, 17
Ham Station, The.....	63
Hamtronics.....	141
Handle-Base & More Inc.....	139
Henry Radio.....	144
Hustler Antennas.....	21
IC Engineering.....	48
ICOM America, Inc.....	74, 75, Cov. IV
Interactive Image Tech.....	77
International Components.....	114
Itech.....	104
J Com.....	142
Jan Crystals.....	142
Japan Radio.....	81
Jesse Jones Industries.....	137
Jun's Electronics.....	137
K1EA Software.....	105
K2AW's "Silicon Alley".....	138
K8XF Telegraph Keys Import Co.....	143
K-Quest.....	128
Kantronics.....	19, 146
Kent Morse Keys.....	140
Kenwood, USA.....	Cov. II, 1
Lakeview Co.....	25
LaRue Electronics.....	78
Lentini Communications.....	66, 89
Lewallen, Roy, W7EL.....	105
Lightning Bolt Antennas.....	139
LogiKey.....	141

(continued on page 147)

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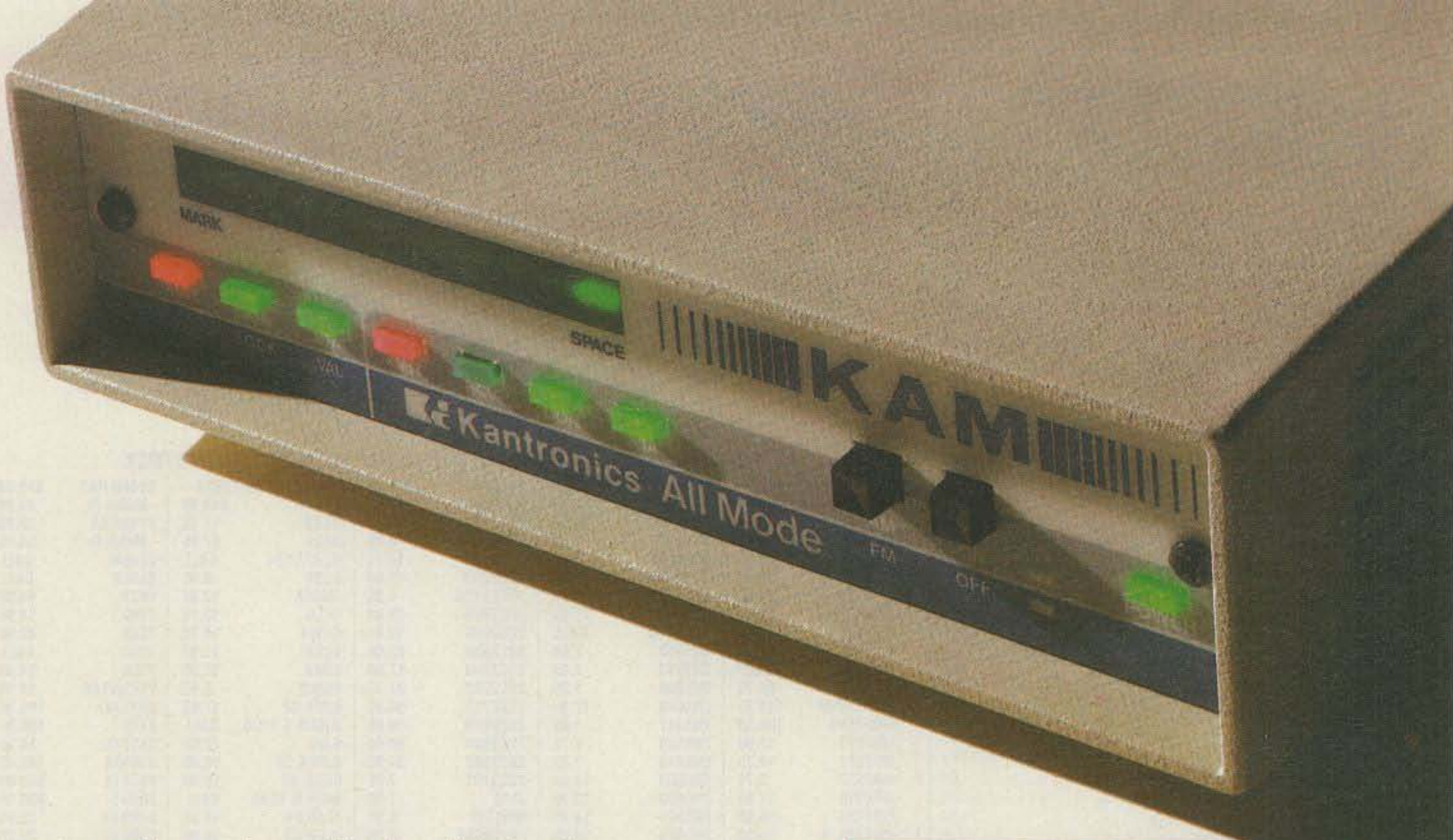
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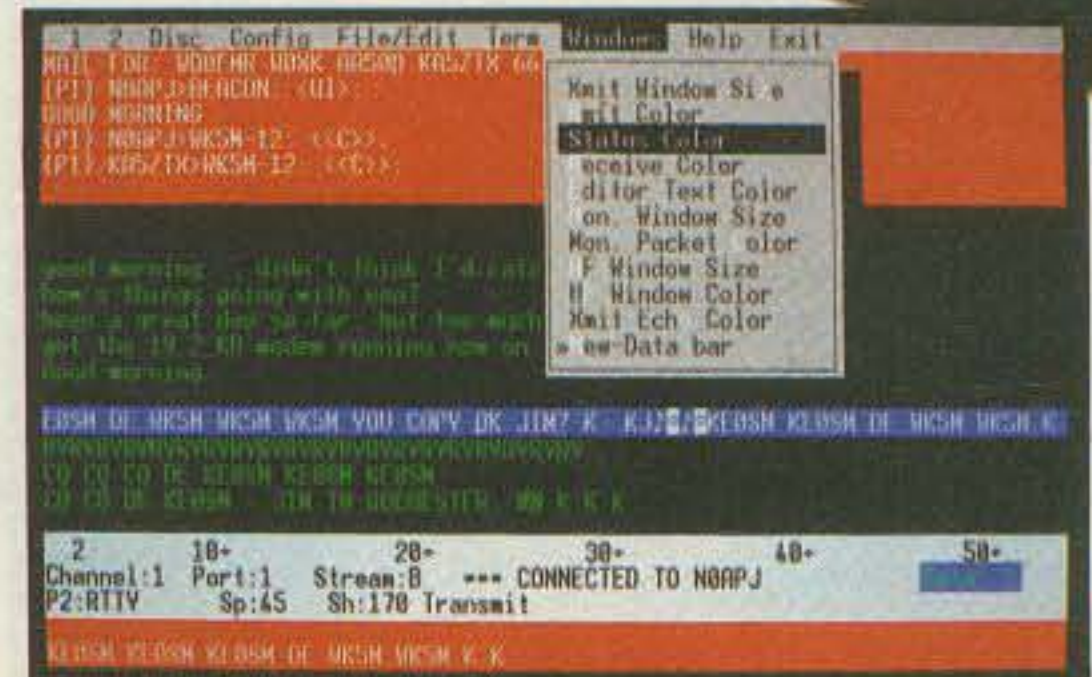
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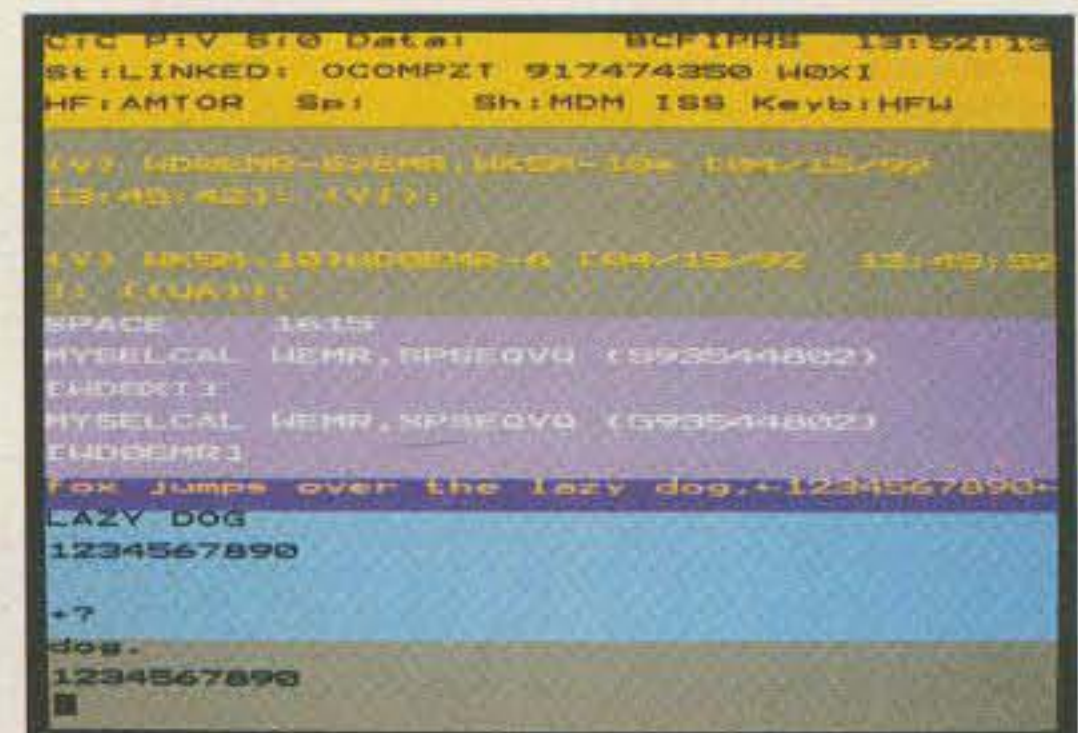
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Advertiser's Index (cont'd)

Luke Co.	141
M ² Enterprises	101
MFJ Enterprises	35, 37, 39, 41, 43
Mackey, James E.	122
Madison Electronics	101
Memphis Amateur Electronics	103
Motron Electronics	140
NCG Inc. (Comet Antennas)	89
National Amateur Radio Assoc.	38
National Radio Center	108
Nemal Electronics	91
ONV Safety Belt Co.	100
OPTOelectronics Inc.	47
Oak Bay Technology	121
Oklahoma Comm. Center	31
Orion Business Int'l.	139
Orlando Hamcation	50
PASS Publishing	63, 85
PC Boards	136
PC Electronics	49
PDK Software	142
Pac Comm	121
Packet Power	142
Palomar Engineers	61, 147
Peet Brothers Co.	38
Periphex Inc.	55
Phillips-Tech Electronics	142
Pipo Communications	108
Pro-Am/Valor	73
QSLs by W4MPY	136
QSL's by WX9X	42
QSO Software	101
R.A.I. Enterprises	90
R&L Electronics	123
RF Connection	122
RF Parts	145
Radio Age	136
Radio Amateur Callbook	48
Radio Center USA	148
Radio City Inc.	70
Radio Club of JHS 22	96
Radio Engineers	141
Radio Place, The	36
Radio Room	138
Radio Shack	51
Radio Works	29
Renaissance Development	85
Robert Hall Electronics	139
Ross Distributing	139
SGC Inc.	87
Sagant Antennas	71
Scrambling News	138
Sensible Solutions	103
Specialty Controls	49
Spectrum International	125
Spider Antennas	120
Startek International	107
Surplus Sales of Nebraska	89
Synthetic Textiles	139
TE Systems	40
TIC General	79
Tapto Corp.	141
Tech Mart	140
Telex Hy-Gain	143
Tenney Technical Services	136
Ten Tec	9, 11
Texas Towers	59
Townsend Electronics	139
Trionics	122, 136, 142
Tucker Surplus Store	52, 53
UNR-Rohn	50
Universal Amateur Radio	95
VHF Communications	87
VIS Study Cards	142
Versatel Communications	140
W5YI Marketing	96, 138, 140
W6EL Software	137
W9INN Antennas	140
WJ20 Master QSO Logging Program	122
W & W Associates	109
Wacom	128
Wallace & Wallace	120
West Radio School, Gordon	56
Wireman Inc.	140
Yaesu Electronics	Cov.III-III A-III B
Yost & Co.	97

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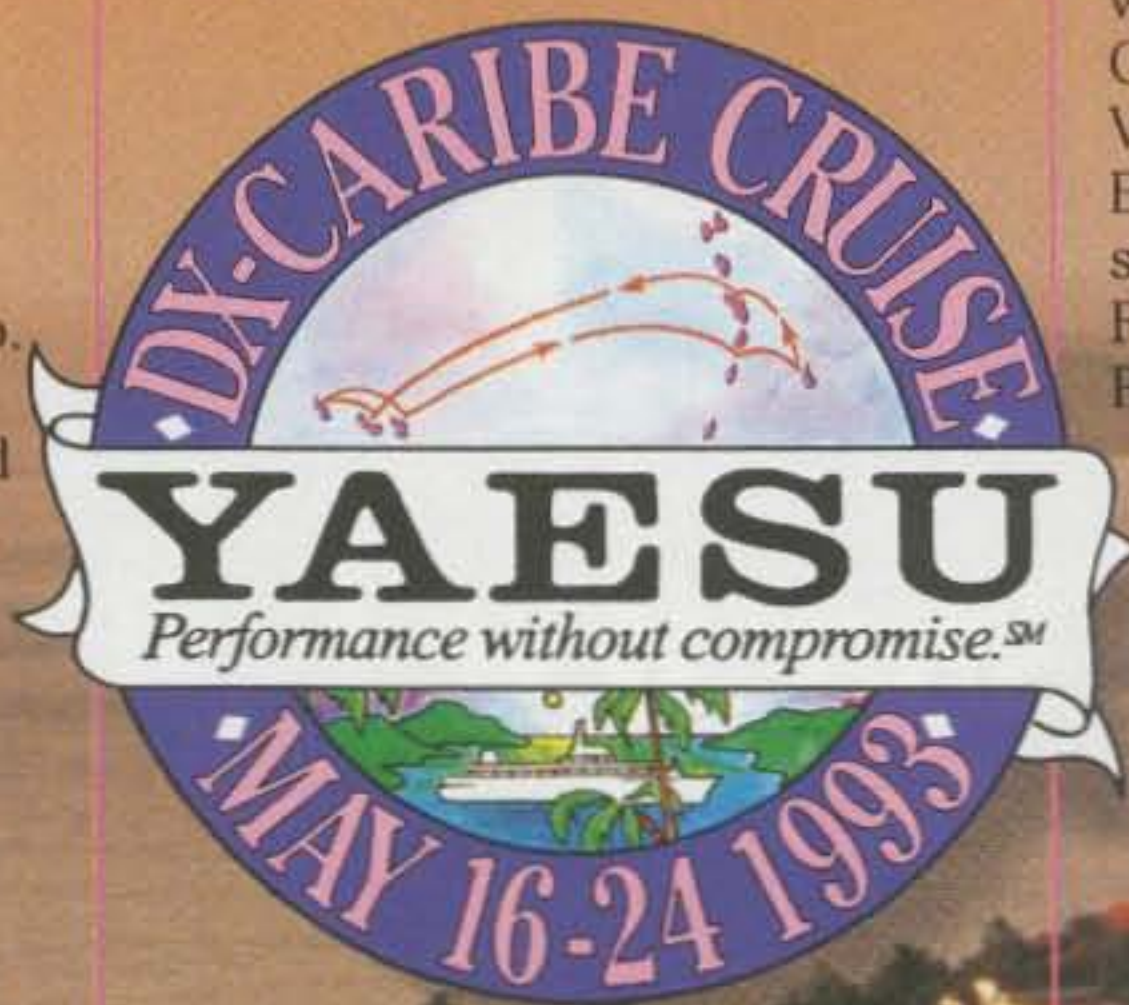
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