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SPECIAL ANTENNA ISSUE

On the cover: K1NG, Exeter, RI



748

THE RADIO AMATEUR'S JOURNAL

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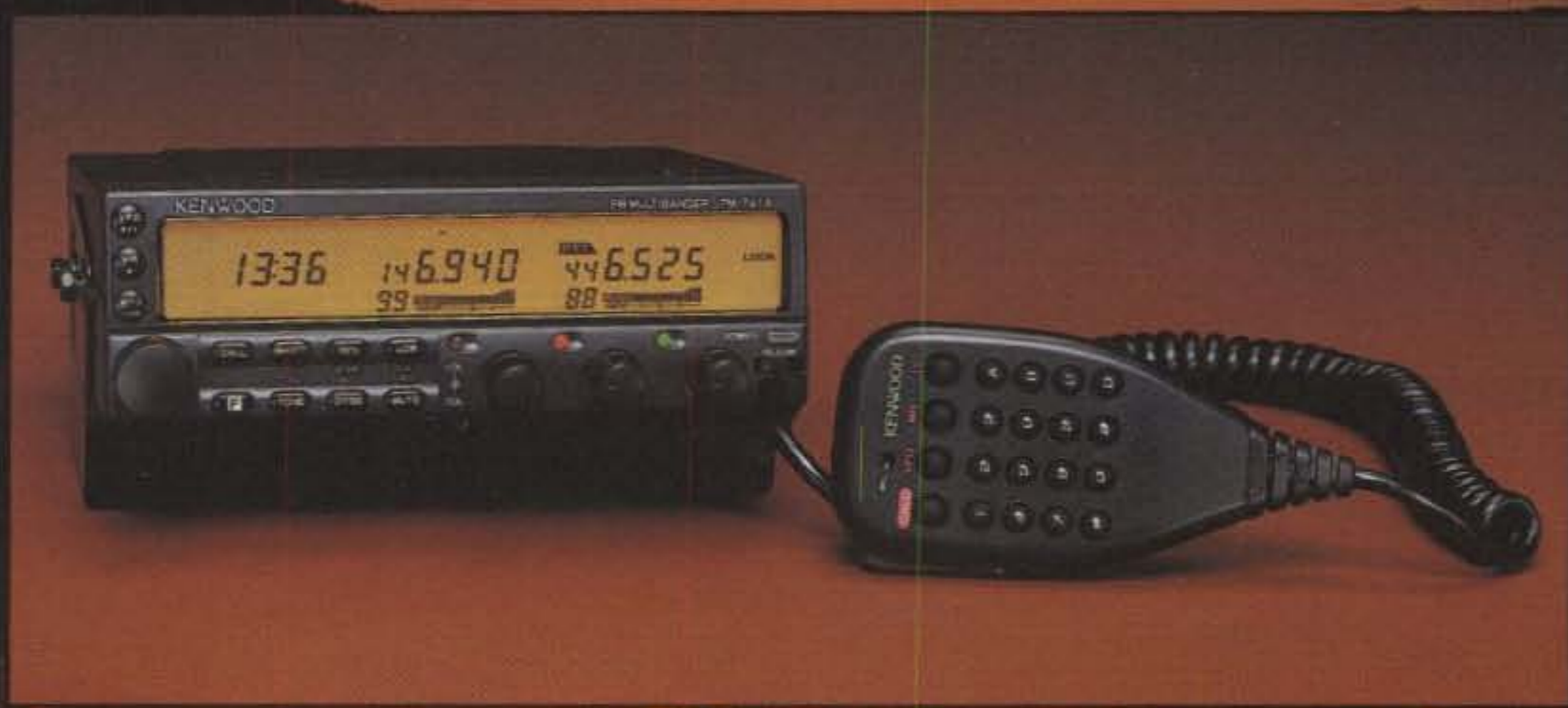
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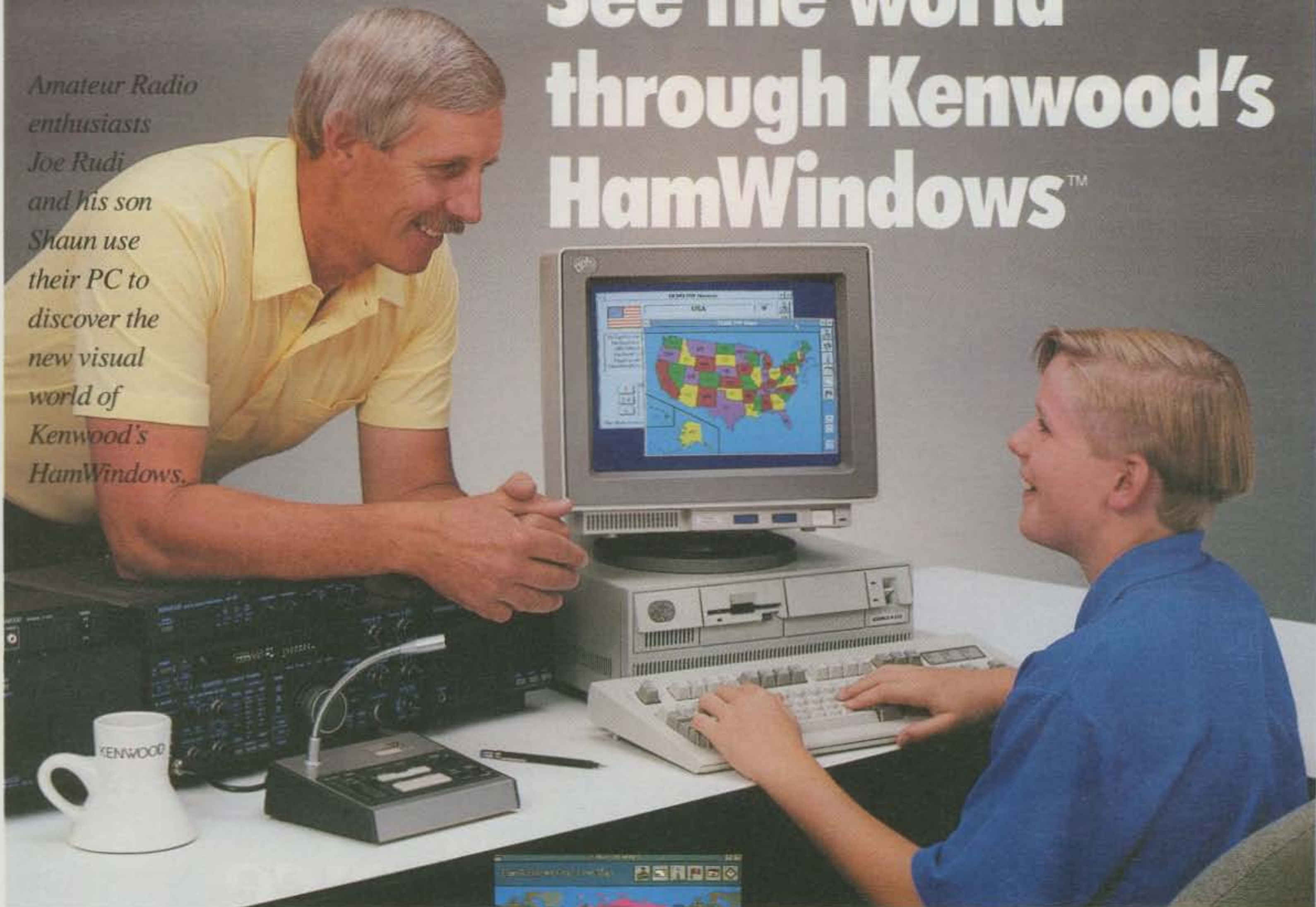
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The Radio Amateur's Journal



ON THE COVER: John Olsen, K1NG, of Exeter, RI, tends to some antenna maintenance atop the tower. Note the proper use of the safety belt. Towers sure get the r.f. out, but never take for granted the risks inherent in tower climbing. Remember: Safety first! (Photo by Larry Mulvehill, WB2ZPI)

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The first hamfest of our season, the Miami Hamfest, is history now, but it certainly was a busy one. I don't know where all the people came from, but we were really busy that weekend. No, I didn't get a chance to check out the food, but I relied on several independent reports from attendees on the quality of the Miami Grease-Dogs. Apparently, I didn't miss anything there. I did miss getting in this year's Dutch PACC Contest, however. I'm still trying to get one province confirmed for a SRAL award.

At Miami I met an amateur who took me to task for my packet radio suggestion (see *February Zero Bias*). He readily admitted that he knew it was a joke, but said I was giving the wrong message to others. I started to think about his comments and those in the occasional letter I receive which also takes me to task for overestimating the intelligence of the average amateur. They know it was meant to be humorous, but somehow think the rest of you don't.

There's a big difference between intelligence and common sense. A lot of us are good test takers and fall into the trap of believing that our license somehow makes us an expert. Well, the common-sense part is usually what keeps us from hurting ourselves (or others) and doing something wrong. Expertise invariably gets all of us in trouble at one time or another. Knowing all about something does not entitle us to throw caution to the wind, stating "I can handle it." The common-sense part instills a little fear of the unknown in a unique situation. That little bit of fear keeps us on the straight and narrow path.

The person who gets in trouble with a table saw generally knows all about how a blade-guard slows down things and how safety glasses can be uncomfortable or inaccessible at times. Expertise and common sense tell you that both are extremely necessary regardless of the time and inconvenience. When we let common sense take a back seat to expertise, we *all* get into trouble.

Newcomers to amateur radio generally emulate what they hear and not necessarily what they read. They also have a certain fear, not wanting to stand out or be subject to ridicule. An amateur's first station is more than likely a very neat place. It's only after we become experts that we can create elaborate stations with those hard to describe wiring configurations deftly hidden in back. The next time an insurance salesman calls, show him that and suggest buying fire insurance.

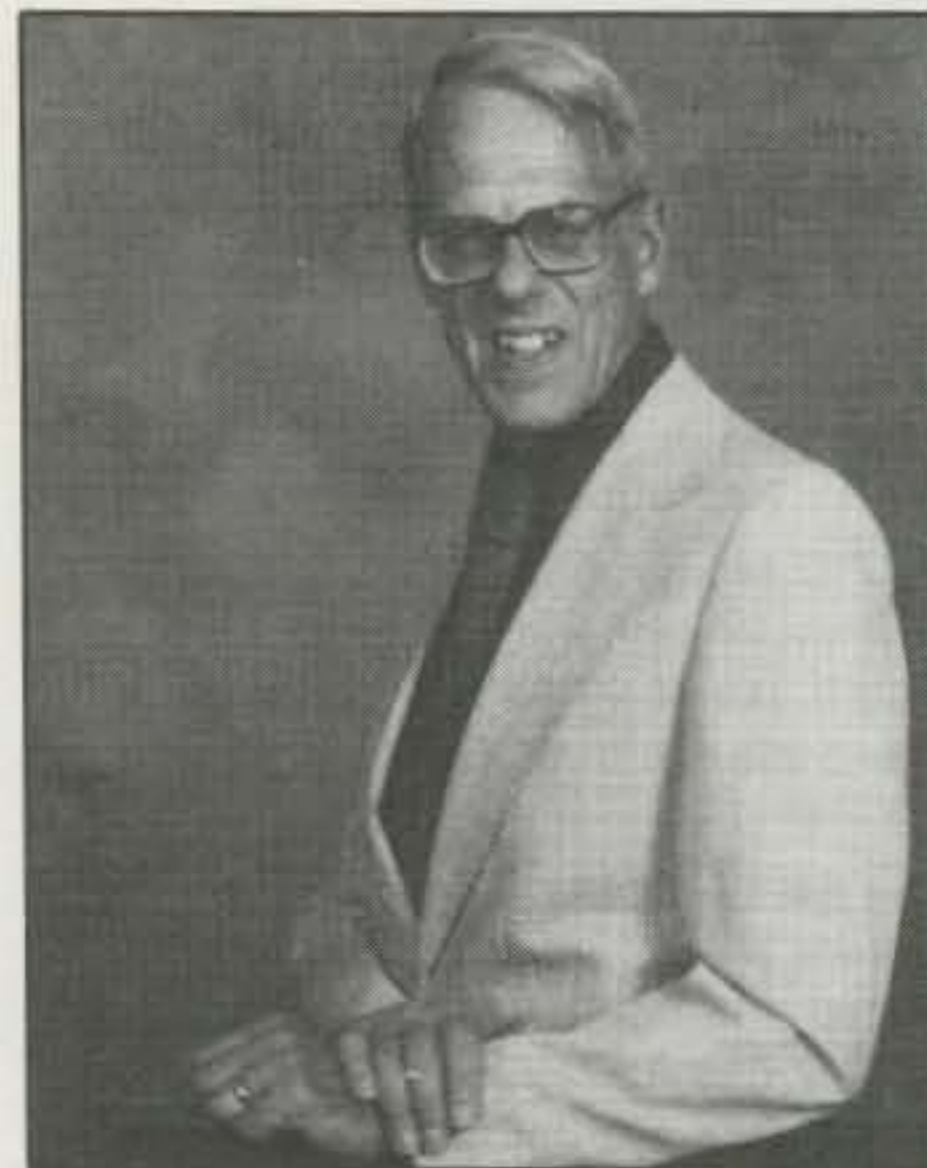
As with the woodworker, we get into trouble or tragically perhaps worse when we know too much and ignore the fear that common sense tells us we should have. I

Donald McClenon, N4IN

When I arrived back in the office after the Miami Hamfest weekend I found one of those messages that startle you and take you down a peg or two. While we were gone, Don McClenon's wife, Helen, called to let us know that Don had passed away on February 7th. He had been working on logs from the recent 160 Meter Contest when he said that he felt tired and was going to lie down.

Don would have been 75 this year, and to look at him you would probably have taken 10 to 15 years off that. I first met him when he took over our 160 Meter DX Contest from Charlie O'Brien, W2EQS, in 1975. At that time he was W3IN and was working for the Navy as an engineer. In the early 1960s he was the Director of the NASA Satellite Tracking Station in Quito, Ecuador, where he won several DX Contest awards signing HC1DC. He had also been a member of the award-winning multi-op station W3AU.

When Don retired, he and the family moved to 40 acres in Melbourne, Florida, where he could pursue contesting, especially 160 meter contesting, and raise beef cattle. If ever I had to describe a happy man, invariably I would be describing Don. Every time I met him or talked to him on the phone he was always up and happy about something.



We're all going to miss Don, not only as a person but also for his extraordinary contributions to 160 meter contesting. Our sympathies go out to his wife, his three children, and two grandchildren for their loss.

don't mean the kind of fear that immobilizes a person, but just enough fear to make a person wary of what he or she is doing or about to do. We've all taken chances that in retrospect have been foolhardy, and most of us laugh and joke about it. We call it luck. Every so often one of us runs out of luck.

If you think about it, the advent of the appliance operator probably has helped to increase the potential life span of quite a few amateurs. Most of us would be a bit too intimidated to get our hands into some of these new rigs, plus the voltages are lower. Granted, it's a trade-off. Newcomers certainly by and large will never have that wonderful experience of being "bitten" by a big project under construction on the bench (you know, the kind where you can't let go). I know it's a shame to have missed it, like other rites of passage, but for some it was a one trial learning experience. The rest of us can laugh about it. That's called humor.

Humor—even amateur radio humor—allows our common sense to take a rest and lets our imagination experience all sorts of situations in which we would be unlikely to find ourselves.

Humor is not offered as suggestion, instruction, or even license. It's supposed to entertain. Fortunately, most of us seem to

understand this. For the very serious and literal among us, consider this as suggestion, instruction, and the license to enjoy yourself. Common sense is another story.

The Big One

This month like the annual running of the bulls in Pamplona, Spain, we have the annual running of the hams in Dayton, Ohio. Both experiences are hard to describe (unless you're Ernest Hemmingway) but certainly never forgotten. When those doors open in Dayton at noon on Friday it's like being at the biggest party you can imagine with 20,000 to 30,000 of your best friends showing up. It's being able to look at and touch just about every piece of amateur gear you've heard or read about. It's about a fleamarket that never seems to end and parties and hospitality suites. It's about seeing stuff so new that it hasn't been advertised yet.

If you're up to a lot of excitement and fun, this is the place to be. If you insist on being very serious and literal, then you probably should stay home. After all, you can't be sure what the effects of so much fun will have on you.

73, Alan, K2EEK

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ANNOUNCEMENTS

• **Long Island, New York UHF Net** - The Long Island UHF Net is held every Tuesday evening at 8 PM on WB2CPE/448.575 repeater. The 8575 group holds the net for the purpose of gathering and exchanging information about amateur radio, to introduce newcomers to the members of the group, and to promote activity on the repeater. Net control operator is Joe, KB2IPL.

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

KA1BB, from 80th anniversary of the sinking of the *Titanic*, Mystic Seaport Museum, Mystic, Connecticut; Tri-City ARC; April 11 & 12 from 1300-2100Z; middle of the General phone and CW bands, 10, 15, 20, 40 meters, and center of Novice 10 meter phone band. QSL with #10 SASE to Tri-City ARC, Box 686, Groton, CT 06340.

W1ORS, from 160th anniversary of the Shakespeare Hotel, Stratford, Connecticut; Stratford ARC; 2300-0400Z April 10; on 28.360 and 14.240 MHz (plus or minus QRM). For QSL send QSL and SASE to Wes Quinn, KD1DC, 30 Coolidge Rd., Milford, CT 06460.

W3QZF, from rededication of Horseshoe Curve National Historic Site, Altoona, Pennsylvania; Horseshoe ARC; April 25-26 (no times given); lower portion of General phone bands 40-15 meters, Novice subband on 10 meters. QSL to HARC, P.O. Box 225, Hollidaysburg, PA 16648.

3-land, from Potomac Valley special event station, Backbone Mountain, Maryland; MADRAS; 0700Z April 4 to 0500Z April 5; CW and SSB near bottom 25 kHz of General portion of band on 80, 40, 20, 15, plus 28.325 and 2 meter SSB (17 and 12 meters may be available). QSL with SASE to MADRAS, P.O. Box 2468, Wheaton, MD 20915-2468. (Counties will include Garrett County, MD, and Mineral, Grant, and Preston Counties, WV.)

K3SRO, from Earth Day commemoration, Lansdale, Pennsylvania; PLA/NET, The Environmental Amateur Radio Network; 1400-2000Z April 25-26; bottom

portion of General 20 and 15 meter phone subbands and Novice 10 meter phone subband. For certificate send QSL and 9 x 12 or #10 SASE to Bob Wilderman, K3SRO, 19 Glen Road, Lansdale, PA 19446.

KK4VN, from commemoration of ending of the Civil War, Cumberland, Virginia; Southside ARA; 1400Z April 11 to 1400Z April 12; CW and SSB in Novice and General portion of 10, 20, 40, 80 meters. For QSL send SASE to KK4VN, Rt. 3 Box 221, Cumberland, VA 23040.

N5RHI, from "Fordyce on the Cotton Belt," Project 819, Pine Bluff and Fordyce, Arkansas, and rail mobile; 1500-2300Z April 25; phone lower 25 kHz of 40 and 20 meter subband and Novice 10 meter subband. For certificate send QSL and 9 x 12 SASE with 2 units of postage to Project 819 Special Event Station, 310 West Harding, Pine Bluff, AR 71601.

WA5SNL or any other Matagorda Co. ARS, from Bay City Heritage Day Festival, Bay City, Texas; Matagorda Co. ARC; 0000-2400Z April 11-12; all bands in all modes. For QSL send SASE to N5QWF, 4404 Doris St., Bay City, TX 77414.

K5GH, from 11th annual Texas Star Party, near McDonald Observatory, Davis Mountains, west Texas; April 27 through May 2 (no times given); 28365, 21365, 14265, 7265 (plus or minus QRM), SSTV and CW on request. For astronomical theme QSL send QSL and SASE to K5GH-TSP, 721 White Dr., Garland, TX 75040.

WH6D, from 50th anniversary Doolittle's raid on Tokyo; ARMY MARS members; 1800Z April 18 to 1800Z April 19; all bands all modes, including Novice subbands, lower portion of each band. For QSL certificate send QSL and SASE to Joe Hao, 3251 Pakanu St., Honolulu, HI 96822.

AA7FL, from Earth Day observance, Oregon; Willamette Valley amateurs; 1700Z April 19 to 0100Z April 20; 28.436, 21.380, 14.280, plus or minus QRM. For QSL send QSL and #10 SASE to AA7FL, P.O. Box 673, Marcola, OR 97454.

7-land, from annual Buzzard Day, Glendive, Mon-

tana; Lower Yellowstone ARC; 1500-2300Z April 25; lower portion of 40, 20, 15 meter subbands and Novice 10 meters. For certificate send SASE to Wally Braun, KB7AO, P.O. Box 101, Savage, MT 59262.

W0DCW, from 35th anniversary of Suburban ARC founding, St. Louis, Missouri; 1900-2400Z April 26; General portion of 15, 20, 40 meters and Novice 10 meters. For QSL send QSL and SASE to SARC, c/o Henry Schaper, Sr., KA0AWS, 241 Tapestry Dr., St. Louis, MO 63129.

N0MQA, from 150th anniversary of Iowa Wesleyan College, Mt. Pleasant, Iowa; 1400Z April 25 to 0200Z April 26; CW in Novice portion of 40 and 15 meters, SSB in lower 50 kHz of 20 meter General phone band and 147.39 MHz. For QSL send QSL and SASE to Roland Shook, N0MQA, Iowa Wesleyan College, Mt. Pleasant, IA 52641.

N0JGB, from 10th anniversary of Black Powder and Dutch Oven Day, Camp Mitigwa, near Madrid, Iowa; Progressive ARC and Mid-Iowa Council Boy Scouts of America; 1400-2100Z April 25; 28.350-28.400, 21.300-21.350, 14.250-14.300, 147.420, 446.250. For certificate send QSL and SASE to David Young, N0MVC, Box 907, Marshalltown, IA 50158.

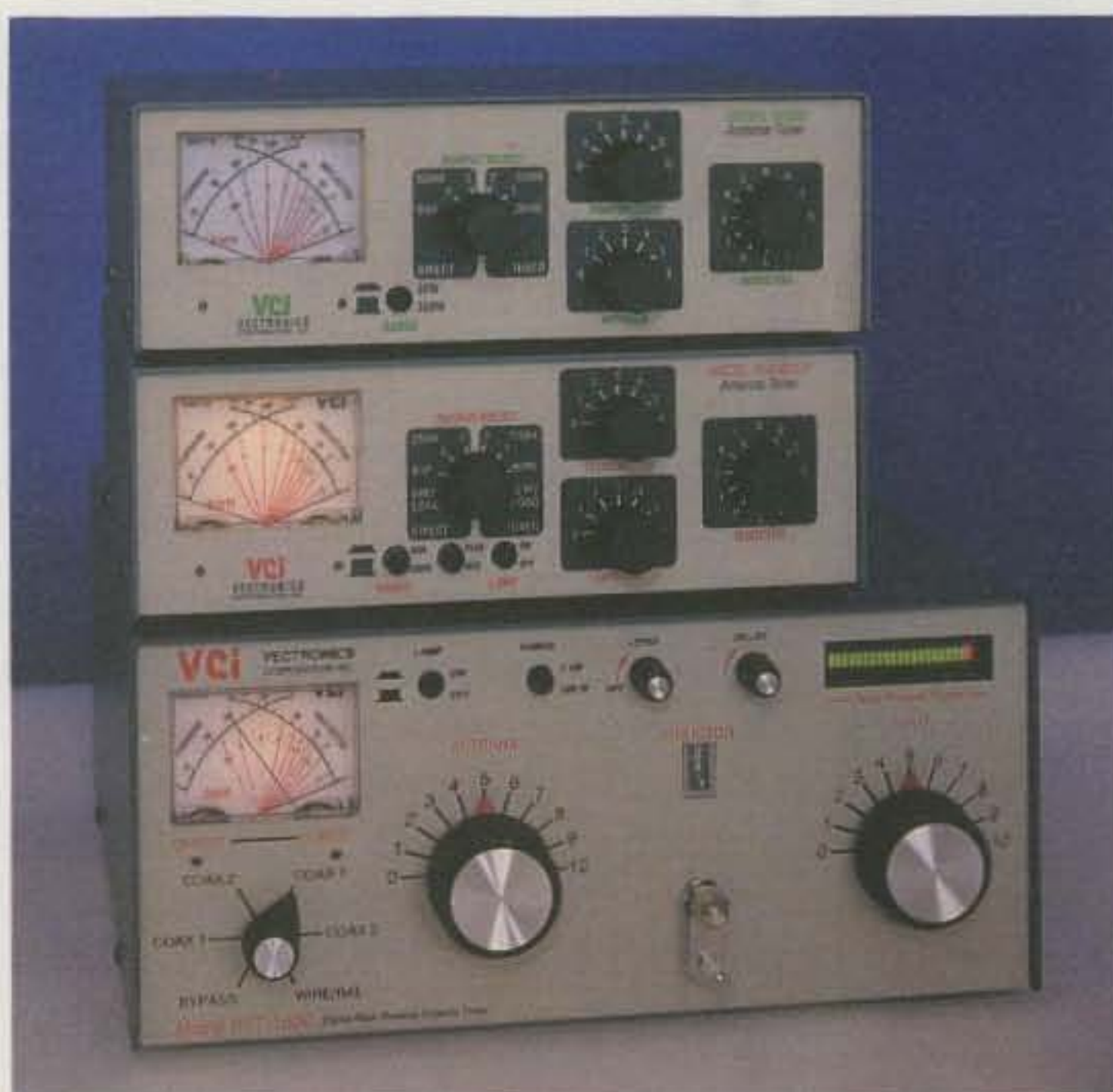
VE3GSC, from Geological Survey of Canada sesquicentennial, Ottawa, Ontario, Canada; Ottawa GSC ARC; in 1992 on Fridays from 1700-1830Z, and during international contests such as the Canada Day Contest and CQ WPX SSB and CQ WW SSB (no frequencies given). For more information, contact Alan Goodacre, 613-995-5366 (FAX 613-952-8987) or 150th Anniversary office at 613-996-5763.

• **The following hamfests, etc., are slated for April and late March:**

March 29, **LAMARSFEST 1991**, Lake County Fairgrounds, Grayslake, Illinois. Contact Frank Avallone, W9GLO, 708-234-4124 before 10 PM.

Apr. 4, **Rochester Area Hamfest**, John Adams Junior High School, Rochester, Minnesota. Contact RARC, Attn. N6VB, 6982 Indigo Court NW, Rochester, MN 55901 (507-280-7751). (VE exams Friday, Apr. 3, advance registration requested, call 507-280-8345 for info.)

(continued on p. 120)



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"My first QSO was ZA1A in Albania with my R7." NE8Z / HC1MD

"Metalwork, machining and traps well made . . . Assembly was straight forward and easy." WX6W

SPECIFICATIONS

Frequency, MHz	28, 24, 21, 18, 14, 10, 7
Gain, dBi	3
Electrical Wavelength	Half-wave
SWR 2:1 Bandwidth	10m-2 MHz / 12m-100 KHz 15m-450 KHz / 17m-100 KHz 20m-250 KHz / 30m-25 KHz 40m-75 KHz
Power Rating, Watts PEP	1800
Radiation Angle, degrees	16
Frequency Selection	Automatic
Horizontal Radiation Pattern, degrees	360
Height, ft (m)	22.5 (6.9)
Mast Size Range, in (cm)	1.5-1.75 (3.8-4.4)
Wind Load, ft ² (m ²)	2.25 (.21)
Weight, lb (kg)	12.3 (5.6)
Counterpoise Radials Supplied	7
Wind Survival, mph (kph)	80 (128)

Heavy wall seamless aluminum tubing for maximum strength and neat appearance.



Pretuned hi-efficiency traps provide automatic frequency selection.

Matching network provides optimum bandwidth without moving parts.

G12 fiberglass insulator for maximum durability.



Broadband impedance matching transformer eliminates need for tuning.

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6 Reasons why build your system



IC-725 HF Transceiver

PS-55 Power Supply

IC-2KL Linear Amplifier

IC-475 UHF Transceiver
IC-275 VHF Transceiver

The IC-725 system above is just one example of how you can build your system.

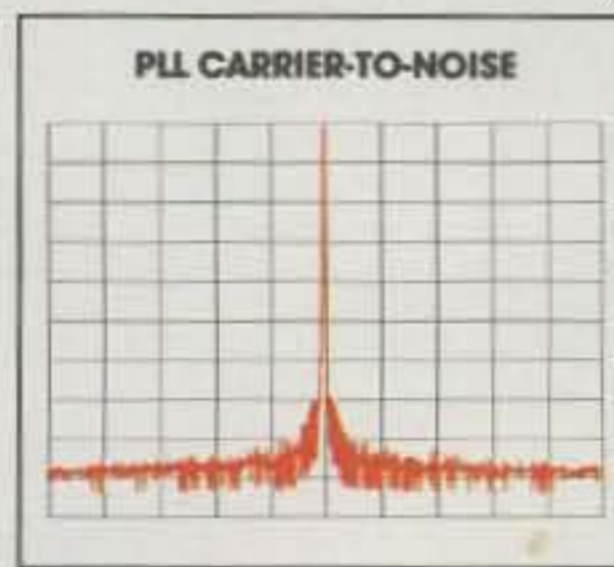
"Don't just buy a radio. Build a system." Experienced ham operators have been giving this advice for a long time. As you build your station, you don't want "stand alone" rigs that cannot integrate with the rest of your equipment. You can avoid serious disappointments in the future by comparing compatibility, performance, reliability and service *before* you purchase each component of your system.

1 A HIGHER LEVEL OF PERFORMANCE

If you have ever made a weak signal QSO, had it fade out, then dialed the same frequency on an ICOM transceiver and found a strong, clear signal... you're already aware of ICOM's superior performance.

We have devoted three decades of research and design to ensure that our transceivers consistently meet or exceed your critical expectations. Our engineers have achieved a balance of dynamic range, selectivity and sensitivity thought unobtainable a few years ago. Their development of

the ICOM DDS System, with an extremely low carrier-to-noise ratio, has resulted in loud and clear transmissions and the ultimate in HF receiver performance.



2 DESIGNED FOR COMPATIBILITY

It has been said many times, "Once you learn to operate one ICOM radio, every other ICOM is a snap to pick up." This is especially helpful as you upgrade or when you operate two or more transceivers simultaneously.

Even more important is the interchangeable, system design of ICOM equipment. This allows the integrated operation of your HF, VHF, UHF, antenna tuner, power amplifier, microphone and even your PC.

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Ever wonder why you rarely see an ICOM radio at a swap meet? A remarkable majority of ICOM transceivers made in the last fifteen years are still making contacts in ham shacks around the world.

ICOM's outstanding reputation for reliability is a result of our integrity of construction. We use only the highest quality components and do not skimp on important details (i.e. heavy duty front panels and one-piece heat sinks).

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4 CUSTOMER SERVICE THAT WILL KEEP YOU ON THE AIR


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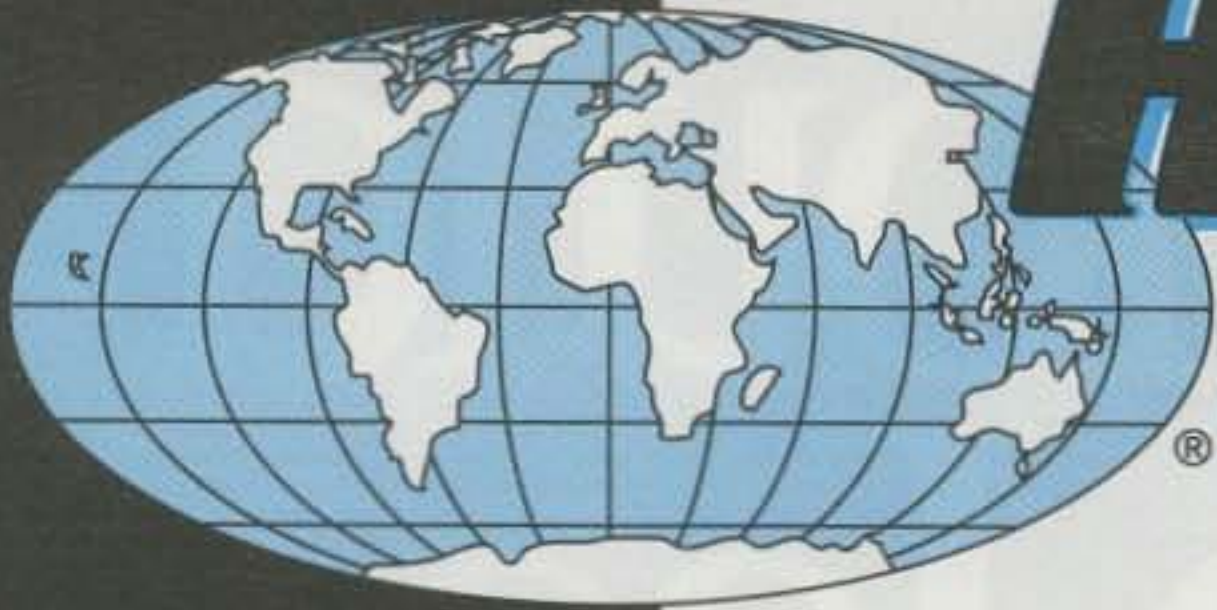
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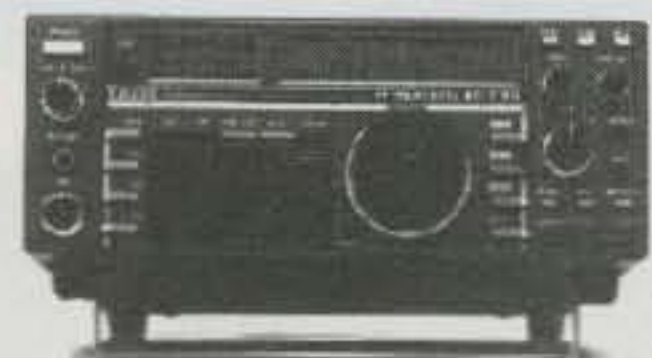
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The N4PC Extended Lazy H Antenna

BY PAUL CARR*, N4PC

This antenna design is the result of two things: requests from readers of my article "The N4PC Loop Antenna" (December 1990 CQ, p. 11), and my need to fill the voids in the cloverleaf pattern on some of the higher bands. I have received several requests for an antenna design that produces four lobes on 17 meters and can be used on the other bands as well. This design has many good features, and it is easier to build than my original loop antenna.

Background

In my research I came across the Lazy H design in many publications. I think this design has been overlooked by many amateurs because of the height specified for the structure. Many amateurs, myself included, cannot put up the antenna so that the bottom wire is 40 feet above the ground and still maintain a $\frac{1}{4}$ to $\frac{3}{4}$ wavelength spacing between the bottom and top wires. Fur-

*97 West Point Rd., Jacksonville, AL 36265

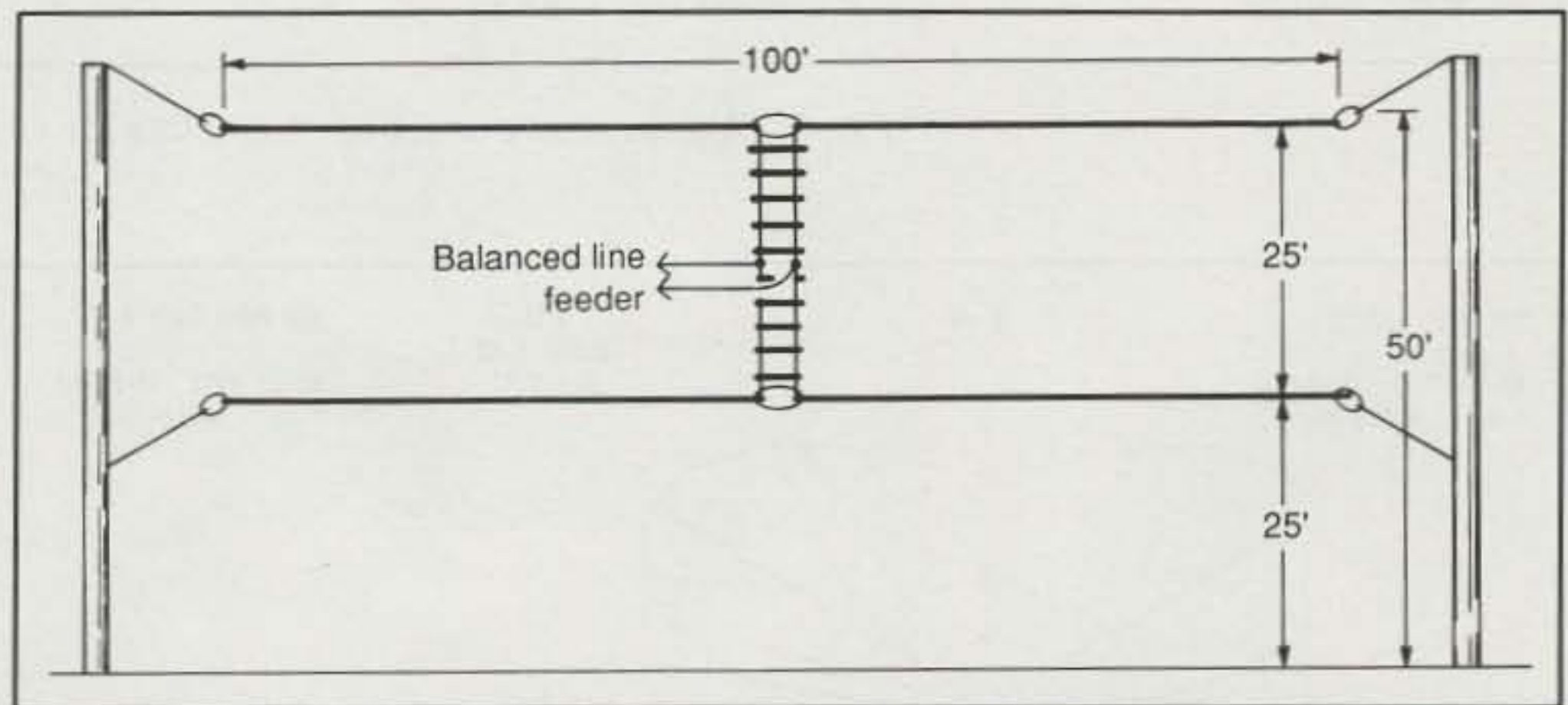


Fig. 1- Basic plan for the extended Lazy H antenna. (Details in text.)

thermore, the predicted pattern is normally two lobes perpendicular to the axis of the array. This was not what I was looking for, but it was a place to start a design procedure.

We are fortunate to have computers as a tool in our shacks, and this is where I be-

gan my research. It is generally known that center-fed dipoles of two wavelengths have a four-lobe pattern. When I investigated this antenna using my computer, I discovered that the antenna produced the horizontal pattern I was looking for, but there were two minor lobes in the vertical

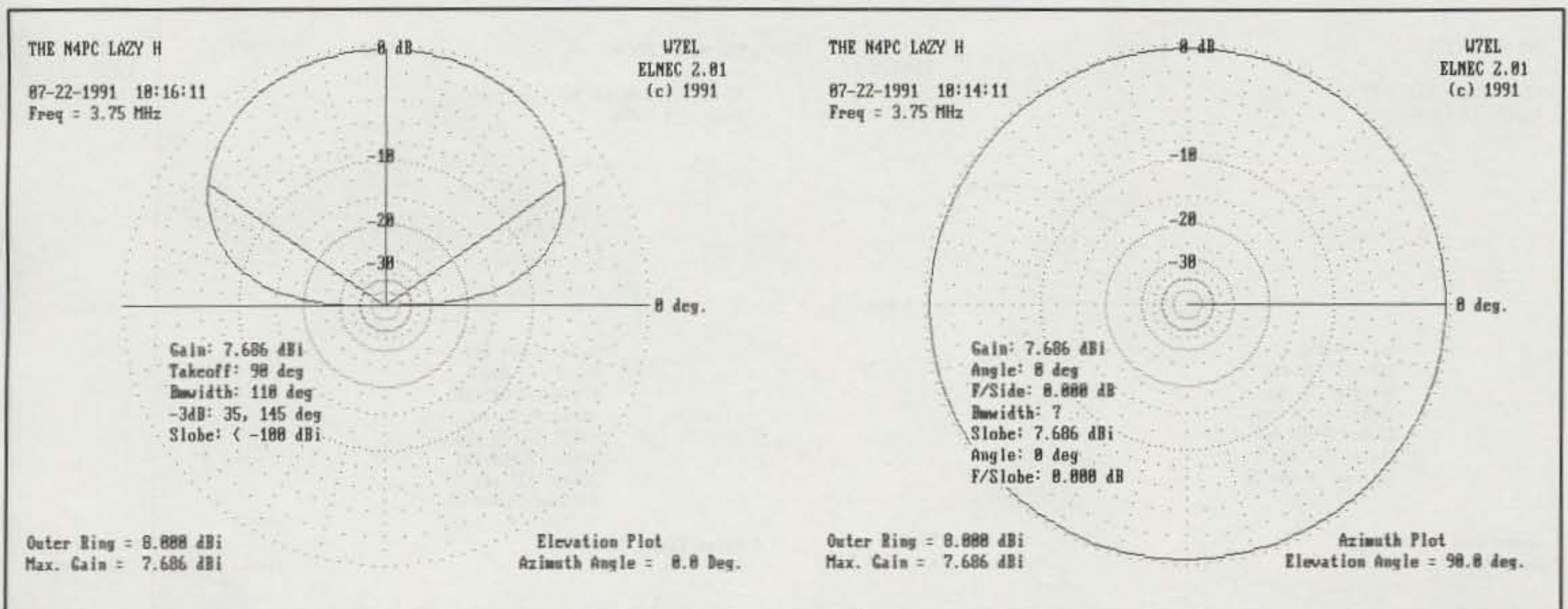


Fig. 2- (A) Elevation and (B) azimuth plots for 80 meters.



Fig. 3- (A) Elevation and (B) azimuth plots for 40 meters.

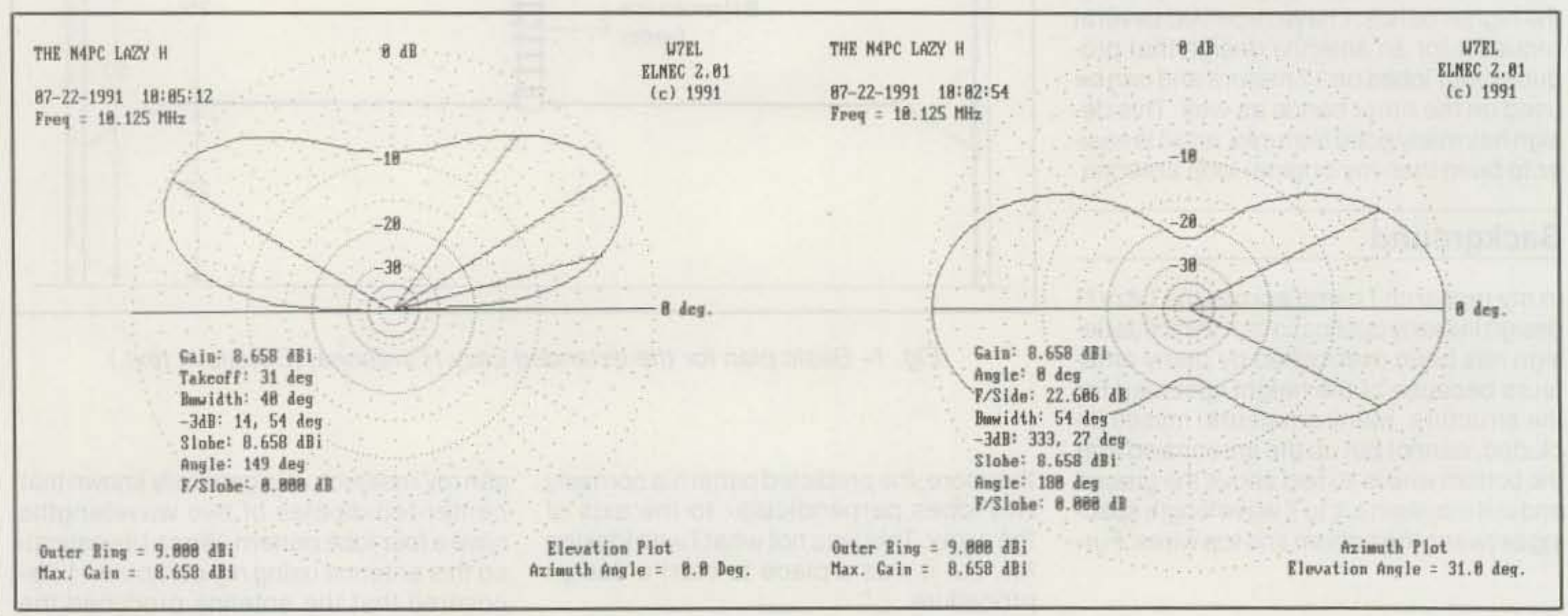


Fig. 4- (A) Elevation and (B) azimuth plots for 30 meters.

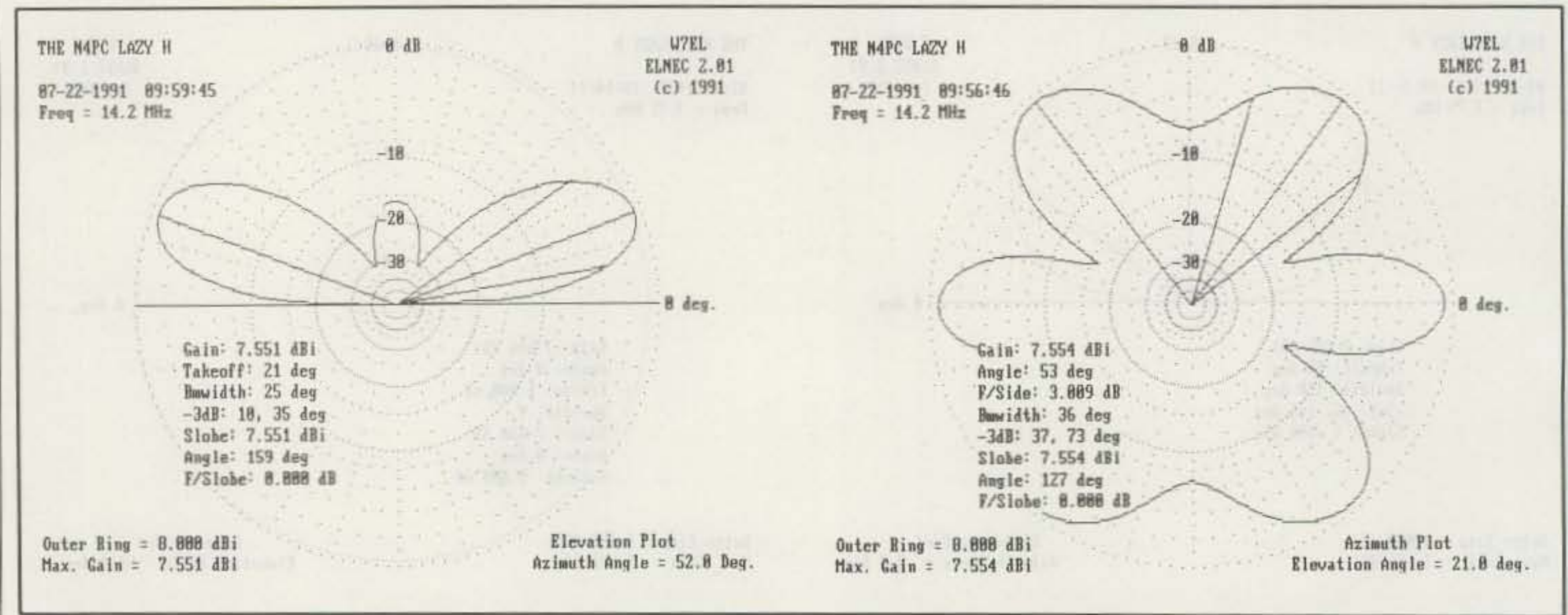


Fig. 5- (A) Elevation and (B) azimuth plots for 20 meters.



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X-500HNA	2m/70cm	8.3/11.7	200	17.2	N	90	2m:3-5/8λ,70cm:8-5/8λ
X-500NA	2m/70cm	8.3/11.7	200	17.2	N	90	2m:3-5/8λ,70cm:8-5/8λ
X-200A	2m/70cm	6.0/8.0	200	8.3	UHF	112.5	2m:2-5/8λ,70cm:4-5/8λ
X-50A	2m/70cm	4.5/7.2	200	5.6	UHF	135	2m:6/8λ,70cm:3-5/8λ

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PART #	FREQ	GAIN(dB)	PWR(W)	LENGTH(FT)	CONNECTOR	WIND RATING	ELEMENT PHASING
U-300A	70cm/23cm	8.6/13.2	150	8.3	N	110	70cm:4-5/8λ, 23cm:10-5/8λ
U-5000A	2m/70cm /23cm	4.5/8.3 /11.7	150	6.0	N	135	2m:6/8λ,70cm:3-5/8λ, 23cm:7-5/8λ

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F-23A

PART #	FREQ	GAIN(dB)	PWR(W)	LENGTH(FT)	CONNECTOR	WIND RATING	ELEMENT PHASING
DP-GH62	6m	6.0	200	21.0	UHF	78	2-5/8λ
F-22A	2m	6.7	200	10.5	UHF	112	2-7/8λ
F-23A	2m	7.8	200	15.0	UHF	90	3-5/8λ
F-142A	1 1/4m	5.5	200	6.0	UHF	110	2-5/8λ
F-718A	70cm	11.5	250	15.0	N	90	18-1/2λ
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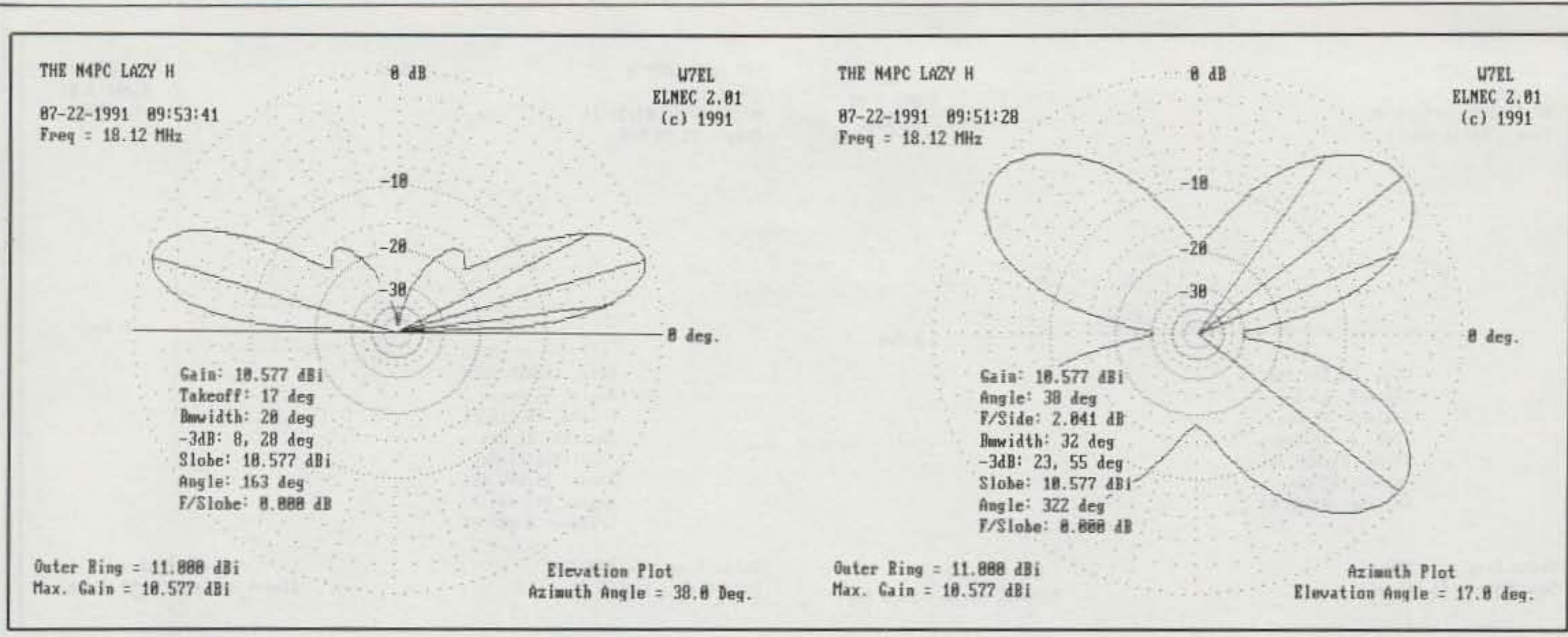


Fig. 6- (A) Elevation and (B) azimuth plots for 17 meters.

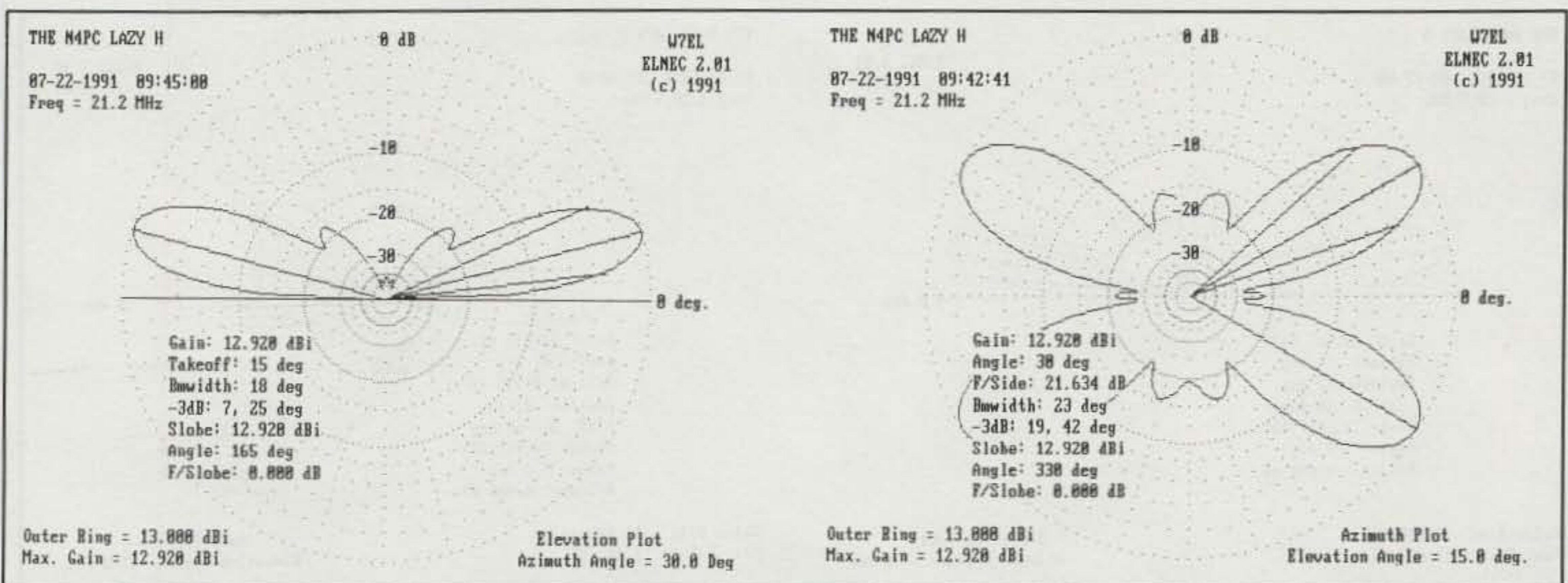


Fig. 7- (A) Elevation and (B) azimuth plots for 15 meters.

pattern which were not contributing favorably to the pattern. When I modeled the structure with a second wire beneath the top wire and fed it in phase, the undesired vertical lobes almost disappeared. That energy was forced into the major lobes to produce an additional gain of about 2 dB. Hence, the birth of the "N4PC Extended Lazy H."

Predicted Results

Perhaps a band-by-band synopsis of predicted results is in order. (The antenna extends from top to bottom of the page—top wire at 50 feet and bottom wire at 25 feet.)

80 Meters: The vertical pattern is the familiar "bowling ball sitting on a table," and the horizontal pattern is omnidirectional. This occurs because the antenna structure is close to the ground in terms of wavelengths.

40 Meters: The structure still produces a high vertical angle, but the horizontal pattern is beginning to look more like that of a dipole.

30 Meters: The vertical angle has decreased to 31 degrees, and the horizontal pattern is very close to that of two half-waves in phase.

20 Meters: The vertical pattern has decreased to 21 degrees. This is slightly higher than a G5RV at the same height due to the second wire underneath the top wire. Note that this is only a small vertical lobe at 90 degrees. I feel that the energy has been forced outward to help fill out the pattern. The horizontal pattern is very similar to the G5RV, but the minor lobes perpendicular to the array are larger, giving a six-lobe horizontal pattern.

17 Meters: This is the band for which the antenna was designed. Note the small minor lobes on the vertical pattern. These were much greater until the addition of the lower wire. The energy that was wasted in

these lobes now contributes to desirable gain—about 2 dB over a two-wavelength center-fed wire. The two-wavelength structure is what produces the four-lobe horizontal pattern.

15 Meters: Again, notice the small minor lobes in the vertical pattern. This I feel is the result of adding the second wire in the structure. Small side lobes have begun to develop on the horizontal pattern.

12 Meters: The vertical pattern shows no surprises. The horizontal pattern shows the development of minor side lobes.

10 Meters: The vertical pattern is as expected. Note the horizontal pattern has six well-pronounced lobes. These are in about the same location as on the 20 meter pattern, but much more pronounced.

Construction

The antenna is as easy to build as a pair of dipoles—well almost; you have to add

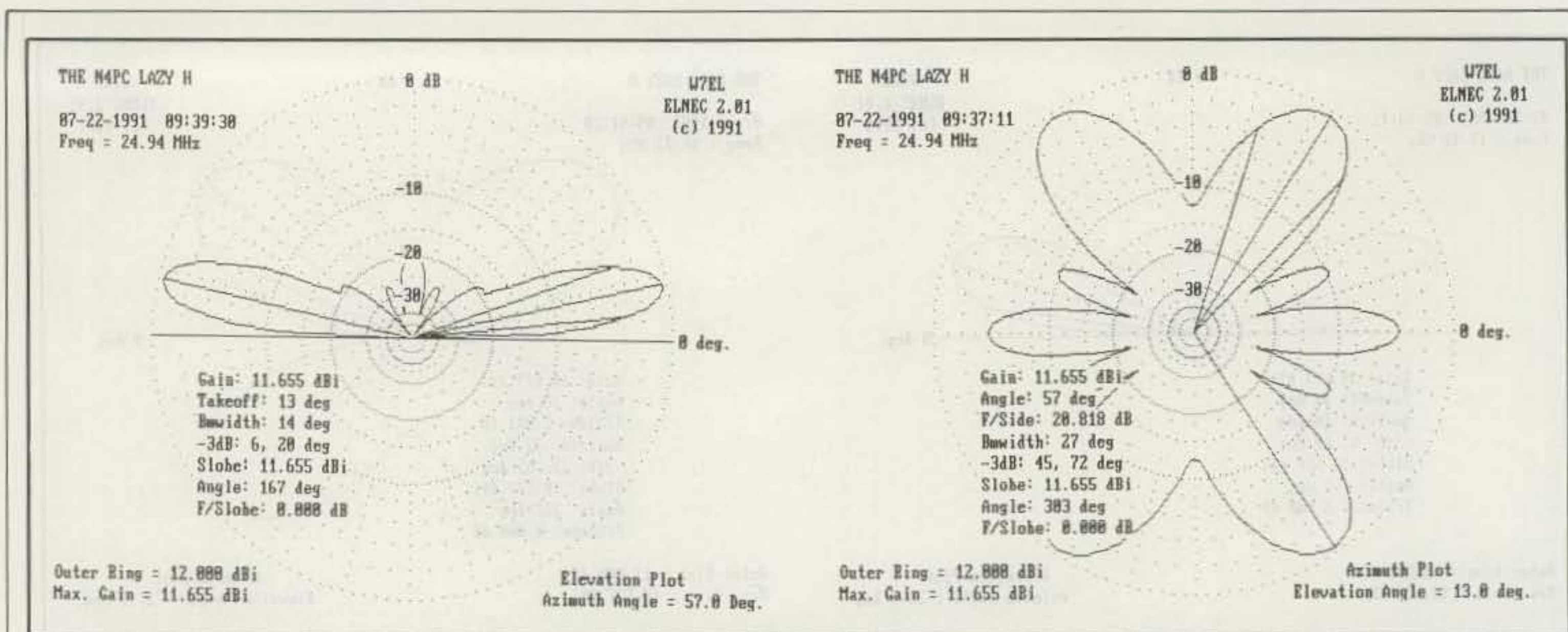


Fig. 8- (A) Elevation and (B) azimuth plots for 12 meters.

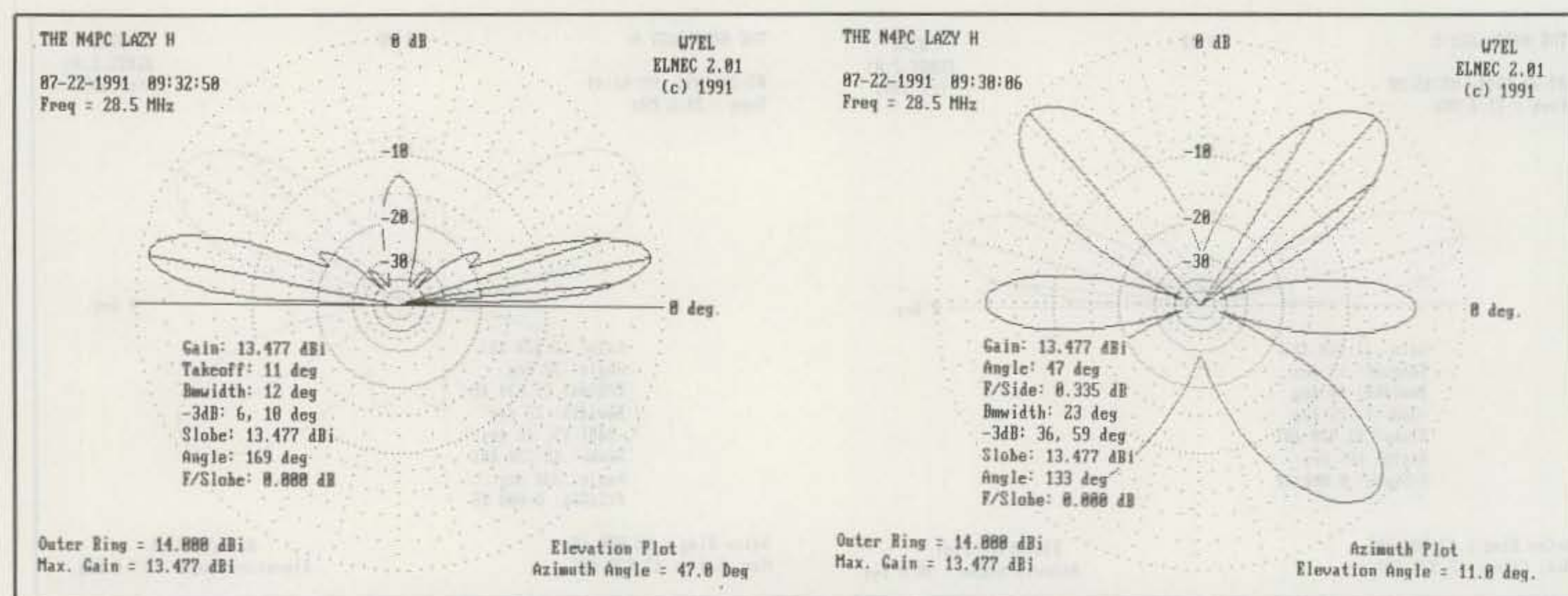


Fig. 9- (A) Elevation and (B) azimuth plots for 10 meters.

a phasing line. Start by selecting three insulators for each dipole. Next construct two identical dipoles each 100 feet in length. The exact length is not critical as long as the dipoles are identical.

Next cut a phasing line from a length of 450 ohm balanced transmission line. You will need a 25 foot final length, so leave enough at each end for connection to the dipoles. Fold the phasing line back on itself and mark the center. This is where the feed line will attach. Hang on! You are almost finished.

Attach the phasing line to the dipoles—one dipole on each end of the phasing line—and attach a balanced transmission line to the phasing line. Add a 25 foot string to each end of the dipoles to maintain proper spacing, and it is ready to go into the air. Hoist the antenna into the air by halyards attached to the top dipole and tension these to meet your needs. Then tension the bottom halyards to maintain the rectangular structure.

Preliminary Test Results

I began evaluation by checking the loading on all bands. I tried two different transmatch designs—a commercial “T” configuration and a home-built, link-coupled, balanced design. I found no surprises. The antenna loaded well with both transmatches.

I checked lobes on the higher bands by a comparison to my loop antenna, and the lobes appear to be where the computer predicted they would be. I am lucky, because the antennas are positioned such that the lobes on one antenna fill the voids of the other antenna pattern. I have antenna pattern selection at the flip of a switch and no rotors to freeze up in the winter. It works as predicted, and I am happy.

Afterthoughts

Do not ask me what the gain of the system is at any frequency. You will not get an an-

swer. The bottom line: Does it work as predicted? Yes!

The computer program I used during the design phase was ELNEC, written by Roy Lewallen, W7EL. This program is easily used, and the predicted results are accurate. The program makes the design phase a real joy.

Acknowledgments

My thanks go to the readers who requested an additional design. That's what got me started. My daughter, Susan, did the typing and proofreading. Thanks, dear.

As with my previous article, I will answer all letters, but an SASE would be appreciated.

My friend Cliff Sides, KC4AF, on Midway Island has shown an interest in this antenna. He plans to build the antenna above a pier extending into the Pacific Ocean. I can't wait to hear it!





HF Equipment *Regular SALE*
IC-781 Xcvr/ps/tuner/scope..... ★ \$6395.00 \$4949



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IC-751A 9-band xcvr/GC rx..... ★ \$1440.00 \$1179

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- FL-53A 250 Hz CW filter (2nd IF)..... 115.00
- FL-70 2.8 kHz wide SSB filter..... 59.00

- IC-735** HF xcvr/SW rcvr/mic..... ★ 1064.00 879⁹⁵
- PS-55 External power supply..... 228.00 209⁹⁵
- AT-150 Automatic antenna tuner..... 446.67 399⁹⁵
- FL-32A 500 Hz CW filter..... 69.00
- EX-243 Electronic keyer unit..... 64.67
- UT-30 Tone encoder..... 18.67

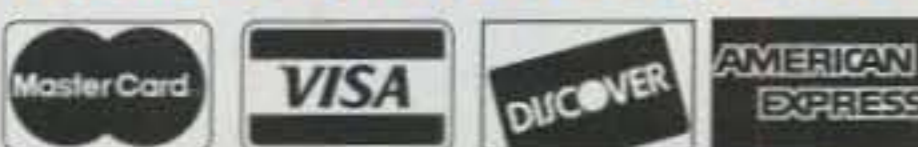


- IC-725** HF xcvr/SW rcvr/mic..... ★ \$893.00 \$734⁹⁵
- AH-3 Automatic antenna tuner..... 488.33 449⁹⁵
- IC-726** 10-band xcvr w/6m..... ★ 1283.00 1074

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- SM-8 Desk mic; two cables, scan..... 89.00
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- IC-575H** 25w 100w 6/10m xcvr..... ★ 1564.00 1309
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- IC-449A** 35w 440FM xcvr/TTP..... ★ 473.00 394⁹⁵
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- IC-2GAT** 2m HT/TTP..... 372.00 314⁹⁵
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- FL-63A** 250 Hz CW filter (1st IF)..... 59.00
- FL-44A** SSB filter (2nd IF)..... 178.00 169⁹⁵
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- EX-310** Voice synthesizer..... 59.00
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Over the years we've had "Plumber's Delights" and other delights, but AA9W now gives us the "Electrician's Delight" straight out of the bins of your local home-improvement store.

The 2 Meter "Electrician's Delight" Antenna

BY EDWARD RATE*, AA9W

As new owners of 2 meter handie-talkies soon discover, the "rubber duck" is not the most efficient type of antenna. Soon thoughts of full-size antenna construction to improve range fill the amateur's waking hours.

What is usually desired is an antenna that is vertically polarized to work the fringe repeaters without a rotator, that has some decent gain, is simple to construct, and can easily be matched to the handheld's antenna jack. If it is compact enough to put in a corner of the shack or in the attic, or if it is rugged enough to install on the roof, so much the better.

The "J" type of antenna comes as close as any to filling the bill, but getting one tuned up can be quite a chore. Tuning up a "J" antenna really involves tuning up two separate circuits which interact, and this can be very troublesome using cut and try methods. This antenna design makes the tuning job a snap!

"Old Timers" will remember a once popular, easy-to-assemble HF antenna called the "Plumber's Delight." I call this VHF antenna "The Electrician's Delight" because it consists mostly of standard electrical parts that can be purchased at any of your local handyman, retail building-supply stores. Aside from the ease of construction, the real beauty of the thing is the

ease with which it can accurately be tuned up without a lot of measuring and cutting.

The pictures really tell the construction story. The parts cost much less than \$15 if you don't include the coax feedline in the tally. The construction skills require only that you be able to drill one hole and make one hacksaw cut of an aluminum rod. Tuning the antenna requires the availability of a SWR meter, and the design of the antenna makes the tuning job extremely simple and precise. Don't despair if you don't have a VHF-type SWR meter. I have found that although it may not give an accurate number reading, a CB-type cheapie can be used to show minimum tuning points. Have I caught your interest?

Construction

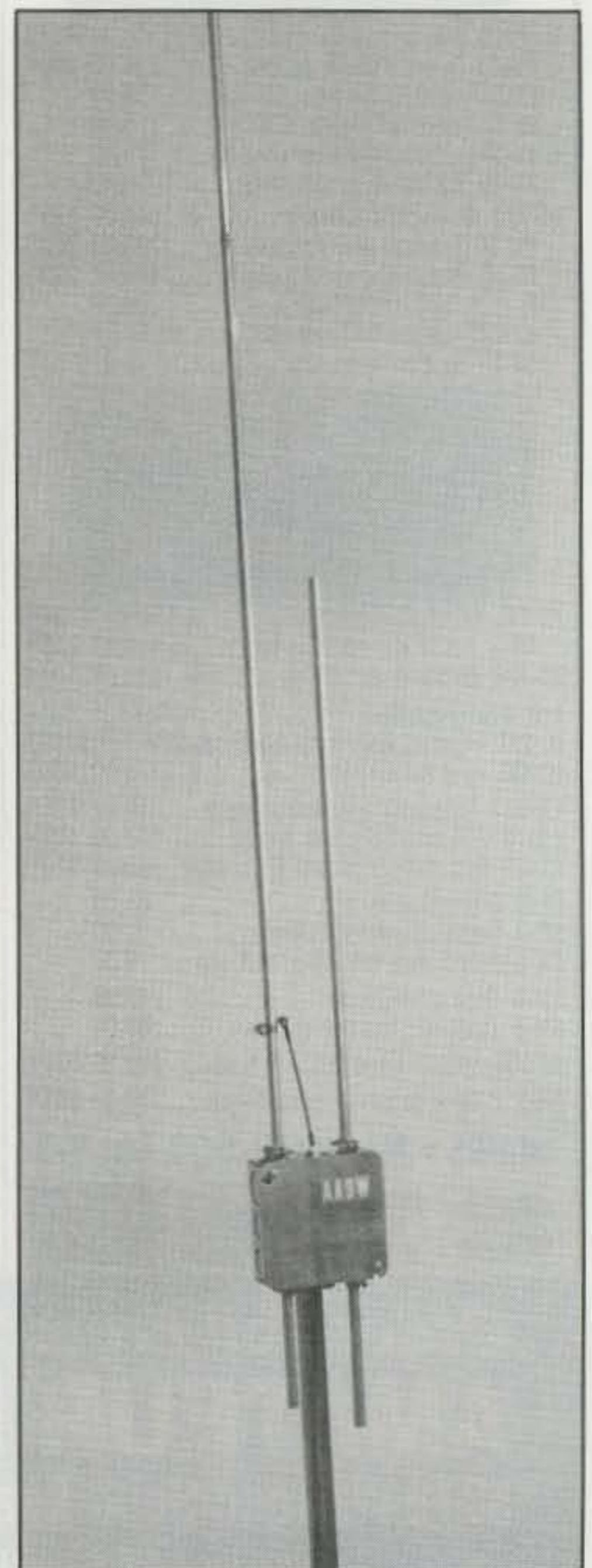
This "J"-type antenna is constructed by taking advantage of a standard, square, 4 inch electrical junction box which has "knockouts" for six 3/4 inch size non-metallic cable (plastic-covered electrical house wire) type clamps. The hole you have to drill is for the BNC-type chassis-mount cable connector. This hole is drilled in the center of one of the center "knockouts," taking care not to remove this "knockout" from the junction box.

The cable clamps are mounted on the box to provide support for the antenna elements, and the clamps allow easy adjustment of the length of the rods for perfect

*9822 N. Andover Ct., Mequon, WI 53092

Item	Qty.	Cost
4 inch square by 1 1/2 inch deep box (standard electrical junction box)	1	\$.79
Box cover plate	1	\$.42
Eight foot length 3/8 inch dia. aluminum rod	1	\$4.99
BNC hole type chassis-mount (Radio Shack part 278-105)	1	\$1.39
Trimmer capacitor 6-50 pF (Radio Shack part 272-1340)	1	\$.80
Miniature hose clamp	1	\$.59
3/4 inch non-metallic clamp-type connectors	5	\$1.00/5
1/4" x 1 1/8" x 2 1/4" u-bolt (clamp for 3/4 inch pipe)	1	\$.68
10 foot standard electrical conduit pipe (marked 3/4" easy pull)	1	\$3.19
RG-58A/U coaxial cable type Type 8219 foam	length to suit	

Table I- Parts list for "The Electrician's Delight" antenna.



"The Electrician's Delight J" mounted on a short mast section for indoor attic installation.

tuning later. Rotate the clamps so that the antenna rods will be as close together as possible when the clamps are tightened and so that the clamping screws face outside the box. You will find that the electrical box conveniently comes with the "U" mast clamp mounting holes already drilled. The antenna rod is purchased in a standard 8 foot length and is cut into two pieces at roughly the 28 inch length. This will result in two pieces of stock, one 68 inches long and the other 28 inches long. The cut dimension is not critical since the lengths protruding out of the bottom of the box are not part of the tuned system. The mast is a section of 3/4 inch standard electrical conduit.

Tuning Up

After the cable clamps, BNC chassis mount, and rods are assembled together, the box should be clamped to a short section of mast for tuning. Make sure that the mast does not protrude above the top of the box. Adjust the length of the long rod to equal three-quarters electrical wavelength as measured from the top of the cable clamp according to the following formula:

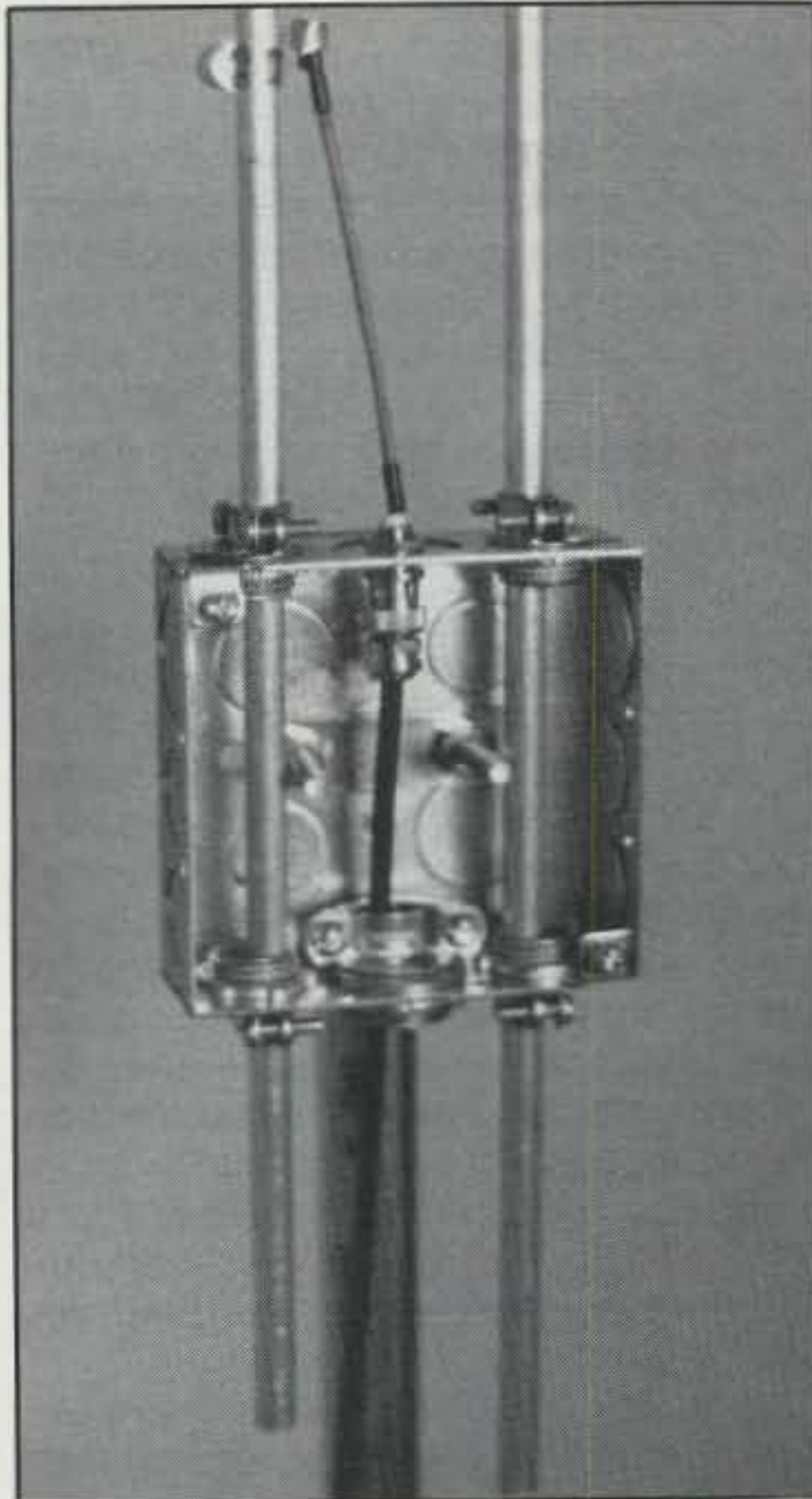
$$\text{length (in inches)} = \frac{8510.616}{\text{(frequency in MHz)}}$$

Tighten both top and bottom clamps on the long rod, as no further adjustments will be necessary for this element. Mount the short rod with approximately 18 1/2 inches extending beyond the top of its clamp, and loosely lighten its top clamp to a point where it makes electrical contact but the length of the short rod can still be adjusted during tuning.

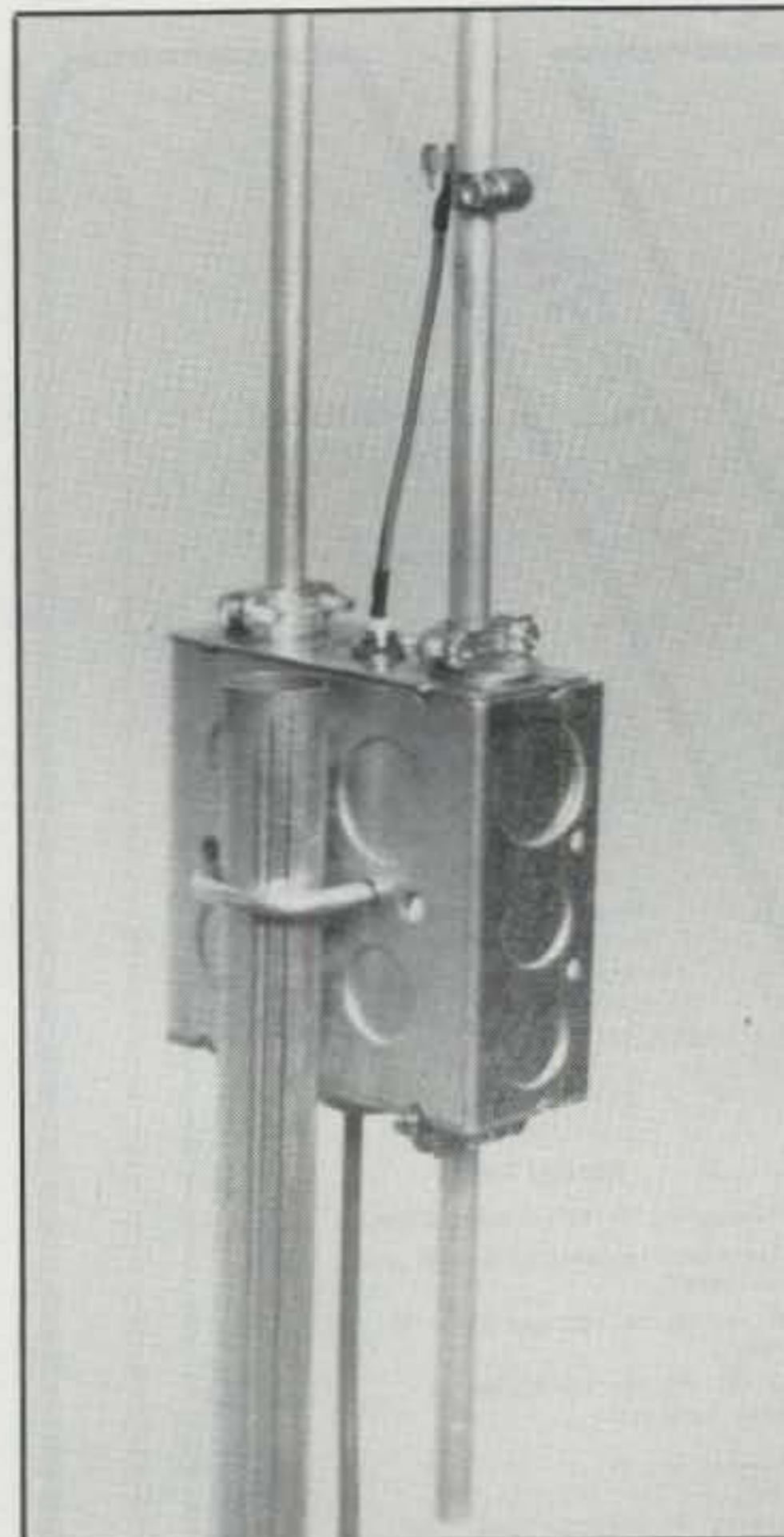
The sliding of the short rod in the clamp will be part of the adjustment process. Connect the variable capacitor to the long rod with a miniature hose clamp at 3 5/16 inches from the top of the rod mounting clamp and solder the connecting wire directly to the BNC jack without slack (see photo). Connect the coax feedline through the bottom center cable clamp to the BNC jack and the box cover can be closed up. The bottom center cable clamp serves as a strain relief for the coax cable, but do not over-tighten it and distort the coax.

Tune-up is accomplished by connecting an SWR meter between the antenna jack of your handie-talkie and the antenna coax feedline. With the talkie output set to low power, and set to the frequency desired, adjust the short rod by sliding it on its top clamp to obtain the lowest SWR reading. By adjusting the top-clamp tension so that the rod will slide but still make electrical contact, you will find that you can easily obtain the optimum length for the short rod. Tighten both of the clamps on the short rod.

The final adjustment is made by tuning the variable capacitor using an insulated



With the cover open, the assembly details are readily apparent.



Rear view showing the mast mounting "U" clamp and the hose-clamp method of mounting the tuning capacitor.

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- Vernier tuning for accurate settings
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Ruggedly constructed of proven design, this amplifier reflects the manufacturer's critical attention to details—such as the silver-plated tank coil for maximum efficiency. Cathode zener fuse and internal/external cooling are among the protective and safety devices employed. Input and output impedances are 50 ohms.

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1500W.

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- Series parallel capacitor connection for greater harmonic attenuation.
- In-circuit wattmeter for continuous monitoring.
- Vernier tuning for easy adjustment.

Front panel switching allows rapid selection of antennas, or to an external dummy load, or permits bypassing the tuner.

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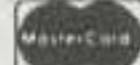
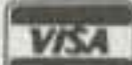
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CIRCLE 65 ON READER SERVICE CARD

tuning tool while observing the SWR meter. You should be able to reduce the SWR reading to much less than 1.2 to 1 with this capacitor, and the tuning will be quite sharp. My attempts at finding a convenient fixed capacitor value were not successful because of the sharp tuning, and the variable trimmer capacitor became a necessary part of the project. At 146.37 MHz the tuning results in a short rod length (measured from the top of its clamp) of 18½ inches.

Other Notes

If the antenna is to be mounted outside, you should consider weatherproofing the BNC jack and plug, and also the capacitor. The electrical box and parts are actually galvanized to prevent rusting. Sealing the junction box against moisture is not necessary since the metal parts are all at DC ground potential. For lightning protection the mounting mast may be grounded at its base. The recommended RG-58A/U 50 ohm coaxial cable to use, if you run any appreciable feedline length, is the lower loss foam type 8219.

Assembly of the "The Electrician's Delight," including tune-up, should not take more than a half hour, and I am certain that you will be amazed at its performance, ease of construction, and professional appearance.

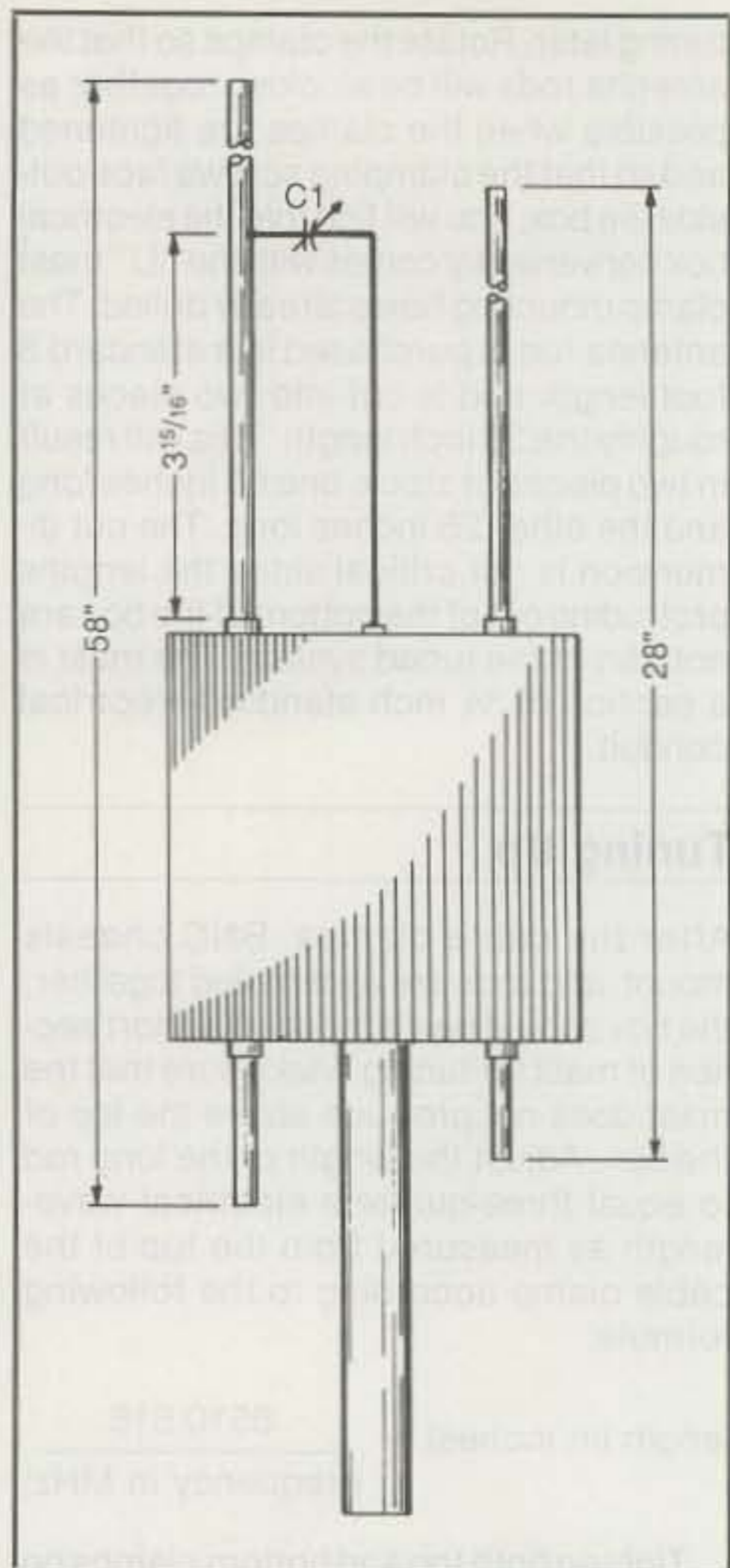
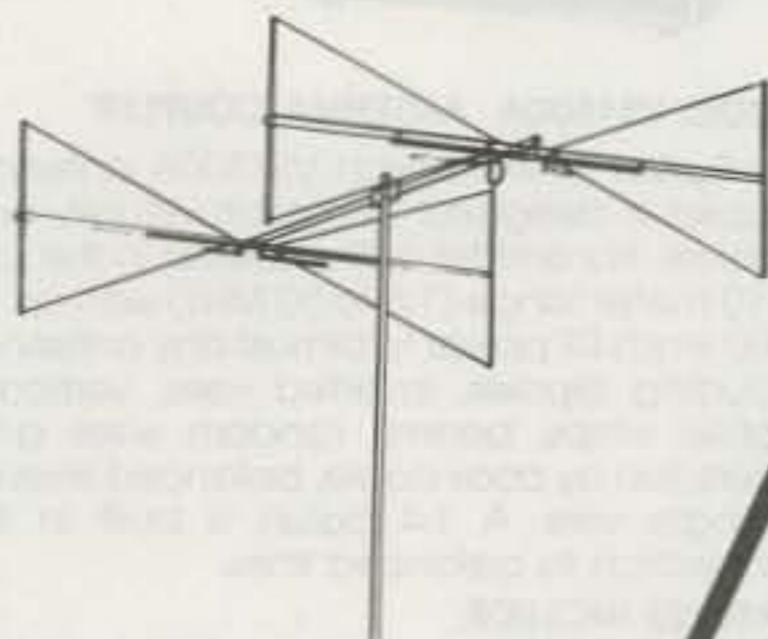


Fig. 1 - Overall diagram for the 2 meter antenna. Check photos for details.

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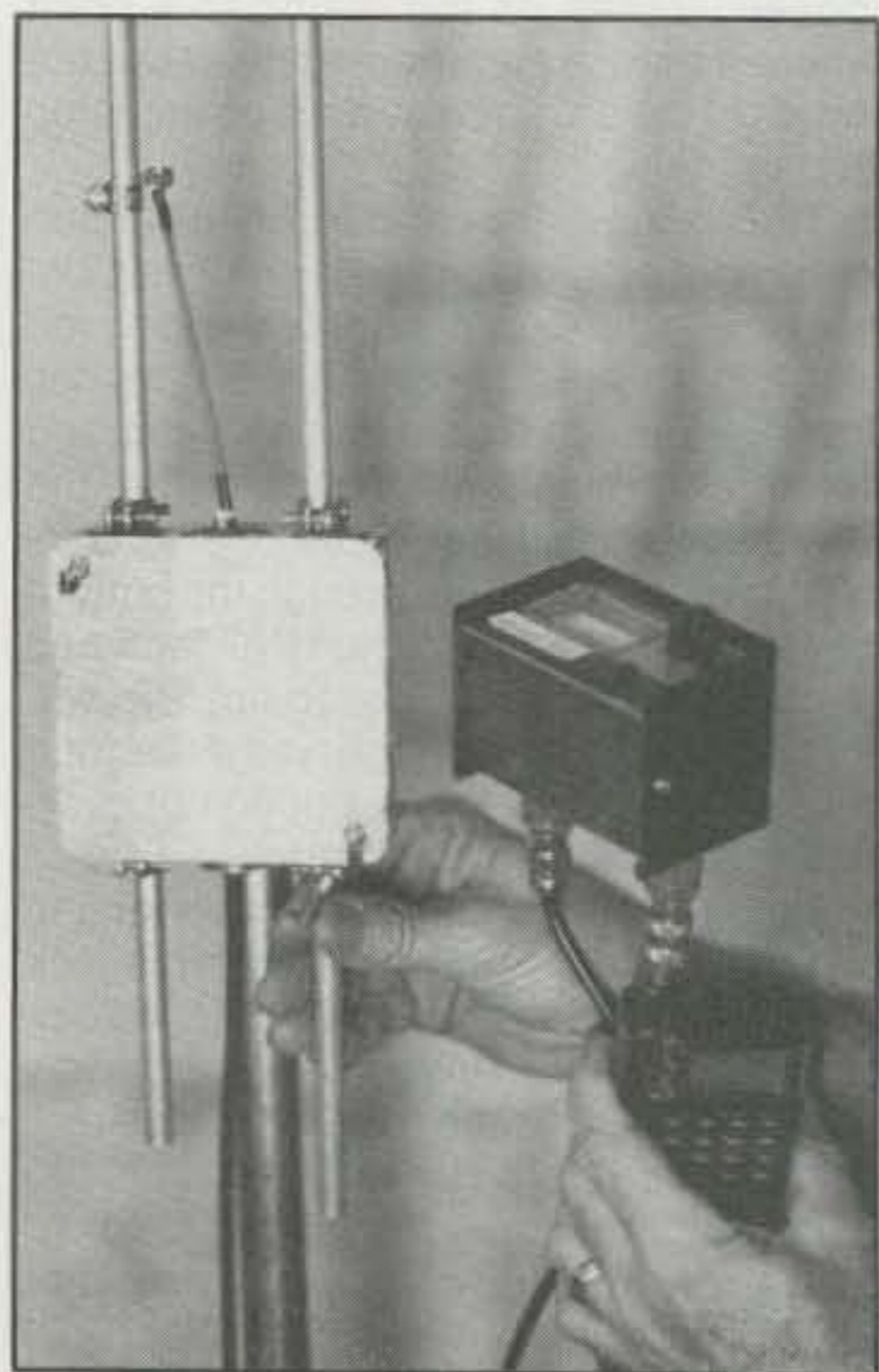
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- Designed for the low-band DXer
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For more information see your dealer or write for a free brochure



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The tuning for minimum SWR is accomplished by sliding the short rod on the loosened top rod clamp. The protruding bottom of the rod makes a good handle.

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a full kilowatt OUTPUT from a quiet desktop linear . . . for \$1095

Ameritron gives you a full kilowatt output (nearly the input of some linears) of peak envelope power for only \$1095 -- from a whisper quiet linear that's perfect for your operating desk because it measures just 8 1/4" H x 14" D x 14 1/4" W. You also get 850 watts output CW and 500 watts RTTY.

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A carefully designed Pi-L output network using the optimum Q for each band gives you exceptionally smooth tuning, extremely wide range load impedance matching and full band coverage. Ball bearing vernier reduction drives on both the plate and load control make tuning precise and easy.

Eimac 3-500Z in shielded RF tank gives you nearly 70% efficiency

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result is a clean signal without flat-topping.

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CQ REVIEWS:

The Cushcraft R7 Vertical Antenna

BY LEW McCOY*, W1ICP

Many amateurs typically have very limited space for antenna installations. We all would all like to have beams, towers, etc., but many times circumstances will not permit such arrays. However, one should not give up hope, because there are very good multi-band antennas that require a minimum of space. The Cushcraft R7 vertical is just such an antenna.

I have had an R7 up for a couple of months and have had excellent results with the vertical. In fact, in the last CQ World-Wide DX Contest, running 100 watts and using the R7 I managed to work DXCC (actually, 117 countries) with the setup. That says an awful lot for this vertical.

Specifically, the antenna is 22.5 feet high, covering the 10, 12, 15, 17, 20, 30, and 40 meter bands. Electrically it is a half wavelength on each band. The antenna weighs 12.3 pounds and requires about 8 feet of area across the base. (The 4 foot long counterpoise rods reach out from the base.)

Cushcraft recommends mounting the base of the R7 at least 5 feet above earth ground. The antenna has its own counterpoise system, which makes it more or less ground independent—one *could* mount the base as high as desired. I mounted mine at 5 feet to follow the manufacturer's minimum requirement for my measurement. Later I moved the base to my rooftop, and I'll admit it performed better at the higher height.

The instructions are very detailed and clear. In fact, the antenna goes together in about 30 minutes. Fig. 1 is from the instruction manual and shows the details of the base mounting and feed point. After mounting the antenna at 5 feet above ground, I went through the bands, checking the SWR curves. Fig. 2 shows the manufacturer's typical curves, and I found that

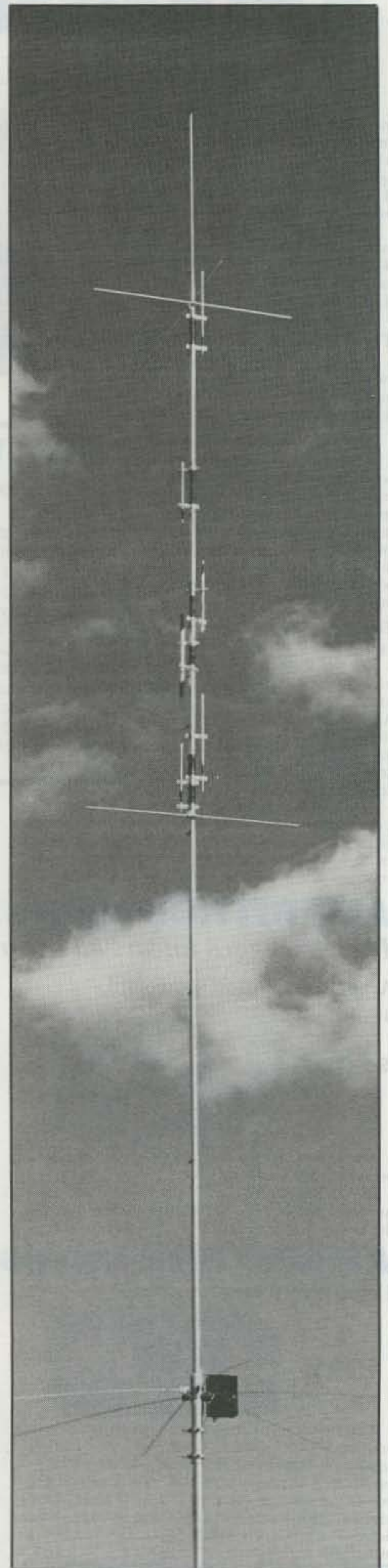
I met or exceeded those. One of the criteria that manufacturers like to state is the SWR 2 to 1 bandwidth for antennas. Simply, this is the amount of frequency coverage with an SWR of 2 to 1 or less. This figure is important because many of our modern transceivers tend to shut themselves down when the SWR goes over 2 to 1. Cushcraft, for example, rates the 2 to 1 bandwidth on 20 meters at 250 kHz, but I found that the SWR was at 2 to 1 across *the whole band*.

There is one important point here that many antenna reviewers fail to mention. The antenna manufacturer is put in a difficult position when it comes to SWR measurements because there are so many variables involved. When a manufacturer gives SWR curves in its advertising or manuals, these curves are made under the most ideal conditions possible. Height of the antenna above ground, actual ground conditions, surrounding metal or conductive structures or wiring—all these and other items can affect the SWR results. What I am saying is that when you buy an antenna and do not get the same results as the manufacturer, please don't blame the manufacturer. His conditions are almost certain to be different from yours.

In my case, measuring the SWR of the R7 in my setup, I found that my SWR results were without exception lower (better) than those sent to me by Cushcraft.

I made many empirical tests against a multiband beam that is 60 feet above ground. The normal gain of this beam would be slightly more than one S unit better than the vertical. I found this was true about 60 to 70 percent of the time. The rest of the time the vertical lay down a better signal both on reception and transmission. Bear in mind that the radiation pattern from the R7 is 360 degrees around the antenna with a relatively low angle of radiation.

During the WW DX Contest mentioned previously I found no real difficulty working DX. Many times I checked the signal against the beam and found the vertical doing a better job. Cushcraft states the radiation



This is the R7, a 40 through 10 meter vertical.

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

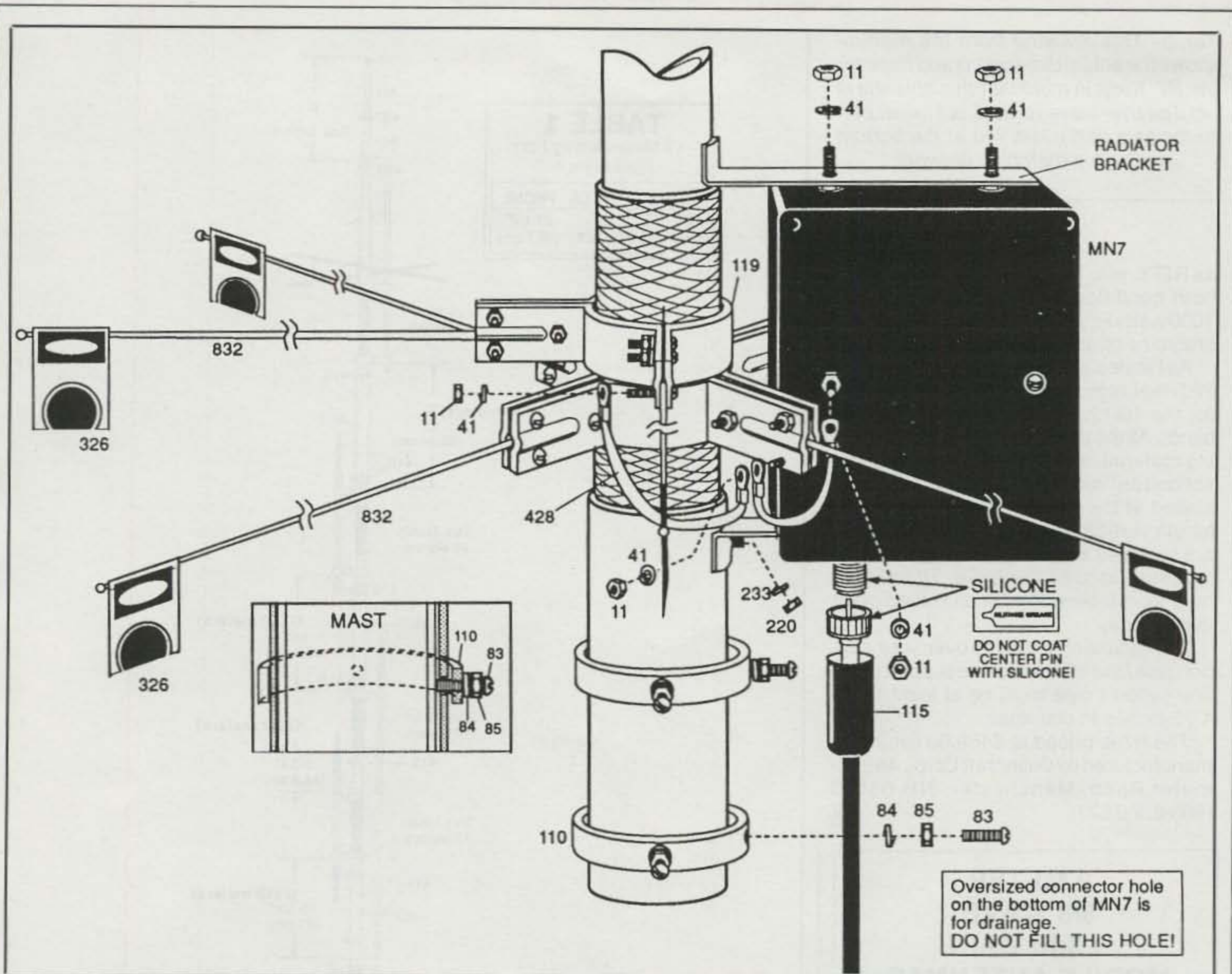


Fig. 1— Here is the base assembly of the R7. The construction details are very extensive, and the antenna goes together in less than an hour.

angle of the vertical to be typically 16 degrees, but I have no way of checking that except from my contest results. These would indicate that the antenna does have

predominantly low-angle radiation. I worked some DX in the contest on 40 meters, which also indicates a low angle from the antenna.

The antenna is rated at 1800 watts SSB, but the manufacturer cautions using key-down powers in excess of 1000 watts for any extended key-down conditions, such

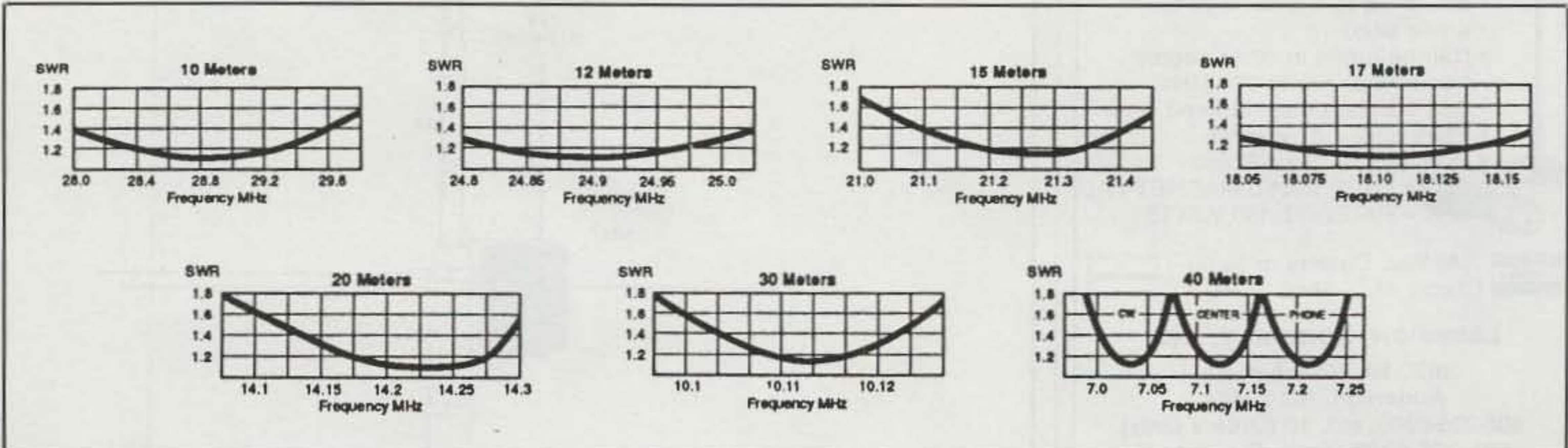


Fig. 2— These are the SWR curves as shown in the construction manual. As I pointed out in the article, I found that I got better readings than shown here.

Fig. 3- This drawing from the manual shows the actual dimensions and traps for the R7. Keep in mind that this antenna is not a quarter-wave vertical, but rather performs as a half wave, fed at the bottom through a matching network.

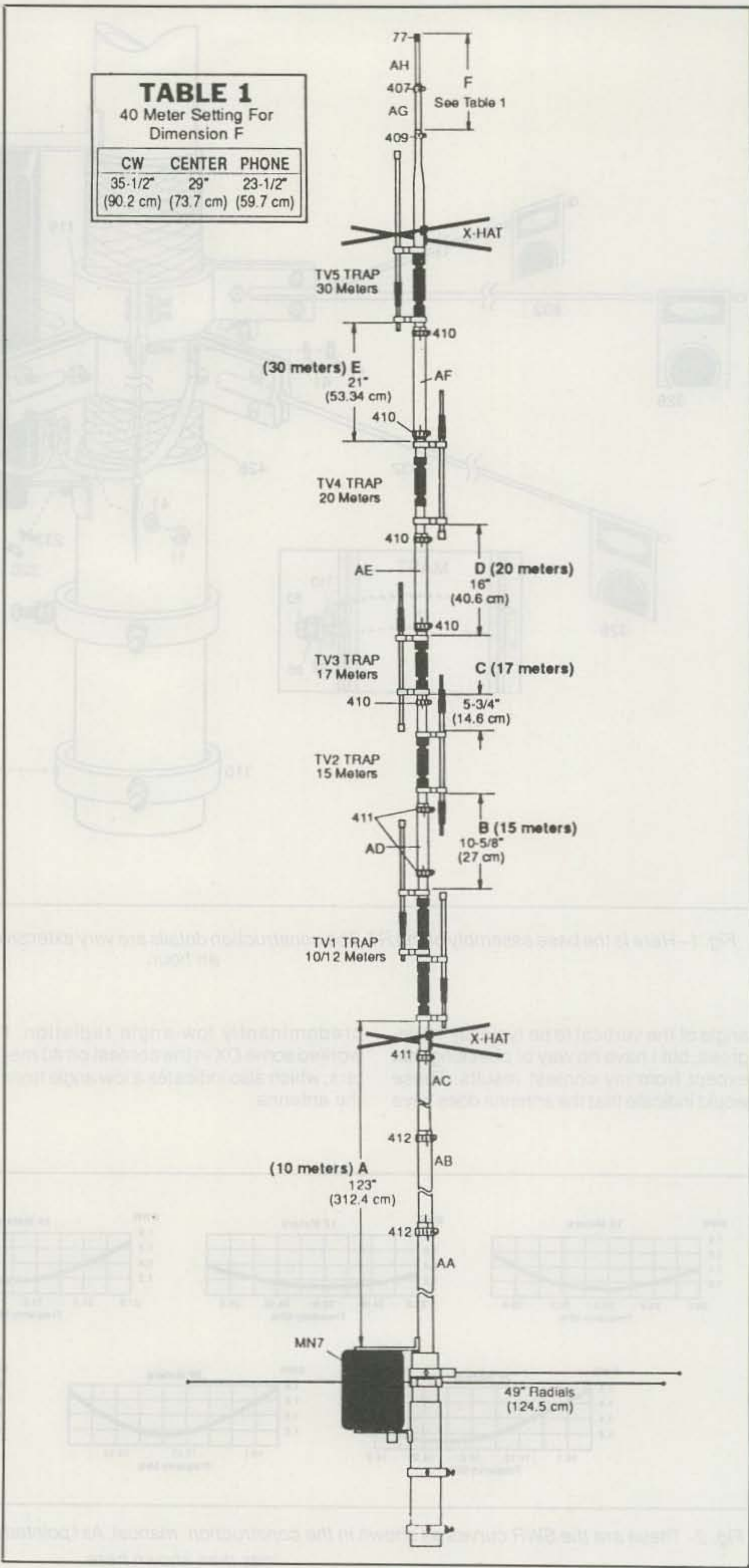
as RTTY, etc. I tested the antenna under both conditions—1500 watts SSB and 1000 watts key down for short periods. No problems of any kind were experienced.

As I stated at the outset, the antenna is 22.5 feet high with five traps—one each for the 10/12, 15, 17, 20, and 30 meter bands. All the hardware is of very outstanding material, and the antenna is best described as "rugged." A feed network is installed at the base (base-fed half-wavelength verticals are voltage feed). There are seven 49 inch long counterpoise rods mounted around the base. These also help to establish the 50 ohm feed-point impedance.

The mounting base fits over your support pipe (and is locked to the support pipe). The support pipe must be at least 1.5 to 1.75 inches in diameter.

The R7 is priced at \$469.00 list and is manufactured by Cushcraft Corp., 48 Perimeter Road, Manchester, NH 03108 (603-627-7877).

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An unun? Yes, W4UW tells us all about UNbalanced to UNbalanced antenna matching and how to do it.

How To Build A Multi-Tap Unun

BY RICHARD A. GENAILLE*, W4UW

The standard balun, as most amateurs know it, has certain limitations when it comes to matching the feedpoint of a dipole antenna under the height constraints imposed by many installations. The usual balun is designed for a 50 ohm input and either a 50 or 200 ohm output providing a 1:1 or a 1:4 transformation ratio. I guess that is great if the feedpoint impedance of your dipole, or other antenna, is 50 or 200 ohms. It is rare that the normal dipole antenna feedpoint impedance meets these parameters! Many amateurs connect a balun to their dipole antenna because, as the oatmeal TV commercial goes, "It's the right thing to do!" Whether it works properly or not is another question.

To prove my point let's take a look at the radiation resistance chart of fig. 1. It appears that 50 ohms would be typical for a dipole at a little over $\frac{1}{8}$ wavelength above ground. If you figure out how high that is for frequencies between 3.5 and 30 MHz, it is doubtful that you would ever install a dipole that low to ground; e.g., about 33 feet for a 75 meter antenna and about 4 feet for a 10 meter antenna. On the other hand, with a 33 foot height (about $\frac{1}{2}$ wavelength) for a 20 meter dipole you could expect to see a feedpoint impedance at resonance of about 70 ohms. Using a 50 ohm coaxial feedline, with or without a balun, would result in a mismatch and 1.4 SWR.

How about a dipole at, say, $\frac{3}{8}$ wavelength high? From the chart it would appear that the feedpoint impedance would be close to 100 ohms. That's a 2:1 mismatch to 50 ohms right there. Add the line perturbations caused by an antenna switch and anything else connected in the transmission line between your transceiver and the antenna, and you're getting awfully close to an SWR that might give your transceiver some heartburn. Add to that the additional SWR caused by shifting frequency to the upper or lower portion of the band, and you really have a problem. As pointed out by Maxwell,¹ the approximate SWR values at the band edge for wire dipoles at resonance at the band center runs between 2.0 and 3.0 in the bands between 7 and 30 MHz.

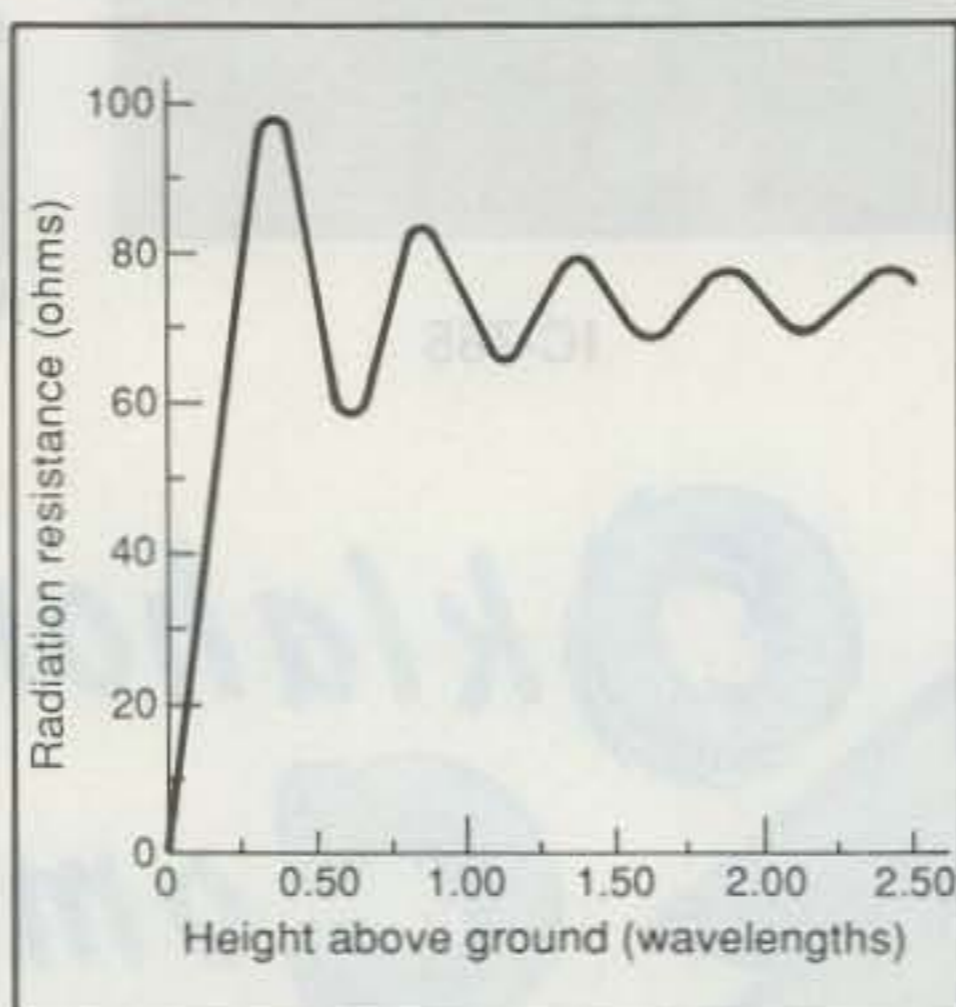


Fig. 1—Radiation resistance of horizontal half-wave dipole at various heights above ground.

At 3.5 MHz it runs about 5:1 or 6:1!

In recent experiments with multiple dipoles for 40 meters and the WARC bands, as well as other bands,² I have found a need for matching my 50 ohm transceiver output and feedline to impedances that are somewhat higher than 50 ohms in order to maintain a favorable SWR, across the various bands, to satisfy the operational limitations of the transceiver—i.e., less than 2:1 or

else! In order to determine the feedpoint impedances of various dipoles, as installed, I have used a remotely controlled bridge.³ The multi-tap unun was developed to further assist in correctly matching my transceiver and feedline to dipole antennas. It can be used in lieu of the remotely controlled bridge, but with a little more antenna up-and-down effort.

Sevick has suggested using tapped ununs (unbalanced to unbalanced) transformers to match from 50 ohms to odd values and has suggested that the idea of a multi-tap unun is a good one which has not heretofore been exploited by many amateurs.⁴ He has provided the encouragement for the work which I have done, resulting in this article. Besides helping to achieve a good match to your dipole feedpoint, the multi-tap unun (MTU) has an additional limited use⁵ upon which I stumbled in the course of my experiments and testing and which will also be described.

Construction

Most folks don't have much of a problem winding a bifilar transformer—i.e., a simple balun or unun. Many of us have made baluns on plastic pipe pieces, ferrite rods, and ferrite cores for special applications. Most of us find tapping a coil once it is

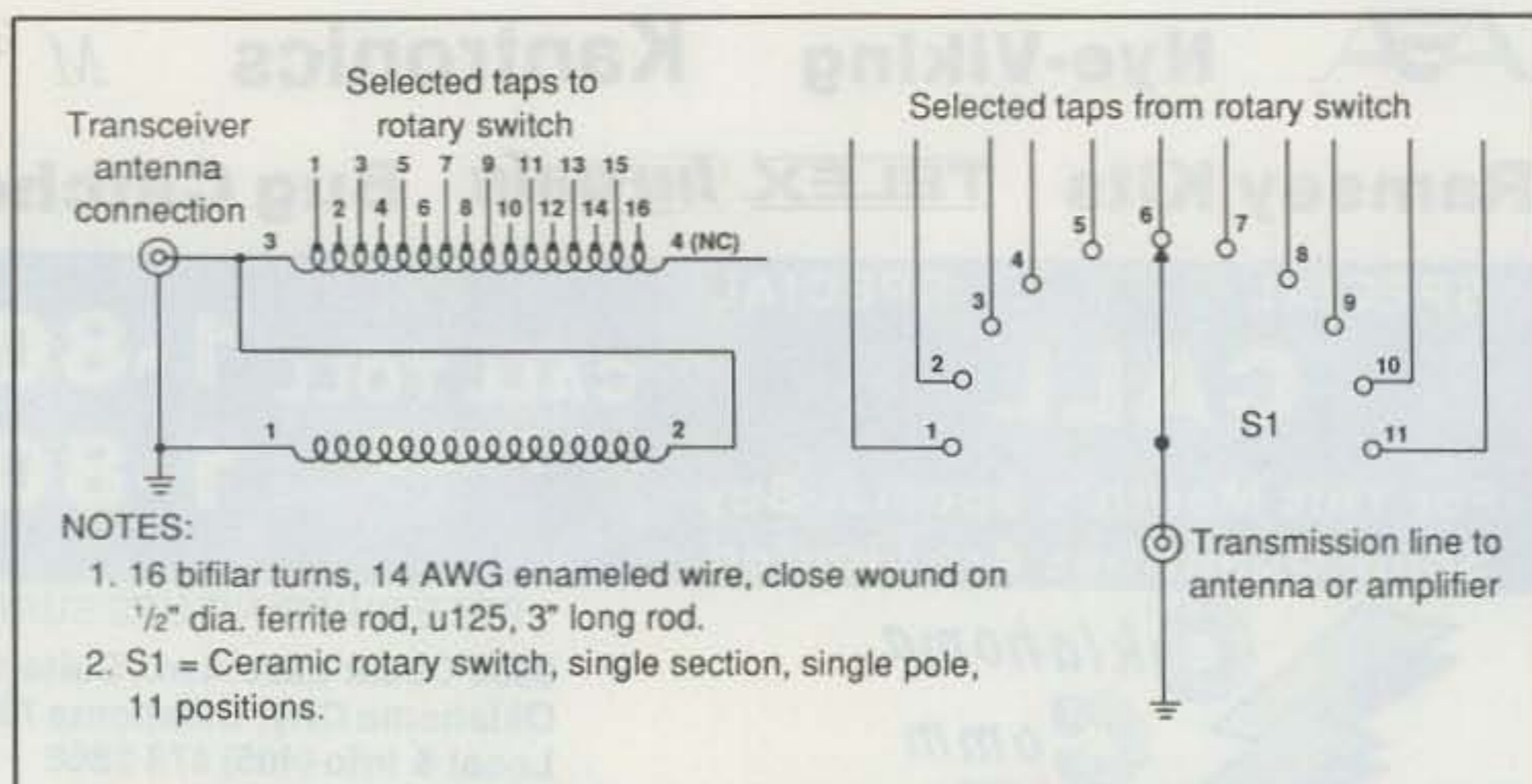


Fig. 2—Multi-tap unun (MTU). Note: MTU can be installed as shown or in reverse direction with different results per given tap selection.

*719 Quarterstaff Rd., Winston-Salem, NC 27104

FOR 1/2" DIAMETER FERRITE ROD

1.57" 0.50" 1.57" 0.50" 1.57" 0.50" 1.57" 0.50" 1.57"

For 1 Turn (less tap) $C = 2\pi r = 2 \times 3.14 \times .25 = 1.57"$ (39.89 mm)
 Allowance for Tap 1/2" (12.7 mm)

Fig. 3- Layout dimensions for MTU tapped coil. Starting with 36 inches (91.44 cm) of wire, the finished length, after folding for taps, came out to be 30 3/4 inches (78.1 cm) for the 16-turn tapped coil. A second length of wire was cut to 30 3/4 inches for the untapped coil.

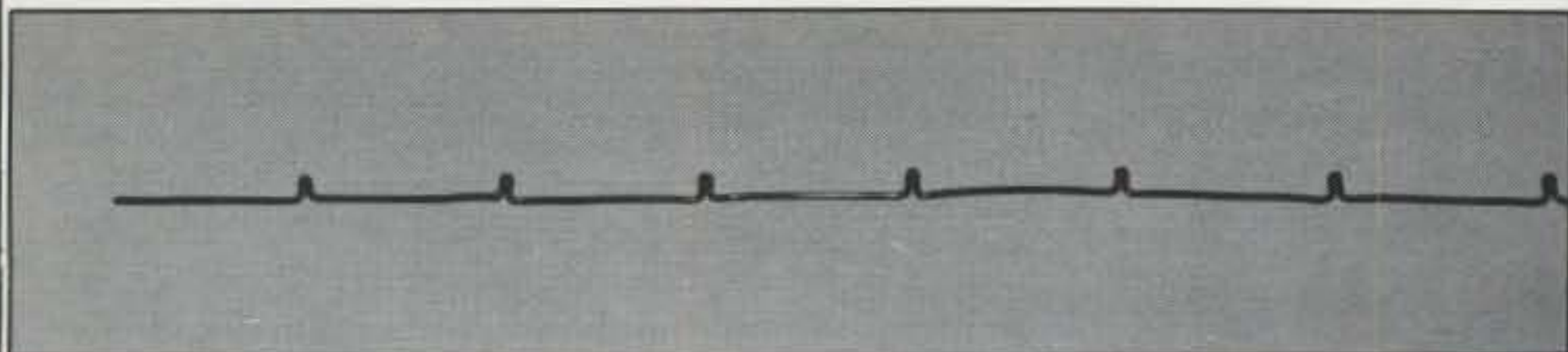


Photo 1- Coil wire after bending and forming taps.

wound, especially enameled-coated wire or teflon-coated wire, a large pain in the "derriere." Winding a multi-tap unun, or balun for that matter, can be done simply by making the taps before winding the coils! My MTU is an experimental one, and yours does not have to be the same electrically or physically as mine. Practice by building one like the one described, and after you get the hang of it and see how it tests out you may want to change the number of turns, the gauge of wire, and even the winding form (rod or core). If you goof up, you can't lose much. You can always reuse the rod or core, and the amount of wire you wasted didn't cost much!

What you are going to build is a bifilar transformer as shown in fig. 2. The materials are readily available and are identified in the figure. The ferrite rod should be long enough to handle the bifilar winding that you want to put on it. My friendly electric motor repair shop was happy to provide me

with what was left of a reel of 14 AWG enameled wire (about 40 feet) for a buck. Ferrite rods and cores are available from Amidon Associates, a frequent advertiser in this magazine, and from well-stocked radio stores. The switch came from my junk box, but I have seen similar switches at many hamfests at very reasonable prices.

You may notice that I show 16 taps on the tapped coil of the unun and only 11 connections for them on the switch. As you will see later, I connected those taps which gave me the best test results. You may wish to use other arrangements, depending on the unun you build.

The coil with the taps is fabricated first. (Let's get the harder job done first while we still have all of our patience!) Actually, it is quite simple. The layout dimensions are shown in fig. 3. What I did was simply allow enough wire between the amount required for each turn to permit me to bend the taps in the wire while it was still straight. I al-

lowed 1/2 inch, which when folded gave me a 1/4 inch long tap. Photo 1 shows the results. Try to keep the taps in the same plane. It works better when after you wind the tapped coil, you wind another coil next to it. Before winding the coils I applied some paint remover to the end of each tap, carefully, with a small cotton swab stick. The enamel coating needs a little convincing to come off and maybe a little coaxing with a sharp knife.

After cleaning off the end of each tap, I tinned each tap end. It's a lot easier to solder connections to the taps later when you go through this process first. I wound the coil, close wound, on a 3 1/64 inch diameter rod (actually, the chuck end of a 3 1/64 inch drill bit). The untapped coil was then wound between the tapped coil turns on the same rod. By winding the coils on a rod a hair smaller in diameter than the 1/2 inch ferrite rod, I was able to slide the rod into the coil for a snug fit. Presto, except for connecting the coils as shown in fig. 2, a multi-tap unun!

Testing

After connecting coil ends 2 and 3 together, connect coil ends 1 and 3 to a coax connector to facilitate testing. I used an SO-239 fitting, since I planned to use this type of hardware in the finished product.

Testing of the MTU was done with a simple SWR bridge which has a non-inductive 500 ohm potentiometer in the appropriate bridge arm. The test setup is shown in photo 2. With the bridge set for 50 ohms, a 200 ohm noninductive resistor was connected between coil end 4 and ground. The RF signal generator was set, arbitrarily to 7 MHz, and a zero reading was noted on the bridge meter. The frequency was varied from 3.0 to 8.0 MHz and the meter remained at zero, indicating that the MTU could be used to effect a 1:4 transformation satisfactorily within this range. The range is affected by the number of turns, the spacing between

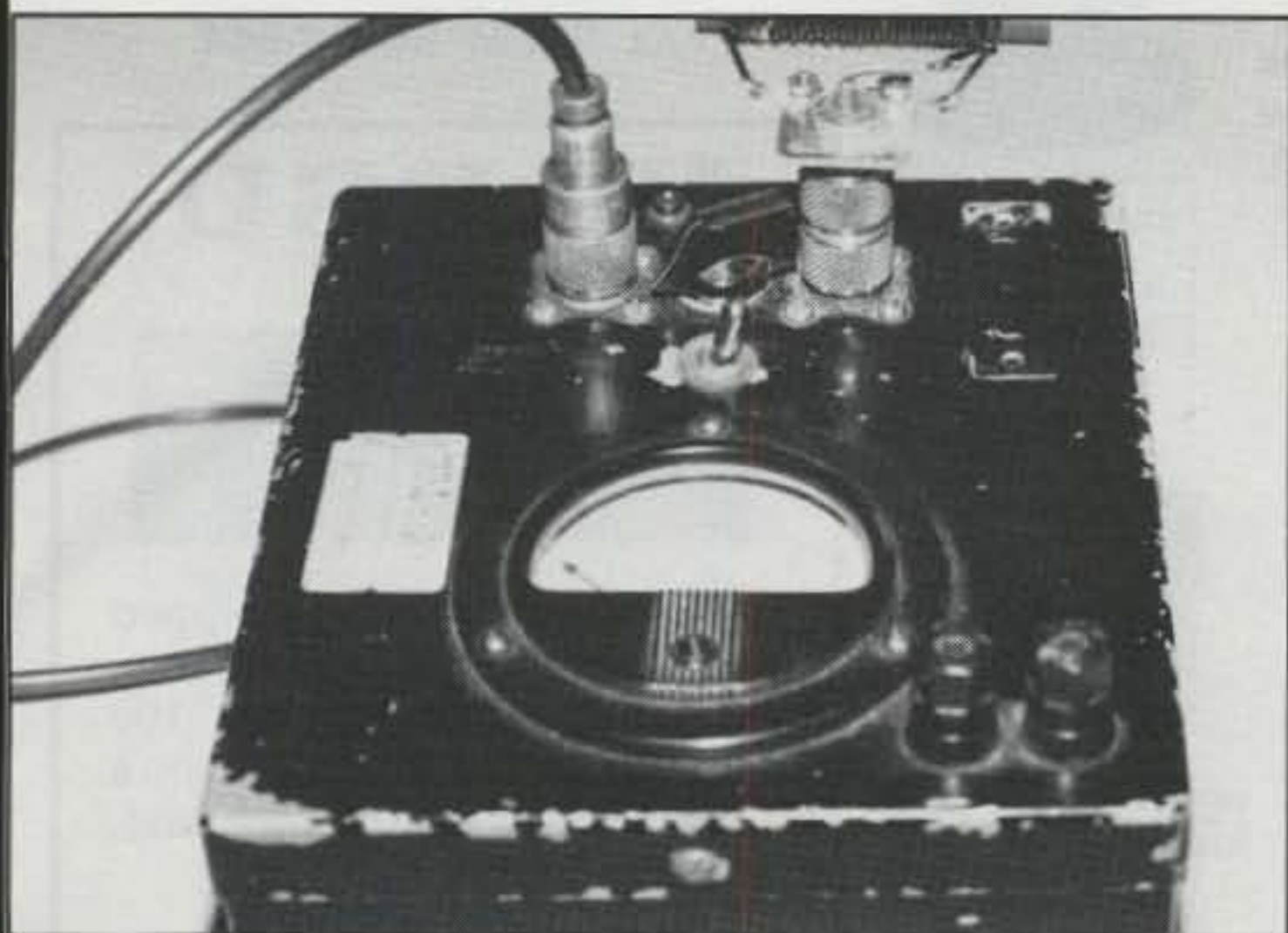


Photo 2- MTU connected to bridge for testing.

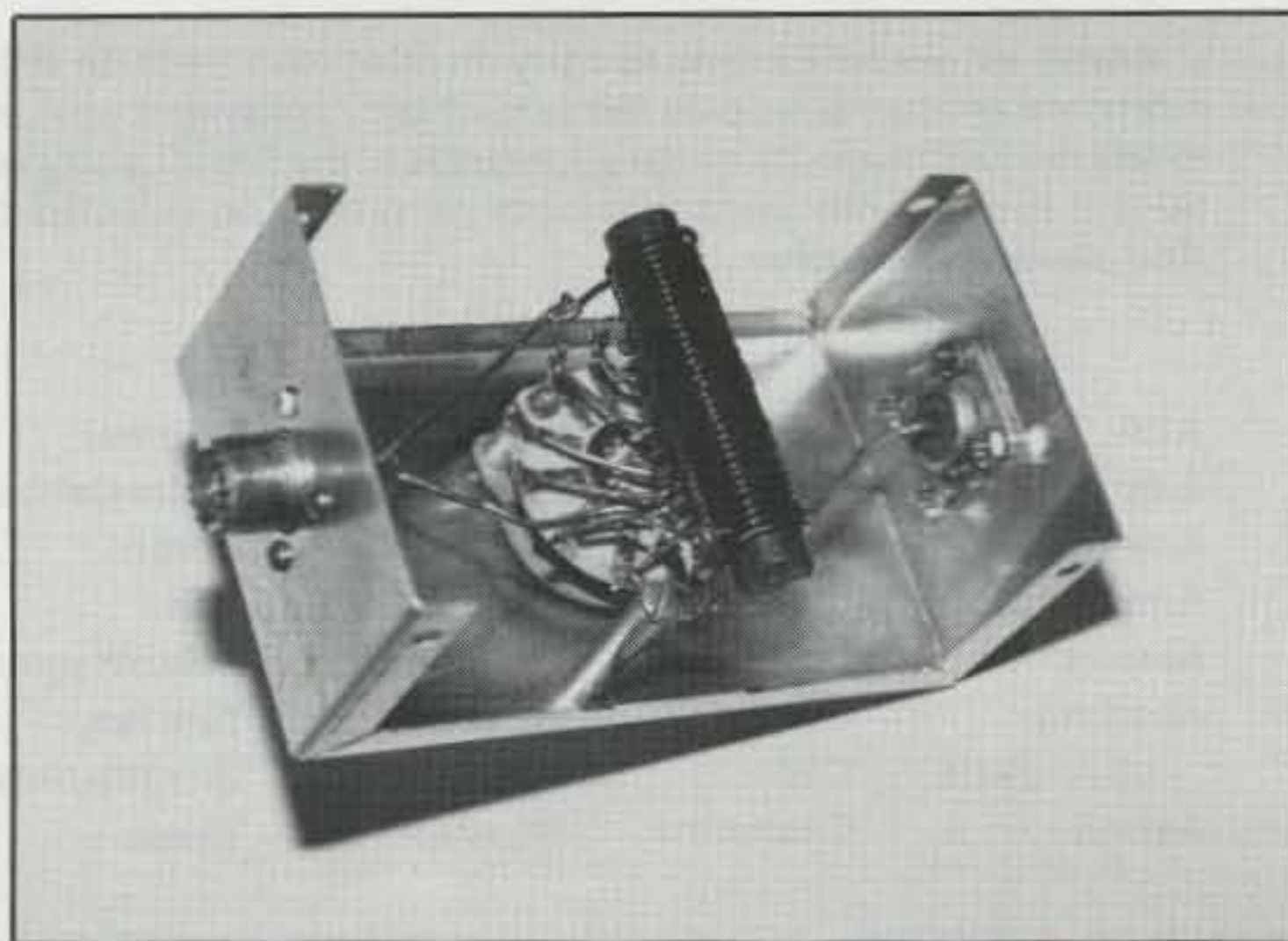


Photo 3- Mounting of MTU in box with switch.

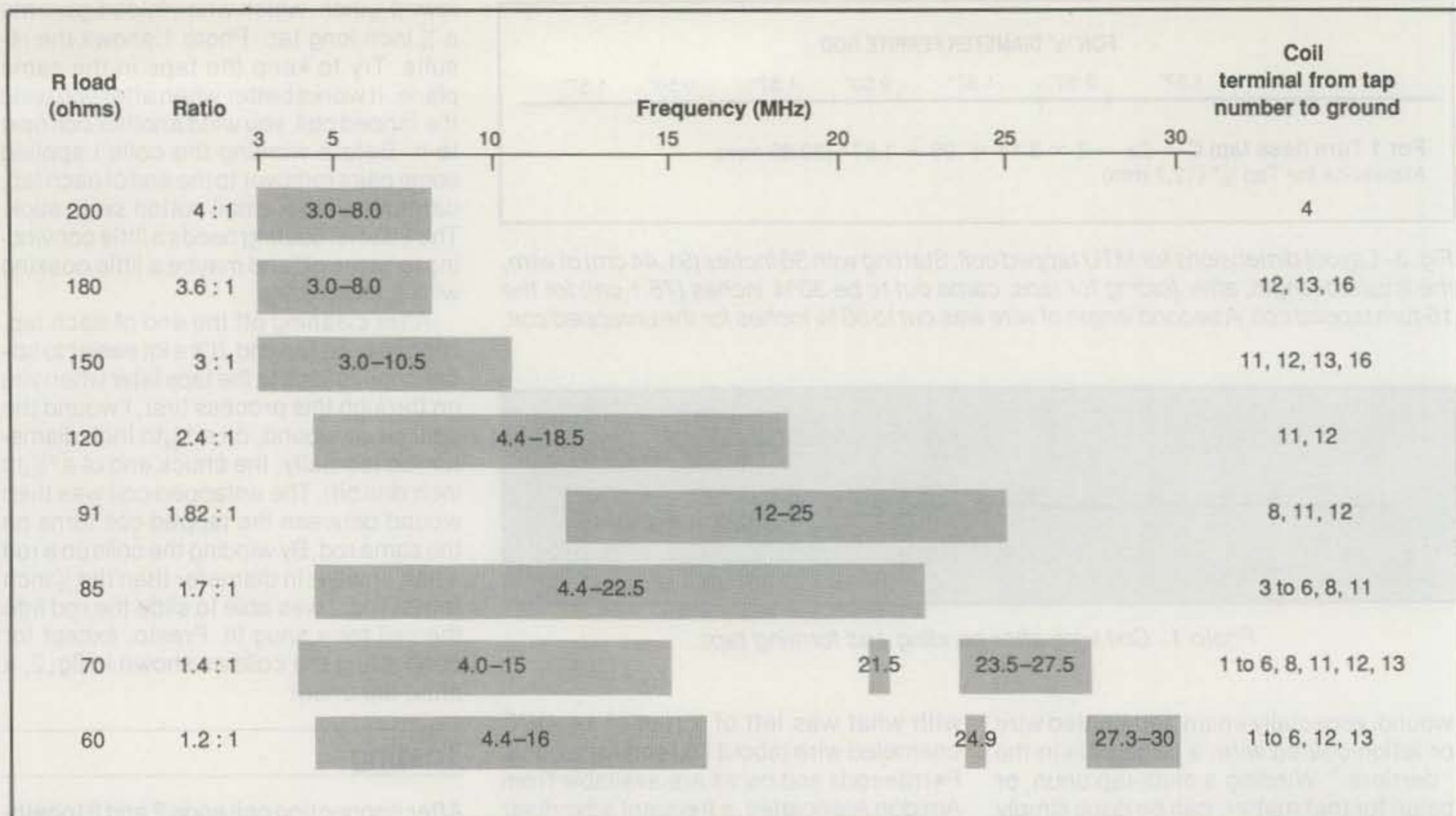


Chart 1—MTU load/ratio to 50 ohms/frequency/tap. Note: Frequency spreads shown are where a perfect match is obtained—i.e., where the SWR for a given resistive load is 1:1.



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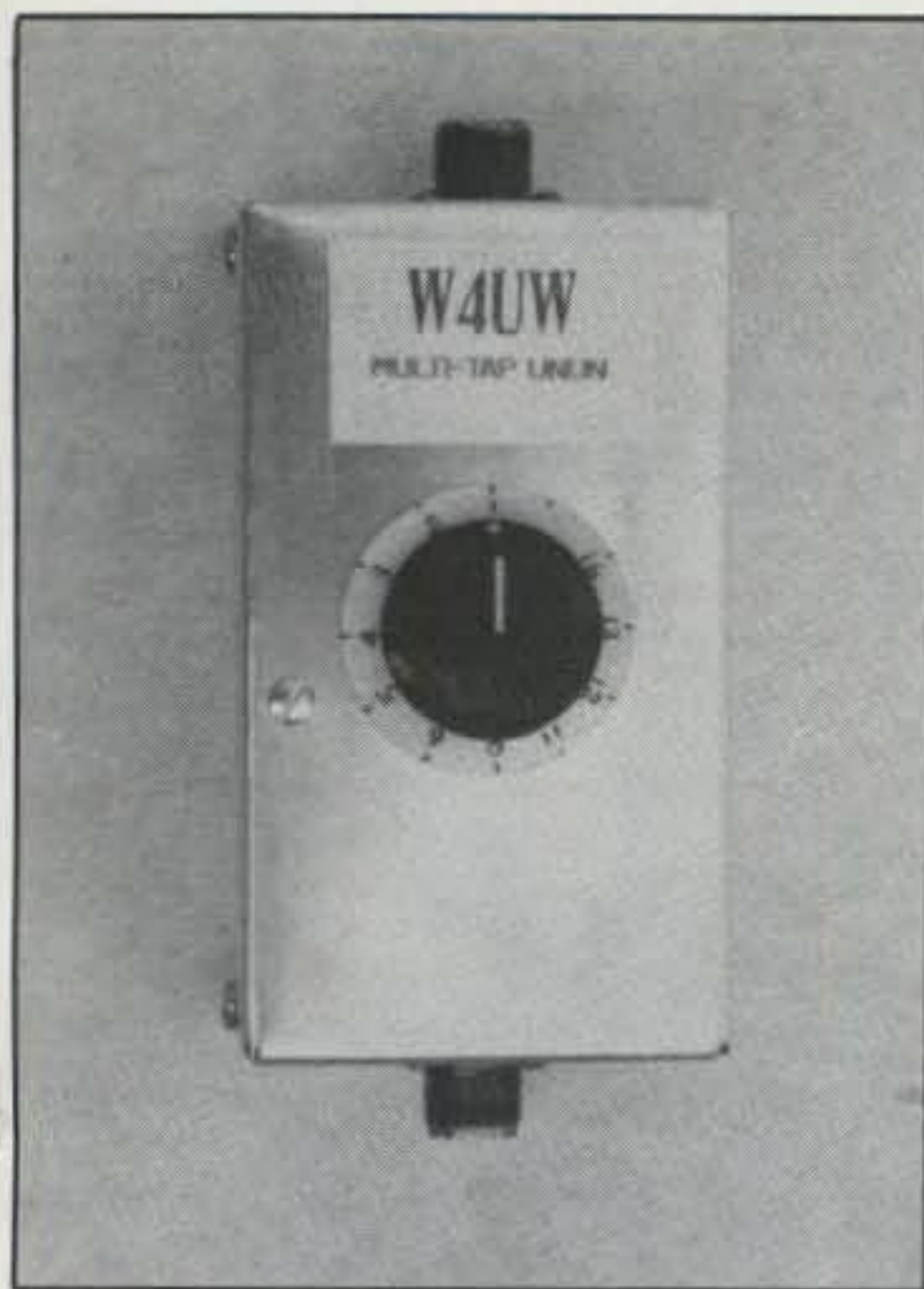


Photo 4— The finished product—the multi-tap unun.

turns, the gauge of wire, plus the form of the ferrite on which a bifilar transformer is wound.

Various noninductive resistors were connected between the taps and ground while the signal generator frequency was varied from 3.0 MHz through 30 MHz to see where the bridge meter would read zero, indicating a match between 50 ohms and the resistive load. Chart 1 shows the results of the tests on this MTU. Bear in mind that your results might be slightly different but that is not too important. What is important is that you now have a means of matching your 50 ohm transceiver output and feedline to a number of different

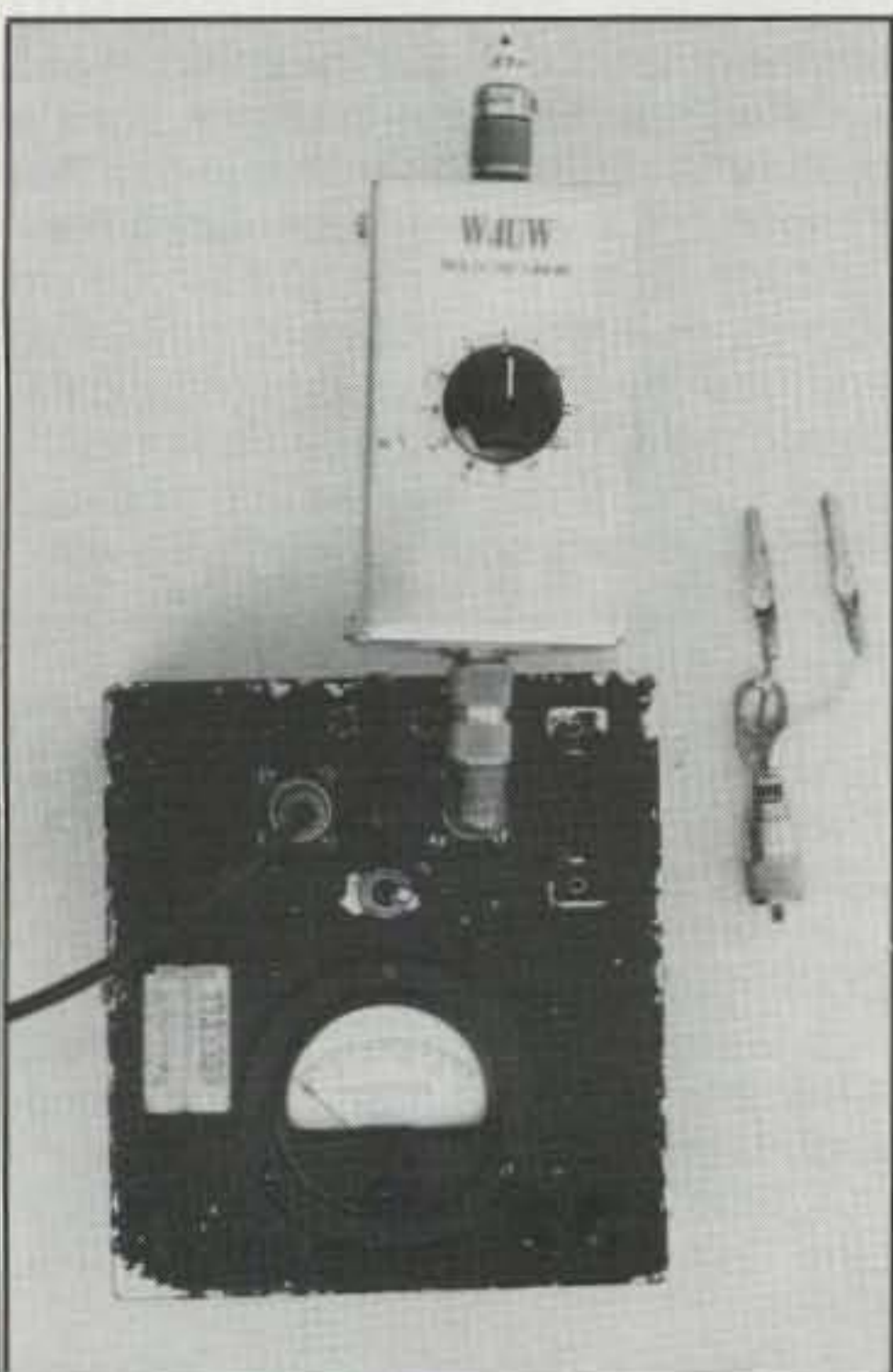


Photo 5— Completed MTU under final testing.

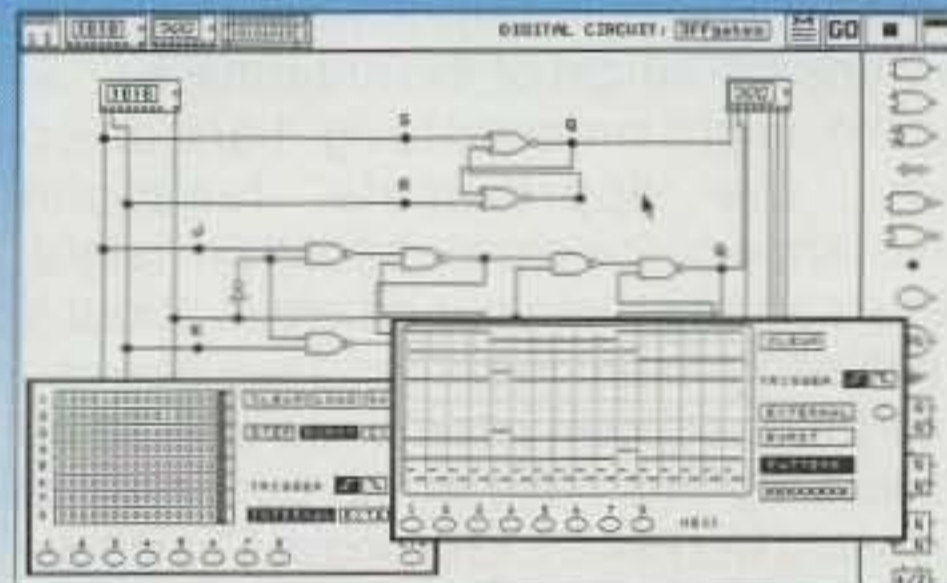
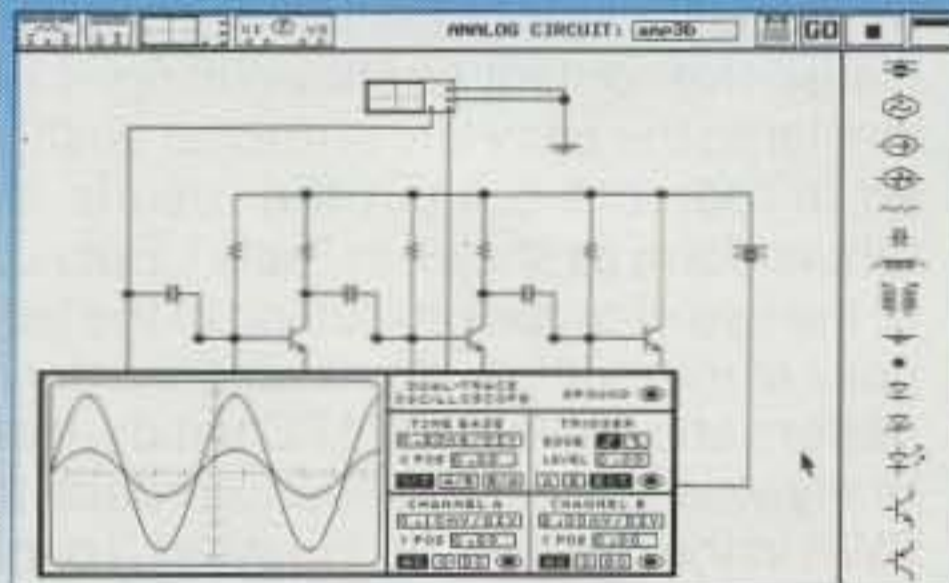
resistive loads at a variety of frequencies. More about this later.

The tested MTU can now be mounted in a suitable enclosure if desired. I used a 5 1/4" x 3" x 2 1/8" Radio Shack metal project enclosure as shown in photo 3. Photo 4 shows the completed unit ready to go with a switch-position dial plate installed. Photo 5 shows the finished product under final test. For convenience in making various tests I have a number of noninductive test resistors mounted in PL-259 plugs. These are my standard loads so to speak and are not used for anything else that might affect their resistance characteristics. I apologize for the peeling paint job on the venerable SWR bridge. It has served long and well in spite of its appearance.

Application

An application block schematic is shown in fig. 4. Two uses for the MTU are shown, the first for antenna feedpoint impedance matching and the second a matching device to make minor corrections at the output of a transceiver to lower the SWR seen by the transceiver. The MTU was developed primarily for the first use, but the second use is sort of a fallout because the MTU acts like a section of transmission line which can be used to make minor adjustments in what the transceiver sees, similar to the device described in footnote 5. While the MTU is not used in the same manner as the remotely controlled bridge de-

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■ Professional Version: 640 kB RAM; EGA/VGA graphics; hard disk.

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FEATURES ■ Personal Version: builds circuits containing 20 components or less. ■ Personal Plus Version: builds circuits containing an unlimited* number of components. ■ Professional Version: uses color coding for circuit tracing with an unlimited* number of components; EGA/VGA support. *limited only by the amount of memory available.

INTERACTIVE IMAGE TECHNOLOGIES



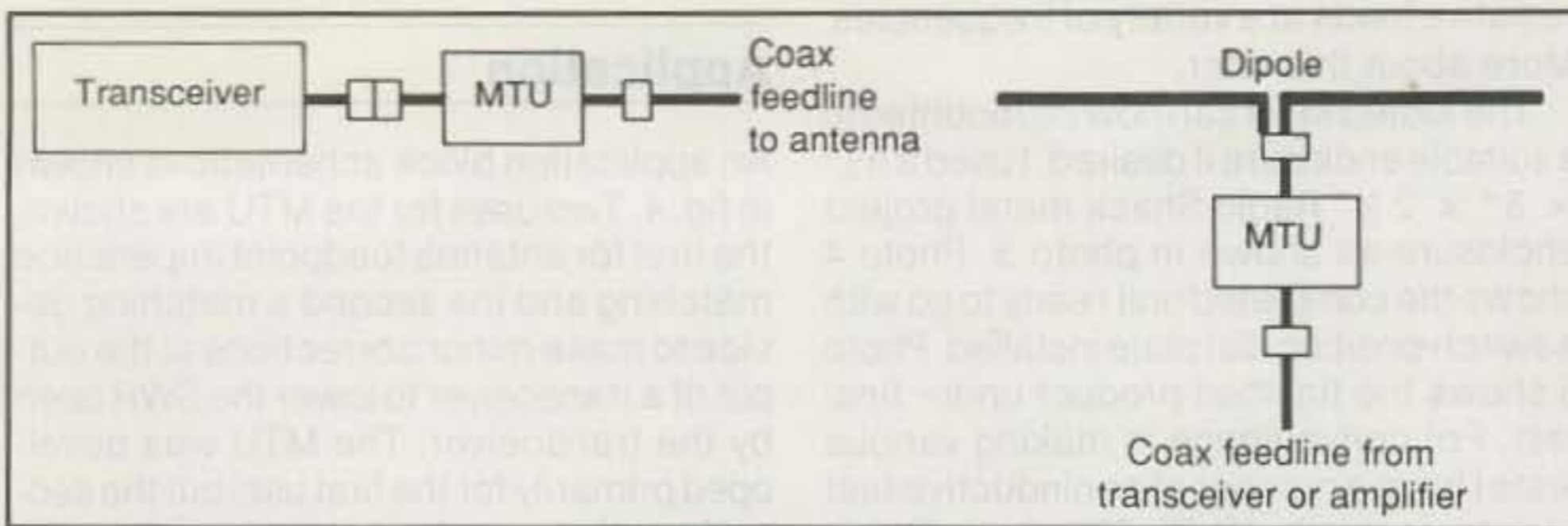


Fig. 4- MTU application block schematic.

scribed in footnote 3, it is nonetheless effective in checking for a suitable match to the feedpoint of a dipole antenna.

The ideal way to check the feedpoint impedance of a dipole, using the MTU, is to use the arrangement shown in photo 6. However, the feedpoint may not be readily accessible, and the weight of the combination is probably excessive and would cause undue sag of the antenna at its midpoint.

An alternate procedure would be to determine the height of the antenna. Knowing the height, proceed to fig. 1 and determine the approximate feedpoint resistance of the dipole based on height. Let's assume that your dipole is about $\frac{1}{2}$ wavelength high. From fig. 1 we can see that the feedpoint resistance should be about 70 ohms. This would occur at the resonant frequency. Looking at Chart 1 we see that we can get a match to 70 ohms in the frequency range of from 4.0 to 15 MHz by using the taps as shown. We select either of the coil taps shown and connect the MTU to the feedpoint. The resultant SWR should be 1:1, or at least very low.

From this information we can either use the MTU as is, or preferably, make another MTU with an appropriate tap or taps and in a different housing to be permanently attached to the feedpoint of the dipole. The choice is yours, and when you have gotten this far you should have a pretty good feel for what you are doing and how you want to do it.

Since a balun or unun behaves somewhat like a transmission line, I decided to try the MTU as a matching device at the transceiver output as shown in fig. 4 and similar to the coax line stretcher described in footnote 5. I put the results into tabular form as shown in Table I. Because of the use of proper matching at the feedpoint of my multiple dipole antenna (for 40 meters and the three WARC bands) there really was not much need to reduce the SWR at the transceiver. However, I decided to use the MTU and see what would happen.

When my TH6DXX beam was installed there was not too much I could do about the SWR, as it was dimensioned by the manual. In any case, the use of the MTU

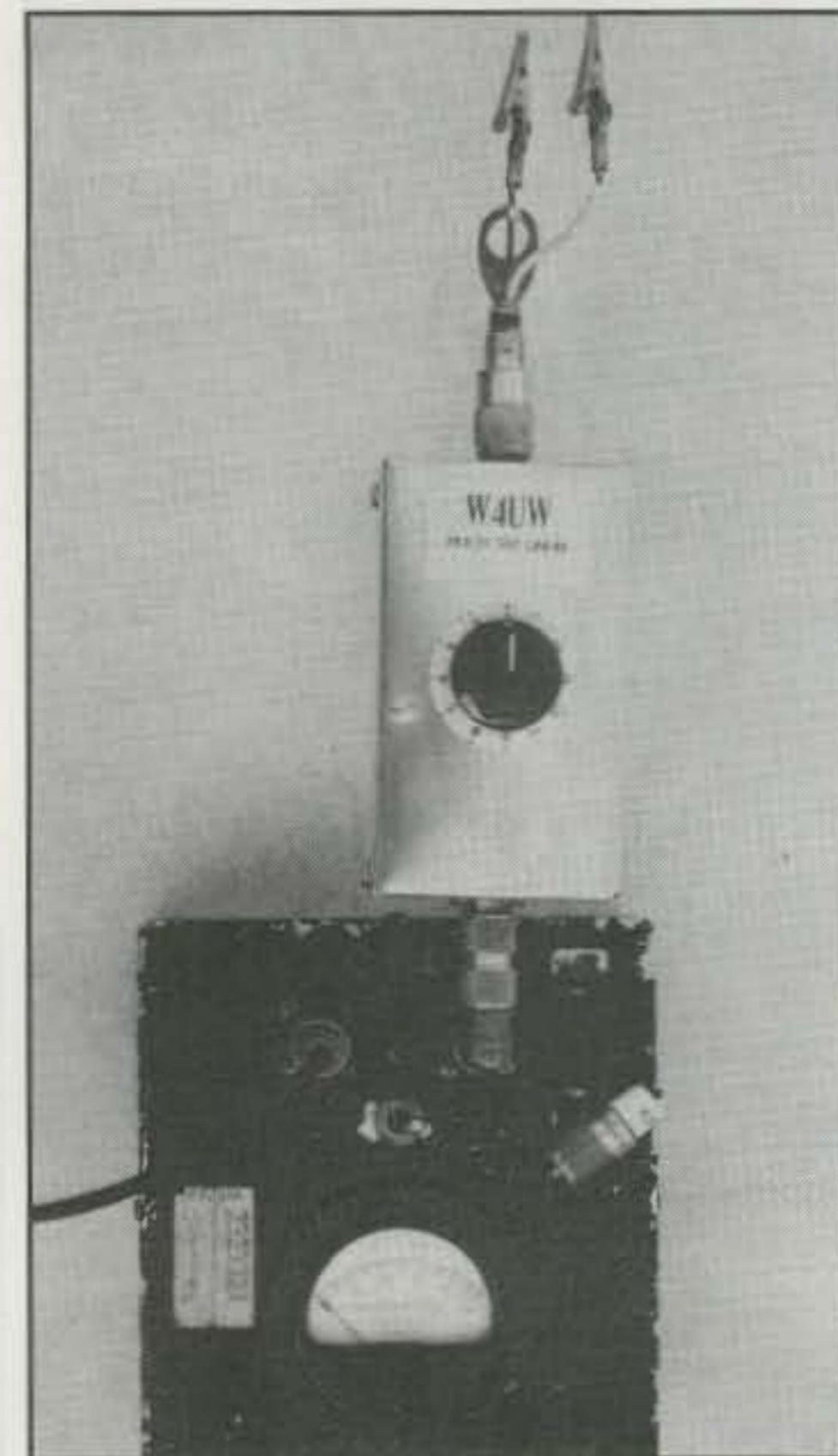


Photo 6- MTU arranged with clips for checking at dipole feedpoint.

resulted in some improvement in the SWR at the transceiver. The SWR at the band edges was generally higher and unacceptable to the transceiver, but the MTU did help somewhat. It was interesting to note that the MTU could be connected in reverse and provide improvement in impedance transformation, albeit in some instances at different taps than in the normal direction. I don't believe that the MTU has the range of the coax line stretcher and certainly not of an antenna tuner, but it is useful when used in this manner and a real "cheapy" if it works in your installation!

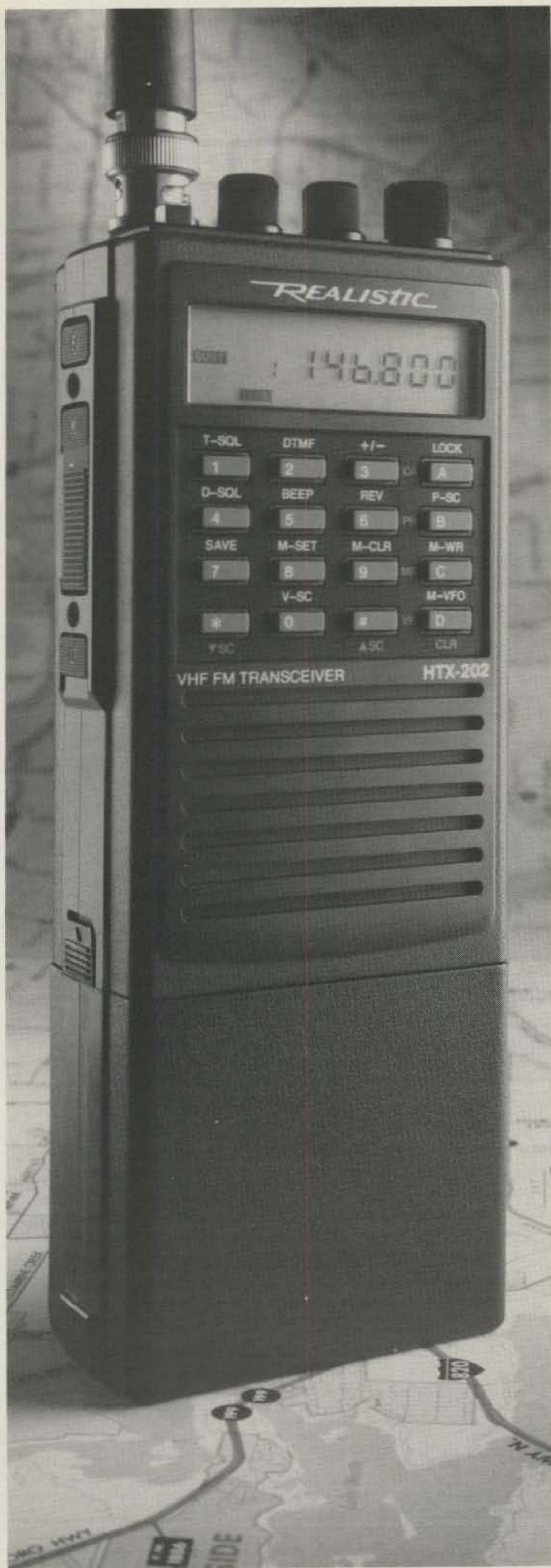
The multi-tap unun can be a solution to your dipole antenna matching problems, and it is a device that is useful and inexpensive to build. Try building one and experiment yourself. You will find that multi-tap ununs have great potential in antenna work.

Footnotes

1. Maxwell, M. Walter, "Reflections, Transmission Lines and Antennas," ARRL, 1990.
2. Genaille, Richard A., "Balun/Balun," CQ, February 1992.
3. Genaille, Richard A., "How To Build A Remotely Controlled Bridge For Impedance Matching," CQ, August 1991.
4. Sevick, Jerry, W2FMI, "Transmission Line Transformers," 2nd edition, ARRL 1990.
5. Genaille, Richard A., "The Coax Line Stretcher," CQ, April 1989.

Antenna	Freq.	Normal SWR at Paragon	SWR/w MTU connected "NORMAL"	SW Pos.	SWR/w MTU connected "REVERSE"	SW Pos.
40 Meter & WARC multiple dipoles	7.0	1.5	1.4	#1	1.4	#1
	7.15	1.0	1.0	#1,2,3	1.0	#1,2
	7.3	1.3	1.5	#1	1.05	#3,4
	10.1	1.05	1.0	#1,2,3	1.0	#1,2,3,4
	10.125	1.05	1.0	#1,2	1.0	#1,2
"	18.068	1.1	1.25	#3,4	1.0	#3,4,5
	18.168	1.6	2.8	#3,4	1.05	#8
"	24.89	1.0	1.05	#8	1.05	#6
	24.99	1.5	1.0	#8	1.0	#4,5,6
TH6DXX	14.0	3.5	2.5	#1	2.5	#1
	14.35	1.5	2.0	#1	1.1	#4,5,6
"	21.0	3.0	2.0	#3	1.5	#13
	21.45	2.0	1.6	#4	1.1	#8
"	28.0	2.0	1.0	#5,6	1.05	#11
	29.7	3.0	1.3	#12	2.0	#6

Table I- Effect of MTU when used for improving load seen by transceiver.



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CIRCLE 168 ON READER SERVICE CARD

K4ABT gives us an overview of Radio Shack's 2 meter HT while showing us how to get it up and running on packet.

How To Put The Radio Shack HTX-202 Two Meter HT On Packet

BY BUCK ROGERS*, K4ABT

Packeting has become a universal pastime for the digital amateur—thus the resurrection of many of our notebook-size model 100 and model 102 Tandy portable computers.

The ownership of a portable packet station was once a novelty item. However, the trend for many of us nowadays is to have close by such a packet station, or at least the components that go together quickly to make up this "necessity."

The uses are limitless. For openers there are mountaintop packeting, vacationing, emergency traffic handling, coordination, digipeating, and the list goes on.

The Real World

To assemble such a station is not as time consuming as you might think—especially at this time of the year when we are getting ready to hit the Dayton Hamvention and hamfest circuit.

A few months ago I wrote an article about a very compact (micro-packet) station that could be placed into the corner of a briefcase. However, the cost of the components to put this package together may have been more in-line for the "Rich and Famous." In that same article I mentioned an earlier article that I had written back in 1985. The 1985 article was about a real, down-to-earth packet station that I put together using affordable components that were available in 1985.

Since the recent article about the micro-packet station the reader mail has become weighted with questions about the earlier (1985) article that I called "PortaPacket." The "PortaPacket" article back in 1985 was built around the Tandy Model 100 and a Kantronics KPC.

The portable transceiver was one of the oldies which used the thumb-wheels to se-

lect the operating frequencies. The ability to store several frequencies into memory was nonexistent in that particular radio.

Because of the interest being so high in this area, I began looking for a more state-of-the-art radio that might fit our application in a 1992 updated version of the "PortaPacket" station.

Eureka!

Within a few days, and in a pile of reader mail, I found my answer. In the midst of this pile of letters were several requests for an interface drawing that would illustrate how to connect a TNC to the new Radio Shack HTX-202, part number 19-1120. (Note: The letters "PN" in this article stand for part number.)

Some of the general specifications of the HTX-202 are listed in Table I. I'm not doing a product review, so I'm only going to list the items that I feel are relative to the HTX-202's use in a packet environment.

Let's Get Busy

With some time to spare one Saturday afternoon I was able to remove the HTX-202 from Jean Ann's grasp (WB4EDZ, my wife; she claims it because it's easy to operate and compact enough for her purse) long enough to build the following PortaPacket station.

For some reason the number 202 rang a bell in my memory of the distant past. I turned to the schematic that came attached inside the HTX-202 manual (a rare commodity nowadays). The mic input connector is the sub-mini $\frac{3}{32}$ inch, or what is commonly known as the 2.5 millimeter mono phone plug (Radio Shack PN 274-290). The receive connector is the mini $\frac{1}{8}$ inch, or the 3.5 mm mono phone plug (Radio Shack PN 274-286A).

The input to the HTX-202 is similar to the 600 ohm impedance of many mic inputs.



Shown here is the Radio Shack HTX-202 VHF FM transceiver.

This is close enough to the impedance of most terminal node controller AFSK outputs.

While I'm on the subject of the I/O port of the HTX-202, here is a hint that may be helpful. In order to make the I/O plugs more substantial, I used a bit of ingenuity. After wiring the TNC to HTX interface cable and attaching the 2.5 and 3.5 mm plugs, I inserted them into the microphone and external speaker jacks. This held the two plugs at the correct spacing and acted as a support to the plugs while I performed the following.

To give the two plugs a "molded together" effect I covered them with a layer of silicone rubber sealant, or caulk (PN 64-2314), being careful not to get the gooey stuff on the HTX itself. After the silicone

*1584 Oxford Court, Gallatin, TN 37066

rubber had cured for several hours, it bonded the two plugs into an easy-to-manage duplex connector.

More Than I Bargained For

While shopping in the local Radio Shack for these connectors, Robert Totton began pointing out some other accessories for the HTX-202. I discovered that Radio Shack has begun building an amateur radio inventory of equipment, accessories, and parts. I'm beginning to pay closer attention to the new additions when I shop there.

If you already own an ICOM or Yaesu hand-held transceiver, Radio Shack stocks a compatible handheld speaker/microphone (PN 19-310). This same microphone fits the I/O port of the HTX-202. Robert pointed out the new American-made 2 meter, $\frac{1}{8}$ wave, magnetic-mount antenna (PN 19-210), one of which now adorns the top of my LTD.

For the VHF and UHF operator who likes to keep track of antenna performance, they now have a VHF/UHF SWR and power meter (PN 19-320). Because of the low insertion loss, I can leave the meter in-line to observe the forward and reflected power—up to 60 watts output.

Before Robert had time to torture me more, I paid him for the connectors and goodies and got out of there while I still had my shirt.

MicroPower

Maybe it was the fun of assembly, or it

GENERAL

Frequency Range	144.000-148.000 MHz
Frequency Step (programmable)	5/10/15/20/25/50/100
Antenna Impedance	50 ohms (unbalanced)
Speaker	8 ohms
Microphone	1200 ohms (condenser)
Channel Display	LCD
Power Requirements (range)	7.2-13.8 volts

RECEIVER

First IF	21.4 MHz
Second IF	455 kHz
Sensitivity	
12 dB SINAD	0.2 uVpd
20 dB NQ	0.35 uVpd
Squelch Sensitivity	
Threshold	0.1 uVpd
Spurious response (attenuation)	80 dB
Intermodulation (attenuation)	70 dB
Adjacent channel rejection @25 kHz	50 dB
AF distortion	less than 2%
AF response	minus 6 dB per octave
CTCSS sensitivity	0.15 uVpd
DTMF squelch sensitivity	0.2 uVpd

TRANSMITTER

RF Power Output @:

7.2 volts DC	2.5 watts
9 volts DC	4.0 watts
12 volts DC	5.0 watts
13.8 volts DC	6.0 watts
Low power (switched)	1.0 watt

Deviation (maximum)	4.5 kHz
TX Audio distortion is less than one half of one percent.	
Modulation type: True FM (reactance).	

Table 1- Specifications of the Radio Shack HTX-202.

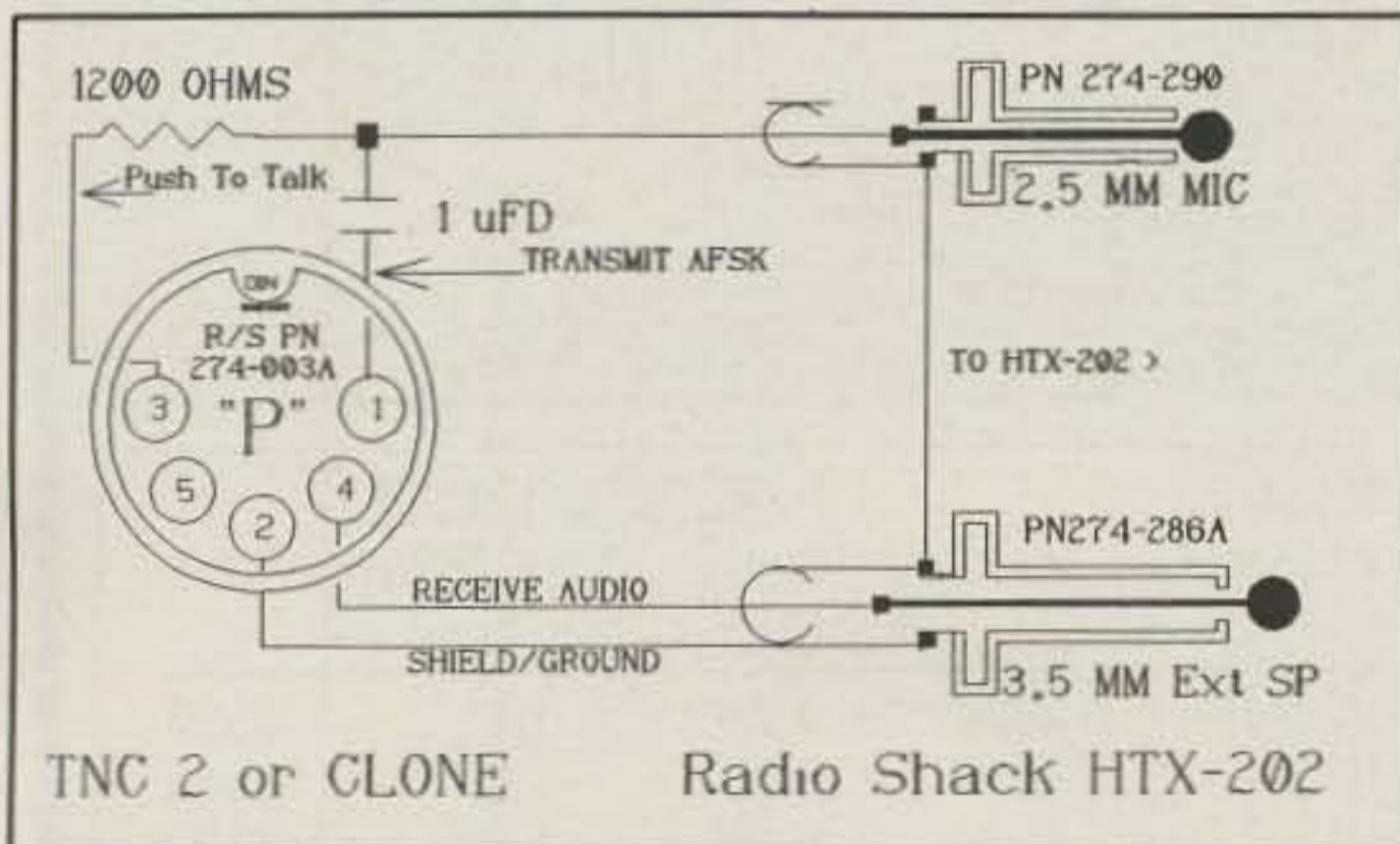
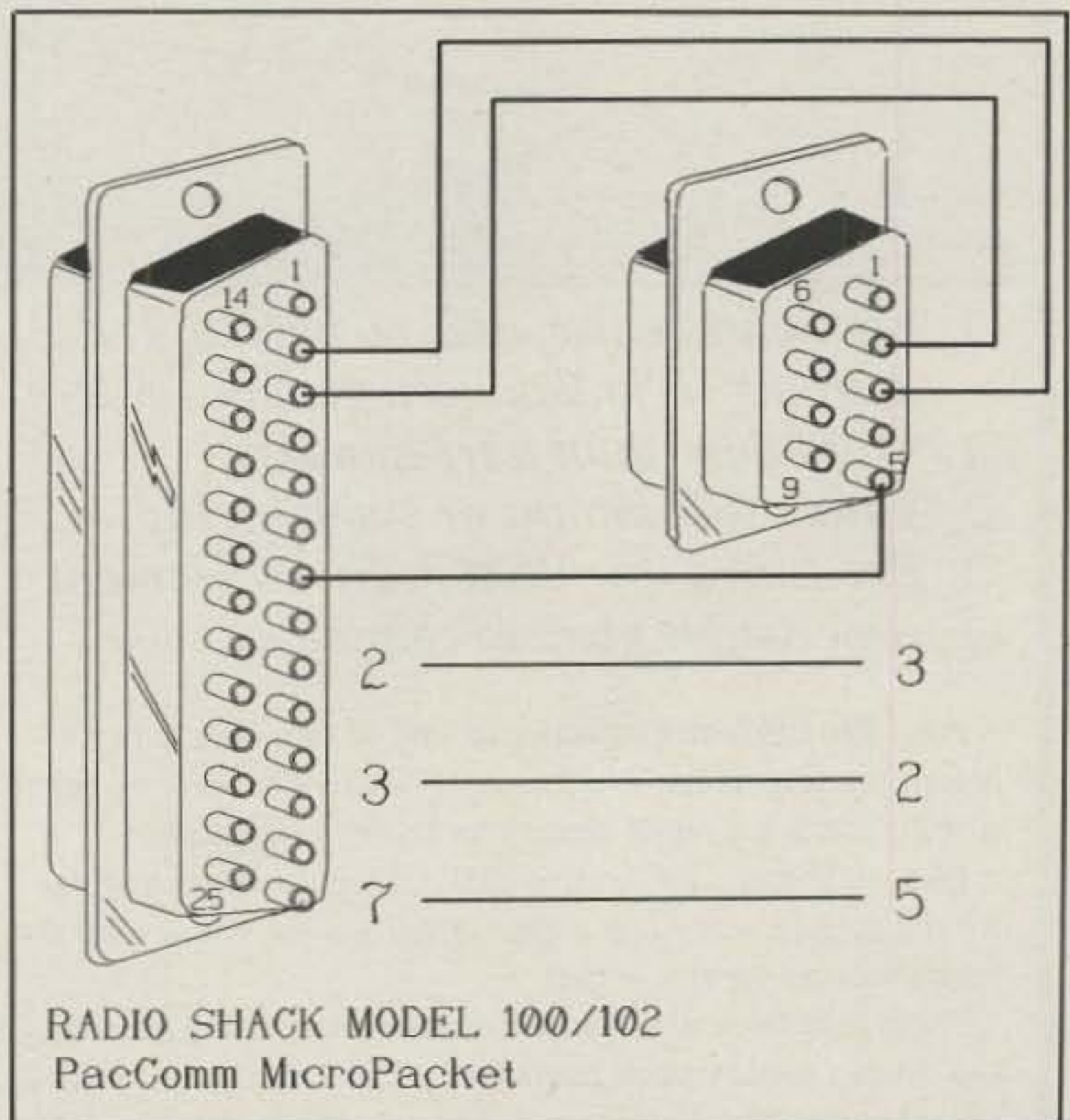


Fig. 1- If connecting to an AEA PK-88, a different connector will be needed at "P." The part number for this connector is 274-025.

Fig. 2- Set Model 100 or 102 "TELCOM" parameters to 57E1E or a terminal baud rate of 1200, with 7 data/word bits, EVEN parity, 1 stop bit, and ENABLE software handshaking. In most cases, this should be compatible with the default parameters of the terminal node controller.



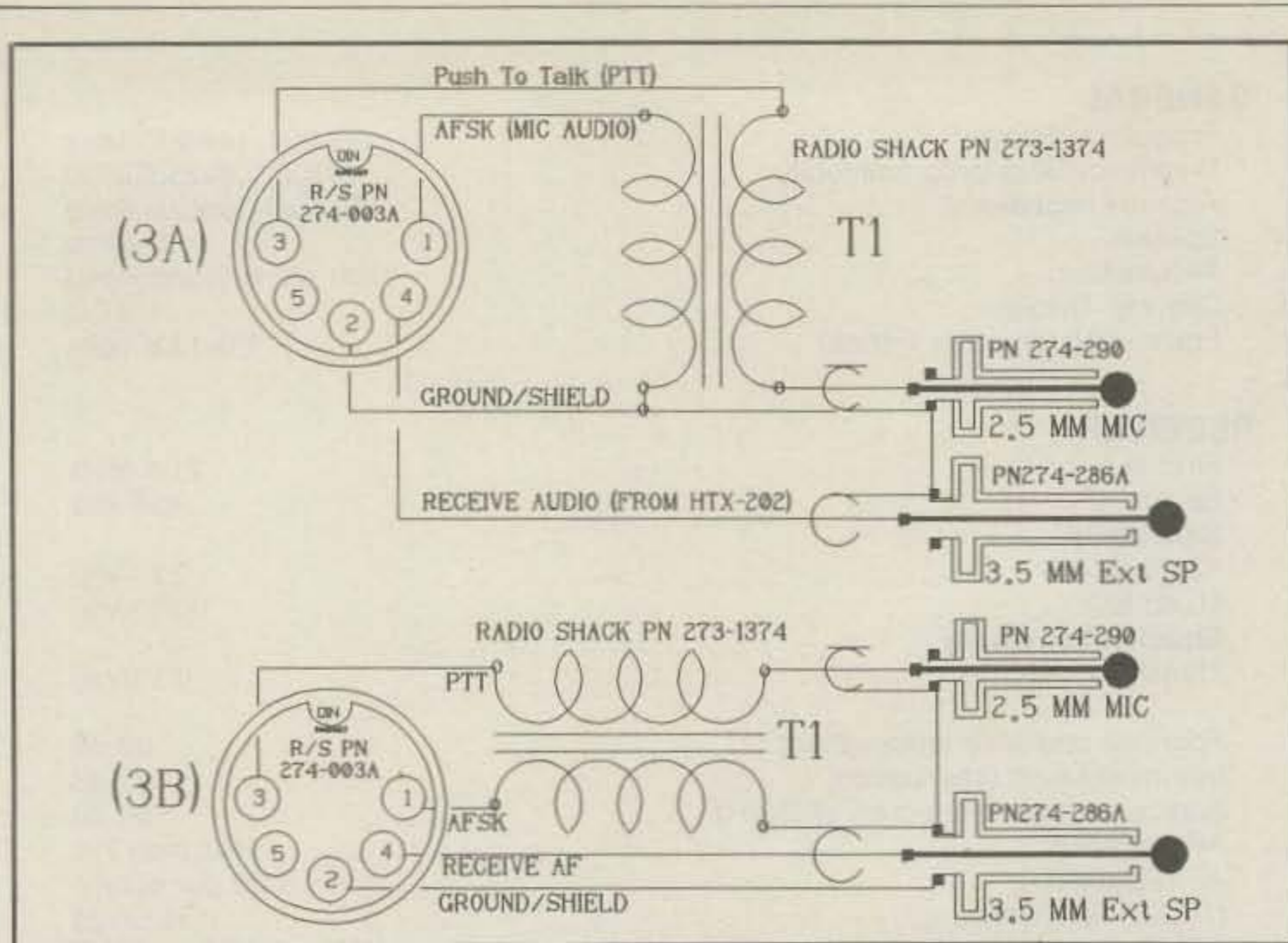


Fig. 3- The drawings shown here are the same, except that I've drawn each in a different manner to reduce confusion when connecting to the isolation transformer, T1.

might have been the short time that it took to put all this together, but in any case, I had the three main components of the PortaPacket station interfaced, on the air, and making connects on the ROSE network in less than two hours. This included the time

it took to build both the interface cables for the MicroPower TNC, to the HTX-202 transceiver, and the model 102 to TNC (see figs. 1 and 2). Fig. 3 (A) and (B) is for use when the 1:1 isolation transformer is used in applications where audio response and

matching are critical.

The driver behind the use of the MicroPower TNC in this 1992 version of the PortaPacket station is the very low, and I do mean low power drain on the battery system. The PacComm MicroPower (CMOS version of the TINY-2) draws under 50 ma of current from a 12 volt, 2 amp, rechargeable battery. I've operated the MicroPower TNC from this supply for more than five hours without recharging. The battery is a sealed unit that is small enough to fit in a corner of the PortaPacket carrying case.

Update Your Records

For information about other Radio Shack products, visit your local Technology Store, or contact: Radio Shack, 700 One Tandy Center, Fort Worth, TX 76102 (817-390-3300).

So that I may redeem myself for an incorrect phone number in an earlier "Packet User's Notebook" column, here's the new address and phone numbers for PacComm (checked and double-checked): PacComm Packet Radio Systems, Inc., 4413 N. Hesperides Street, Tampa, FL 33614-7618 (813-874-2980; FAX 813-872-8696).

Happy Packeting de Buck4ABT.

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Model & Elements	Band	MEASURED		
		Gain dB/d	Max VSWR in band	Price
H20-4	20 m	9.23	1.61	\$530
H15-4	15 m	8.80	1.65	\$340
H10-3	10 m	6.46	1.79	\$190
H6-6	6 m	9.41	1.91	\$200
H144-5	2 m	9.10	1.70	\$ 50
H144-15	2 m	13.73	1.68	\$145
H220-5	1.25 m	9.10	1.70	\$ 50
H220-17	1.25 m	13.53	1.29	\$150
H432-24	70 cm	16.14	1.76	\$145

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- 2 V into open circuit
- 0 to 50% AM Mod.
- Internal 400 Hz & 1000 Hz Mod. frequencies



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- TM074 (23-inch screen, cabinet model)

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- 2 nsec/div Sweep Rate with X10 Sweep Magnifier
- Trigger View
- Versatile Trigger Selection
- Alternate Sweep

The 465B is an upgraded version of the reliable TEK 465. It offers improved trace selection which allows choice of Channel 1 and/or Channel 2, sum or difference, or A trigger view in any combination. This unit comes complete with operating manual.

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\$329**



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- 360K floppy drive, 20 MB hard drive
- Monochrome monitor
- DOS, keyboard, instruction manuals included

**HP 204C/002 OSCILLATOR
\$249**



- Rechargeable batteries
- Wide ranged oscillator, solid state and highly portable
- Frequency range from 5 Hz to 1.2 MHz
- Output is 5 V into an open circuit and 2.5 V into 600 Ω
- Output impedance is 600 Ω
- The output is variable with greater than 40 dB attenuation for an open circuit output of less than 60 mV RMS

**GR 1650A
RLC BRIDGE
\$249**



A completely portable unit which measures resistance (1 m Ω to 11 M Ω), capacitance (1pF to 1100 μ F), and inductance (1 μ H to 1100 μ H). Also measures D and Q. Accuracy is 1%. Has built-in 1 kHz oscillator and null detector.

After finding out about AA9W's article elsewhere in this issue, agronomists wanted equal time. The components are readily available from the same source.

The Irrigator's Special

A Free-Standing, Collapsible, PVC Vertical Antenna

BY BRUCE AULD*, NZ5G

If you've been an amateur long enough, you probably remember the "Plumber's Delight" variety of beam antennas using inexpensive water pipe. This being the 1990s, newer, lighter, and less-expensive materials present a whole host of opportunities the amateurs of the 50s did not enjoy. I have long eyed the long lengths of PVC tubing that stand on end in the hardware store and in my garage for repair of my sprinkler system, wondering if I could fashion it into an antenna.

The opportunity arose when my family planned a vacation to the Smoky Mountains of Tennessee and my wife cleared my request to take along my cherished homebrew gear. My desire was to make a vertical antenna that could be collapsed into 5 foot lengths which would fit in the trunk of my car and could be set up in less than 10 minutes. Finally, I wanted an antenna that did not require a tuner. This antenna resulted.

Described below is a free-standing vertical antenna, helically wound on sections of interlocking PVC tubing, providing operation on 20, 30, or 40 meters by a quick switch of tubing sections. It stands on its own PVC base and operates with 6 radials laid on top of the ground. It is fed directly with coax, and if you can scrounge the nuts, bolts, and wire from your junkbox (*of course you can!*), the materials will cost about \$5.00. It is simple enough that a beginner can put it together, and there is nothing critical about it. Performance is excellent.

Theory of Operation

Normally, vertical antennas are designed around a quarter-wave radiator and quar-

ter-wave radials. However, shortened radiators can be quite effective, and one method of accomplishing this is to wind it helically, or in a spiral, around a form. No formula exists for the precise length of wire needed, but generally speaking, a half wavelength of wire wound helically will resonate well.

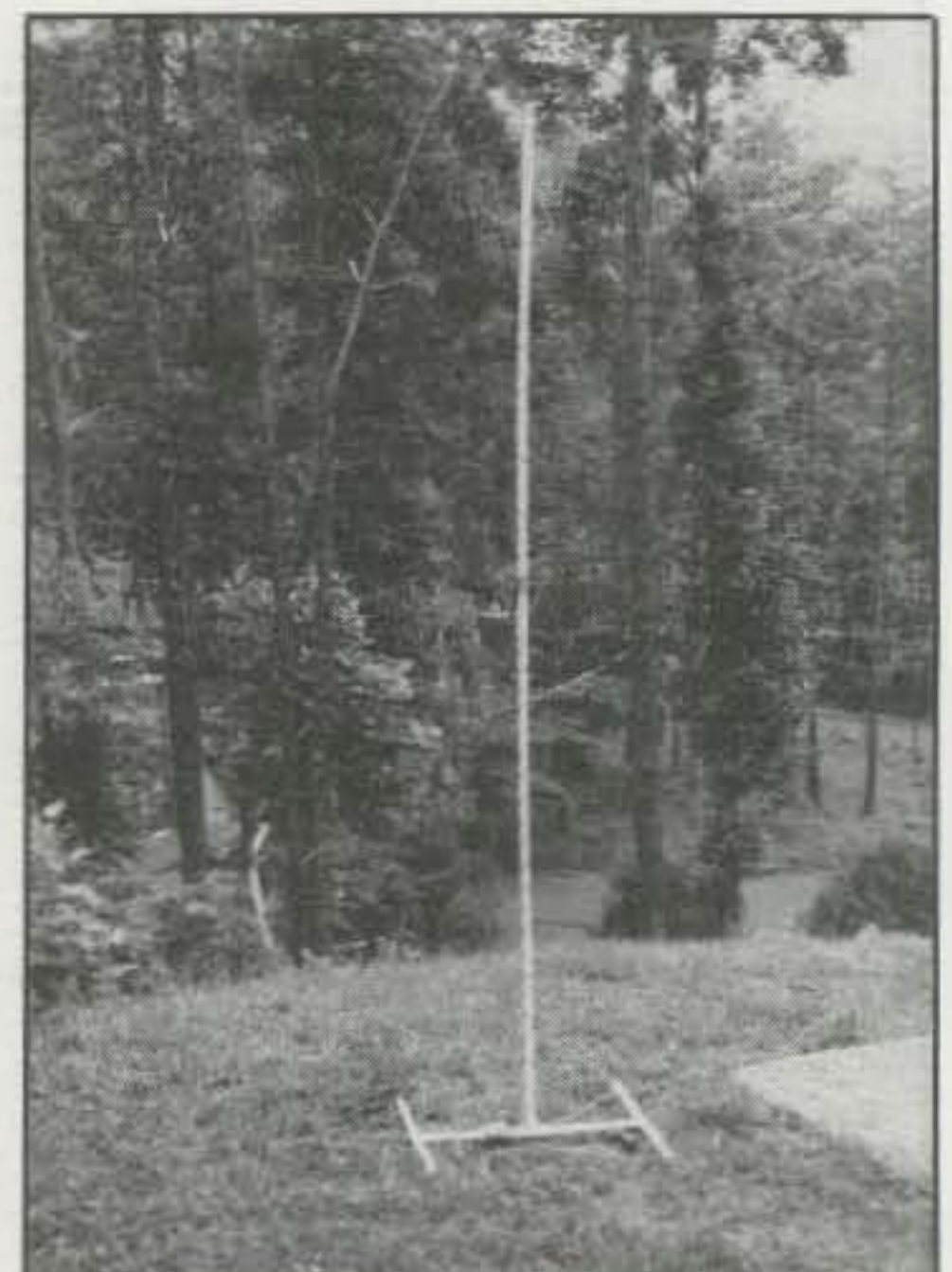
I wanted the longest radiator possible, and I found that lengths of PVC in excess of 10 feet were too floppy. Consequently, the radiators for this antenna system are wound around two 5 foot sections of $\frac{3}{4}$ inch PVC. The correct length of wire is found by applying the following formula for half-wave antennas:

$$468/\text{freq. in MHz} = \text{antenna length in feet}$$

This rule is true for helically wound antennas generally, but I found that on 20 meters a quarter wave of wire (approximately 16 feet) helically wound around the 10 foot form was resonant. This is probably because the 10 foot form I use is not dramatically shorter than a full-length vertical. The 30 and 40 meter antennas, however, both required a half wave of wire. The full winding is split between the two 5 foot sections and connected by a simple jumper. The antenna is terminated at the top in a 3 foot telescoping whip for tuning the antenna to the desired operating frequency within the band.

Most of the time spent developing this antenna was in the radial system. The prototype was built for 20 meters and consisted of four 16 foot radials casually laid out on top of the ground and weighted at the ends. It worked well, but making the antenna operate on several bands with the same performance would require four radials for each of 40 and 30 meters. This was simply too impractical for portable operation.

I found that received signal strength was dramatically affected by the number and



Antenna is easy to set up for portable use.

length of radials. I first tried six 25 foot radials for the sake of simplicity, but performance suffered. Received signal strength improved dramatically by employing two tuned radials for each band, for a total of six. These can be conveniently rolled up and laid out quickly. I have no doubt that even better performance could be achieved by adding radials.

The feedpoint impedance of a full-length vertical over an adequate ground system is about 35 ohms. Consequently, this system is fed directly with coax and employs no impedance matching network.

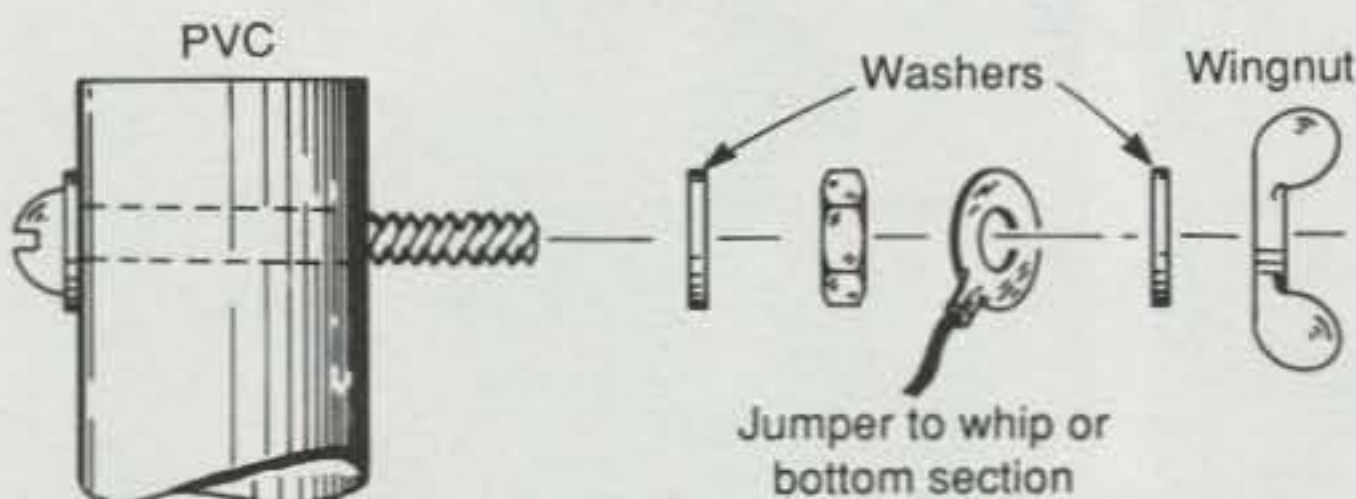
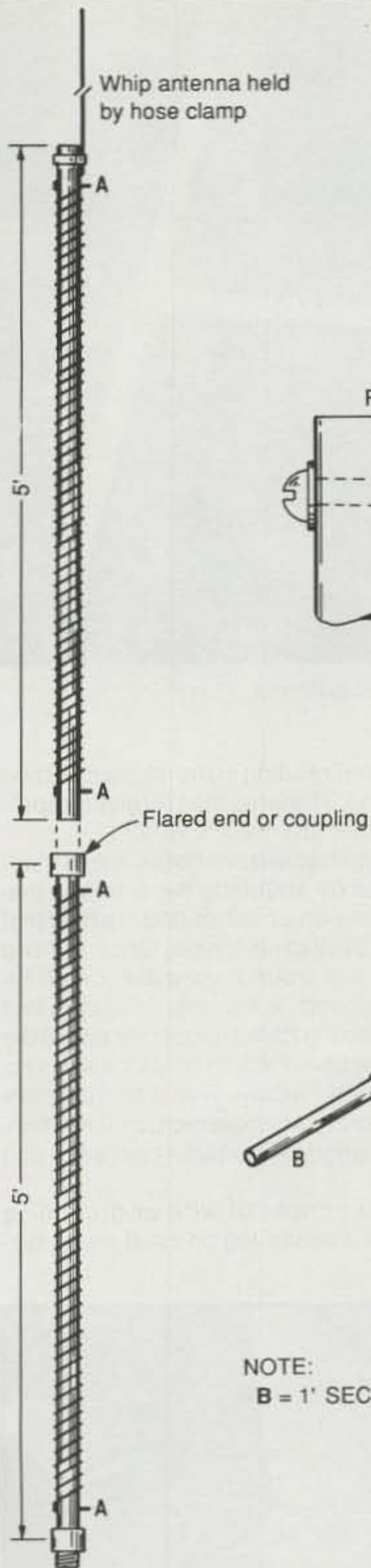
Construction

The antenna is quite easy to build. I constructed the entire antenna in about an

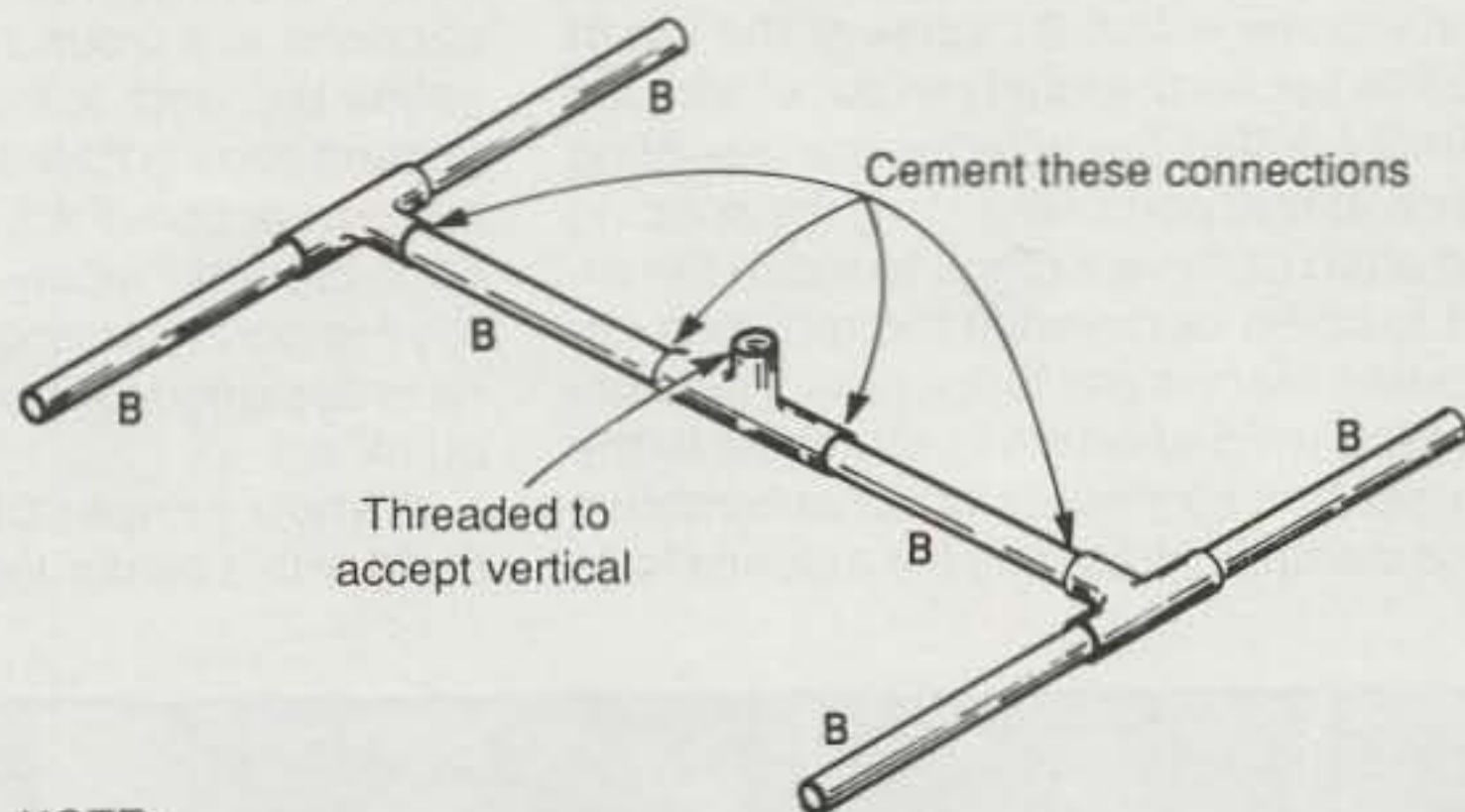
*1704 Windsor Forest Trail, Roanoke, TX 76262

Parts List

- 4 each—10 foot section, 3/4 inch PVC
- Wire—250 feet (stranded if possible)
- 10 sets—2 inch 8-32 machine screw, one nut, three washers, one wing nut
- 10—Solder lugs
- 1—Whip antenna
- 1—4 inch square (or any convenient size) of PC board material
- 1—Coax connector



DETAIL A



NOTE:
B = 1' SECTION OF 3/4" PVC.

Fig. 1—Overall plan for PVC vertical antenna.

our, designing as I went along. Refer to Fig. 1 for the antenna layout and Table I for parts list and the lengths of wire needed for the radiator and radials.

The antenna is constructed by cutting 40 foot lengths of 3/4 inch PVC in half to yield two easily carried 5 foot sections. If the ends of your PVC are not already flared to accept another length of tubing, cement a double female coupler to one end of one 5 foot section and cement a connector with threads on the other end. This becomes

the bottom section, and the top 5 foot section has neither a flare nor a coupler attached to it.

The 20 meter radiator is wound with 8 feet of wire on each of the top and bottom sections. The 30 and 40 meter radiators, however, share the same bottom section containing 33 feet of wire. The 30 meter top section has 13 additional feet to equal a half wave of wire (46 feet at 10 MHz), and the 40 meter top section has 33 more feet (66 feet at 7 MHz).

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Model	Pin (W)	Pout (W)	Ic (A)	Gain/NF (dB)	(13.6 V) Type
50 MHz					
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	10	400	60	15/0.6	HPA
0550RH	10	400	60	—	Repeater HPA
0552G	25-40	400	55	15/0.6	HPA
0552RH	25-40	400	55	—	Repeater HPA

144 MHz					
1403G	1-5	10-50	6	15/0.6	LPA
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	10	400	54	15/0.6	HPA
1450RH	10	400	54	—	Repeater HPA
1452G	25	400	50	15/0.6	HPA
1452RH	25	400	50	—	Repeater HPA
1454G	50-100	400	45	15/0.6	HPA
1454RH	50-100	400	45	—	Repeater HPA

220 MHz					
2210G	10	130	20	12/0.7	Standard
2210R	10	130	19	—	Repeater
2212G	30	130	16	12/0.7	Standard
2212R	30	130	15	—	Repeater
2250G	10	220	42	14/0.7	HPA
2250RH	10	280	45	—	Repeater HPA
2252G	25	220	36	14/0.7	HPA
2252RH	25	280	40	—	Repeater HPA

440 MHz					
4410G	10	100	19	10/1.1	Standard
4410R	10	100	18	—	Repeater
4412G	20-30	100	19	10/1.1	Standard
4412R	20-30	100	18	—	Repeater
4450G	10	175	34	12/1.1	HPA
4450RE	10	175	34	—	Repeater HPA
4452G	25	175	29	12/1.1	HPA
4452RE	25	175	29	—	Repeater HPA



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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



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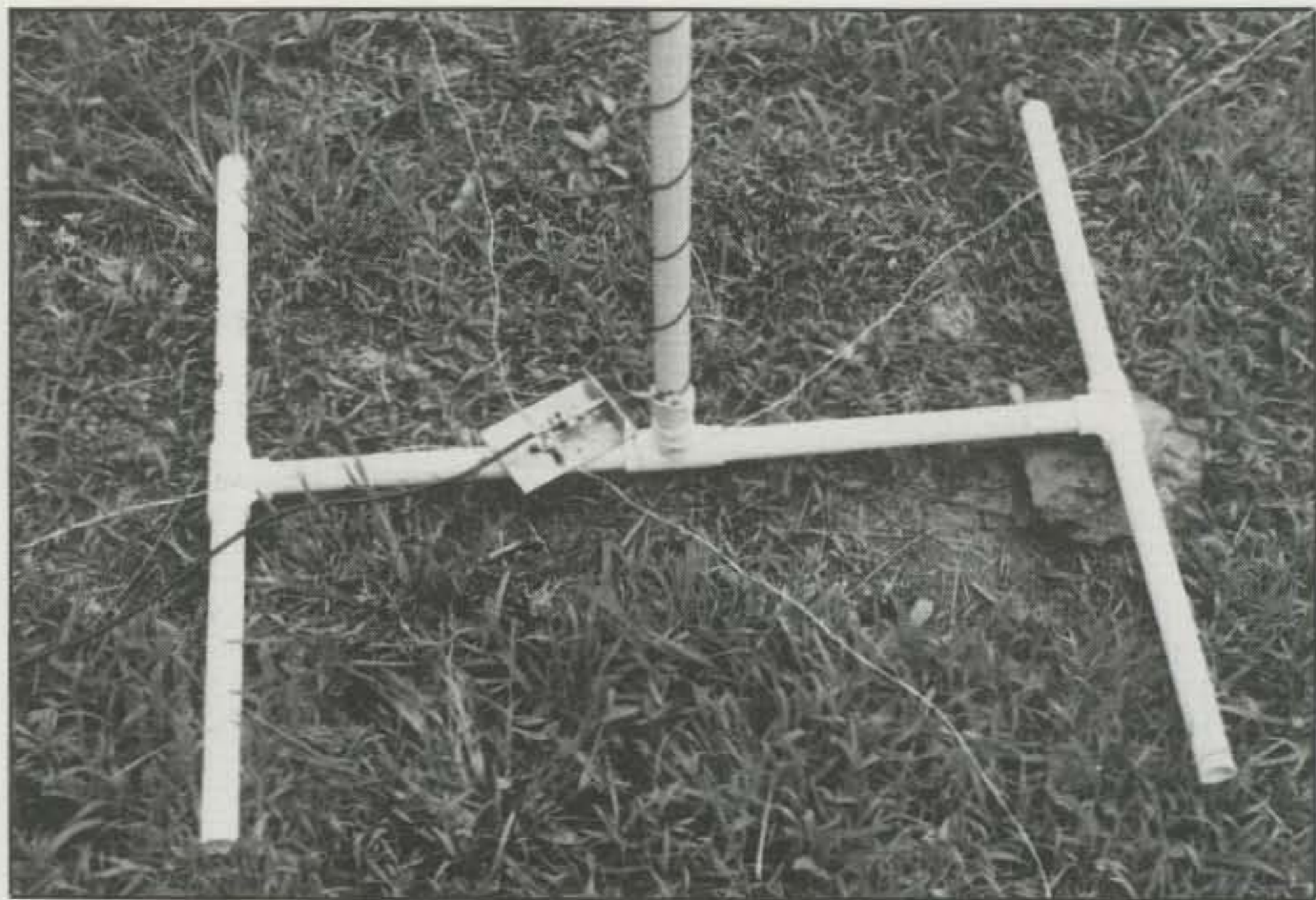
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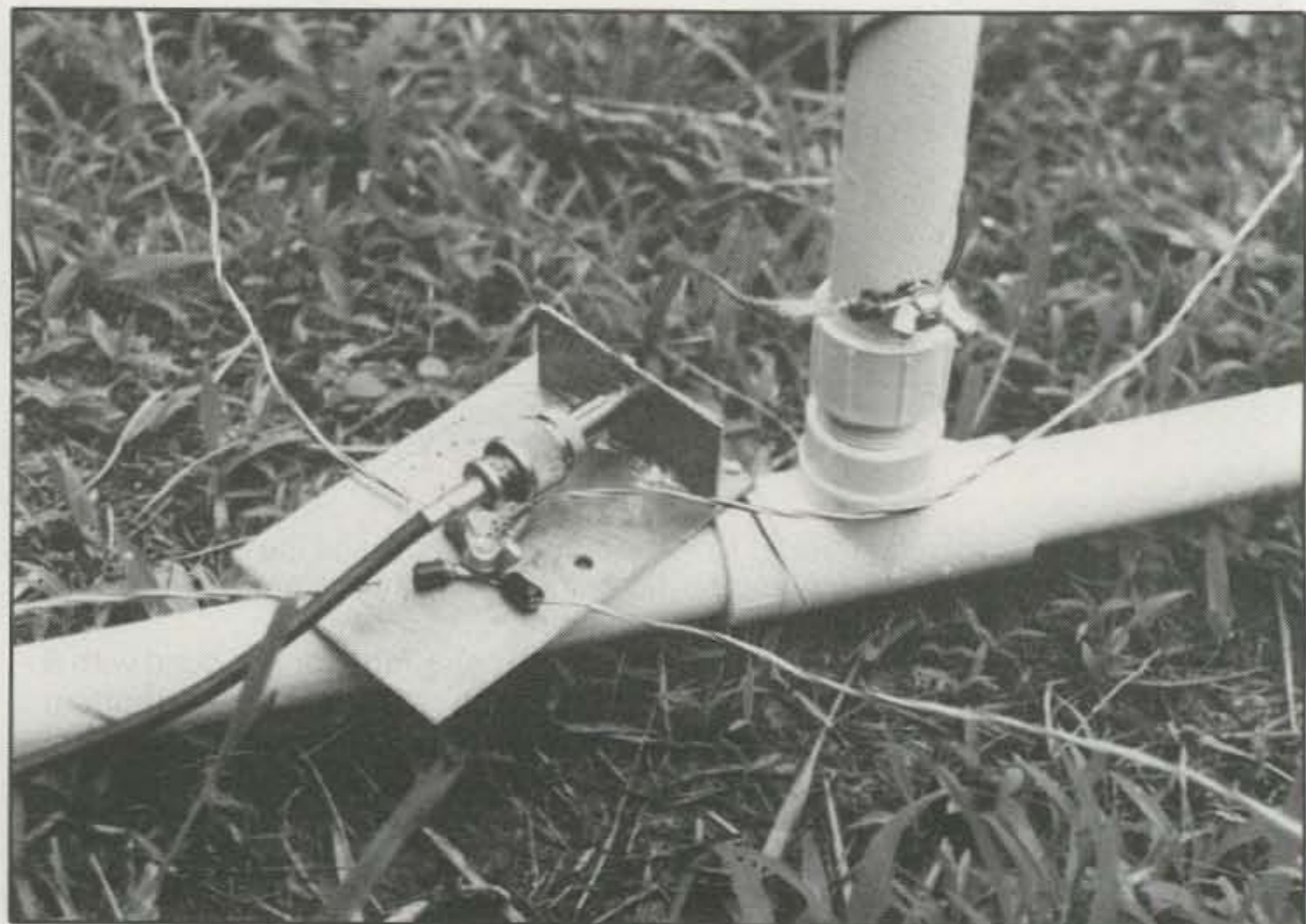
The base section of the vertical antenna.

There is no secret to winding the 5 foot sections. It is done by trial and error. The exact spacing between each winding, and whether you make it to the end of the pole with too little or too much wire, depends on the type of wire used and, frankly, how many times you are willing to start over. I finally came within 3 inches of the top of the five section before I ran out of wire, so I simply drilled the hole for the mounting screw at that point. Changing the spacing and pitch of the windings to aid in the effort to come out even at the top does not impair antenna performance. The telescoping whip antenna is attached to the top section by means of an automotive hose clamp for adjusting the antenna to its

lowest SWR reading in the desired portion of the band. The whip also forgives imprecise wire length used in winding.

The windings are anchored at each end of the pipe by attaching the wire to a machine screw which is inserted in a hole that is drilled through the pipe. Once the two sections are wound, they are joined together by inserting the end of the top 5 foot section into the flared or coupler end of the bottom section. Friction holds the two sections together nicely. This is an intentionally temporary arrangement, as the antenna is designed for portable operation and quick set up.

A short jumper of wire or grounding braid with a solder lug on each end is fas-



Close-up view of base connections and method of attaching the radials. (See text.)

tened to the top mounting screw of the bottom 5 foot section and the bottom screw of the top section. This jumper electrically joins the two halves of the antenna, and a similar jumper connects the coax connector to the base of the antenna. For swift setup I use a wing nut for attaching the jumpers.

The antenna base is simply six 1 foot lengths of tubing joined by "T" couplers. The threaded connector on the bottom radiator section is easily screwed into its corresponding coupling in the center of the antenna base. This coupling is a "T" coupling, one part of which has internal threads intended to accept a riser and sprinkler head.

The antenna base is basically 2 feet square and is adequate to support the antenna on level ground. If you have a rock or brick handy to weight the base, the antenna will resist the worst wind a field day has to offer!

You will be spared a headache later if you note that only a few couplers used on the antenna are actually glued to the tubing. The threaded and double female couplers are cemented to the bottom radiator section, and the center and end couplings of the antenna base are glued to the two center 1 foot lengths of PVC. This is necessary or the PVC will rotate within the antenna base couplings and fall over. Use rubber cement for this application, but remember not to cement the top radiator section into the bottom section coupler. Otherwise the antenna will not be collapsible.

The radials and coax terminate in a 4 inch square of PC board material. I drilled two holes, one to mount a coax connector and the other for a screw to hold the PC board to the antenna base and the radials to the PC board. The coax terminates in a connector, and a jumper connects the center conductor of the coax to the screw through the bottom of the base radiator section. A wing nut is handy at this location also.

A coat or two of spray lacquer will keep the windings in place. Do not spray the screws to which wires and jumpers are connected as this will jeopardize the electrical connection necessary at this point.

Tune-up and Operation

Once the antenna is constructed, set it up for one band, attach all the radials and whip, and apply power to it (very little power, so as not to cause interference). Determine the frequency at which the SWR is the lowest. Lengthen the whip if resonance is too high, and conversely, shorten it if resonance is too low. You may use one whip for all bands if you note its length for each band. No tuner is necessary, and the bandwidth of the antenna is broad enough for operation throughout each band. Repeat this process for each band.

Band (meters)	Bottom Section (feet)	Top Section (feet)
20	8	8
30	33	13
40	33	33

Radial Lengths (two each)	
20	16
30	23
40	33

Table 1- Antenna wire lengths.

Don't be surprised if you make very easy and pleasant contacts with this antenna. I was thoroughly gratified by its performance. At home, before leaving on my vacation, I had no trouble at all making good, solid contacts. Once in the mountains, I was able to set up the antenna and apply power to it in less than 10 minutes, including setting up my homebrew transmitter, receiver, 30 watt amp, and keyer. My first contact was with a fellow in Maine. I had many more, despite a nasty solar flare the week before, but I was completely satisfied after the first QSO.

The antenna is disassembled and in my garage awaiting our next vacation, but it is ready to go any time. Now I have my eye on that rack of PVC again, and a collapsible 10 or 12 meter beam may be in the trunk on the way to the mountains next year!



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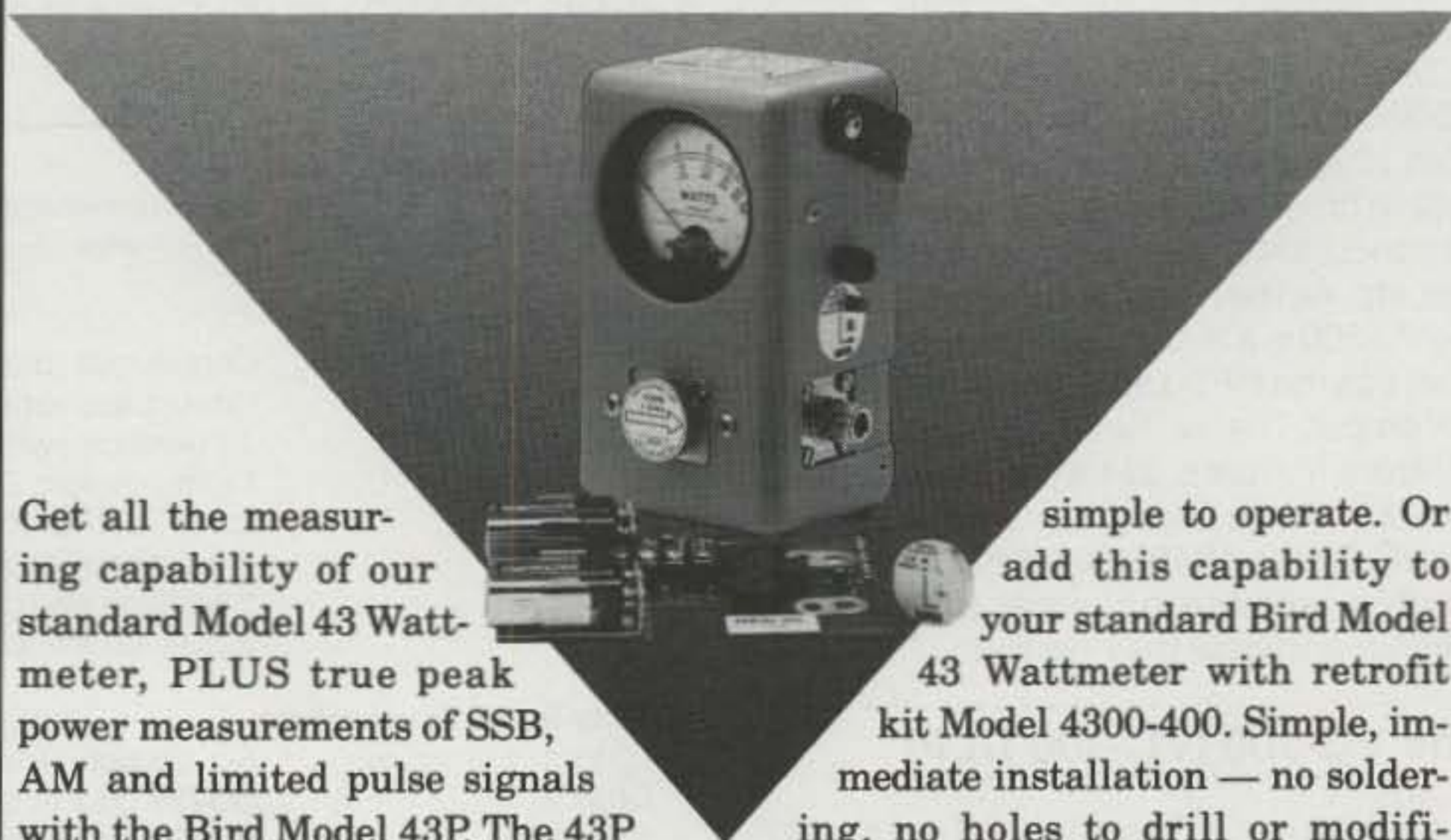
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CQ REVIEWS:

The Vectronics VC-300 and HFT-1500 HF Antenna Tuners

BY JOHN J. SCHULTZ*, W4FA

Although the company name "Vectronics" may not strike most amateurs as familiar, the company has been around for some years selling HF products directly or supplying various HF products to U.S. manufacturers for marketing under the U.S. manufacturer's name. Well, nothing wrong with that.

Paul, VE3UP, and Jim, VE3DSR, the driving forces behind the firm, are old Collins Radio hands. I can only very slightly edge them out on being licensed the longest. They were licensed in 1952 and 1953, respectively, whereas I was licensed in 1950. How about that? Well, it really doesn't have much to do with antenna tuner products, but it makes for a bit of nostalgia.

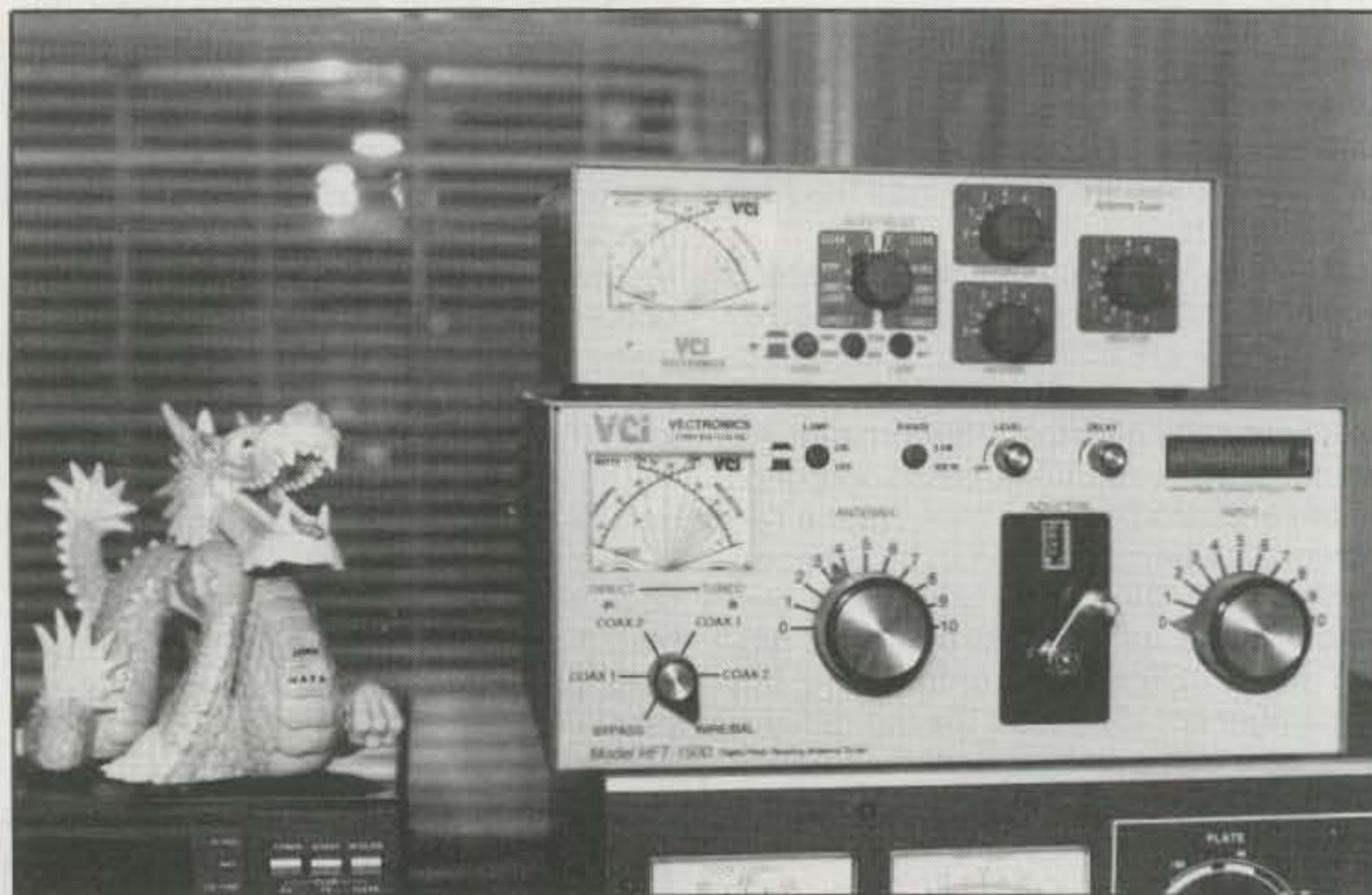
The purpose of this article is to review two Vectronics antenna tuner products which they have decided now to market directly. Neither of the products is exactly a copy of their previous designs. Both are strictly stand-alone designs with various new features.

The two tuners to be presented are the VC-300 (VC-300 DLP) and the HFT-1500. Both tuners cover 160-10 meters, have built-in cross-needle SWR/power meters, switched antenna selection, built-in baluns, etc. As the "numbers" might indicate, the VC-300 is a 300 watt output class tuner whereas the HFT-1500 is designed for 1.5 KW output. The two tuners do have various different features, as I'll cover. However, their attractive price class at \$130.00 for the VC-300 and \$400.00 for the HFT-1500 surely makes one curious as to what they contain and how they perform.

The VC-300 (VC-300 DLP)

The VC-300 is the basic tuner. The VC-300 DLP is the same tuner but with a built-in dummy load, selectable peak/average reading for the meter, and a lamp on/off switch for the meter.

Table I presents the specifications for the VC-300 DLP in case you would like to obtain some idea of its antenna switching



The VC-300 DLP stacked on top of the HFT-1500. The station "mascot" to the left is 6 inches high to the tip of its nose to give you some idea of the size of the tuners.

Front-Panel Indicators

Meter Dual-movement D'Arsonval lighted cross-needle power and SWR meter

Front-Panel Controls

Transmitter Tuning Continuous rotation capacitor
 Antenna Tuning Continuous rotation capacitor
 Inductance 12 position switched inductor
 Output Select Eight position: DIRECT coax 1, coax 2, bypass and dummy load; TUNED coax 1, coax 2, wire and dummy load
 Range 2 position switch: 30W/300W
 Meter 2 position switch: PEAK/AVG
 Lamp 2 position switch: ON/OFF

Rear-Panel Connectors

Coax 1 SO239 connector
 Coax 2 SO239 connector
 Bypass SO239 connector
 Transmitter In SO239 connector
 Balanced Line Dual banana jack
 Wire Banana jack

Other

Frequency Coverage 1.8-30 MHz
 Power Maximum 300W continuous
 Dimensions 3.5"H x 10.2"W x 9.4"D
 Weight 3.6 lbs.

Table I- Specifications for the VC-300 DLP.

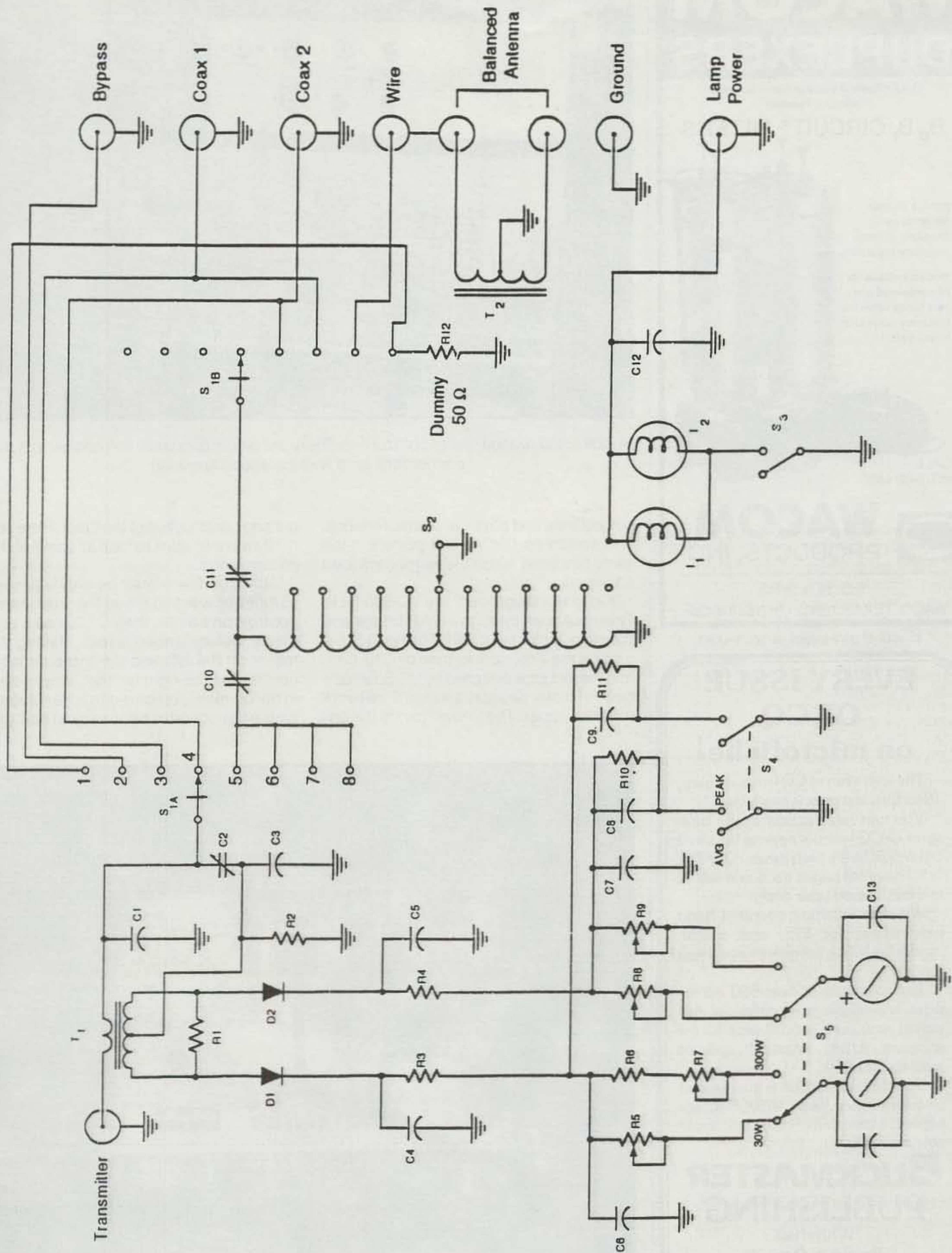


Fig. 1- Diagram of the VC-300 DLP. Note that the VC-300 is the same except for the lack of the dummy load resistor, S3, S4, and the components associated only with S3 and S4.

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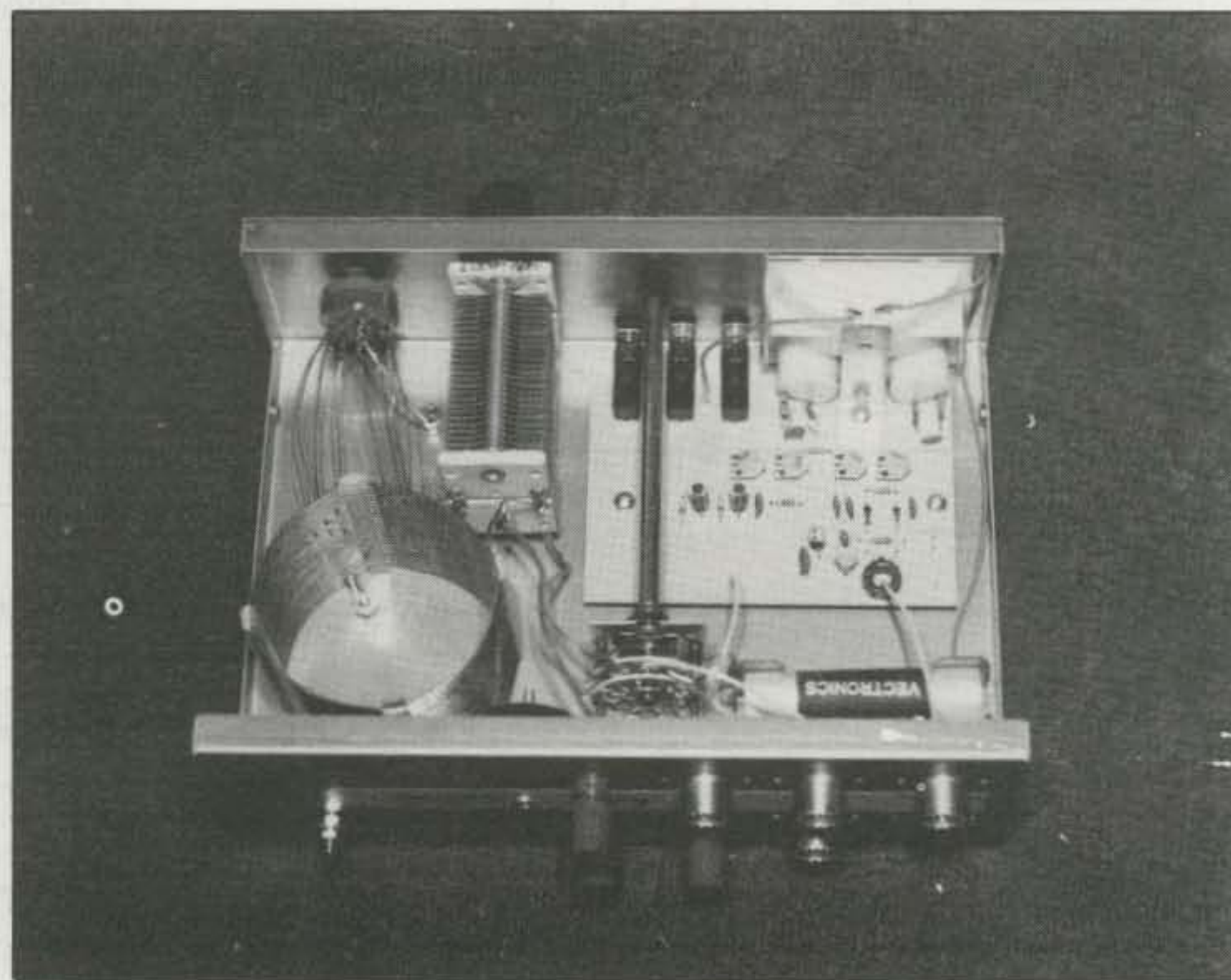
A look at the rear panels of both tuners. There are plenty of coaxial line connectors plus connectors for a wire/balanced line load.

possibilities and physical characteristics. The switch on the VC-300 performs the same functions minus the two dummy load positions.

Fig. 1 is a diagram of the VC-300 DLP. The input goes through a SWR bridge and then to selector switch S1. The heart of the tuner is the T network formed by C10, C11, and the inductor switched by S2. So what's new? It looks like just another T network tuner on paper. The "new" part is the lay-

out and construction of the tuner. Here you really have to start to look at some of the photographs.

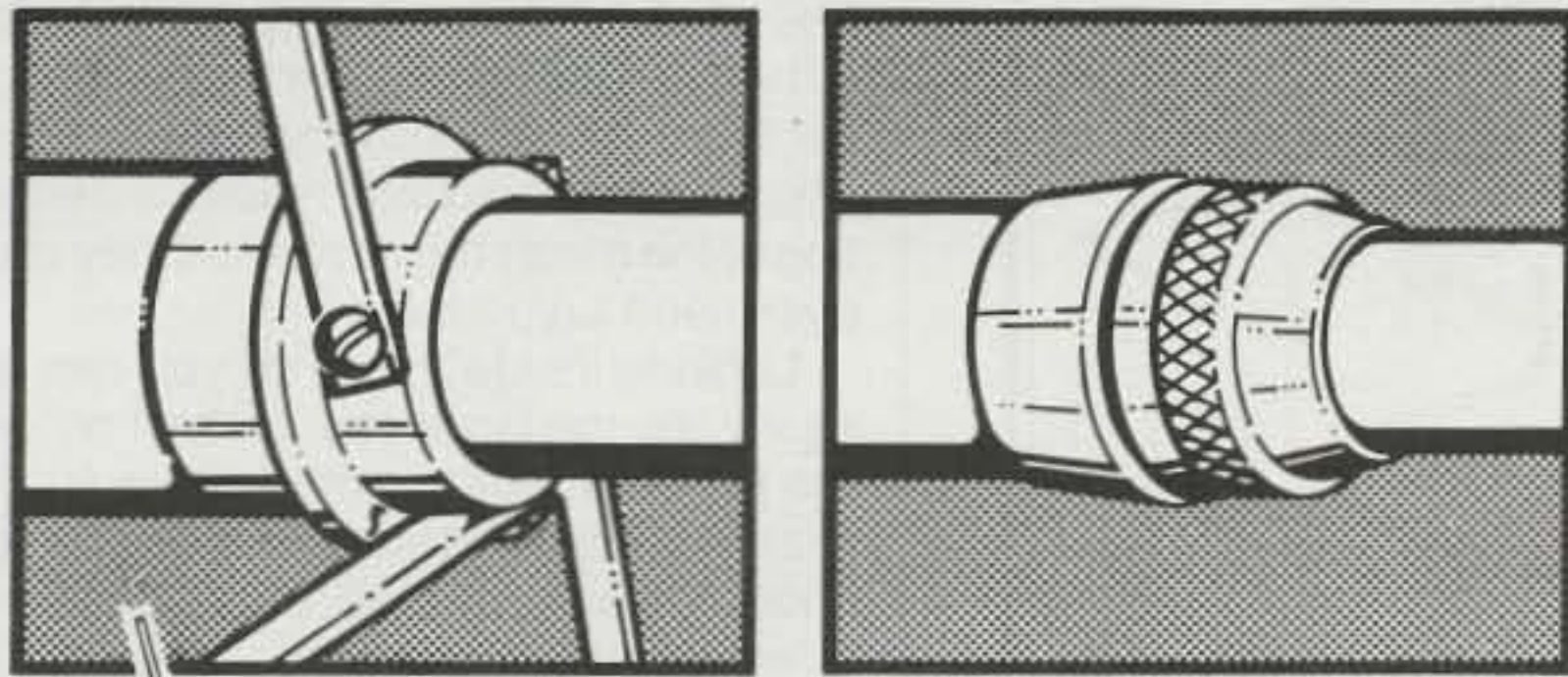
Although there may be only a limited number of ways to place the front-panel controls on a tuner, the VC-300 has a very clean, well-balanced layout. Having the meter on the left and the three variable controls on the right is "the" way to do it in my opinion, compared to tuner layouts where the operator has to adjust controls



A look inside the VC-300 DLP. The large T network coil is obvious on the left and the non-inductive resistor on the right with the name Vectronics on it is the dummy load

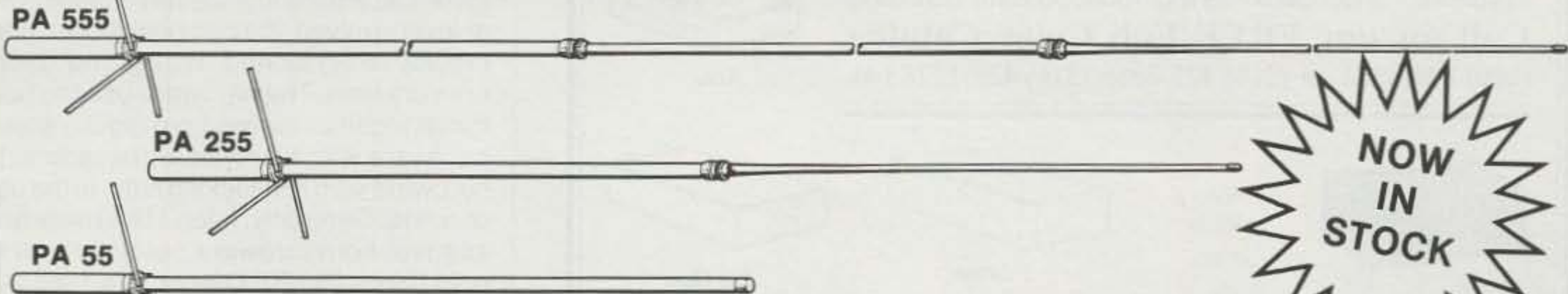
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PA 255	2m/70cm	6.0dB	8.0dB	200	98.4	UHF	112	2m:2-5/8λ, 70cm:4-5/8λ
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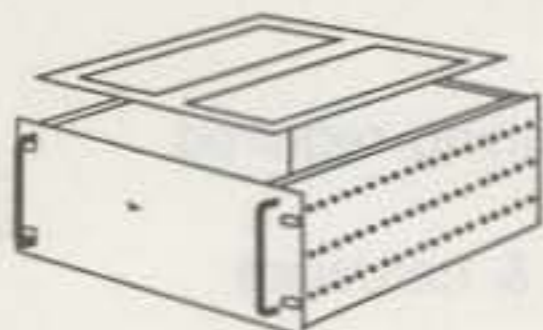
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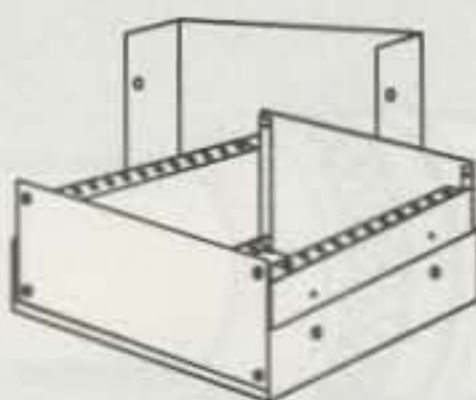
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placed on either side of a meter. The lettering on the front panel is very clear, and the panel sports a Lexan scratch-resistant finish which is unusual for its price class. The black fields around the controls stand out very nicely against the matte, light-gray background. Another thoughtful feature was to provide access holes for zero setting of the meter movements if they should ever need adjustment.

Looking inside the tuner you can fairly easily see the large coil for the T network, the PC board for the meter circuitry, the rear-mounted switch to keep lead lengths short, the dummy load, etc. Unfortunately, what you can't see until you get right up to the unit are the finer details. For the power level involved, the components are generously dimensioned. Wiring and layout are very neat. The hardware used to hold things together ranges from regular screw hardware with plenty of lockwashers, to hardware with self-locking nuts, to the use of rivets. Generally, I don't like rivets and suggest homebrewers not use them to hold things like RF connectors. I did talk with Vectronics, and they assured me that their machine-placed rivets were very secure. I would have to agree. I took a pair of pliers to one of the SO-239 connectors and I couldn't budge it.

Operation of the VC-300 is quite simple. It shares the good point of T network tuners in that it will match a wide range of load impedances and the somewhat difficult point that the tuning of the variable capacitors can be quite sharp at times, especially on the higher frequency bands. The latter is no problem if you log the approximate control settings. However, if you are searching to match into an unknown load, a bit of patience may be necessary.

I tried out the VC-300 running about 200 watts into it and with a reasonable assortment of unbalanced and balanced antenna loads on bands from 160-10 meters. I could always obtain a reasonable SWR match of 1:1.3 or less. Interestingly enough, there was absolutely no trace of hand-capacitance effect when adjusting the variable capacitors. It's not unusual for T network tuners to exhibit a bit of that effect, so I was rather surprised.

The knobs on the unit are what I call European style. That is, they have no side set screws, but a shaft grip tightened by a nut which is hidden under a front cap on the knob. They work extremely well, and I'm surprised they are not more common in the U.S. market. I think I first saw them in DL land some 30 years ago.

No tuner is going to couple power into any and all random antenna loads on any band, but the VC-300 is as flexible a tuner as I have seen. No component overheating was detected, but the dummy load in the VC-300 DLP is definitely intended for only intermittent use. The power scales on the meter seem to be quite well calibrated. The maximum error measured was around

We Couldn't Have Said It Better Ourselves!

FRANK W. COOPER W3NV

October 15, 1991

Mr. Bill Sattler
DX Engineering, Inc.
618 Spaulding Ave.
Brownsville, Oregon 97327

Dear Bill:

I thought you might like to hear about the results I have been having with your two super beams! As your records will show I have your 20 meter six element beam on the 58' boom and the 24 foot boom 11 element log periodic for 10,12,15 and 17 meters.

The performance has been nothing but spectacular. Words cannot describe the super results I have had with these two beams. I have heard and worked everything on the bands with only my exciter running 100 watts! Have no need for my linears even when the pile-ups for the ZA's and 3B7's were unbelievable the beams put me right through with the usual 5/9 plus reports!

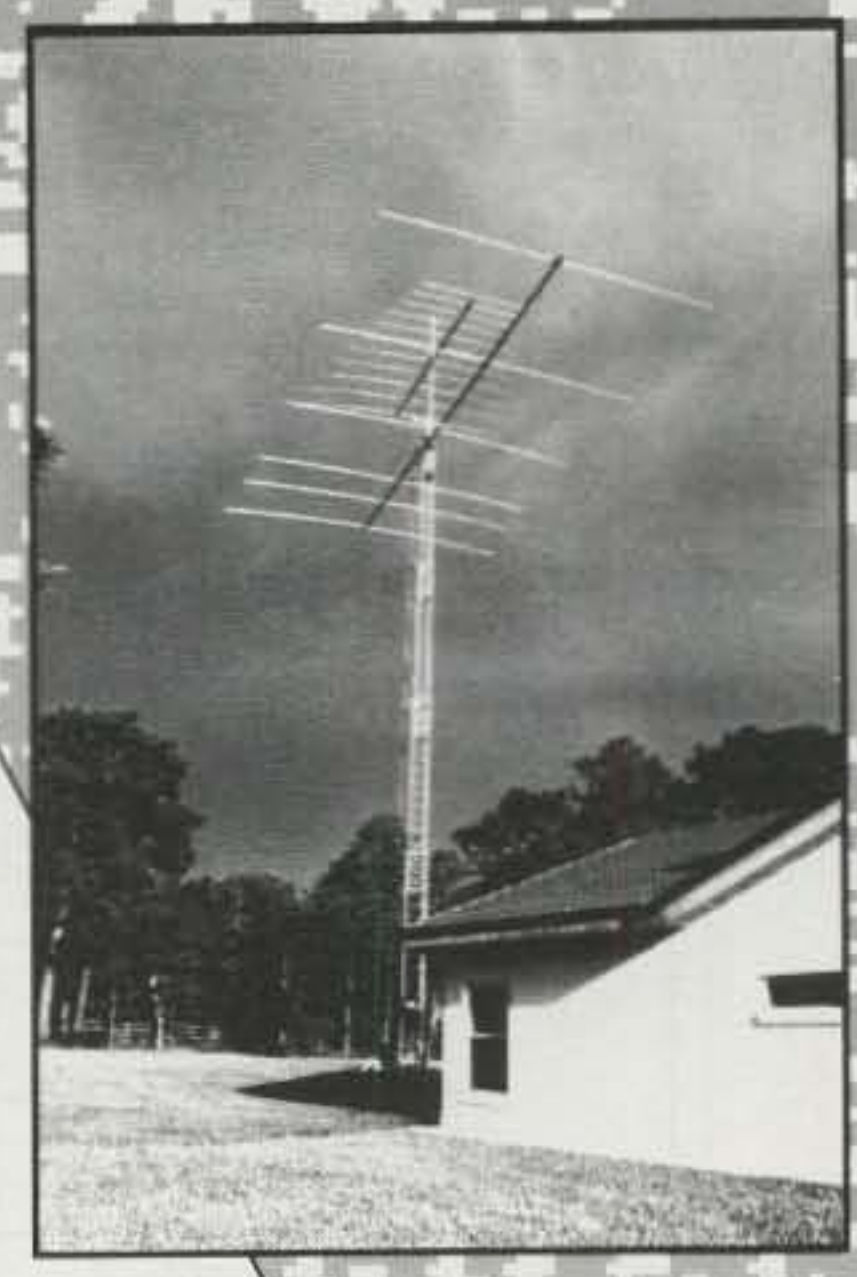
I know location is important and most Florida spots are good but believe me the beams are doing a super job and it would be remiss not to write and tell you how pleased I am with my choice of antennas! Keep up the good work!

I might mention that I am quite surprised and pleased with the performance of the Log Periodic antenna. Never was too keen on that type of antenna but it sure does a super job and makes operating four bands just great. Your new 5 band log sounds great and I might have chosen that if it was available at the time of my purchases.

I am enclosing some better photos of the beams which I thought you might enjoy seeing. Thanks again for doing such a super engineering job on the antennas and it has made my dxing a real fun part of the hobby.

73 de W3NV
Frank
Frank W. Cooper

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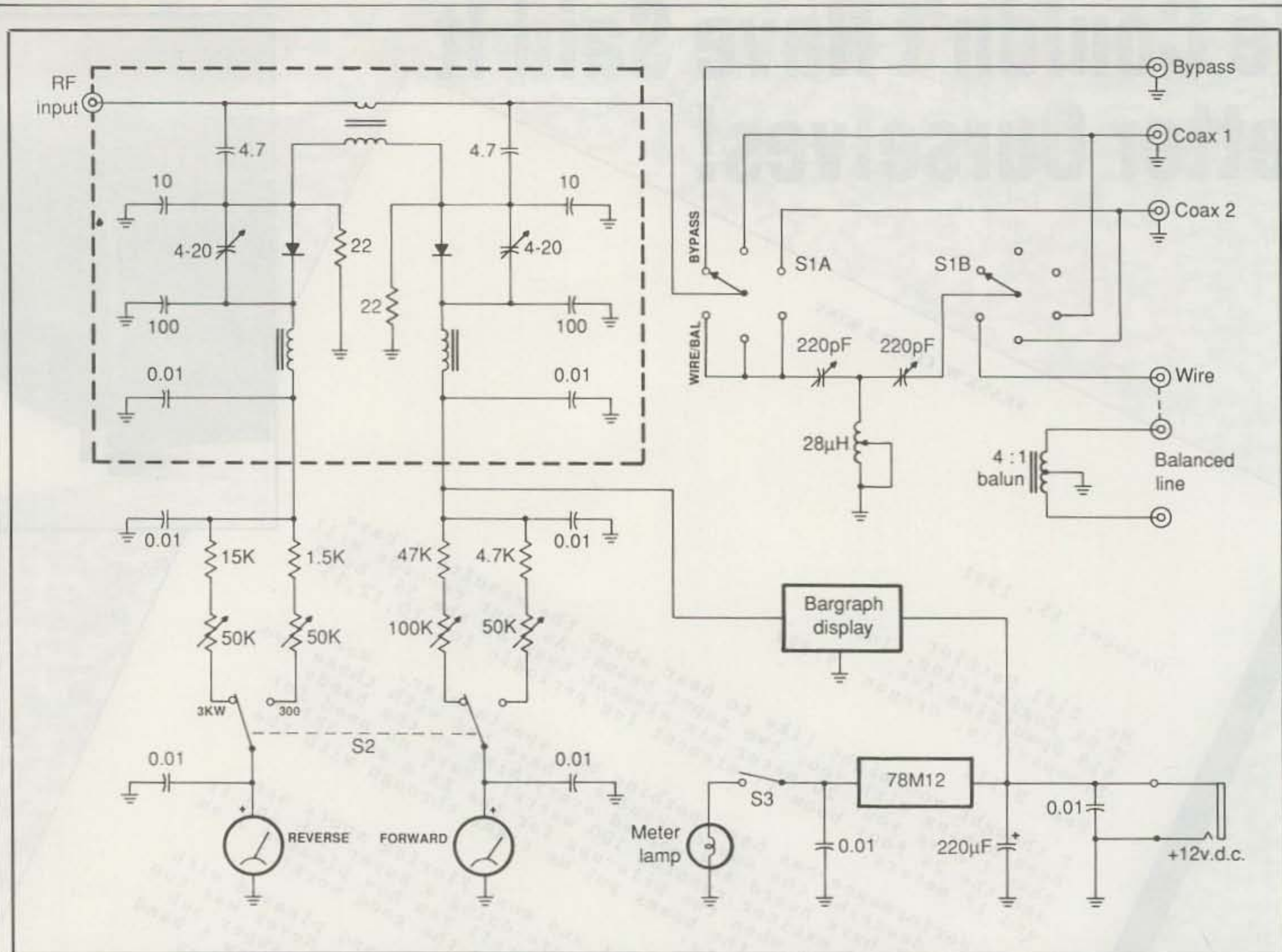


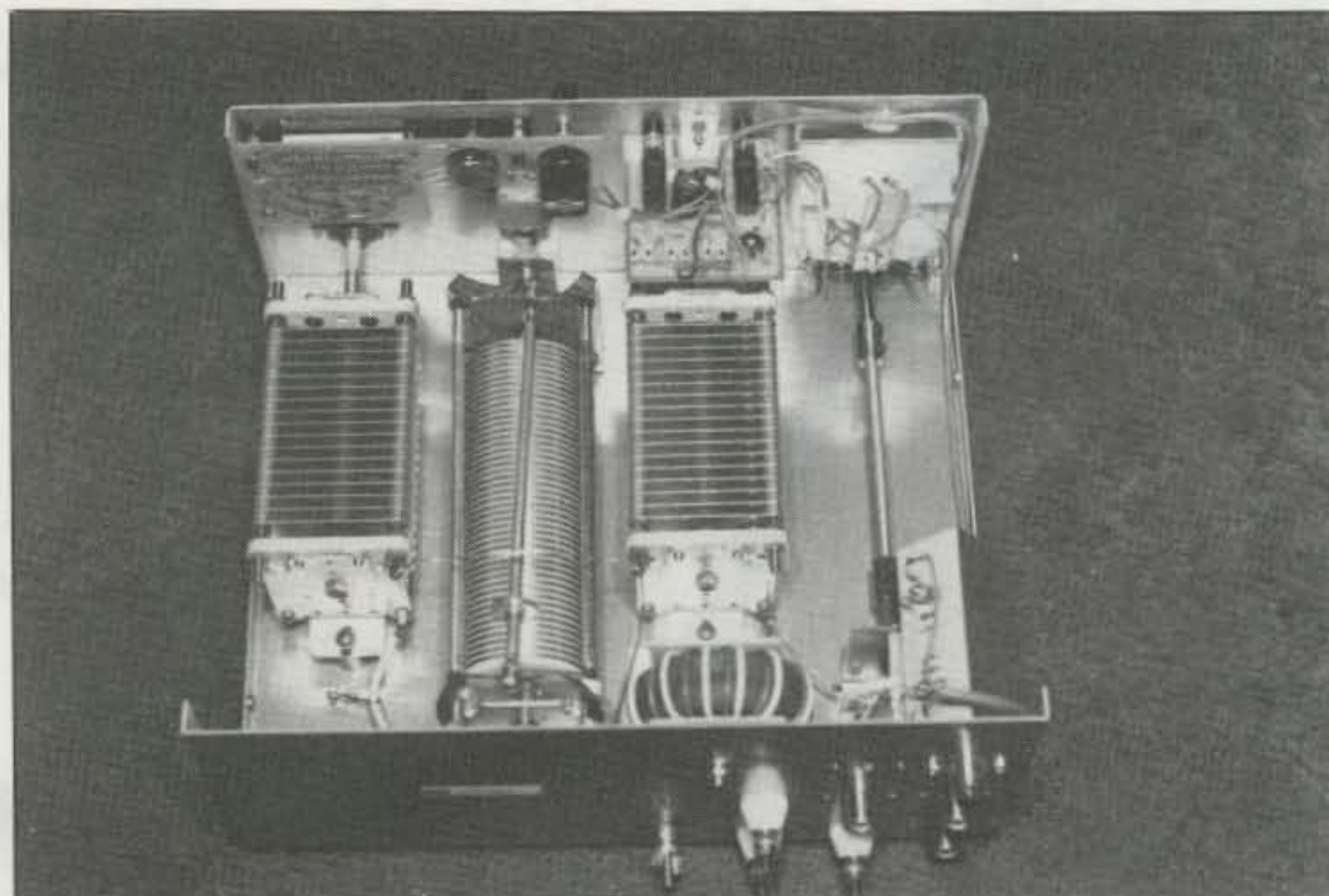
Fig. 2—Diagram of the HFT-1500. Note that the 12 VDC input is only needed if the meter lamp and bargraph display are to be active.

± 10%. The fact that the dummy load in the VC-300 can either be used direct or via the tuner's T network is interesting, since the operator can get used to using the tuner's controls without radiating a signal.

The manual for the unit runs eight pages and contains many useful hints on how to use and adjust the unit. The only fault I would find is the lack of a power/time derating curve for the dummy load in the VC-300 DLP. Overall, the VC-300 is a "handsome" tuner, if a tuner can be described that way, backed up by solid construction and the use of quality components. It probably would "fit the bill" nicely for many years of service for any station setup utilizing a transceiver that outputs up to 300 watts.

The HFT-1500

The HFT-1500 is the "heavy-weight" in the Vectronics line. The specifications are shown in Table II, and a schematic of the unit is shown in fig. 2. The HFT-1500 is basically a T network tuner, but it incorporates a number of interesting features I



A look inside the HFT-1500. The well-dimensioned size of the LC components is obvious. The shielded enclosure for the SWR bridge is on the rear right and next to it is the balanced line balun constructed from two stacked, large-diameter cores. The feed-through insulators for the balanced line output (below the balun) are made out of Delrin rather than porcelain, so they should be practically indestructible even if you tighten up things a bit too much.

Front-Panel Indicators and Controls

Meter	Dual movement D'Arsonval cross-needle power and SWR meter
Bar Graph Display	21 segment LED display

Controls

Input Tuning	Continuous rotation capacitor
Antenna Tuning	Continuous rotation capacitor
Inductance	28 uH Delrin roller inductor
Antenna Selector	6 position: Coax 1 tuned and tuner bypass, coax 2 tuned and tuner bypass, bypass and balanced antenna
Range Switch	2 position 300W/3000W

Rear-Panel Connectors

Coax 1	SO239 connector
Coax 2	SO239 connector
Bypass	SO239 connector
RF Input	SO239 connector
Balanced Line	Dual high-voltage Delrin terminal post
End-Fed Wire	Dual high-voltage Delrin terminal post

Other

Frequency Coverage	1.8-30 MHz
Power Maximum	1500 W single tone continuous, 3 KW PEP
Dimensions	5.5"H x 12.5"W x 12"D (incl. terminals)
Weight	10 lbs.

Table II- Specifications for the HFT-1500.

have not seen before in a tuner of its power/price class.

Perhaps the most notable features from an external view are the bright, clear, and functional panel layout and the logging set-

tings for the two variable capacitors and the roller inductor. Both capacitors have vernier drives, and the arrow indicator for each capacitor moves across its 0-10 scale at a much slower rate than the rota-

tion of the tuning knob for each capacitor. The vernier action almost totally eliminates the "touchiness" sometimes associated with the adjustment of the variable capacitors in a T network tuner.

The turns counter for the roller inductor reads from 000 to 460 as you traverse the 0-46 turns on the inductor. So essentially you can reset the inductor to a tenth or less of a turn with ease. The resetability reliability is greatly enhanced because the turns counter for the inductor is gear, rather than belt, driven by the shaft of the roller inductor.

The other features on the front panel include the antenna selector switch, meter lamp on/off switch, 300/3KW power range selector switch for the meter, level control, delay control, and a 21-segment LED bargraph power-output display. The level and delay controls are solely associated with the bargraph display which indicates relative peak forward power. The bargraph display segments are green except for the final one to the right, which is red. By using the level control you can adjust the red segment to illuminate for any desired output power level. The delay control sets the time hold for the display. In conjunction with the regular analog power/SWR metering in the HFT-1500, the bargraph provides a very quick and colorful indication that a given peak power level has been reached.

The front panel of the HFT-1500 has the

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BP-5	10.8v	500mah	\$21.00
BP-7	13.2v	500mah	\$23.00
BP-8	8.4v	800mah	\$21.00
BP-22	8.4v	270mah	\$22.00

KENWOOD BATTERY INSERTS

PB-21	7.2v	200mah	\$12.00
PB-21H	7.2v	600mah	\$15.00
PB24 Tabs	9.6v	600mah	\$15.00
PB-25/26	8.4v	500mah	\$18.00

YAESU BATTERY INSERTS

FNB-3/3A	10.8v	500mah	\$28.00
FNB-4/4A	12v	500mah	\$27.50
FNB-10	7.2v	600mah	\$15.00
FNB-11	12v	600mah	\$30.00
FNB-12	12v	500mah	\$30.00
FNB-17	7.2v	600mah	\$18.00

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Tempo S2/4/5 Late	500mah	\$21.00
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San-Tec #142 #144 Tabs	600mah	\$22.00
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BP-3	8.4v	270mah	\$33.00
BP-5	10.8v	500mah	\$42.00
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BP-7S	13.2v	1200mah	\$59.00
BP-8S	9.6v	1200mah	\$59.00

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BP83	7.2v	600mah	\$33.50
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FNB-12	12.0v	500mah	\$45.00
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same finish treatment as the VC-300. It looks very "smart."

Looking inside the HFT-1500, one can't help but be impressed by the spacious layout and the details of its construction. The input SWR directional coupler is housed in a separately shielded enclosure. PC boards mounted behind the front panel contain the meter calibration circuitry and the bargraph driver circuitry. The tuner, in-

cluding the analog power/SWR circuitry, will function without the need for any external power source. However, as can be seen from fig. 2, a 12 VDC external power source is required to activate the bargraph and meter lamp in the unit.

The main volume inside the HFT-1500 is dominated by the two 5 KV, 220 pF variable capacitors and the 28 uH roller inductor. Everything but everything is held se-

curely in place and varnish is even used to secure the set screws on all of the shaft couplers and various shaft nuts—a nice, careful touch. About the only thing I could find on the negative side was that while the roller inductor used very respectable #12 wire, some of the interconnecting wires between the capacitors, for instance, were only #16. I didn't find that to be consistent, although it probably makes no practical difference because of the short lengths of the leads involved.

I tried out the HFT-1500 at a KW output from a linear amplifier into a delta loop antenna on 160–10 meters, a random-length unbalanced wire antenna on 40–10 meters, and into a KW level dummy load on all bands. The unit tuned very easily indeed to an absolute 1:1 SWR due to the vernier drives on the capacitors and the sort of inherent vernier effect present in the roller inductor mechanism. There was some heating effect on a few of the active turns on the roller inductor on 10 meters, but I was putting a KW into the unit key-down. The heating effect was less than I experienced burning my fingers using 2 watt carbon resistors for low-power dummy loads. The power scales on the meters were correct to within about 10%. The greatest discrepancy I could find was that 200 watts input on the forward-power scale read out as 175 watts. One KW input read out exactly as 1 KW. The unit is rated for 3 KW PEP, and I could see no reason why it would not operate quite well at that power level.

The manual for the HFT-1500 contains some nine pages and is very complete. It contains many tips on how to use the tuner and suggested control settings for each band when you are initially trying to match into an unknown load impedance.

Overall, I would rate the HFT-1500 as an excellent tuner unit for the KW + power level. It is definitely easy to adjust, and re-setability is excellent if one logs the control settings. Its provisions for two coaxial antenna outputs plus a wire or balanced line output should satisfy most station needs.

Price Class

The VC-300 is priced at \$129.95, VC-300 DLP \$149.95, HFT-1500: \$399.95. The units have a one-year unconditional guarantee and a 30-day money-back return guarantee if ordered directly from Vecronics.

Vecronics is expanding its HF product line distribution, and it might be worthwhile to request one of their free catalogs directly from: Vecronics, 31 Estate Drive, Scarborough, Ontario, M1H 2Z2, Canada (telephone 416-289-4637). The 416 area code gets you to Ontario directly from the U.S., and it might even be less expensive to call for a minute than to spend \$0.50 on a first-class postage stamp. Times do change!

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Weight	13 lbs	15 lbs	15 lbs



Specifications:	1-1/4 METER		
	C1022-G	C2522-G	C5022-G
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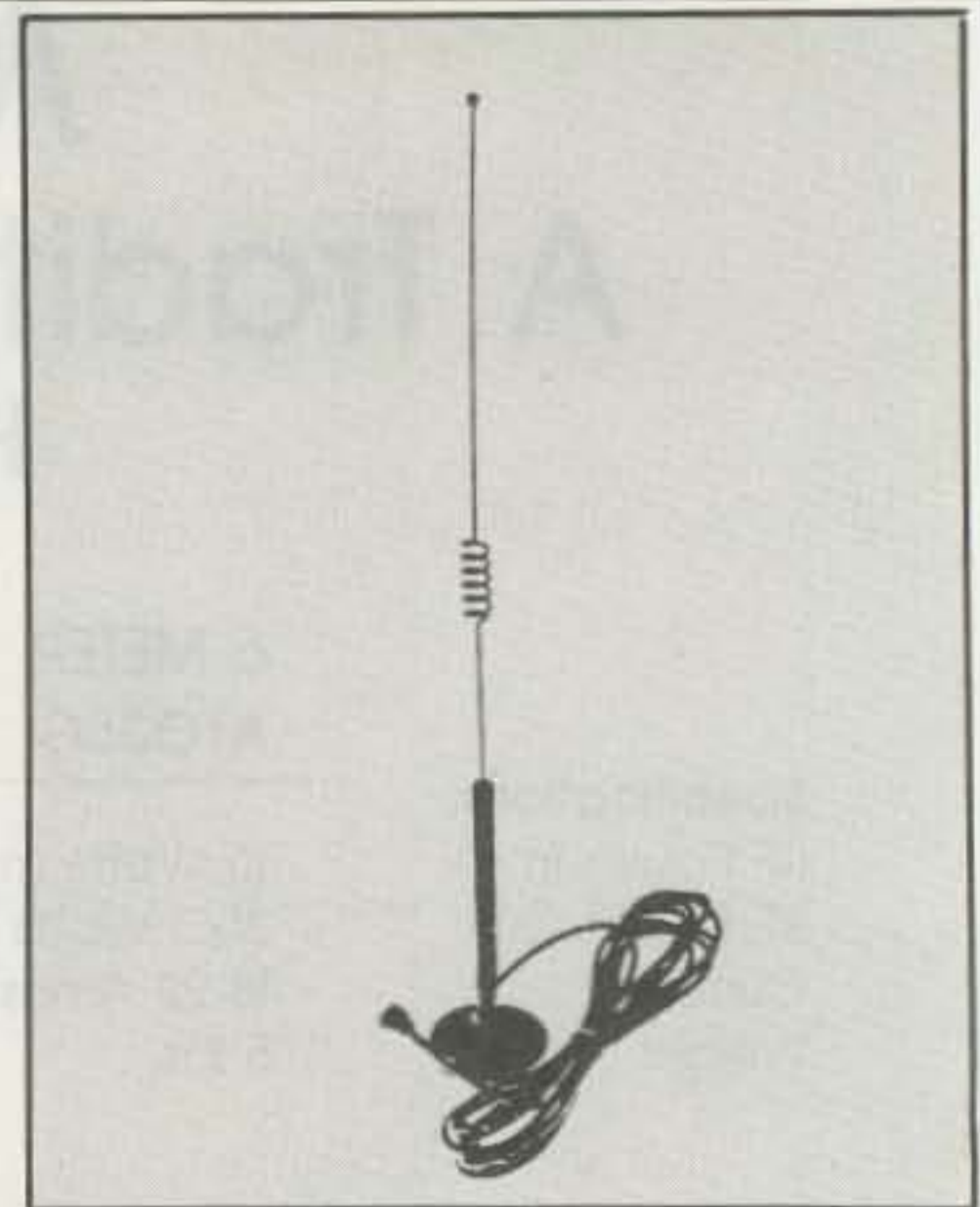
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For more information contact Susan Tracy, WA6OCV, at j•Com, Box 194, Ben Lomond, CA 95005 (408-335-9120), or circle number 105 on the reader service card.

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The antenna is available at Lakeview dealers for \$27.95. A whip can also be ordered which will fit all 3/8 x 24 TPI mounts (\$17.95; Model DBWC-1 bright chrome or Model DBWB-1 black). For more information, or to order directly, contact Lakeview Company, Inc., 3620-9A Whitehall Road, Anderson, SC 29624 (803-226-6990), or for info circle number 101 on the reader service card. (cont. on p. 56)

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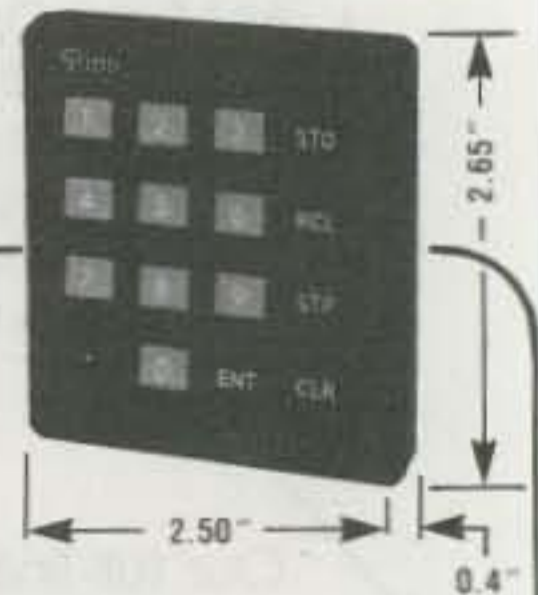
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Manual includes operating instructions, setting up your station, DX techniques, antenna suggestions, trouble shooting guide, theory of operation, alignment procedures, parts placement, schematic, parts list and more.

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MFJ Portable Antenna Tuner



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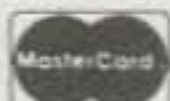
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CIRCLE 150 ON READER SERVICE CARD

Showcase (from p. 52)



STARTEK RF Detector

STARTEK International has introduced two new "ultra high sensitivity RF detector counters" with 2 inch, 10-segment LED signal strength bar graphs. The bar graph functions independently from the digital frequency counter and will indicate the relative strength of an input signal at any frequency from 500 kHz to 3.5 GHz. "Dot Graph" or "Bar Graph" operation is switch selectable and the sensitivity is adjustable. The digital frequency counter function has a range of 1 MHz to 1.5 GHz on the Model 15-BG and 1 MHz to 3.2 GHz on the Model 35-BG. The only performance difference between the two models is frequency bandwidth, and the 35-BG is more sensitive above 500 MHz.

Size is 3.4"W x 3.8"H x 1"D, and weight is 9 ounces. The 15-BG is priced at \$220.00; the 35-BG at \$265.00. A telescoping antenna accessory is \$12.00 (Model TA-90), and a vinyl carrying case is also \$12.00 (Model CC-90). For more information, contact STARTEK International, Inc., 398 NE 38th St., Ft. Lauderdale, FL 33334 (305-561-2211), or circle number 109 on the reader service card.

Sensible Solutions Version 4 WB2OPA LogMaster

Version 4 of the WB2OPA LogMaster, HF logging system for PC compatibles allows users to connect to and monitor their local DX Packet-Cluster bulletin board system while simultaneously performing logging functions. Kenwood and ICOM computer-ready radios (Yaesu and Ten-Tec are being phased in; call for availability) can have their frequency set to that of the DX "spot" announced over the cluster by pushing a button. The program also allows the user to send a DX "spot" announcement, automatically formatted, from his log book, and more.

The program requires 512K of memory, a hard drive, or dual floppy drives (at least one of the dual drives must have 720K capacity). It works with monochrome or color displays. The program is priced at \$69.95. A demo disk is available for \$5.00 (refundable with purchase). For more information contact Sensible Solutions, P.O. Box 474, Middletown, NJ 07748 (1-800-538-0001 US and Canada, or 908-495-5066), or circle number 108 on the reader service card.

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MFJ-945D **\$89⁹⁵**



Don't leave home without this mobile

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Small 8 x 2 x 6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter makes tuning easy while in motion. Has lamp switch. 1.8-30 MHz. 300 watts PEP. Mobile mount, MFJ-20, \$4.95.

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

Milestones of Amateur Radio—A Personal Voyage

Last month I discussed the evolution of the regenerative receiver, which was the mainstay of amateur communication until it was overtaken by the superheterodyne receiver in the late 1930s.

The need for a more selective receiver design was apparent well before World War I. Even in those early days of coherer and crystal detectors, experimenters were searching for a better means of reception. A spark or arc signal could be picked up on a simple detector because the inherent "buzz" modulation of the transmitter was audible. If the signal was loud enough, it was all over the dial. Two or three such signals would lock up the receiver. Receiver selectivity was an unknown commodity.

Early Attempts At Improved Reception

The new-fangled tube-type CW transmitter which showed up around 1922, as compared to the spark set, emitted a purer wave having little modulation on it, unless it was run with AC on the tube plate (which

48 Campbell Lane, Menlo Park, CA 94025

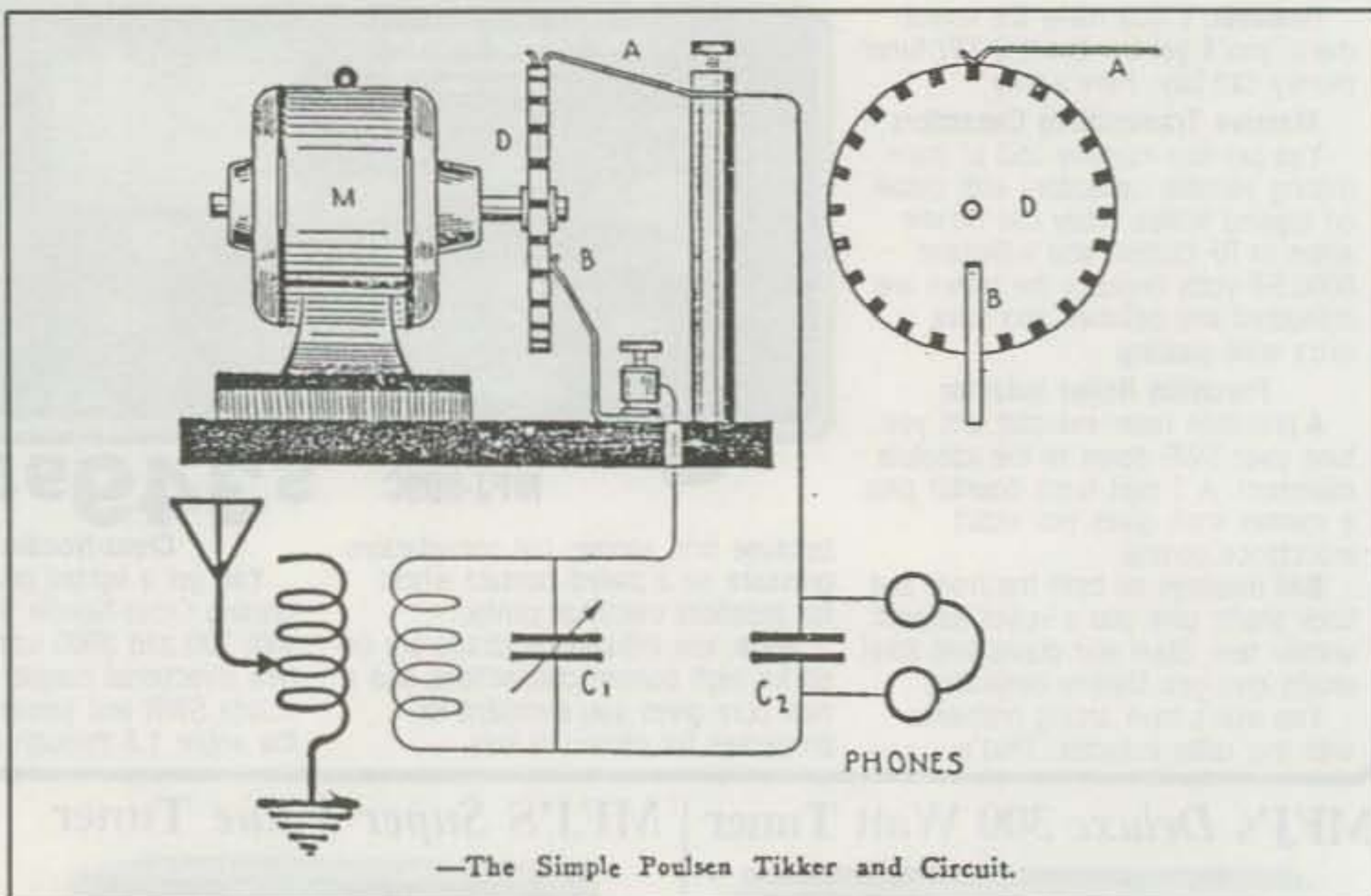


Fig. 1—A chopper wheel combined with a crystal detector was one scheme used to receive CW signals in the early days of amateur radio. The chopper was run by a small electric motor.

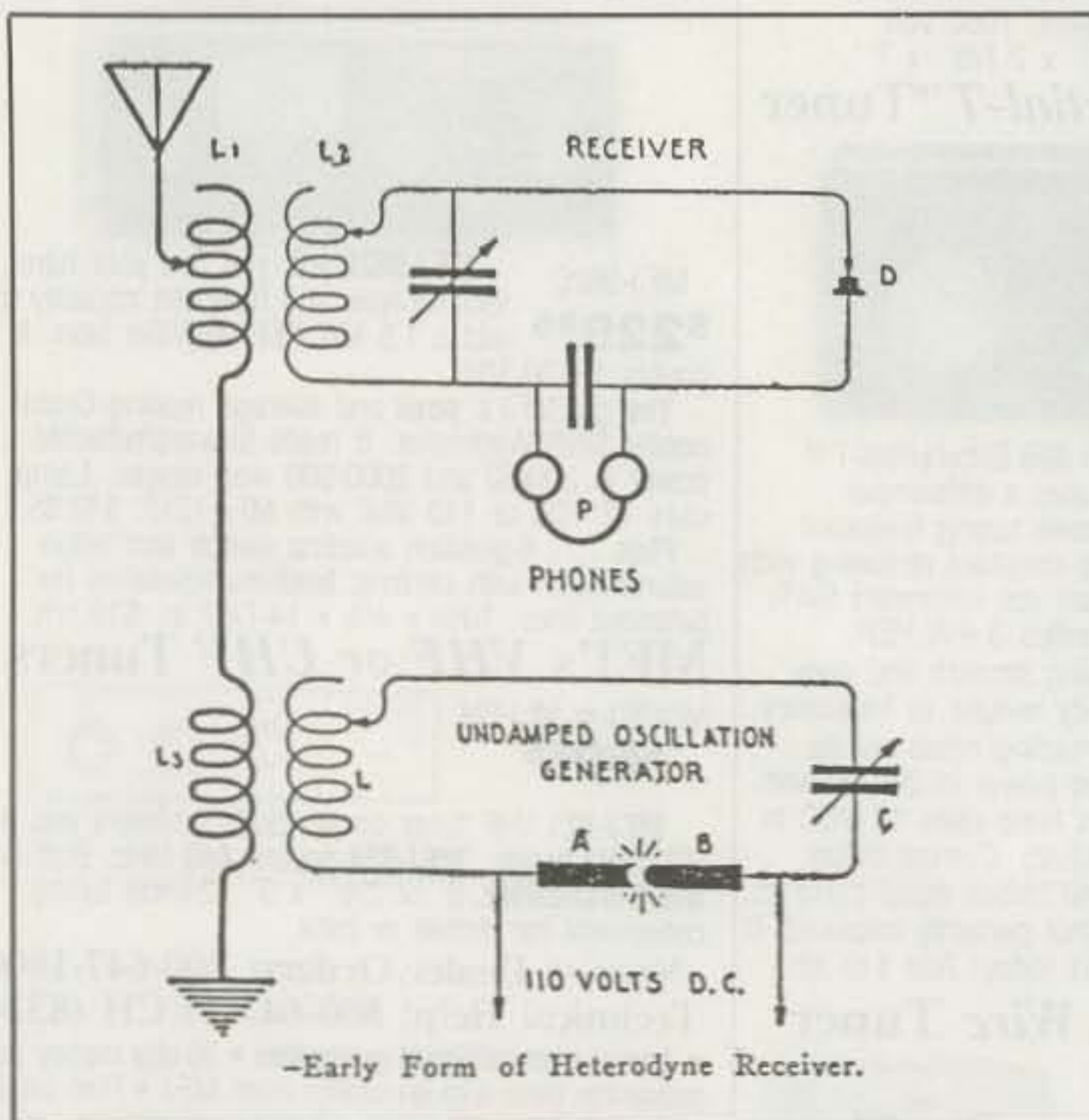


Fig. 2—Early heterodyne receiver used galena crystal for the detector and a small arc as a mixing oscillator. A setup like this must have created loud hash in other receivers for miles around!

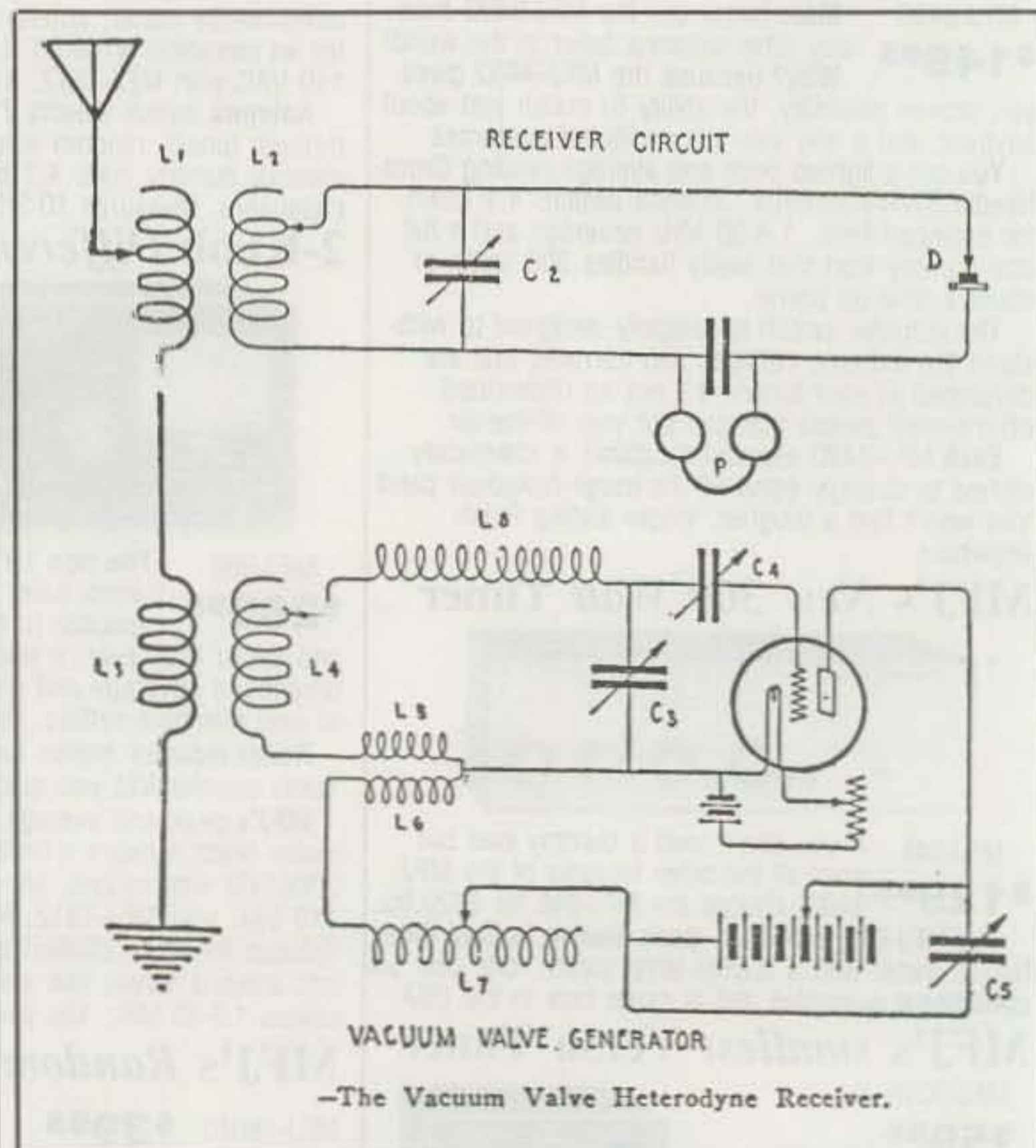


Fig. 3—Triode oscillator and crystal detector made fairly reliable autodyne receiver. This solved the problem of hearing a CW signal.

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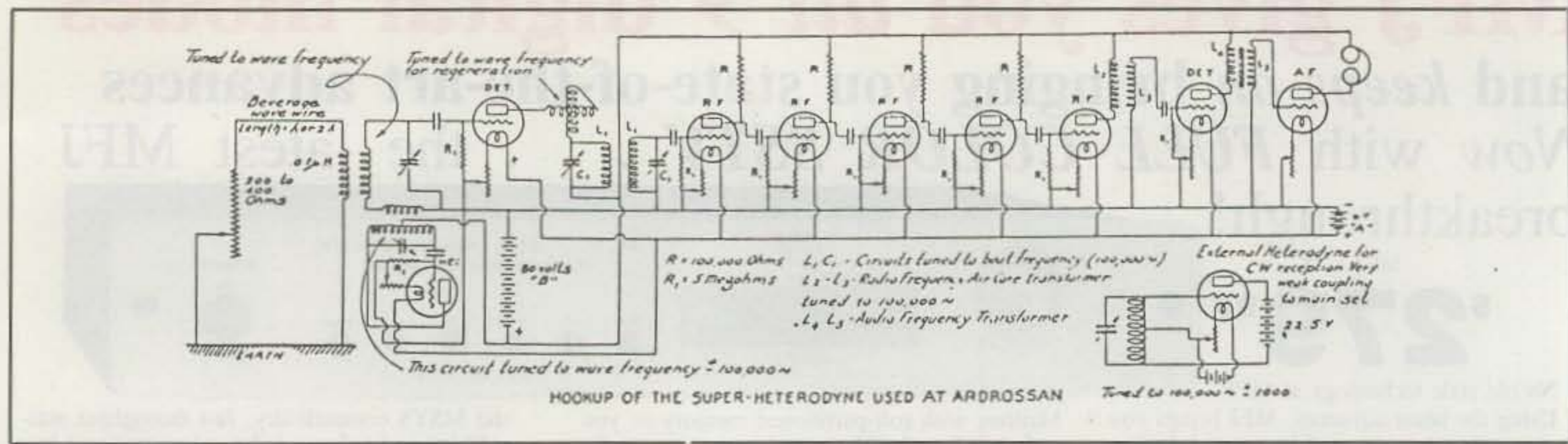


Fig. 4- The worth of the superheterodyne receiver was proven in 1921 when U.S. amateurs were picked up in Scotland by Paul Godley using this ten-tube receiver. Notice that the IF stages are resistance coupled. A long-wire Beverage antenna was used.

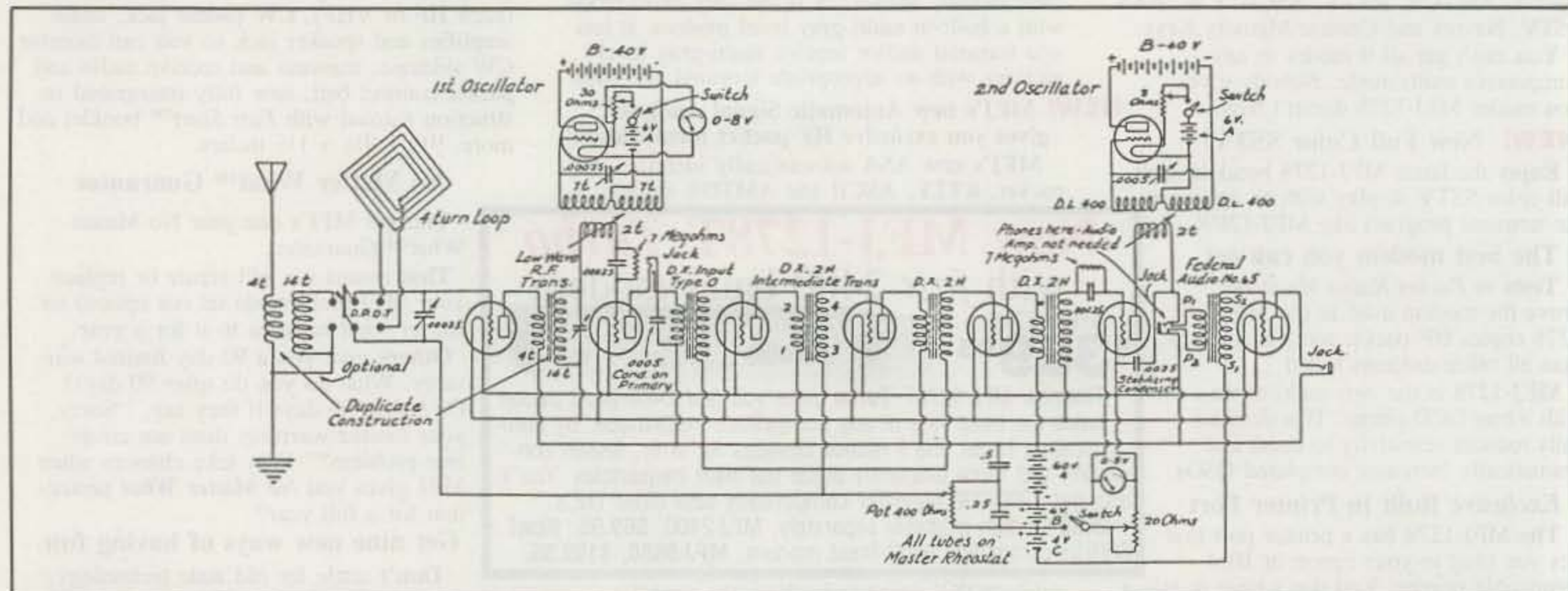


Fig. 5- Four-foot long breadboard superhet of 3XAQ had nine tubes and choice of long wire or loop antenna. A great receiver, but too expensive for most amateurs.

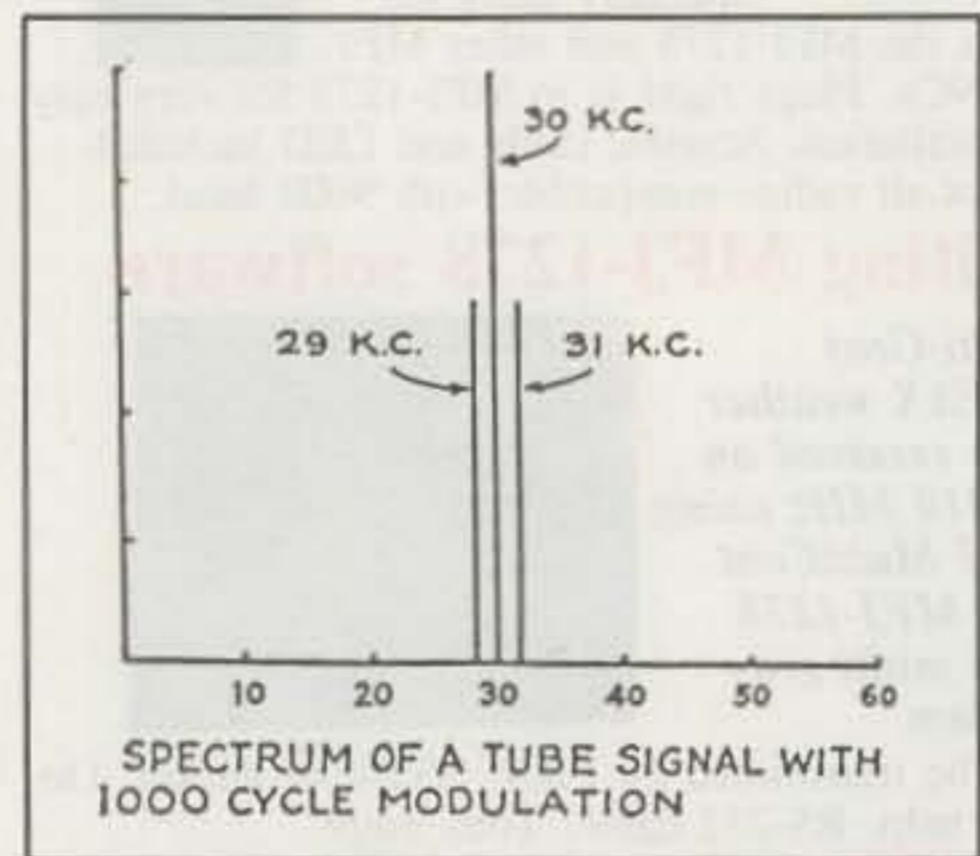


Fig. 6- During 1924 sidebands were recognized in amateur literature and the need for good IF selectivity became apparent. Early supers used IF in the 30 kHz region.

it often was). It was not easy to read on a simple detector, even with AC ripple modulation. To make the "undamped" oscillation audible, it was necessary to break up the oscillations at either the transmitter or

receiver so the resulting signal was suitable for headphone reception. A "chopper wheel" or "tikker" was one scheme to do this (fig. 1). A second technique was the heterodyne system, based upon the interaction of the received signal with a locally generated signal. This could be a small arc oscillator (fig. 2) or a "vacuum valve" (fig. 3). In either case, the local oscillator was tuned about 1000 Hz from the oncoming signal to produce an audible beat-note in the headphones. (The modern version of this scheme is the "autodyne" receiver.)

This solved the problem of hearing a CW signal, but added nothing to the selectivity or sensitivity of the receiver. Regeneration was one answer to this problem, but there was a better solution on the horizon.

Major Armstrong and The Superheterodyne Receiver

Major Edwin H. Armstrong, a ferocious genius of the early century, is not only credited with the invention of the regenerative

receiver, but also with creation of the super-regenerative receiver and the superheterodyne receiver. At a later date another of his creative contributions was broad-band frequency modulation, the backbone of today's FM broadcast system.

The second of his great contributions was the system of superheterodyne reception, the concept of beating two high frequencies to obtain a low-difference frequency that could be detected by available equipment. It came about in the following manner.

During World War I the major speculated that German bombers attacking England could be fired upon more accurately if they could be located by radio picking up and zeroing-in on their ignition noise radiation. The frequency content of the ignition noise was very high for those days (peaking at around 40 MHz) and could not be picked up by the then existing receivers

Armstrong's experience with the heterodyne receiver led him to conclude that a very high frequency signal (40 MHz) could be mixed with a nearby, locally generated signal of, say, 40.150 MHz, the re

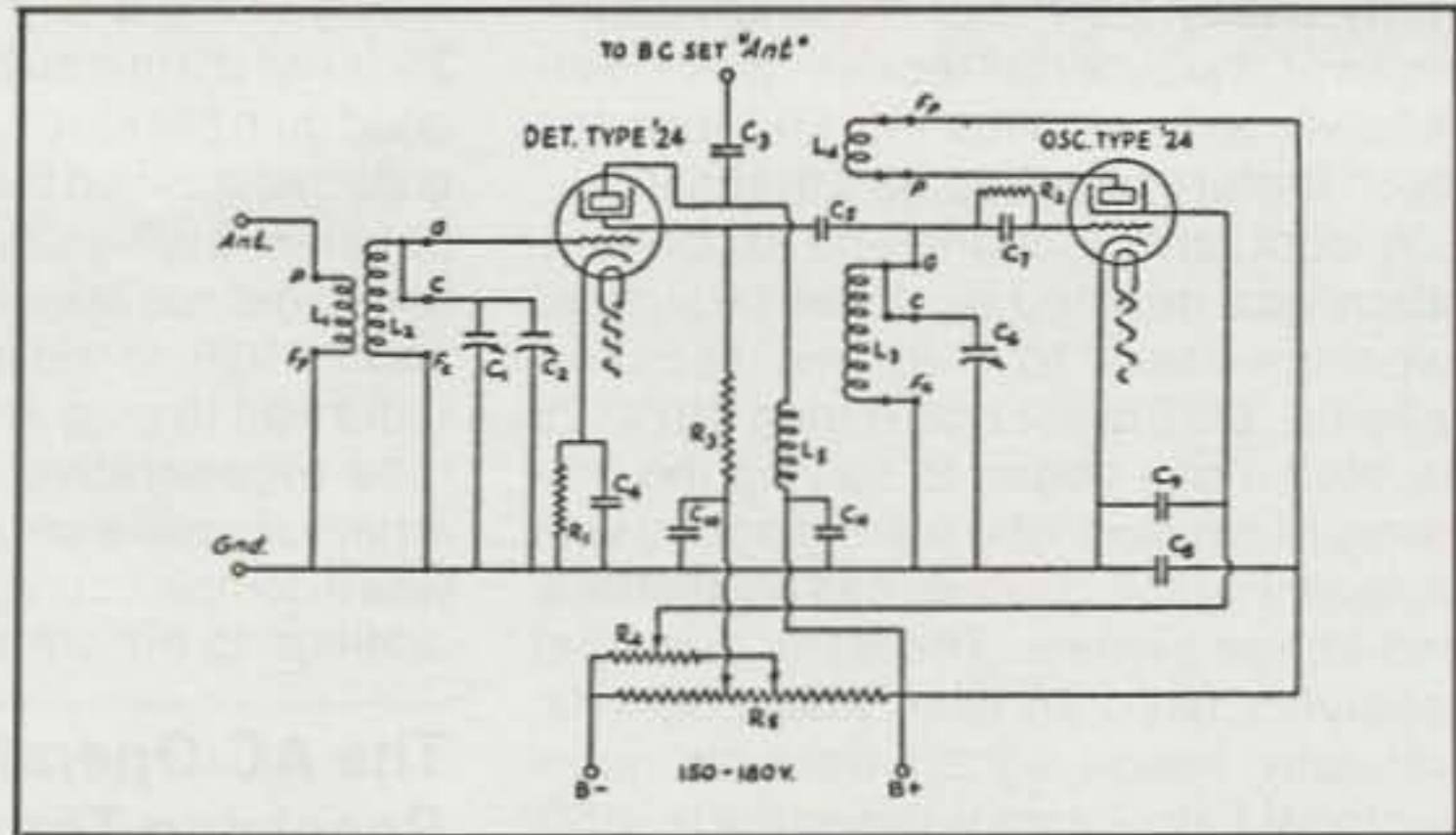
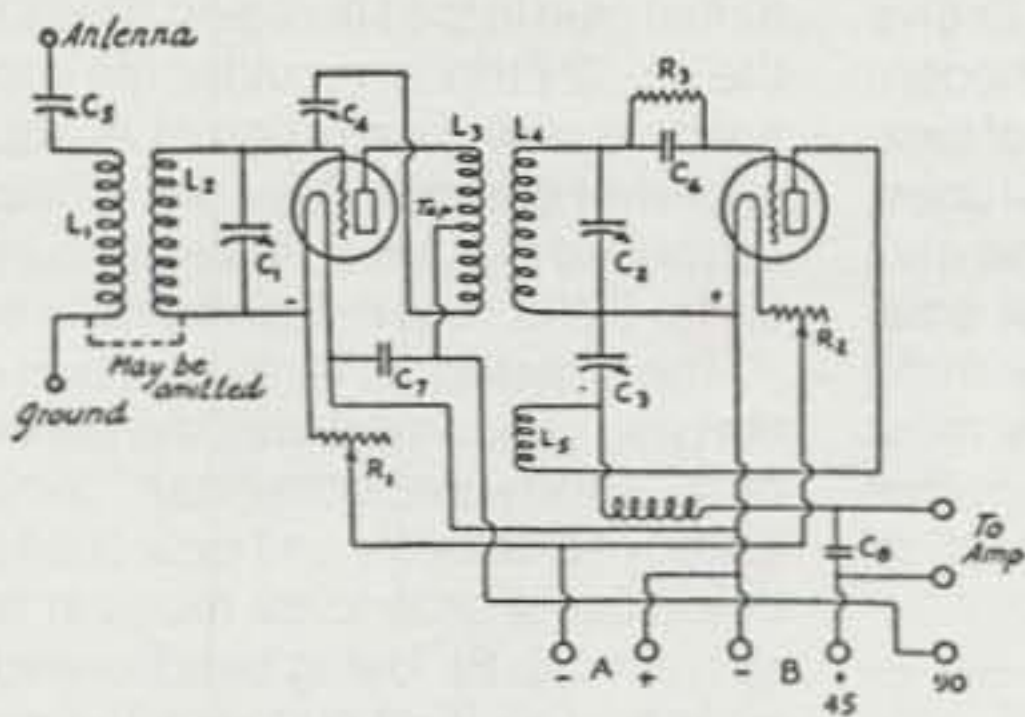


Fig. 7— Advantage of RF amplification was realized, but an RF stage that provided amplification and yet remained stable was a tricky thing. Neutralization solved the problem.

Fig. 8— Advent of AC heater-type tubes allowed the development of stable, high-gain receiver circuits. This popular "converter" circuit placed ahead of a sensitive broadcast receiver provided good shortwave reception. Notice that coils are tapped for "bandspread" operation.

ultant beat signal of 150 kHz could be highly amplified and detected by normal means.

The war ended before his idea could be put to use, but it became the basis for practically all radio reception after the war. The worth of the superheterodyne receiver for amateur service was proven in 1921 when, sponsored by the ARRL, Paul Godley in Scotland picked up the first trans-Atlantic amateur signals near 200 meters using a superheterodyne receiver (fig. 4). Twenty

CW stations were heard, but only six spark stations. This was the death-knell of "King Spark" and the crystal detector.

Build Your Own Superhet!

In 1923 the Radio Club of America published a paper entitled "How to Build a Super-heterodyne Receiver," by George Eltz, Jr., and the circuitry of this radically new design became available to amateurs worldwide.

By spring 1924 a few amateurs had constructed the new receiver and were having mixed results. The 4 foot long breadboard superhet of 3XAQ (Baltimore, Maryland) had nine 201 tubes, a choice of either loop or long-wire antenna, and a BFO for CW reception (fig. 5). He reported coast-to-coast reception and reception of European amateurs that were inaudible on a "low-loss Reinartz" tuner! Don Wallace (9ZT, later W6AM) also extolled the virtues of the superhet receiving system. This was

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pretty heady stuff! For most amateurs, however, the superhet receiver was too expensive, too complicated, and took too much battery power to be attractive.

A lot of time, thought, and experimentation was devoted by some farsighted experimenters to the new receiver scheme. *QST* magazine during 1924-25 devoted many pages to solving the problems of builders who were plagued with receiver instability, unwanted oscillations, and image signals. The early superhet receivers used an IF of about 30 kHz. Naturally, image signals were abundant and loud! Later designs raised the IF to 50, 100, and 250 kHz with vastly improved results. The presence of sidebands on a voice signal and the need for a selective passband became common knowledge (fig. 6). On the negative side, the problems of stability, shielding, parasitics, and heavy battery drain remained to be solved.

It was well known that an RF amplifier stage ahead of the first detector could improve image response. The problem was how to build one that would provide signal gain and would refrain from unwanted oscillation. A neutralized triode stage proved able to do the job—barely (fig. 7).

Putting the New Circuit to Work

While all the basic information was at hand to build a basic superhet, the designer was inhibited by the lack of high-gain receiving

tubes. Using a string of 201A triodes (at \$5.00 each) in a superhet did little to give good gain per stage. The birth of a modern superhet awaited the development of inexpensive, high-gain, AC-operated tubes, which did not arrive upon the scene until about 1928. In the meantime, most amateurs had to plug along with two or three tube regenerative sets. As far as most amateurs were concerned, the superhet was a complex curiosity and not a practical addition to the station.

The AC-Operated Receiving Tetrode

Long moribund, the sluggish tube industry came to life in 1929. Riding the broadcast boom, vast profits were made on the sale of UV-199 and UX-201A tubes for DC-operated broadcast receivers. Newer tube designs were in the laboratories of RCA and General Electric, but until the market demand materialized, there was no rush to develop them in great numbers.

Finally, the pressure of events convinced the tube manufacturers that the market for DC-operated receivers was exhausted and the time was ripe to introduce a new breed of broadcast receiver that would run from the light socket. That called for a whole new stable of tubes.

Of great interest to the receiver builder was the announcement of the UY-224 receiving tetrode. At last, here was a high-

gain well-shielded tube that could provide actual gain in the HF region. This tube, plus the UY-227 triode, provided the impetus for a whole new generation of AC-operated, superhet designs. (My column last month described the use of these tubes in the National SW-3 regenerative receiver.)

The first step, as far as shortwave reception was concerned, was the development of a "shortwave converter," which consisted of a detector and local oscillator that could use a broadcast receiver as the IF system (fig. 8). Using bandspread plug-in coils and an IF of 800 kHz, the converter was reasonably clean of image signals, even as high as 20 meters. If the broadcast receiver was sensitive, the combination provided excellent shortwave reception for those days.

A Real Shortwave Superhet Receiver

All the ingredients were at hand to make a shortwave superhet receiver. A few kits were available on the market, but amateurs, in the main, were afraid of the receiver complexity. It was not until April 1932 that the Hammarlund Manufacturing Company advertised a high-frequency superheterodyne: the "Comet Pro." This eight-tube receiver was equipped with high-Q plug-in coils and tuned as high as 20 megacycles! Best of all, it incorporated a bandspread technique plus a beat-oscil-

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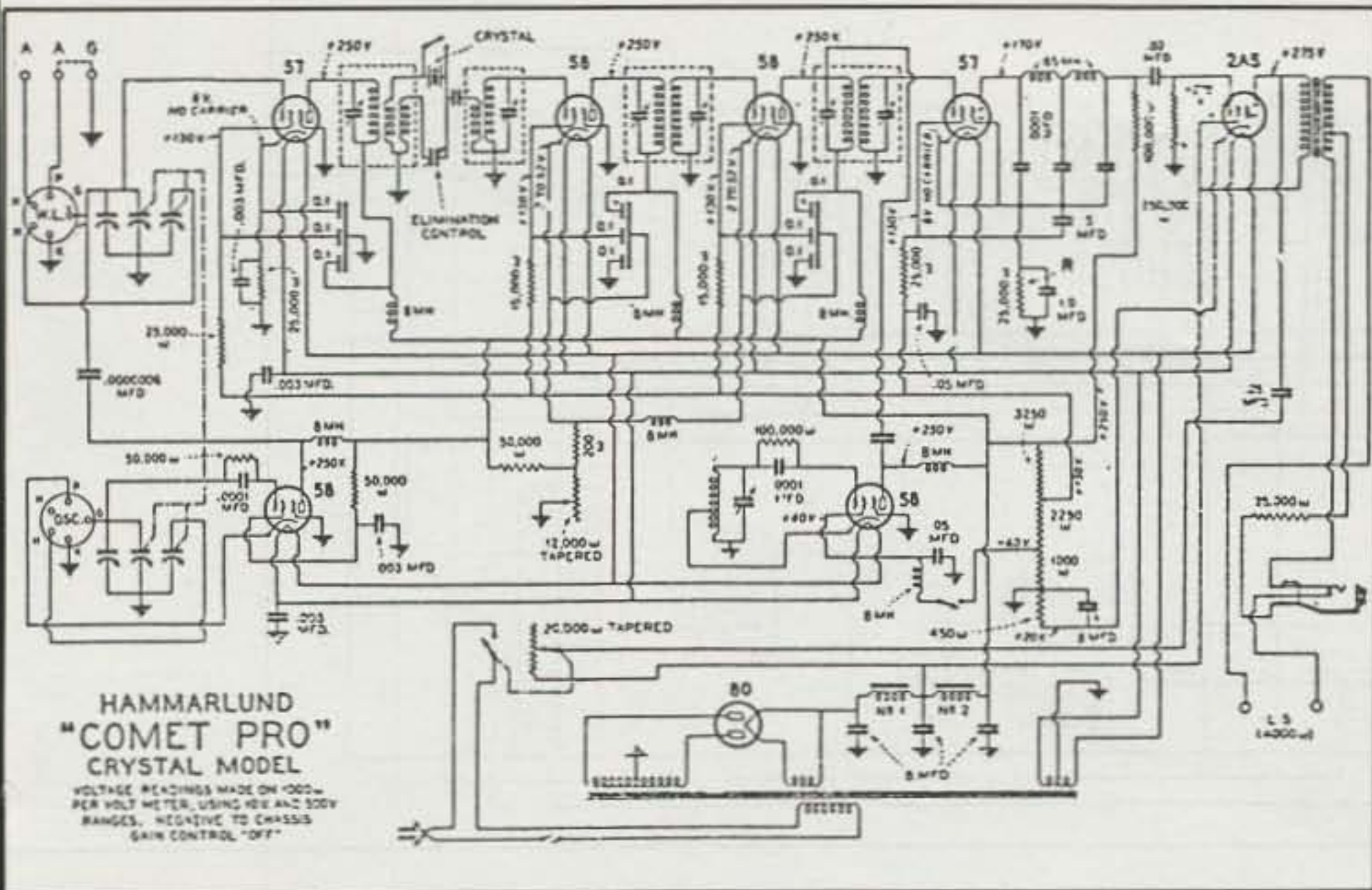


Fig. 9- Eight-tube, AC-operated "Comet Pro" was first of the "modern" receivers. Later versions had a crystal IF filter for added selectivity. Image response was poor because of lack of RF stage.

ator that made it useful for both phone and CW work. The first of the "modern" receivers was available for amateur use (fig. 9)! A how-to-do-it article covering construction of a shortwave superhet was given in the August and September 1932 issues of QST. A complete superhet, with RF amplifier stage, crystal filter, high-gain IF stages, and BFO was described, together with explicit assembly information (fig. 10). Now any amateur with a good set of tools and a working knowledge of superhet theory could build a first-class receiver!

The National AGS Receiver

For over a year the National Company had been working with the Airways Division of the Department of Commerce to supply an Aviation Ground Station (AGS) superhet receiver. The receiver was announced in October 1932 (fig. 11). A well-heeled amateur could spend a couple of hundred bucks for this superlative set. (Remember, this was the depths of the Depression, and not many amateurs had this amount of money for their hobby!)

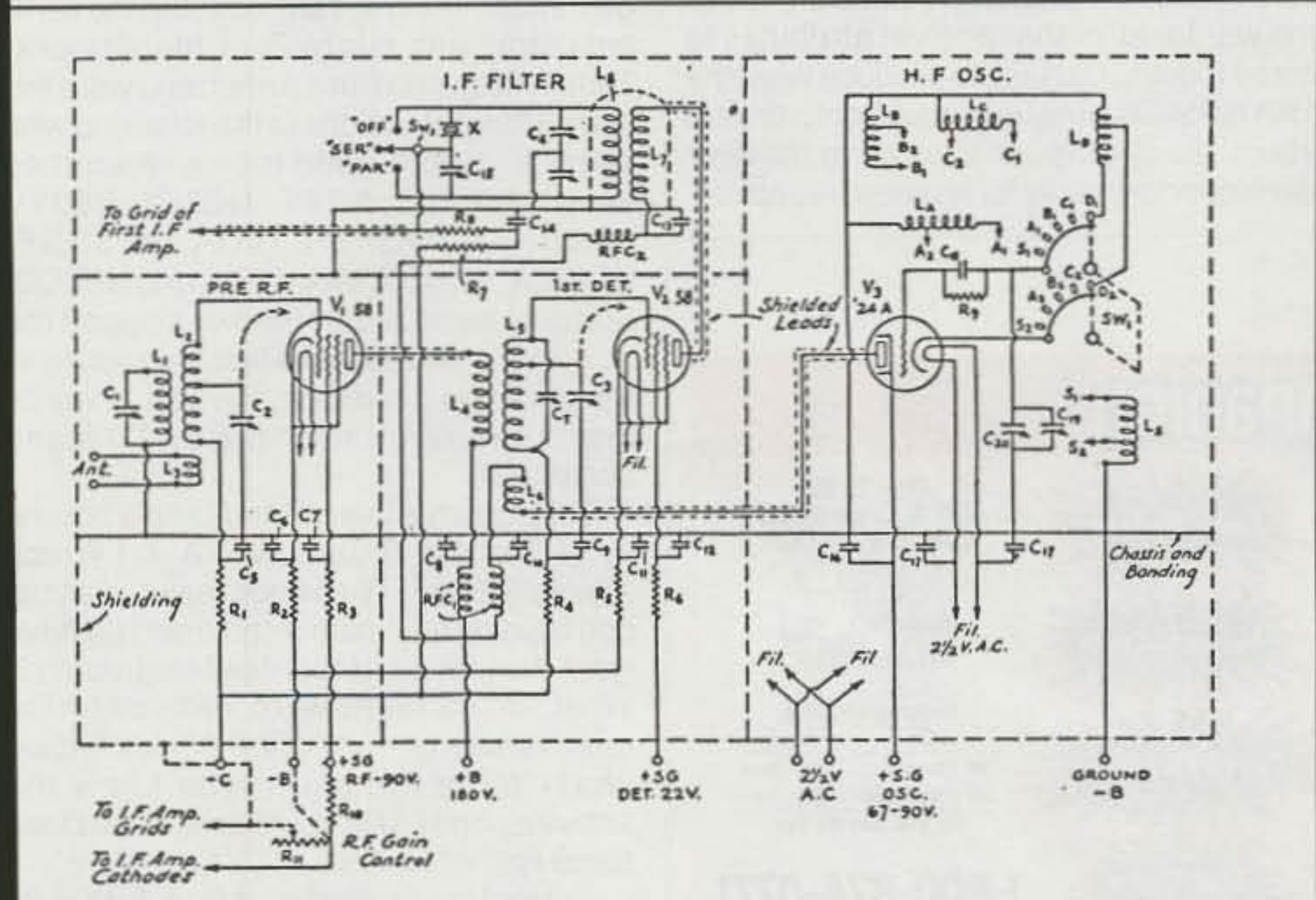


Fig. 10- IF amplifier circuit of superhet designed for amateur service (QST, Aug.-Sept. 1932). This circuit was basic design for many commercially produced receivers in the mid-30s. Note the RF amplifier stage and IF crystal filter. Rest of circuit was conventional.

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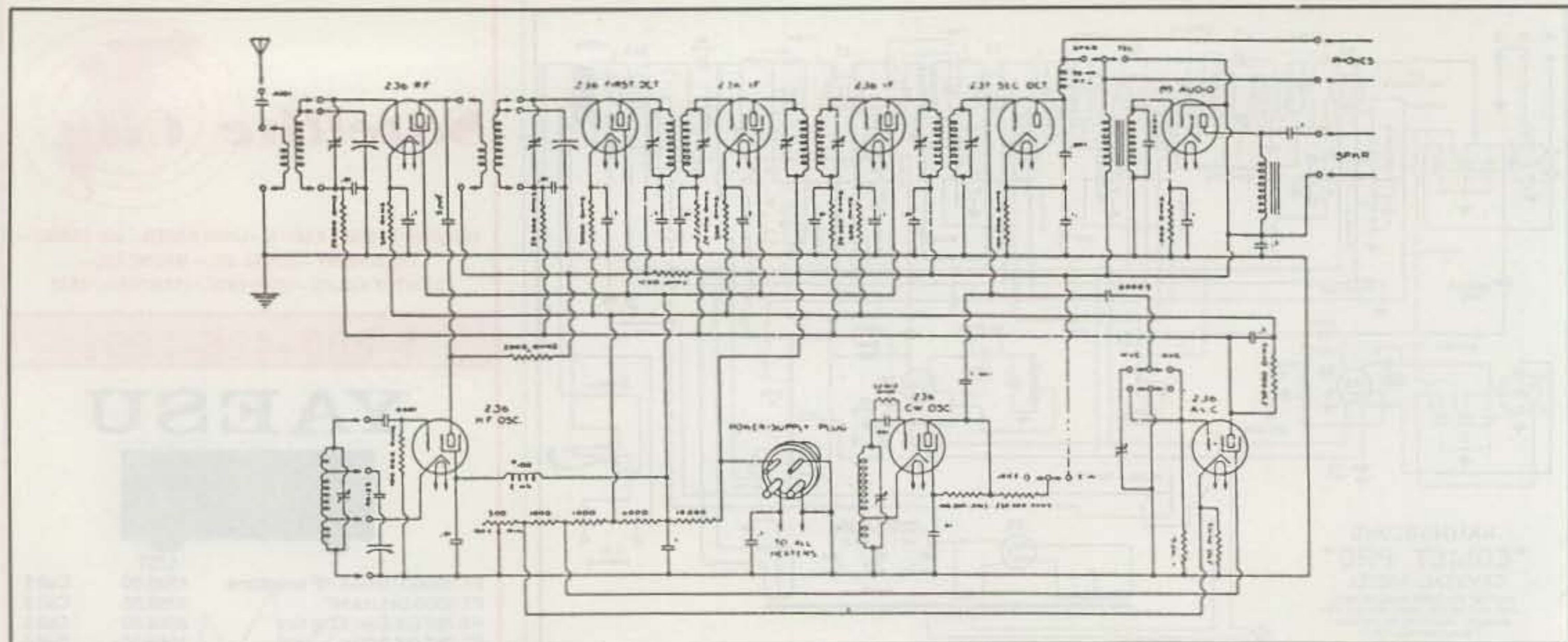


Fig. 11- Circuit of National AGS receiver, the forerunner of the famous HRO. It incorporated RF stage and automatic volume control for phone work.

The AGS receiver had what the Comet Pro lacked: a tuned RF stage ahead of the first mixer. It also had improved stability and good overload characteristics. But it really wasn't designed as an amateur receiver; it had no bandspread.

The AGS receiver, however, was the test-bed for the forthcoming famous National HRO, one of the best amateur receivers of the 30s and 40s. Priced much less than the AGS and offering exceptional bandspread, the HRO quickly caught on with the DX operators. It proved to be an exceptional 20 meter receiver, having two tuned RF stages, automatic volume control, an S-meter (R-meter in those days), a crystal filter, a standby switch, and other goodies dear to the heart of the serious operator.

The Pre-War Situation

By 1933 the amateur receiver market was

in full swing. The RME-69, the Patterson PR-10, the National FB7, and other well-known manufacturers produced short-wave receivers for the amateur and short-wave-listener market. All of these receivers incorporated features that are inherent in modern SSB receivers. They were the real forerunners, the designs and inceptions of which laid the groundwork for what amateurs have come to expect in today's receivers: sensitivity, selectivity, stability, freedom from overload, and wide dynamic range. The 1934 receivers had some of these virtues to a greater or lesser degree.

By the time World War II closed down amateur radio, the concept of double conversion was at hand. It remained until after the war for all of the receiver attributes to come together, at last, to produce what the 1920s/1930s amateur could only dream about: the all-purpose shortwave receiver developed primarily for amateur reception.

(Note: Drawings are reproduced from various issues of QST magazine.—ed.)

Correction

Lengths given for the 6 meter beam in the February issue of CQ (fig. 2, p.83) are half-element lengths.

The Dead Band Quiz

Okay, you guys. It was no problem to identify "the girls" in the movie *High Road to China*: the two Gypsy Moth planes. The quotation "The oxen are slow, but the earth is patient" was said by Zura, the old monk. Tom Selleck and Bess Armstrong were the stars. Congratulations to the following who know a rattling good movie when they see it: N7JQQ, NZ0E, N0BLX, VE3YV/K8HI, KG7UG, WA1VOA, VE3GNF/KC9WW, KE9OZ, WA3WPY, and N8KCC. Some of these smart fellows slapped me on the wrist because the first time you hear the saying in the movie, the actual words are "the oxen," not "the ox." I stand corrected.

This month's Dead Band Quiz is courtesy of Richard Stuart, WF7A: (1) Which "Twilight Zone" TV episode featured some one building an amateur radio set? (2) What were the first words sent by telegraph? (3) What two callsigns were featured on the radio version of "War of the Worlds"? (Gotcha!) Write me and if you know the answers, and I'll list your name in the Dead Band Roll of Honor!

I'm looking for material for future quizzes. If you have a worthy quiz question send it to me along with the answer. (I have no crystal ball). Thanks.

73, Bill, W6SA

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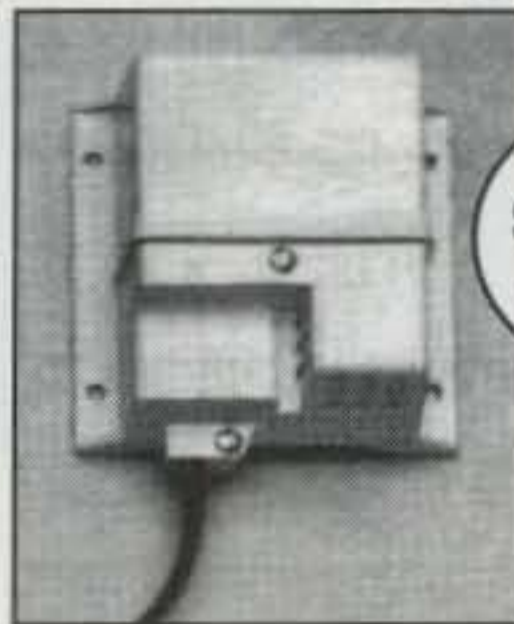
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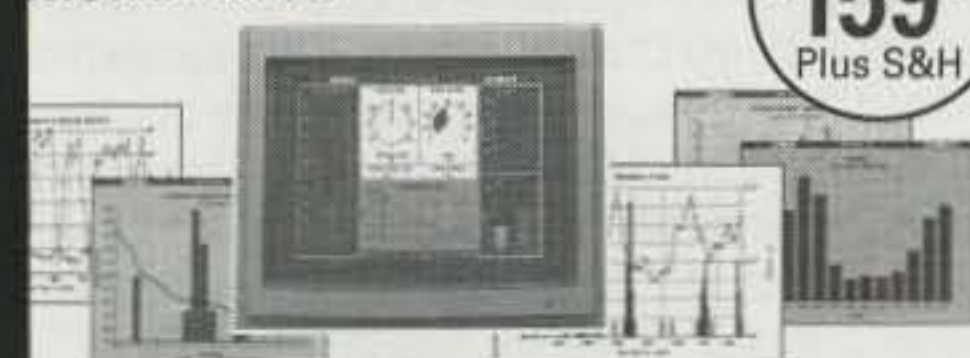
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The NJDXA reviews:

“Where Do We Go Next?” A Book By Martti Laine, OH2BH

BY BILL HUDZIK*, WA2UDT

It can be awkward to review a popular book that is published by your own company. The natural expectancy would be for a glowing review. Rather than taking that approach, to give you a sense of this book we elected to reprint a review done by an impartial group of notable DXers. This review initially appeared in the October 1991 issue of the “NJDXA Newsletter,” the newsletter of the North Jersey DX Association, and it is reprinted with their permission.

—K2EEK

When I saw Martti Laine's new book at Dayton I couldn't resist picking up a copy. At first I thought it was just going to be a travelogue of his DXpeditions as I was initially impressed by the many photos scattered throughout the book. However, its format reminded me of some of my college textbooks (wide margins and an editorial style). Nine chapters are contributed by guest authors such as WA6AUD, K7JA, and W6CF, with Martti providing the introductions.

As everyone knows, first impressions are not always the final ones. That adage is particularly true in the case of Martti's book. It is *definitely not* a fun narrative of adventures but a serious dissertation on DX and DXpeditions. It took me about two weeks to read through the various chapters since several, such as the one on today's DXers, and another on technical aspects and logistics of DXpeditions, are insightful. It is obvious from the first chapter that Martti is a very dedicated and unique individual who holds such personalities as Danny Weil and Hugh Cassidy in high esteem. Martti's use of the fictional characters WA6AUF so skillfully employed in “The West Coast DX Bulletin” may be confusing to those readers who are just becoming interested in DX or who are recently licensed. Fortunately the chapter contributed by Hugh Cassidy gives some explanation for those who were not around

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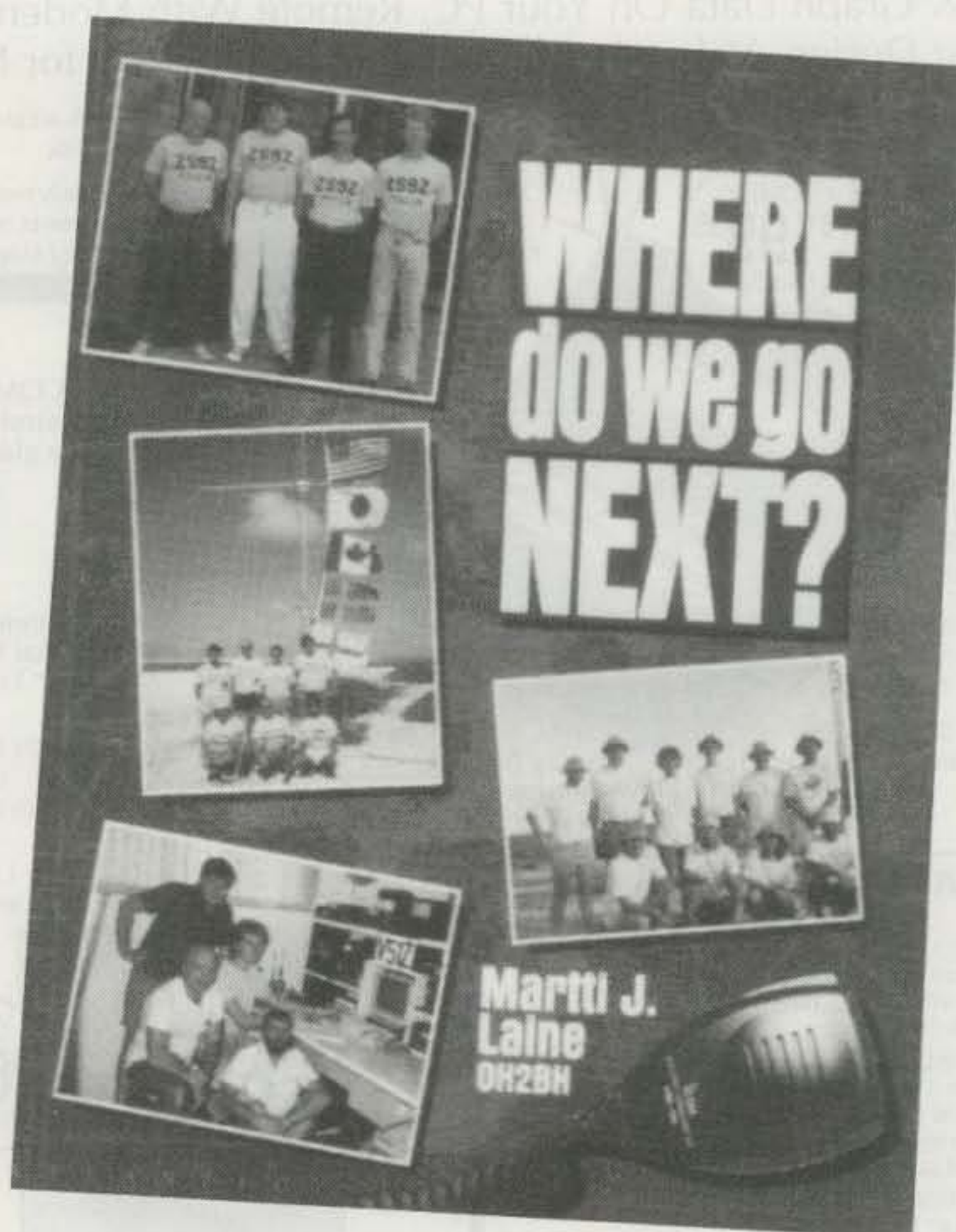
10 or 20 years ago. This is minor, but I did find it detracted from the author's own unique style.

Martti's profile of today's DXer is worth some time. He describes them as intelligent, well informed, and technically competent for the most part. These are the people who are constantly there when propagation is poor, QRM is rough, and have the dedication to stay in the fracas to get a new one. This is one of the must read chapters in the book. The section “DXpeditions in Action” provides an understanding of what occurs on the receiving side of a pile-up and various methods used to make the most of crowd control. Being an elf, the chapter on technical ability and the use of current technology to make an efficient DXpedition is a must read for anyone considering to embark on one. For instance, Martti suggests that the neophyte DXpeditioner try an easy route such as a Caribbean trip to gain experience in operating and equipment logistics. I can attest to this from my own experiences in KP2 and the

CW pileups I generated there. It's one thing having 3 or 4 stations come back to you in the ARRL SS but another when one CC keeps you busy for 2 hours! You quickly learn pileup management. Jim Maxwell's chapter on just what is a DXCC country and what procedures need to be followed to get a “new one” approved is worth reading more than once.

The above chapters are the ones that stood out in my mind. What the author alludes to but does not reveal (after all, one can't give away all the secrets) is how to develop the diplomatic and government contacts needed to overcome the all-encompassing bureaucracy. The expertise Martti has developed is evident throughout the book and undoubtedly a major factor to his success. My suggestion is to read the book a few chapters at a time and think about them. OH2BH has a lot to say.

Where Do We Go Next? is available from the CQ Bookstore, 76 North Broadway, Hicksville, NY 11801. The price is \$22.95 plus \$4.00 shipping and handling



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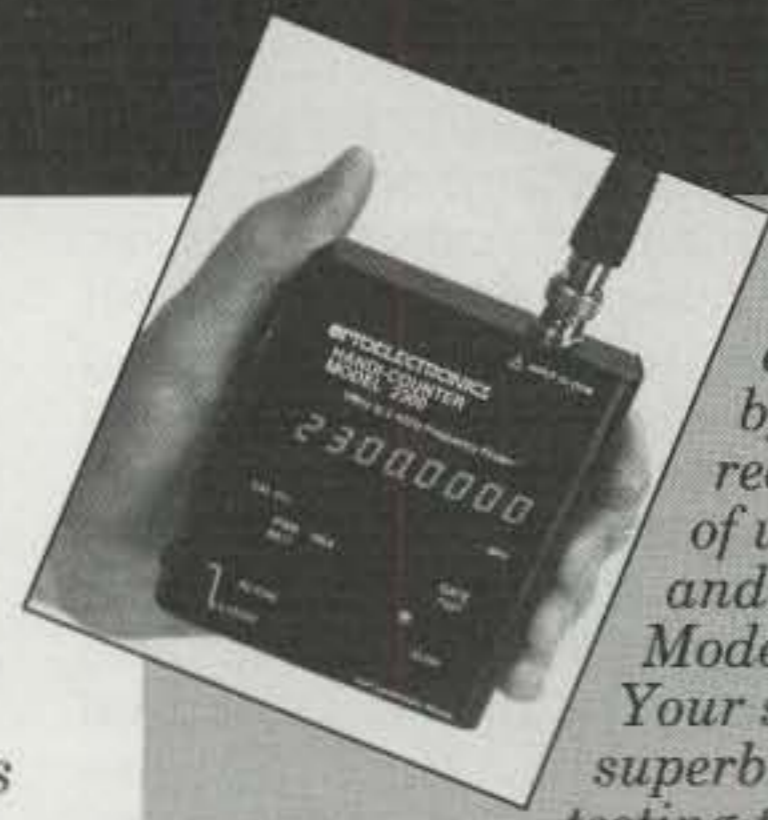
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RF Signal Strength Indicator	16 Segment Adjustable Bargraph	16 Segment Adjustable Bargraph	16 Segment Adjustable Bargraph	•	•	•	•
Hold Switch	Yes	Yes	Yes	Yes	Yes	No	Yes
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

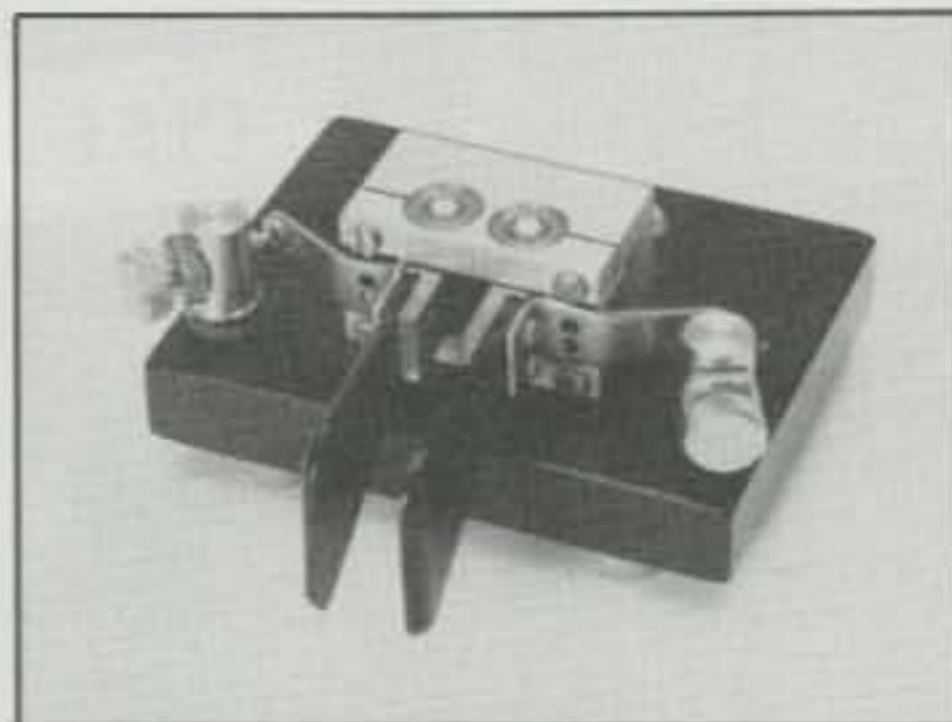
Telegraph Instruments

I have received several requests for information about the telegraph keys I use in my home station. This article covers those keys, and it provides comments which should benefit many new amateurs, no matter which keys they use.

I have a variety of manual (hand) telegraph keys, and I use several of them during Novice code band contacts. My favorite handkeys are a Speed-X, a WW II surplus J-38, and a Mac teardrop. I advise students to use handkeys until their code proficiency has been increased to about 14 words per minute. New operators who go directly to an electronic keyer, without first acquiring sending skill with a handkey, are likely to send poorly spaced garbage on the air. It is important to develop good spacing between words/groups, and handkey experience seems to promote that required capability very well.

I always have a semi-automatic key (bug) connected in parallel with a handkey. I have used several types of bugs, and my favorite is a Vibroplex Presentation model which my wife (Marie, W6JEP) and I have used for several decades. A bug is a great telegraph instrument, but I no longer recommend it to new amateurs. Bug sending is harder to master than electronic keyer sending. In addition, modern electronic keyers have features which bugs do not provide. If you are going to use both a bug and a keyer, I advise you to use each one with a different hand. I use my right hand when sending code with a handkey or a bug, and I send code with my left hand when using a paddle with an electronic keyer. I know several amateurs who used the same hand for both bug and paddle sending, and that resulted in timing problems with resultant poor code. It is not very difficult to master the operation of a second keying device with your "off" hand.

I am also using the combination of a PK-50 Message Memory Keyer with a PK-100 Dual Paddle Key, both of which are assembled and sold by Palomar Engineers (Box 462222, Escondido, CA 92046). The PK-100 (see photo) is designed for use with iambic keyers. It is machined from brass bar stock, and it features a solid steel base to provide excellent stability. Ball-race bearings and copper contacts are includ-



Palomar Model PK-100 Dual Paddle Key.

ed. Fine-pitch screw threads with knurled bolt heads and knurled locking nuts enable the user to precisely adjust each pair of keying contacts and the associated springs. R.A. Kent of England accomplishes the precision machining, and a nice silver-and-black Kent nameplate is supplied with the paddle. The protective backing is removed from the nameplate to expose the adhesive inner surface that is used to secure the nameplate to the paddle. This paddle is properly adjusted by Palomar, and it should function satisfactorily as it is when it is received. The instruction sheet provided with the paddle shows how to connect it to an electronic keyer. Details of how to attach a parallel handkey and/or bug are also provided by the instruction sheet. Contact cleaning and contact space adjustment procedures are also provided. The PK-100 is easy to use, even by the rawest beginning amateur.

The PK-50 (see photo) is an excellent electronic iambic keyer. It provides a wide variety of features to make operating experiences simple and easy. Iambic keying automatically compensates for many sending errors which are common to inexperienced code operators. If you let go of the dit or dah paddle too soon, the dit or dah automatically continues to its proper full length. As an example, if you hit a dit before a previous dah is completed, the dah completes properly and a correct length space is inserted before the following dit is sent. Iambic keying enables a beginner, who knows the code, to send good code after just a few minutes of practice. However, the operator must learn to leave appropriate spaces between words/groups, because the keyer cannot provide this required spacing.

The PK-50 operator's manual is a B-size

(11 by 17 inches) sheet folded in half to the size (8.5 by 11 inches) of a standard "A" page. Three of the four pages are filled with clear and detailed operating information. No prior knowledge of keyers is presumed or required. Operating instructions are detailed, but they are easy to follow; they do a good job of transferring essential information from experts to those of us who wish to become experts. The opening paragraph explains how to install the keyer, whereas the subsequent paragraphs tell how to use the PK-50.

Messages can be stored in up to four channels. The maximum length of a stored message is about 20 words. If you exceed the allowable message storage time, a series of dits alerts you to this fact, and nothing further is stored past the point where the dits were heard. One can store CQ (general call to all stations) calls, contest exchanges, or any desired messages in the four positions. These positions can be linked together (two, three, or four of them) to automatically send the prerecorded messages in any desired sequence. A message (a CQ call, for example) can be programmed to repeat continuously until you stop it by closing a key contact. Closing a key contact immediately stops any message in progress. When recording a message, a mistake is easily corrected without erasing the good portion that exists prior to the error. You can insert a second recorded message into the one that is playing, and the first message automatically resumes when the second one is completed. You can insert a break in a recorded message to allow insertion of specific information; when you stop sending that additional information, the original recorded message automatically resumes. You can insert a 0.1 to 9.9 second pause in a recorded message to allow time for additional data to be sent; when the predetermined pause time has elapsed, the origi-



Palomar PK-50 Message Memory Keyer.

45527 Third Street East, Lancaster, CA
93535-1802



This is Scott Barto, KB2KOL, at the operating position of the South Towns Amateur Radio Society's base station (WB2ELW). Randy Schueler, KA2RFW, helps youngsters learn about amateur radio at the Hamburg Memorial Youth Center, NY.

nally recorded message automatically resumes. Messages are easily checked without having to key the transmitter, and messages can be erased quickly.

The PK-50 includes several useful functions, two of which can be initiated two ways. The function button can be depressed prior to pushing the **Tune**, **Semi Auto**, **On/Off Line**, or **DEC.S/N** button. Depressing **Tune** keys the transmitter. Pushing **Semi Auto** shifts between normal ambic keying and bug-type (semi-automatic) keying, wherein the dual paddle functions like a bug. Depressing **On/Off Line** causes the PK-50 and the transmit-

ter to be keyed in one position, whereas just the keyer is activated in the other position. This latter position is useful when recording messages and conducting keyer checks (speed, serial number, weight, etc.). The **DEC. S/N** button is used to decrease the existing inserted serial number, such as when you want to repeat a serial number due to losing the previous possible contact. After the function button is pushed, the dual paddle can be used to activate the tune or decrease serial number function by simply sending **X** (xmit) or **D** (decrease), respectively.

The function switch can be used in conjunction with the dual paddle to accomplish several other tasks. Sending **D** decreases the stored serial number by one. Sending **K** provides the correction time (in milliseconds) related to compensating for the delay in a transmitter's QSK relay system. If the delay time is known, this function can be used to insert the desired compensating correction time into the PK-50. Sending **N** causes the stored serial number to be sent. This function is also used to insert a new/different serial number, such as is required at the start of a subsequent contest. Sending **0** (zero) allows you to change the tone/pitch of the keyer's monitor by adjusting the **Speed** control. Sending **R** reverses the dual paddle between right- and left-handed operation. This is a nice feature which quickly makes the paddle useful to left- or right-handed

operators. Sending **S** causes the sending speed to be sent in code. Furthermore, any desired sending speed (5 to 60 wpm) can be locked in to provide transmissions at a desired rate.

Sending **W** causes the preset keying weight (25 to 75) to be sent in code, and enables you to select a different keying weight, if that is desired. This weight is simply the relationship of a dit to the following space. If the dit and the following space are the same length (one-to-one) the weight is 50%, which is normal. A weight of less than 50% applies to a dit that is shorter than the space which follows it. A weight of more than 50% applies when the dit is longer than the following space. If you like shorter dits with longer intervening spaces, select a lower weight. If you prefer longer dits with shorter spaces, select a higher weight. Two more functions are available after the red function button is depressed.

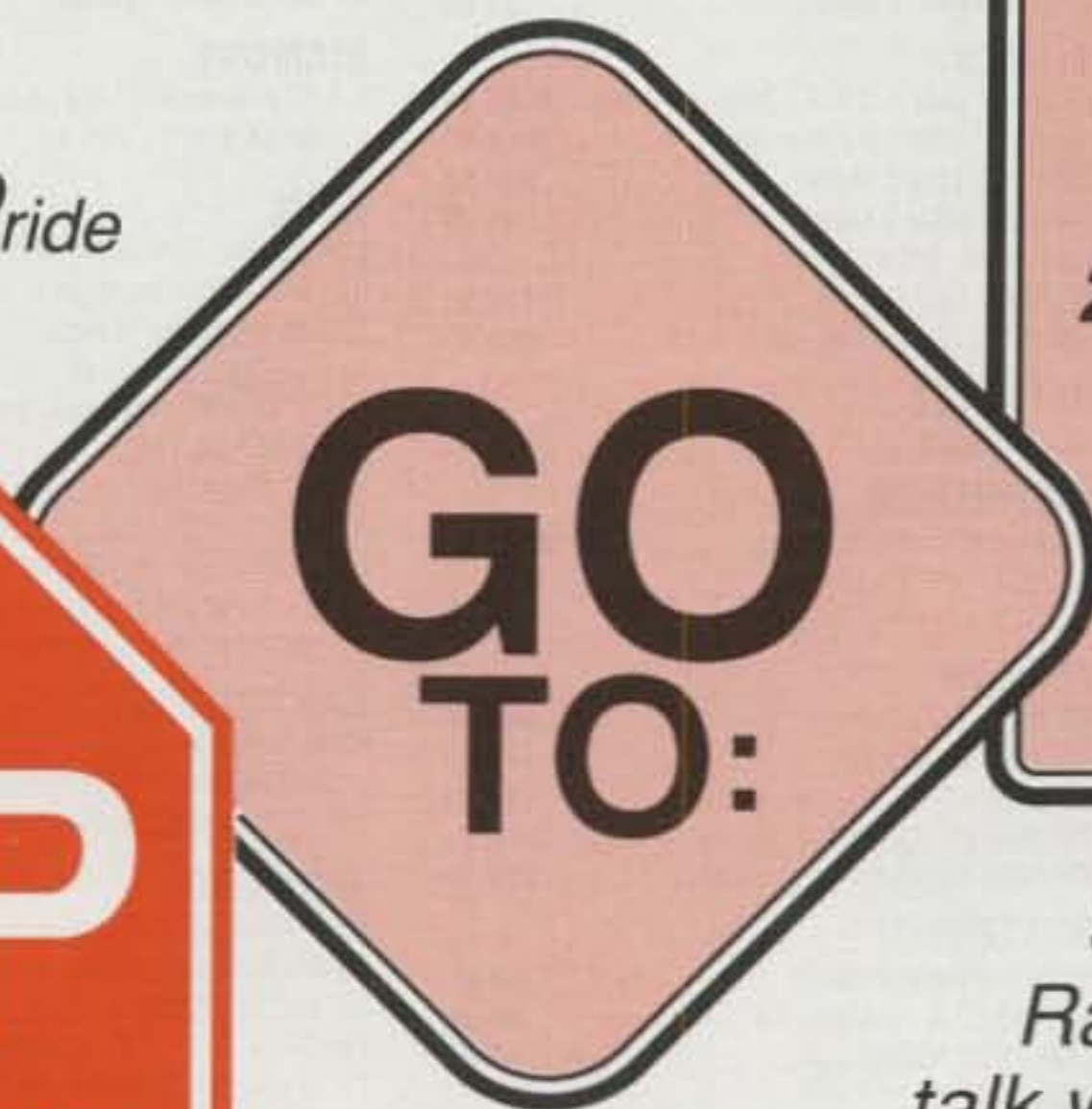
Sending **X** (xmit) keys the transmitter for tuning purposes. Sending **Z** causes a coded serial number format to be sent and allows you to select any other desired format. These formats are:

0 sent as 0, with leading zeros sent;
0 sent as T, with leading zeros sent;
0 sent as 0, with no leading zeros sent;
0 sent as T, with no leading zeros sent.

The instruction manual concludes with the PK-50 schematic diagram. The PK-50 is easy to use and it provides many useful

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functions. The front-panel variable controls are used to adjust the keying speed and the monitor volume. Messages can be stored in channels 1 through 4 by depressing the button of the desired channel and recording your message after hearing the internally generated **K** (invitation to transmit). Briefly depressing a button (1-4) causes the stored message to be sent. The function switch is the unmarked one in the middle of the front panel. When this red push-button switch is pressed, an internally generated **F** is sent to advise the operator that any one of the functions (noted below switches 1 through 4) can be activated by depressing the associated button.

The back panel contains connectors used to attach keyer input power (plus 8 to 20 VDC), dual paddle leads, and the transmitter's keying leads.

Most of the preceding information also applies to many other electronic keyers. Modern keyers can greatly reduce the fatigue factor during long periods of operation.

QSL Post Office

John Hart, N0OCF, forwards domestic (U.S.A. only) QSL cards at ten cents each. The minimum submittal is ten cards, and QSL cards must be submitted in multiples of ten. The maximum acceptable size is 3.5 by 5 inches. Nothing may be attached to

a submitted QSL. If a card is being sent to someone who is listed correctly in the current *Callbook*, it does not have to be addressed; just write the callsign legibly in the address area. Do not attach postage to cards and do not put them in individual envelopes. If a card is being sent to an amateur who is not listed correctly in the current *Callbook*, you must write the name and address on the card to have it forwarded.

If you expect to receive cards via the QSL Post Office, you should submit two business-size (#10) self-addressed envelopes to John with first-class postage attached. You will be notified when additional SASEs are required.

The QSL Post Office address is 767 South Xenon Court (117), Lakewood, CO 80228. Their telephone number is 303-987-9442.

Use an accurate scale to determine how many of your QSL cards weigh a total of one ounce. Five to eight cards commonly total one ounce, but card weights vary a lot.

Amateur Radio Jewelry

Harold Sasnowitz, KB2MB, offers a nice assortment of callsign jewelry and useful gifts. Most items can be ordered for either amateurs or non-amateurs. He sells desk sets, lapel pins/brooches, lightning pendants/pins, men's and women's rings,



Ten-year-old Alice Coppock, KC6VYI, of San Diego, California holds a Technician class license. Her mother is KB6OGM and her father is N9EPY. Alice prints QSL cards of her own design on her home computer system. She regularly checks into the 2300 Zulu Net which meets at 2300 UTC on 28,390 (plus-or-minus a few) kilohertz every day except Sunday. The net manager is Jim Rogers, N6WUQ; he is very pleased that Alice is active in his net.

necklace charms/lavaliere, plaques, stick pins, tie bars, tie tacs, travel alarm clock/flashlight combination, weather instruments, a 7-inch diameter worldwide time clock, and UTC/local time wristwatches. Callsigns can be shown on everything except the clock, weather instruments, and wristwatches. A 16-page catalog can be requested from H & M Jewelry Company, 26 Edgecomb Road, Binghamton, NY 13905. Gift certificates are available.



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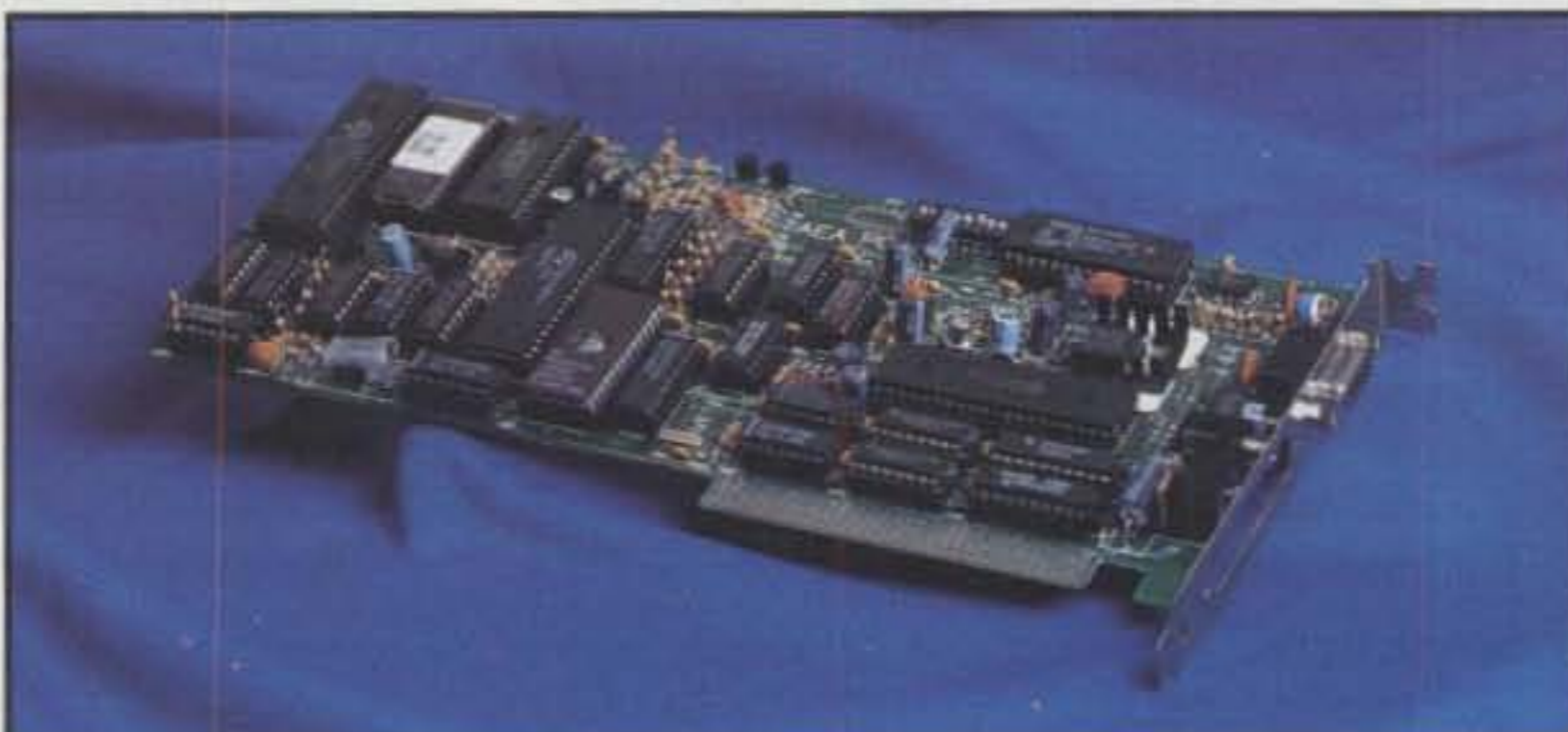
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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for April is:

Harry H. Incho, N2CWG
USA-CA All Counties #676
All CW, 8-25-90

"My amateur radio activities began with my first license in 1938, as W6PRV, while I was serving as a radio operator with the California National Guard. During subsequent schooling, army service, and job training, that license lapsed. I re-entered the ranks of amateur radio operators in 1962 with the call WB2CBK.



Harry Incho, N2CWG, dedicated CW mobile operator and holder of USA-CA All Counties #676.

"In February 1967 I worked Bill, W1JDS, on the old 40M CW County Hunters Net and was hooked on county hunting from then on. I have many fond memories of that net, with Jim, K1ZFQ, not only working as net control, but also providing a QSL bureau to see that we all got those new ones confirmed. I believe my most enjoyable and satisfying ham activity during these past years has been Mobile CW operating on vacation trips. I hope I can keep doing it for a few more years.

"My age is 72 and I am a retired entomologist with a career spent helping test and develop new household insecticides. I guess reading and cooking are my hobbies, in addition to ham radio. My wife, Eileen, is not a ham, but she has been very helpful and supportive in pursuit of my hobby. She now does most of the driving on trips so I can operate CW 'in motion.'

"There are many people in the present

333 South Lincoln Avenue, Mundelein, IL 60060

CW County Hunters Net whom I need to thank for their help, but I will only mention Mike, KV1M, for going out of his way to give me that last one in Kentucky; Ed, WA6VJP, for his untiring patience and for sharing his expertise as the net control; and Sally, Ed's wife, for the calls to let me know KV1M/M was going to be in my last two counties.

"Many thanks to all who helped to make USA-CA All Counties #676 a possibility for me. It has taken a long time; I really never expected to complete it.—73, Harry, N2CWG."

Awards Issued

Kenneth C. Greene, KK6MR, took a big initial step in the USA-CA program by claiming USA-CA 2000 #923, USA-CA 1500 #1011, USA-CA 1000 #1210, and USA-CA 500 #2557, All 20M SSB, dated 12-2-91.

Alfredo Gabba, I1HAG, qualified for a gold seal to add to his certificate when he claimed USA-CA 1000 #1211, All SSB, dated 12-30-91.

USA-CA 500 certificates went to:

Kenneth C. Greene, KK6MR, USA-CA 500 #2557, All 20M SSB, 12-2-91.

Ingmar Lindstrom, SM6CQV, USA-CA 500 #2558, Mixed, 12-2-91.

Edward Burger, Jr., N1HGU, USA-CA 500 #2559, All 10M SSB, 12-23-91.

Giovanni Bini, I5JHW, USA-CA 500 #2560, All SSB, 12-26-91.

Awards Available

The YL ISSB Program. Founded nearly 28 years ago by V. Mayree Tallman, K4ICA, the YL International Single Sideband System is an emergency system of nearly 15,000 members in over 200 countries. The system is active 365 days a year, beginning at 1300 UTC, on 14.332 MHz. While constantly monitoring the frequency for emergencies, members contact each other for a very extensive awards program. Some of the many awards available to members are listed below. All amateurs are invited to check in. For more information about the YL System, send an SASE to WA1GAG, Tom Wuelfing, 210 Merrill Street, Route 8, Gilford, NH 03246. Tom will send information about the system as well as an application for membership.

North Star Award. This award is available in the following classes.

Class E—work a member on all six continents.

Class D—work a member in 25 different countries.

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1500	1011	KK6MR	2557
1000	1210	SM6CQV	2558
		N1HGU	2559
		I5JHW	2560

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 April 2, 1985. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, USA. DX stations must include extra postage for airmail reply.

Class C—work a member in 50 different countries.

Class B—work a member in 100 different countries.

Class A—working a member in 150 different countries.

SSB'sers U.S.A. 20 Meter Award. An artistic color award given to members for working an SSBer member in all 50 U.S. states.

Golden Fireside Award. Issued for contacting member YL/OM teams in all 50 states. Teams may be base or mobile and may be used again in any state in which they are worked and on any YL System frequency.

American Princess Award. Issued for contacting four YL/XYL members in each of the 50 states.

15 x 50 Award. This award is presented upon completion of contacting 15 members in each of the 50 states.

Mobile Award. This award is issued with three wheels for contacting two mobiles in each state, base to mobile. A fourth wheel is awarded for contacting one mobile in each state, mobile to mobile.

YL ISSB 28th Anniversary Presidential Commemorative Plaque. This plaque is being offered to celebrate SSBers 28 years of existence, which began February 9 1963. Contacts must be made with system members in six categories and on established system frequencies. Only contacts beginning on August 29, 1991 count for this award. Categories are as follows.

1. Contact 12 members of any of the three councils: Executive, Emeritus, or Starlight.

**NEW
DUAL BAND RINGO**

Cushcraft

AR-270 (2m/70cm)

The engineering hams at Cushcraft bring to you an all new computer aided design.

AR-270 uses the latest technology to give excellent gain and low angle radiation in a durable all aluminum antenna. It is a perfect choice for FM simplex, repeater or packet radio. Enjoy the full performance of your dual band radio with this exciting new antenna.

- Excellent gain
- Broadband, minimum VSWR
- All aluminum - reduces static build-up
- No painted surface to chip peel or crack
- UV stabilized insulators
- Precision wound coils won't detune
- SO-239 connector
- Less than 4 feet high
- DC ground for lightning protection
- Mounting flexibility
- Rust free stainless steel hardware
- RF de-coupling eliminates TVI
- Amazing performance

AR-270 144-148 MHz
435-450 MHz



ARX-450B



AR-270



ARX-2B

RINGO RANGERS

The world's most popular 2 meter, 1 1/4 meter and 70 cm antennas.

They stand tall to give you more performance and wider area coverage. Ringo Rangers are your best single band antenna choice for FM repeaters, simplex or packet radio. There are many imitations, but none equal the value of a Ringo Ranger.

- Excellent gain and bandwidth
- Optimum low angle radiation
- Broadband with low VSWR
- Highest power rating
- Built in lightning arrester
- RF de-coupling radials
- All weather performance
- SO-239 connector
- Rust free stainless steel hardware
- Slim profile for better appearance
- Durable static free aluminum
- Traditional Cushcraft value

ARX-2B 135-160 MHz
ARX-220B 220-225 MHz
ARX-450B 435-450 MHz
ARX-450BN* 435-450 MHz

* N connector

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CIRCLE 69 ON READER SERVICE CARD

2. Contact 12 members who hold either the TFO or Rigel trophy.

3. Contact 12 members who hold a TFO number.

4. Contact 12 member teams (YL/OM members of same family).

5. Contact 12 members in 12 different DX countries. Contacts in the five categories above may be used more than once and in any or all of the first five categories.

6. Contact 6 YL and 6 OM members in each of the 10 US call areas (not states). These must all be new contacts. None of the contacts from the first five categories may be used for category #6. KH6 and KL7 are considered DX for this award.

Worked All Winnipeg Award. The Worked All Winnipeg Award is sponsored by the Winnipeg Amateur Radio Club, Inc. and is awarded to an amateur radio operator in recognition of his/her outstanding achievement in having accomplished two-way radio communications with the required number of VE4 radio stations located within the area of the City of Winnipeg, Manitoba, Canada.

The award is a beautiful certificate on a parchment paper stock with drawings along its border of many of the buildings that represent the attractions of the City of Winnipeg along with the provincial emblems. The rules are as follows.

Stations *outside* Manitoba but within the North American Continent must work at least 15 different Winnipeg stations.

Stations *within* Manitoba, including the City of Winnipeg, must work at least 25 different Winnipeg stations.

Stations *outside* the North American Continent need only work a minimum of 10 different Winnipeg stations to qualify.



Worked All Winnipeg Award sponsored by the Winnipeg Amateur Radio Club, Inc.

All bands can be used, and any mode, but the contact must be a *direct contact* between two individual stations (repeater use is not valid). If a *single mode* and/or a *single band* is used for *all* of the qualifying contacts, this will be noted on the award.

All contacts taking place from January 1, 1956 on are accepted.

QSL cards are not required; a certified copy (with signatures of two other

amateurs who have checked your log) of your log book data is all that is required. This copy should be sent, together with the fee for the certificate and mailing costs (\$2.00 or 6 IRCs), to "Worked All Winnipeg Award" Custodian, c/o Dick Maguire, VE4HK, 598 St., Marys Rd., Winnipeg, Manitoba, Canada R2M 3L5.

The second annual Worked All Winnipeg Award QSO Party will be held on Saturday, April 11, 1992 between 1500Z and 2200Z. Winnipeg amateurs will be on the following frequencies: 20 meters 14.150 MHz to 14.165 MHz; 15 meters 21.330 MHz to 21.400 MHz; and 10 meters 28.300 MHz to 28.400 MHz.

WABA (Worked Antarctic Bases Award). WABA is an award program for DXers interested in making contacts with stations operated in Antarctica. Therefore, this means working any Antarctic Base located from 60 to 90 degrees south, as by definition the Antarctic Continent starts at 60 degrees south.

WABA is sponsored by ARI (Associazione Radioamatori Italiani) and Diamond DX Club.

The award is available to licensed radio amateurs and SWLs for contacts starting with January 1, 1961, the year of "The Antarctic Treaty." All bands from 10 to 160 meters, all modes, are valid. There are no restrictions on signal reports received or given. Currently, two separate classes of the award are available, Simple and Hard, plus Honor Roll and Top Honor Roll. Requirements are as follows.

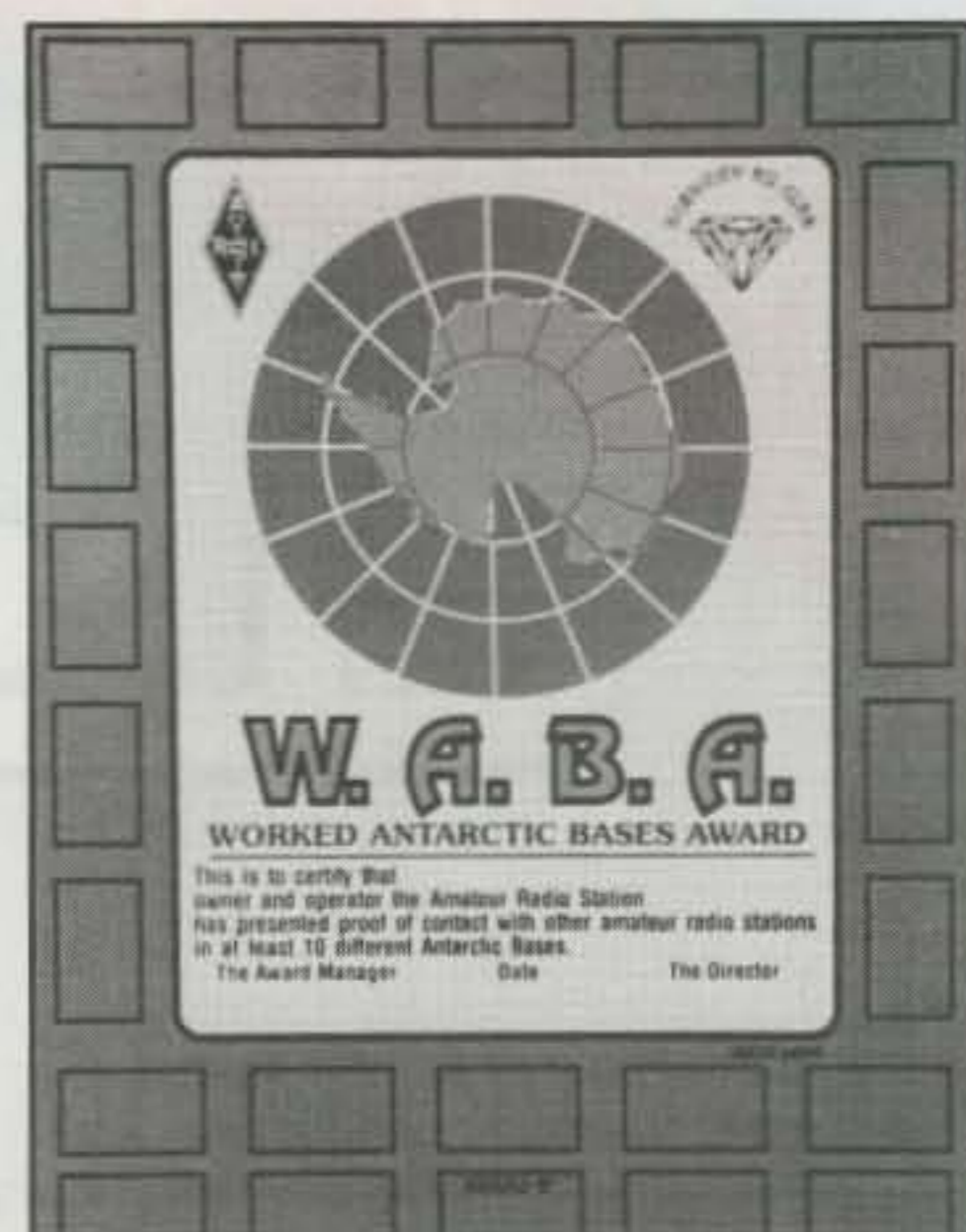
Simple Class—requires 10 contacts and confirmations from 10 different stations operating from Antarctica, representing at least 5 countries having bases there. Simple Class will have no endorsements or updates.

Hard Class—requires 15 contacts and confirmations from stations operated from 15 different bases in Antarctica, representing at least 5 countries having bases there. Hard Class may be updated whenever the applicant wishes, to reach the Honor Roll and Top Honor Roll levels.

Honor Roll—requires 25 contacts and confirmations from stations operated from 25 different bases in Antarctica, representing at least 15 countries having bases there.

Top Honor Roll—requires 50 contacts and confirmations from stations operated from 50 different bases in Antarctica, representing at least 20 countries having bases there.

Send applications to the Diamond DX Club Awards Manager, I8IYW, Giuseppe Iannuzzi, P.O. Box 5083, 80144 Naples, Italy. Application must include a detailed log extract showing callsign of station worked, date, time, frequency, mode, RST received, name of Antarctic Base, plus all QSL cards for the contacts listed. Members of Diamond DX Club need not send QSL cards, but some cards may be re-



Worked Antarctic Bases Award offered by Associazione Radioamatori Italiani and the Diamond DX Club.

quested by the award manager for checking purposes. QSLs will be returned through the bureau; however, the applicant may send an SASE and request direct return of cards.

The fee for WABA, all classes, is \$15 US (or 25 IRCs or 20,000 lire). The fee for endorsements is \$2 US (or 3 IRCs or 3,000 lire), while Honor Roll and Top Honor Roll endorsements are free. Adhesive color flag endorsements of each of the countries having a base or bases in Antarctica are available for submitting at least 50% of the active bases belonging to that country, following the reference numbers in the WABA Directory.

Radio amateurs who have operated, or are operating, from any base in Antarctica have a right to apply automatically for WABA, Simple Class, without meeting the requirements specified above. Awards issued under this provision will carry a printed "operator" flag.

Contacts with special call IR1ANT (operated from Torino, Italy on the occasion of the Antarctic Adventure on 27 January 1991), IY0A in Roma, Italy (the official station in communication daily with IA0PS in Antarctica), and IY8UN in Napoli, Italy (also in communication daily with IA0PS) are valid and can be used to help make up the 50% of bases needed to complete a country section or to qualify for a basic award, Simple or Hard.

A copy of the WABA Directory is available from the Diamond DX Club, c/o the Award Manager's address. The price is \$4 US (or 5,000 lire or 6 IRCs) to help defray printing and postage costs.

People having information regarding Antarctic Bases not included in the WABA Directory are asked to get in touch with or write to I8IYW or IK1GPG or I1HYW to up-



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Cross Needle and Digital SWR/Power Meters for All Brands

Model	Freq. Range	Forward Power	Connectors
Cross Needle	Int. Sensor		
CN-101	1.8-150MHz	15/150W/1.5kW	SO-239
CN-103	140-525MHz	20/200W	SO-239 or N
NS-660A/PA	1.8-150MHz	30/300W/3kW	SO-239
NS-663BM/BN	140-525MHz	30/300W	SO-239 or N
Digital			
DP-810	1.8-525MHz	0-1.5kW/0-15W	SO-239 or N
DP-820	140-525MHz	0-150W	SO-239 or N
DP-830	1.8-150MHz	0-1.5kW	SO-239
Mobile			
CN-410M	3.5-150MHz	15/150W	SO-239
CN-460M	140-450MHz	15/150W	SO-239
CN-465M	140-450MHz	15/75W	SO-239
CN-520	1.8-60MHz	200/2000W	SO-239

Rugged, Efficient, Low Cost answer to SWR/Power measurement that fits well into any station.



CN-520



CN-101



DP-830

Power Supplies

Daiwa power supplies use the latest hi-tech circuitry and components providing reliable, regulated DC Power. Short circuit protection protects the power supply in the event of accidental shorting. Crowbar protection protects your rig in the unlikely event of power supply failure. All Daiwa Power supplies are 120V 50/60Hz. Also available 220V 50/60Hz.

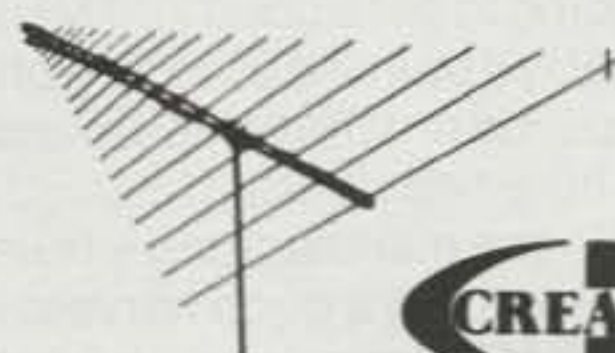
Model	PS120M	PS140II	PS304	RS3080	RS40X
Voltage	3-15	13.8	1-15	1-15	1-15
Current (ICS)	12A	14A	30A	33A	40A
Current (cont.)	9.2A	12A	24A	30A	32A
Ripple (max.)	3mV	3mV	3mV	3mV	3mV
Regulation	1%	1%	11%	1%	1%
Cooling Fan	NO	NO	NO	YES	YES
Size (inch)	5x4x9	5x4x9	7x6x9	7x6x9	11x5.5x9
Weight (lb.)	11	11	16	21	22



PS-304

CREATE is serious about long term reliability. The CREATE Family of Rotators, Roof Top Towers and High Gain Antennas were designed with the serious DX'er in mind.

This high gain, wide-band VHF/UHF Antenna is excellent for DXing, Amateur Radio, FM broadcast, scanners, VHF/UHF television, government, cellular and business band use. The forward gain is 10-12dB, front to back ratio 15dB, 23 elements, transmit power to 500W. Boom length 5.8ft, VSWR 2.0:1 or less, max. Longest element 9.8ft, weight 11 lbs., wind survival 90mph. CLP5130-2, 105-1300MHz also available. 19 Element Boom 4.6 ft., Longest Element 4.6ft.



CLP5130-1



CR-18



CR-30



CR-45

CREATE High Grade Aluminum Roof Towers for your antenna requirements. Guying is recommended to insure safety.

Model	Height	Base Width	Max. Wind Load Ft2	Max. Vert. Load lbs.	Weight
CR18	5'10"	31 1/2"	21@90mph	440	18
CR30	9'10"	39"	27@90mph	1,322	33
CR45	14'9"	39"	23@90mph	881	57

CREATE Rotator Features: RC5

- Cast and machined aluminum case
- Worm drive brake gearing
- Auto, mast clamp guides
- Preset (on 3 models)
- Water tight connector
- Long term reliability
- Circle overlay available for USA (west-central-east)



Worm drive brake gearing is great for keeping your antenna in position during severe weather conditions.



EMOTO is a new generation of Rotators that are out to set high standards! EMOTO supplies over 60% of the Japanese market with many innovative features. EMOTO also has an AZ-EL Rotator with computer I/O ports, for those working satellite or EME Moon Bounce. Ask your dealer today!

- Large Machined Steel Gears
- Adjustable Centering Mast Clamp
- Preset and Computer Control
- Cast and Machined Aluminum Cases
- Friction Braking
- Circular Position Indicators
- Long Term Reliability
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date the directory. People helping in this way will be given Helper Credit by mention on the first page of the directory. Also, the Italian official ARI magazine, *Radio Rivista*, will publish twice yearly the call signs and names of new WABA Award recipients and persons receiving upgrades.

Simple, Hard, Honor Roll, and Top Honor Roll awards consist of an aluminum silk-screen printed color plate, personalized, showing the Antarctic Continent (200 x 240 mm).

Six Counties Award for Northern Ireland. This award is available to radio amateurs and SWLs who work/log GI stations in Northern Ireland. It is on a point system, 12 points being required. GI stations contacted or logged provide one point each. Work GB4SPD (on St. Patrick's Day) and achieve 3 points. At least one GI contact is required in each of the 6 counties of Northern Ireland. Send a list of log extracts (GCR) plus 2.00 pounds sterling or 8 IRCs to either Award Manager GI4WRI, Ivor McKinney, 175 Straffordstown Road, Randalstown, Co. Antrim, Northern Ireland BT41 3LT; or W2ORA, Joe Duffin, 4 W. Central Avenue, Moorestown, NJ 08057.

IRTS 60th Anniversary Award. The Irish Radio Transmitters Society will celebrate their 60th anniversary in 1992. As part of this celebration they are sponsoring a "Diamond Jubilee Award" that will be issued to any radio amateur who makes contact with 20 of the 26 counties in the Republic of Ireland during 1992. QSLs are not necessary, but valid contact entries in your operating log book are a requirement. When you have contacted 20 different EI counties, simply prepare a list taken from your operating log book showing call, county, date, time, band, and mode. This list should be reviewed by two radio club officials or licensed radio amateurs who certify in writing that you have these entries in your log and the information on the application list is correct. They must then sign the application, including their call signs and club affiliation. Send this verified list to IRTS, P.O. Box 462, Dublin 9, Ireland.

Notes

Ken Andersen, K6PU, is the new manager for the Worked All California Counties Award sponsored by the Northern California Contest Club. His address is P.O. Box 853, Pine Grove, CA 95665. Ken succeeds Phil, K6ZM, who recently became a silent key.

Also note that the price of the USA-CA Record Book, available from the CQ offices, has been increased to \$2.00 each (two books are suggested—one to send in when applying for the award, and one to keep for your records).

Until next month . . .

73, Dorothy, WB9RCY

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Where To Next?

Megabytes of information about the next generation of packet controllers are emerging into the market place. However, the one single topic that's beginning to aggravate a lot of packet users is the lack of frequency spectrum available to us in the VHF/UHF digital medium.

Manufacturers of VHF transceivers ignore the fact that the United States has (what is left of) a 220 MHz band. The reason for this lack of concern for our need for the 220 MHz spectrum is because most transceiver manufacturers are by and large located in Japan, where there is no 220 MHz amateur band. No wonder they don't manufacture transceivers for the 220 MHz band.

Now is the time for all good American (and Japanese) manufacturers to come to the aid of our (digital) hobby. We need and we are going to get a good 220 MHz transceiver that will be in the 25 to 50 watt range. It just depends on who (which manufacturer) gets here with it first.

There is one manufacturer who is sitting by quietly reaping a good harvest with its 35 watt 220 MHz transceiver, while the rest of the transceiver makers are sleeping.

In any part of the country in which you travel these facts can be verified by listening on the 223 and 224 MHz voice repeaters. There are 220 voice repeaters popping onto the airwaves like never before. As a matter of fact, I've witnessed this increase in 220 MHz voice usage here in Nashville and while living in the Atlanta area previously. The usage has more than doubled, and it shows no signs of slowing down. With the new no-code licensing the increase is bound to be even greater.

One vital point: If we ask the 220 MHz voice users what kind of transceiver they are using, chances are a majority will answer an IC-38A.

It's Lunch Time, and Only One Guest is Having Lunch!

The question now becomes clear: Why are the rest of the manufacturers *not* building and promoting their wares for this valuable spectrum? Could it be that they would like to see the demise of 220 MHz in the USA? If it were to die out, it would leave more spectrum for the powerful commercial lobby.

1584 Oxford Court, Gallatin, TN 37066

Here is a way to kill two birds with one stone. Already two megaHertz has been allocated away from us and into commercial service. Do the 220 MHz manufacturers thus envision ways to turn this spectrum into many more dollars from the USA by allowing the demise of the 220 MHz band for amateur use?

If the 220 MHz band were to become all commercial, then the transceivers that could have been in amateur service could be designed and marketed as commercial transceivers at two or three times the money. Oh, yes. If you have a problem believing this, then look at the hand-held transceivers in other services, on other VHF and UHF bands. The same radio that is used in amateur service will have a couple of number changes, and no more than one minor cosmetic change, and will be placed into operation "up the band a ways" into commercial service. It will double its value, or at least it will bring two and three times the price.

Let's assume for a moment that this might be true. For the purveyors of these transceivers, and for guardians of our precious amateur frequencies, we say, "This won't happen again without a fight!"

I've said it, and I'm not sorry that I have. As a matter of fact, I'm only saying what the rest of the VHF and UHF amateur world is thinking and feeling.

To be sure there is no misunderstanding, the comments that I make herein by no means reflect the feelings of the editor or publisher.

There is A Method To The Madness

Is there a purpose or reason why we don't have a good competitively priced 220 MHz radio in the 25 to 50 watt class? Not only do we need this power level, we also need access to the "True FM" modulated stages and access to the discriminator output. Something similar to an "RJ" type connector will suffice. Now I'm sure you are beginning to read between the lines as to the method to my madness.

I had one manufacturer's representative tell me that the research and design for a transceiver would cost too much and that FCC type "approval" would cost even more.

First of all, the designs are already cast, and second, FCC type acceptance is more

Knoxville Hamfest Packet Forum

K4ABT will be presenting a Packet Forum on Saturday, June 6 from 10 AM to 12 noon at the Knoxville Hamfest & Computer Fair to be held at The Jacobs Building, Tennessee Valley Fairgrounds. In addition to the presentation and discussion, K4ABT will be handing out free general-information and introduction to packet radio handbooks.

For more information about either the forum or the hamfest's other activities, contact Hamfest Chairman Ron Russell, KA4AZQ, 2919 Denson Ave., Knoxville, TN 37921.

of a "standards approval." I for one am not swallowing the reasoning that it costs too much to design and market. The real truth is that a 220 MHz radio is no more expensive to design and build than a 2 meter transceiver!

Why The Need For Additional Digital/Data Spectrum?

We are sometimes confronted with the why and how of this kind of question, so for the neophyte, let's understand why and how the packet community needs this spectrum.

The 220 MHz band is the best of both worlds! It has the long-range qualities of 2 meters, and yet it has the bounce about, signal deflection, and fill-in of the 440 MHz band. An antenna for 220 MHz can occupy much less space than an antenna with equal gain cut for the 144 MHz band.

Up front, there are voice users already operating within the voice portion of the 440-450 MHz UHF band. Next, we have the ATV users in the 430-440 region, and not by any means final, we have the simplex voice user. The simplex user is one who enjoys the satisfaction of a good DX contact on the VHF/UHF bands.

Both the 144 MHz band and the 440 MHz band are becoming crowded. There are dual-band radios for these two bands coming from every direction, but have we seen a two-band transceiver for 144 and 223 MHz?

50 MHz			
51.12	Neighbor Backbone	51.14	Experimental
51.16	Keyboard to Keyboard	51.18	Experimental
144 MHz			
144.91	Keyboard to Keyboard	144.93	LAN
144.95	DX Spotting Network	144.97	LAN
144.99	LAN	145.01	Keyboard to Keyboard
145.03	Keyboard to Keyboard	145.05	Keyboard to Keyboard
145.07	LAN	145.09	LAN
145.61	LAN	145.63	9600 bps
145.65	LAN	145.67	TCP/IP
145.69	LAN	145.71	9600 bps
145.73	LAN	145.75	DX Spotting Network
145.77	Keyboard to Keyboard	145.79	LAN
220 MHz			
223.54	Node Backbone	223.56	Node Backbone
223.58	DX Spotting Network	223.60	Node Backbone
223.62	Node Backbone	223.64	Keyboard to Keyboard
223.66	Keyboard to Keyboard	223.68	LAN
223.70	9600 bps	223.72	TCP/IP
440 MHz			
433.05	Experimental	433.80	BBS Backbone (Forward)
443.05	TCP/IP Bkbone (100 kHz)	443.15	ROSE BkBone (100 kHz)
443.25	DX Spotting (100 kHz)	443.35	Node BkBone (100 kHz)
443.41	BBS Interlink (Forward)	443.43	9600 bps
443.45	BBS Interlink (Forward)	443.47	Node Keybd to Keybd
443.49	DX Spotting (100 kHz)	441.49	ROSE Trunking 9600

Definitions

LAN (Local Area Network): Anything except TCP/IP and DX Spotters is tolerated. Please avoid placing high-level switches, digipeaters, or nodes on these frequencies since they are designated for local use. Low-level switches are permitted for access to high-level backbones.

Experimental: All packet modes, such as switches, nodes, gateways, etc., except full-service BBSes or other 24-hour service. A frequency for testing new equipment, protocols, and programs, etc.

Keyboard to Keyboard: Primarily chat channels; no full-service BBSes, TCP/IP, or DX spotting. These frequencies are also set aside for primary emergency operations.

Backbone: No uncoordinated stations! These channels are for specific purposes, such as BBS, switch, node, DX nets, and uplinks. The use of these frequencies is defined and specified within each station's coordination. Users are requested to use the normal entry points on the 144 and 220 MHz bands.

TCP/IP: Stations using TCP/IP protocol supported atop AX.25. Only AX.25 stations using persistence access method allowed and for communications with TCP/IP stations.

DX Spotter: DX spotting network; no other packet activity is allowed.

9600 bps: Only stations using 9600 bps with direct FSK (G3RUH, etc.).

Table 1- A bandplan format for 50, 144, 220, and 440 MHz.

So, What's The Beef?

With these thoughts in mind, we are about to come to grips with our immediate packet need, which is we need backbone and trunking spectrum! This spectrum should be capable of providing 5 kHz, 20 kHz, and a few 100 kHz wide channels.

The 9600 baud, Direct Frequency Shift Keyed (DFSK) trunk/backbone is the reason for the 20 kHz wide channel requirement, and 56 kilobauds is the reason why an 88 to 100 kHz bandpass is needed.

The Key Word is "Bandplan"

There are numerous bandplans in motion around the U.S. and Canada. However, we need to adopt some semblance of a bandplan which will enable the use of this spectrum, and do so in some rational fashion. There is more to constructing a bandplan than just putting a list of frequencies on a

docket and filing it with the League. For openers, there needs to be, and should be, the same kind of spectrum allocations made for packet applications as there are for AM, CW, FM, SSB, etc. It should be obvious to both the FCC and the ARRL that packet radio is now as entrenched in today's communication technologies as are FM and its distant cousin, SSB.

Our need to build a bandplan is long past due, and there are several levels which must be looked at as a bandplan is developed. Many users tried to look the other way in the hope that someone else would "do it." That did not happen, and the wound has only gotten worse.

Something that used to be a simple migration for many of us has now reached proportions that demand someone to take the initiative and "just do it!"

Even as I write these words, I'm realizing that what is appearing on this Word-Perfect screen are statements that will bring a lot of comments from the "do-good-

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•
DR-110T • DR-112T

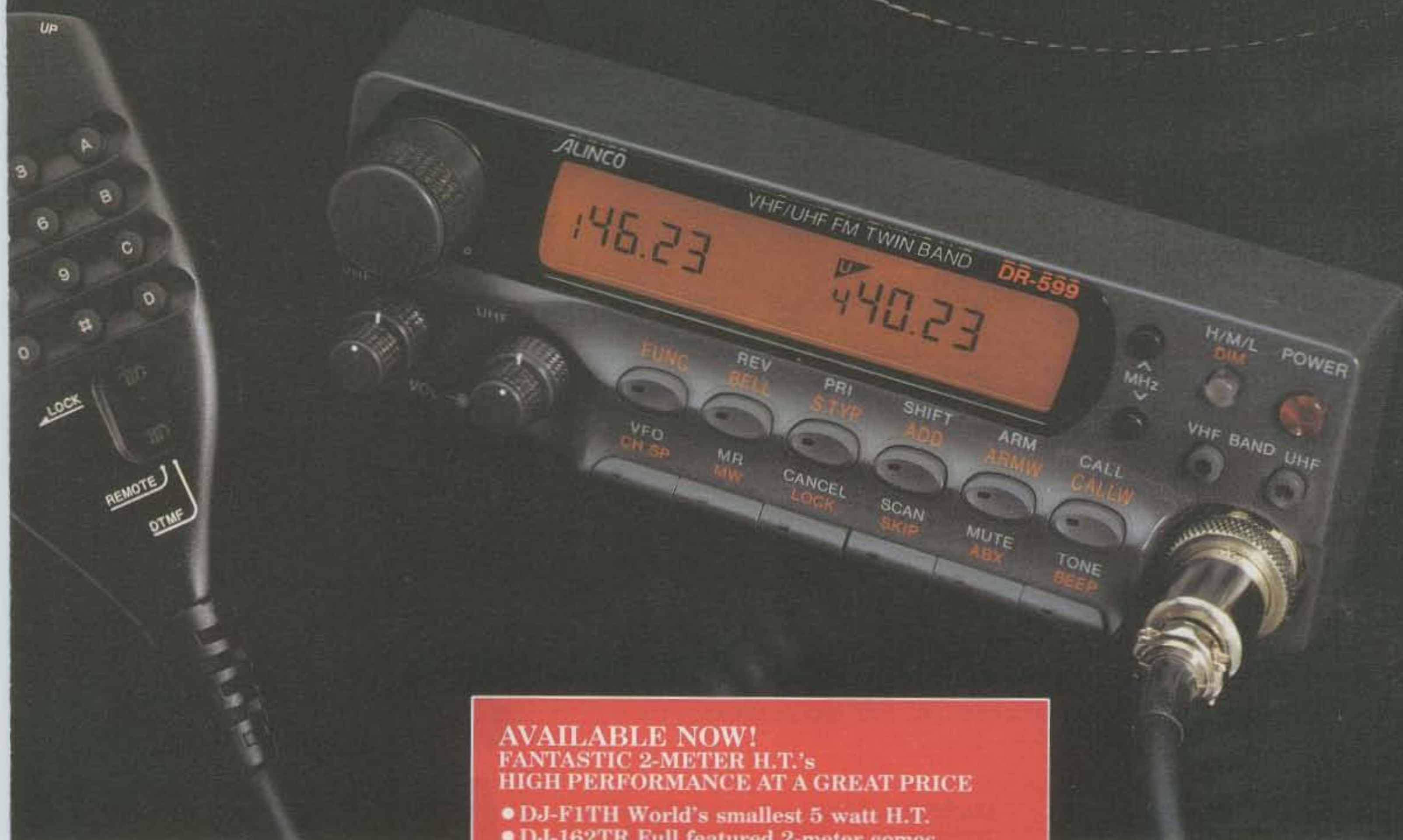


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- DJ-F1TH World's smallest 5 watt H.T.
- DJ-162TR Full featured 2-meter comes standard with EDC-34 rapid charger

New Model DR-599T

Here's the radio that goes where no radio has gone before. This is truly the most advanced twin-bander available today.

Hi-tech features and ergonomic design put the DR-599T in a league of its own. From the Remote control microphone to the contoured fingertip buttons, the DR-599T looks and feels like a smooth operator.

Space limitations are not a problem for the DR-599T. The detachable control head allows the transceiver body to be hidden from view while the sleek control head can be neatly mounted on a dash or visor. (Optional separation kit required).

This DR-599T has full duplex cross band operation and cross band repeater functions with real-world

power and excellent sensitivity. Airband receive is also possible with a simple modification.

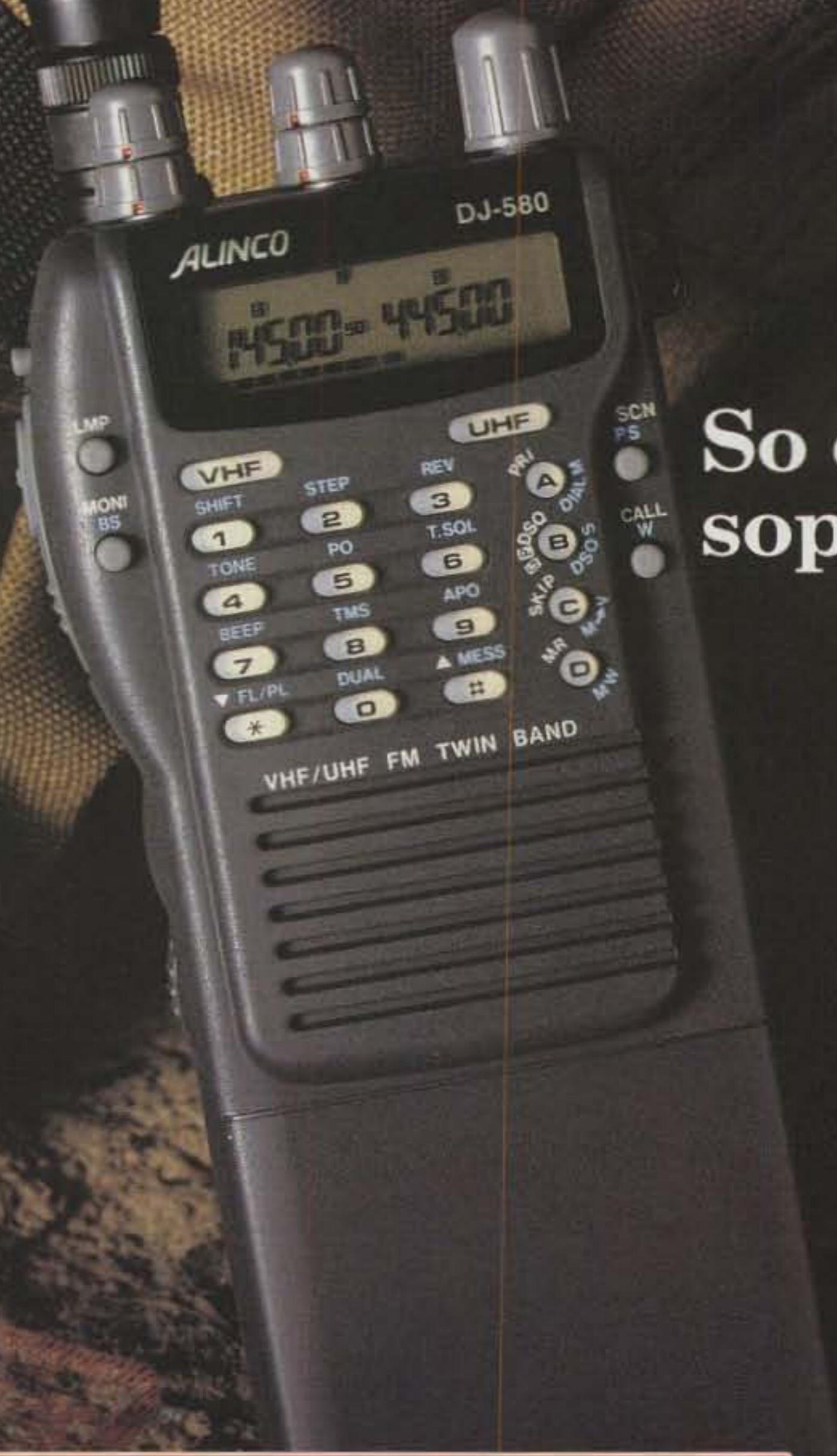
The standard features include 3 power output selections, ARM, ABX, Bell, Reverse, Mute, and Auto Dialer functions. Also, with the optional EJ-8U DTMF Decoder board installed, the DR-599T can be remotely operated from another transceiver.

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- DJ-F1TH World's smallest 5 watt H.T.
- DJ-162TR Full featured 2-meter comes standard with EDC-34 rapid charger

New Model DJ-580T

RATED # 1 IN JAPAN, NOW AVAILABLE IN THE U.S.

A super-compact handheld, the tiny DJ-580T is a powerful, feature-packed twin bander. This super-compact HT is the smallest you'll find, and literally fits in the palm of your hand.

Ergonomic design, combined with excellent sensitivity and unbelievable great sound, sets a new standard for miniature HT's.

New MCF function allows you to set the 40 memory channels regardless of which channels you want for VHF or UHF. Any combination is possible.

Alinco's DJ-580T has Full-Duplex Cross Band Operation and Cross Band Repeater Functions with real world power and excellent sensitivity. Airband

receive with simple modification.

If the battery is depleted to less than 5 volts, Alinco's Patented Super Low Battery Consumption Function is automatically activated. You can continue to operate the radio all the way down to 3.5 volts. This feature is effective with dry cell batteries only.

This unit has built in DSQ for paging, CTCSS encode and decode standard, various scanning functions, 3 power level selections for each band, bell function, and an illuminated keypad.

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Photo 1- Yours truly (left) and the mayor of Gallatin, Tennessee, Tom Garrott, who proclaimed the week of January 25th Amateur Radio Week in Gallatin.

ers." However, this same group of "dogooders" is the same sad group who tries to defend their lack of ambition by finding fault, regardless of the ultimate outcome. Indeed, they will scream foul at the drop of a hat, but after the benefits of these ideals are manifested, this same group is among the first to take credit for their success.

To build a bandplan we need a place to start. From there we need a committee that represents all areas of the packet hobby. With these ingredients our bandplan can begin, but where do they start? Someone has to toss out the ball. In short, there must be a starting point. Everyone is sitting around the table, afraid to offer an opening format. Last month I mentioned the League digital committee. These are the guys who need our help and direction. Contact them, write to them, and supply them with the information that you have compiled for your region. Tell Dale Sinner, Paul Rinaldo, Frank Butler, and the other members of the digital committee that we need a "real" bandplan before the system consumes itself. No! This problem won't go away, and it won't get better until we all take part in the cure.

Whether you are within the FADCA, or SADCA group in Florida, the NEDA association in the New England area, NCPA in the Northern California area, or SEDAN in the Southeastern Emergency Digital Association Networks area, you have a problem that needs to be resolved, and soon.

I've looked at bandplans that are suggested by several packet organizations across the nation. Table I is a cross-section of their frequency applications as related to this topic. This bandplan is submitted as a basis or format, and *not* as a final determination!

For any reader who is associated with one of the large packet associations, let them know your opinions, and by all means give them your support, because this topic is going to be about as popular as a tax increase in a recession at election time, but someone has to tread onto this turf.

Few days pass that I don't receive a letter or hear the comment "But Buck, this



Photo 2- Attendance at the packet forum at the Central Tennessee Hamfest exceeded the expected numbers.

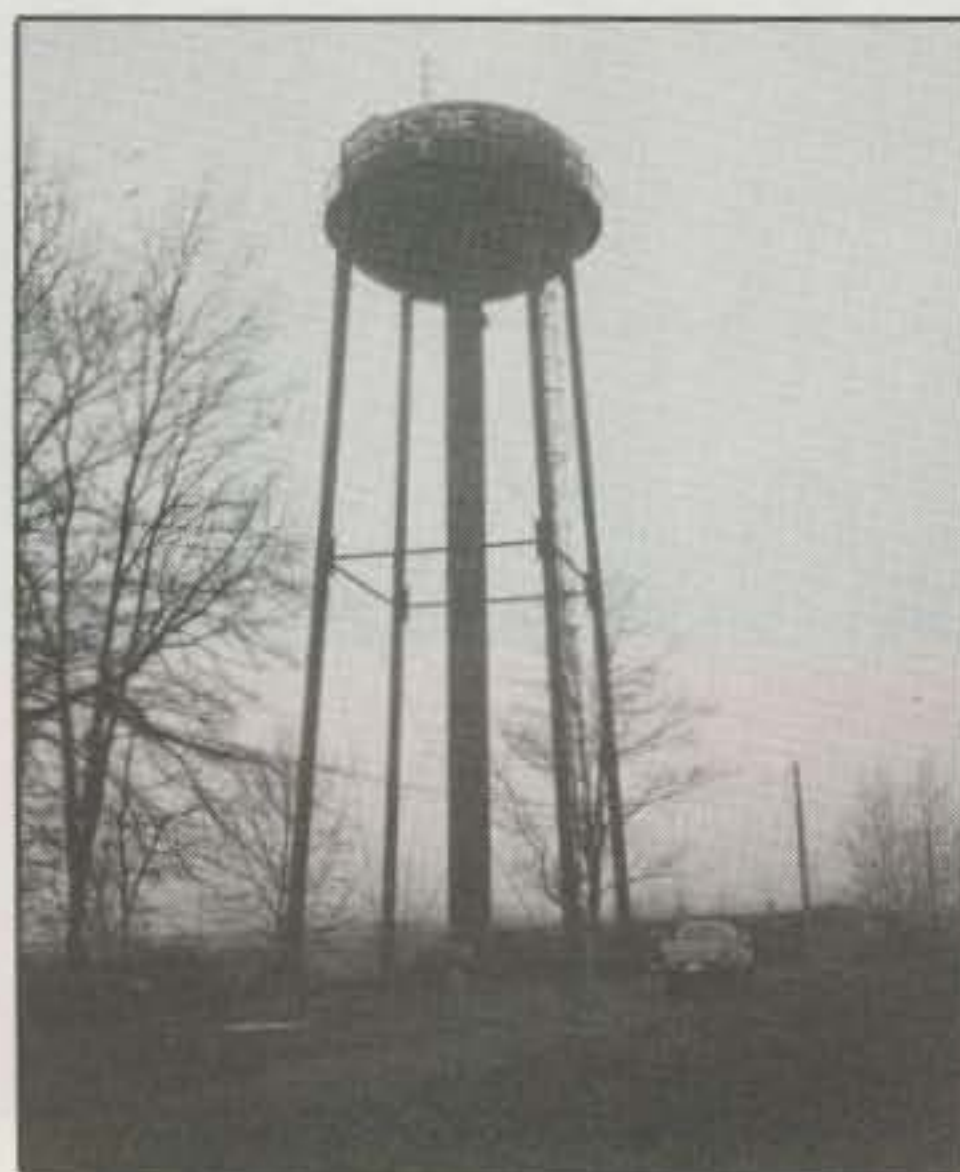


Photo 3- KC4NEH and KC4ECD searched out this water tank as the site for their ROSE switch. (See details in text.)

is only a hobby!" How true this statement used to be. However, the "hobby" has taken on enormous proportions. To give you a quick idea of its magnitude, stop and look at the overall number of amateurs who are purchasing new equipment daily. The number of new dealers who are entering the amateur radio distribution business should speak for itself.

At a recent hamfest where less than 1000 amateurs were in attendance, 166 candidates showed up for testing. Over 100 of these candidates were to be tested for a *new* or first-time license.

Now you're getting the picture. Act now

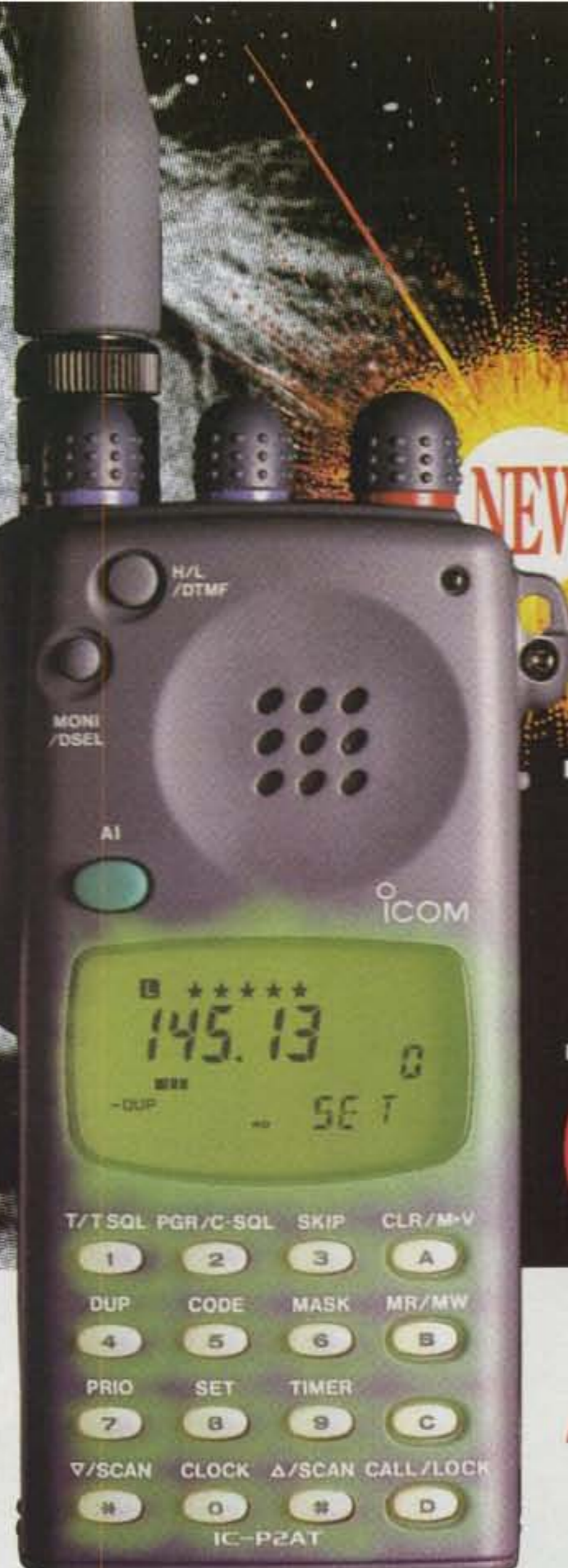
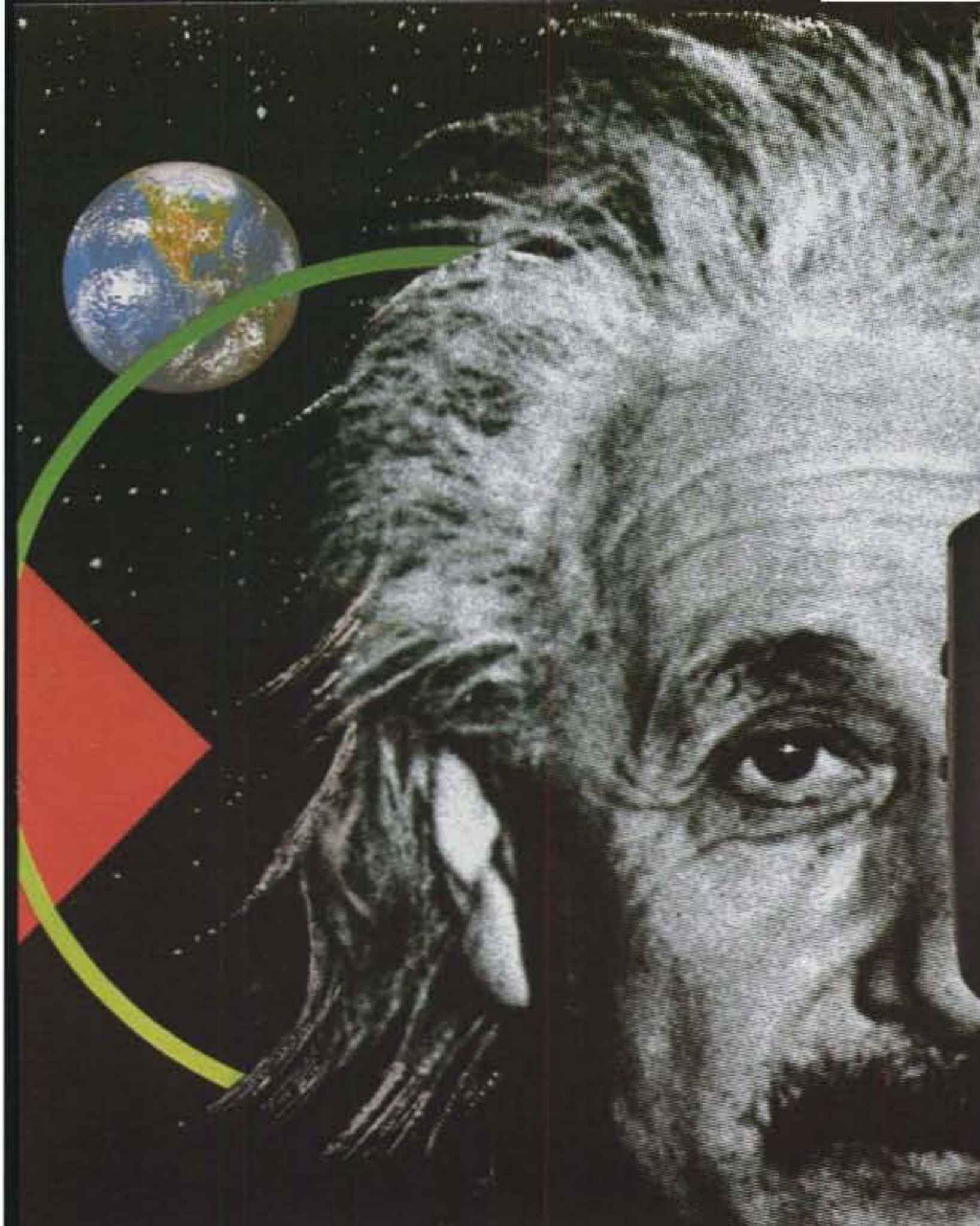
and be prepared for the future. Competition on *all* amateur frequencies may soon compel us to subdivide our precious spectrum even more. Still not covered is the manner in which many commercial users and manufacturers are stampeding the Commission to take away blocks of this same spectrum for their own applications, without regard for our emergency networks or for our hobby as a whole.

No longer do we have to call for a clarification if we wish to include a piece of fiber-optic in a long-distance packet node to node link (worm-hole). The same is true when we link one state to another via a spare microwave service channel. Why? Simple. We are conserving valuable spectrum, and at the same time we are reducing the congestion by routing heavy data traffic through these worm-holes. More on this technique in a future issue.

The Hamfest Season Is Underway

I've been making plans for the granddaddy of all hamfests, and while doing so, I've uncovered a lot of good information about various meetings, forums, and events that are taking place at Dayton this year. The 1992 Dayton HamVention may prove to be the best yet for the digital amateur.

Speaking of Hamfests... The summer semester of packet seminars opens with the Knoxville, Tennessee Hamfest on June 6th. There will be free packet handbooks for those attending this two hour packet seminar on Saturday, June 6th in Knoxville. I'll have more information about the Knox-



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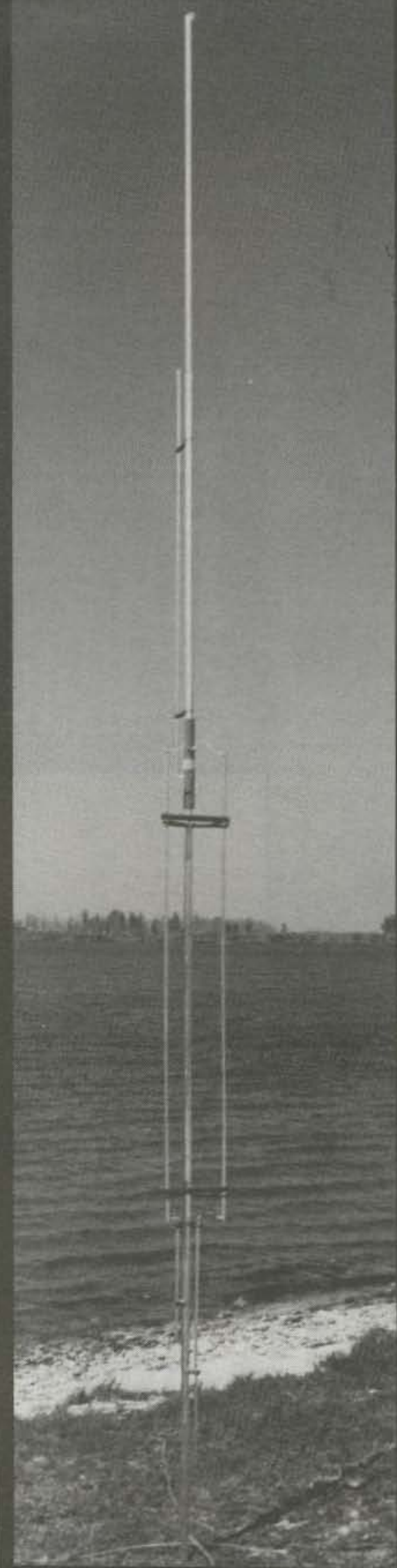
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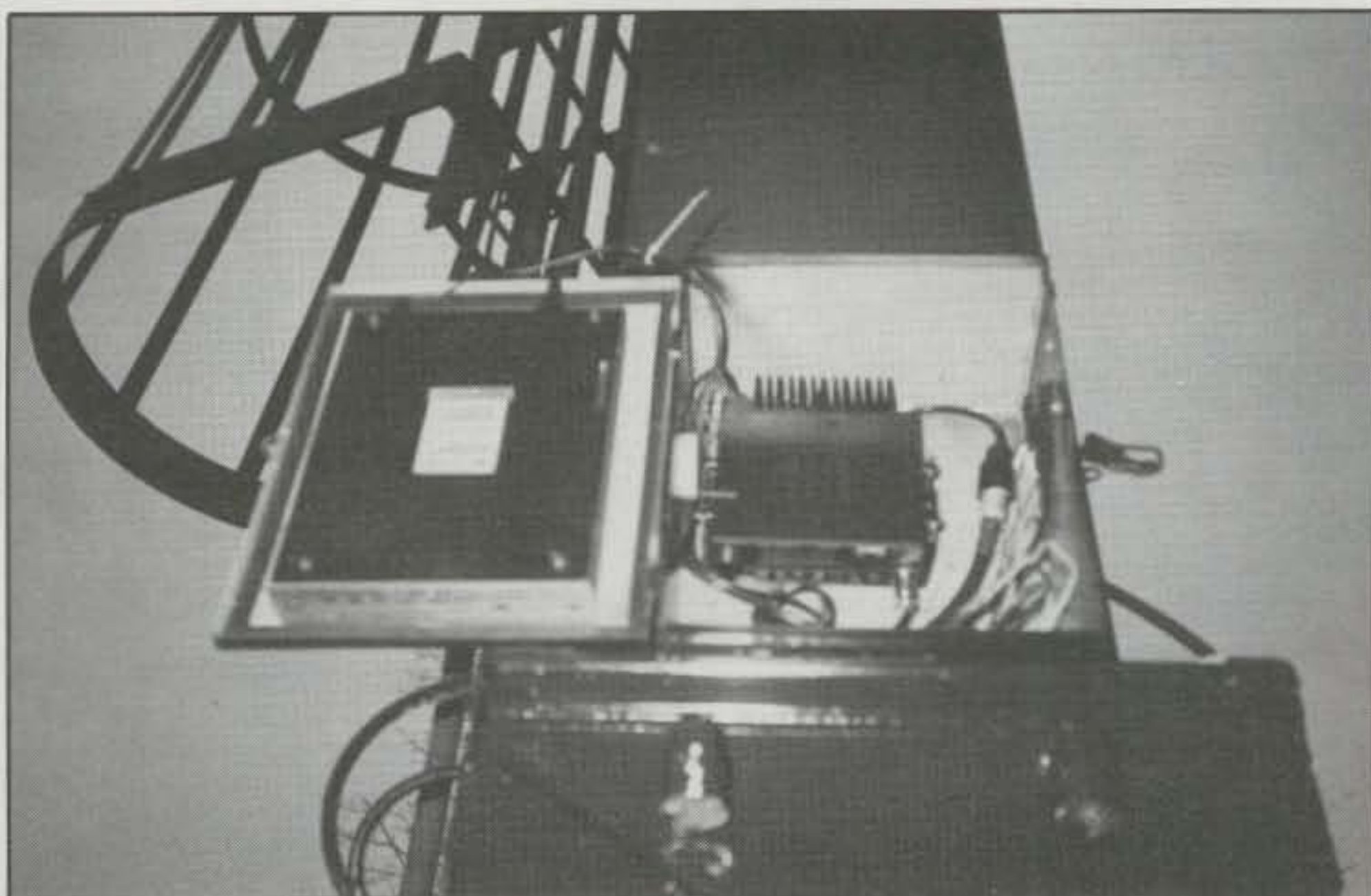


Photo 4— Mike and Perk built a complete packet switch, transceiver, and TNC inside this steel utility case.

ville Hamfest in future issues.

Proclamation: For the folks in central Tennessee, it was a well-received hamfest on January 25th. Although it was a bit on the cool side, there was a record turnout of area amateurs. Well, I say area, but I saw Keith, N9IBS, from Metropolis, Illinois; Jim, AA4UA, from Blythe/Augusta, Georgia; and Lonnie from Eufaula, Alabama. Charlie, N6IFL, made it to the Gallatin hamfest, too. Kentucky, Florida, and South Carolina were well represented at this Central Tennessee Hamfest.

The reason I mention the above event is because the Central Tennessee Hamfest is an event that is taken somewhat se-

riously in the Gallatin area. The mayor of Gallatin, Tom Garrott, issued a decree proclaiming the week of January 25th as Amateur Radio Week in Gallatin and Sumner County, Tennessee. Taking part in the ceremony were Bill Ferrell, N4SSB; Robert Perkinson, KC4NEH; Tom Park, WD4KWP; and myself (see photo 1). No, the mayor is the one on the right. Thanks to Betty Bell of the *News-Examiner* for the photos.

The packet forum exceeded the expectations of the hamfest planners. They had arranged seating for 120 people, and when the crowd began to gather for the forum, it was obvious that the attendance had been underestimated (see photo 2). Here



Photo 5— To prevent oxidation from rain water, a heavy compound was used on the water tank leg where the unit was attached to the water tank supports.

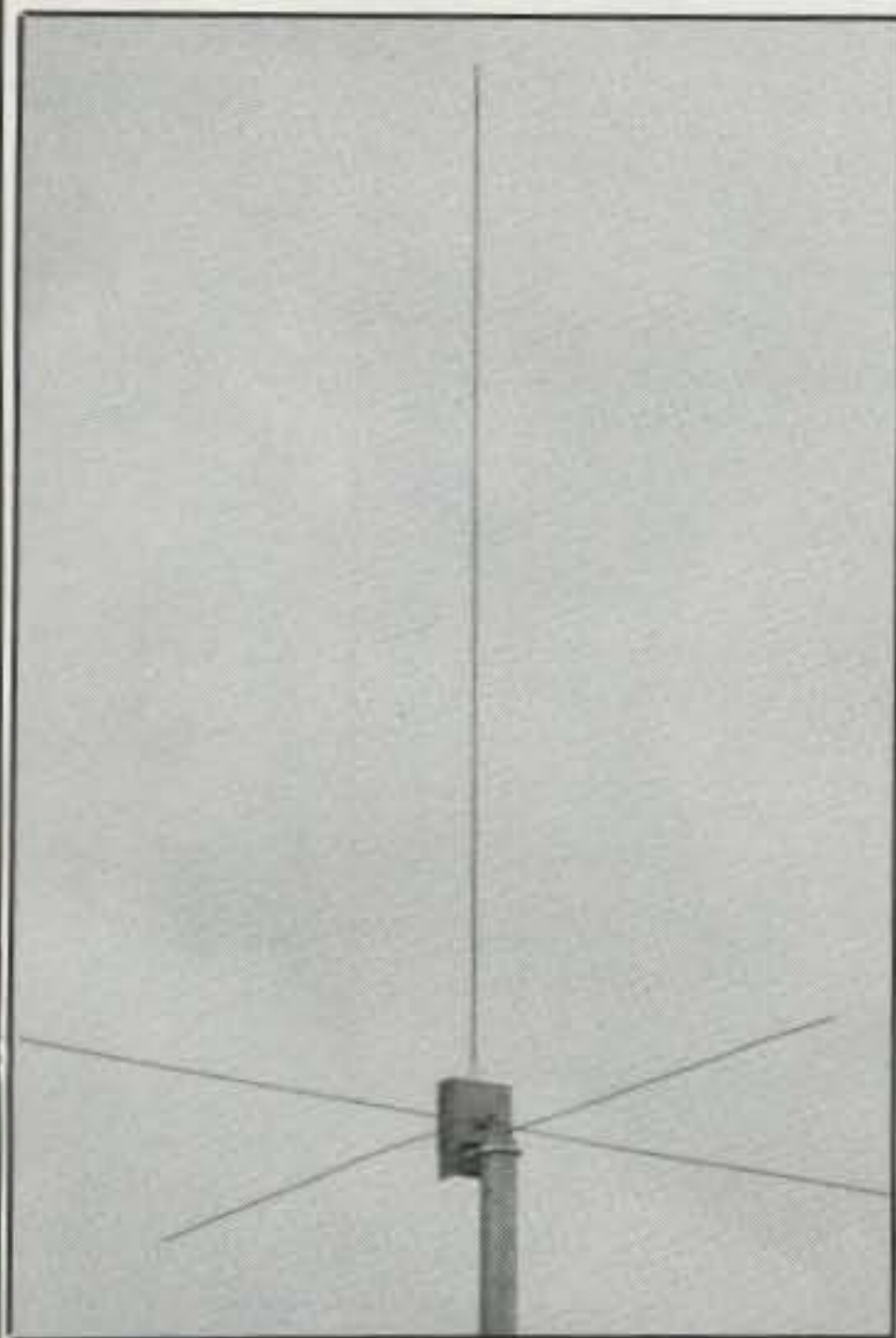


Photo 6- MFJ's 5/8-wave, base-station ground-plane antenna, Model MFJ-1750.

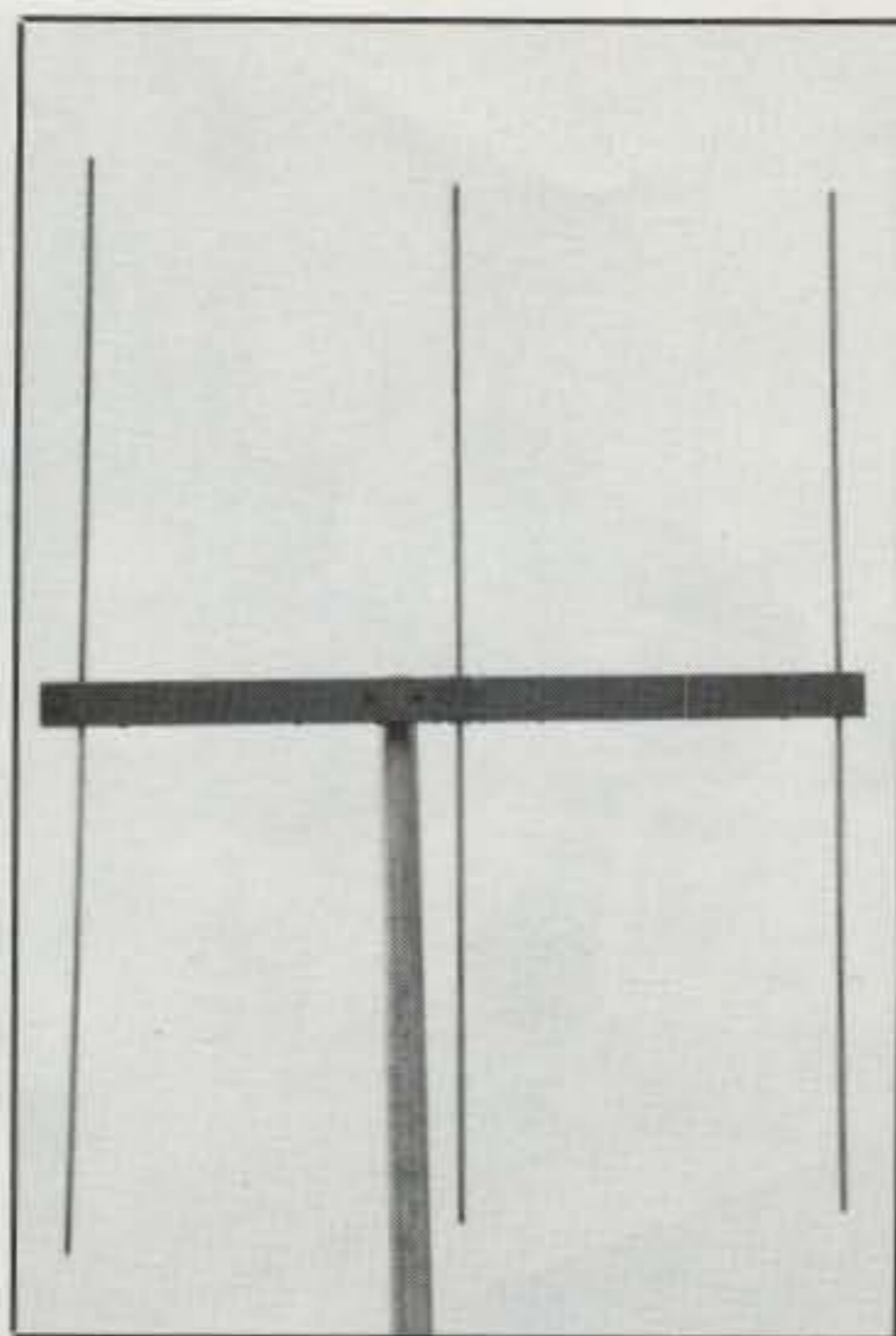


Photo 7- The MFJ-1763 compact, 3-element, 2 meter beam.

is where I saw the real dedication of the packeteer. Although a few had to stand, they were there for the full two hour packet forum.

Similar circumstances occurred with the VE test sessions because of the unexpected crowd. The hamfest committee has assured us that next year the Central Tennessee Hamfest will be held in much larger facilities.

For The Lack of a Camel A Kingdom Was Lost

Maybe that's not the exact words of that old cliché, but it will serve to describe a notion that we sometimes overlook. In an effort to improve coverage of the keyboard-to-keyboard emergency packet network in their area, Robert Perkinson, KC4NEH, and Mike Parker, KC4ECD, set out to find a location for a ROSE switch. The search area was near Lafayette, Tennessee, an area which has plenty of hills and mountains, but few existing towers with space available for a switch.

Mike and Perk found a water tank (see photo 3) atop a mountain near the area needing coverage. Perk built the complete packet switch, transceiver, and TNC inside a steel utility case approximately 10 x 12 x 6 (see photo 4). He then installed a 13.8 volt, 45 ampere-hour battery and the associated charger in another (steel ammo) box and attached the two steel boxes using stainless-steel bolts.

With an Isopole atop the water tank, final touches were made by attaching the steel cases to the tower. Here they used large

stainless-steel aircraft cable to affix the complex to one of the water tank supports. I suppose steel-banding could have been used, but we hams sometime implement whatever means are available at the moment.

For obvious reasons, Perk and Mike used a heavy compound on the water tank leg where the cables lapped the support. This "No-Oxy" compound prevents oxidation formation on either the tank support or the cable where rain water might come in contact with either (see photo 5).

A Ceramic Insulator!

In these days of plastics, Teflon, steatite, and other trademarks for all type of insulators, we ran across an announcement of a new antenna that is being built and marketed by MFJ Enterprises of Starkville, Mississippi (see photo 6). This new 5/8-wave, 2 meter antenna sports, of all things, a real, sure enough, ceramic insulator between the radiator and the supporting metal bracket.

There are several features that caught my attention. A couple of notable features are how it handles 300 watts and the easy way that it is tuned. Seems this 5/8-wave, base-station ground-plane antenna has a portion of the radiator threaded so as to make it easy to set the VSWR in a quick fashion.

After the blast of lightning back last November, this next feature is one that appeals to my future antenna requirements. The antenna is "shunt-fed." This is a matching network whereby a DC ground is exhibited to static build-up, yet it pro-

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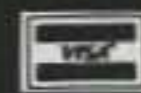
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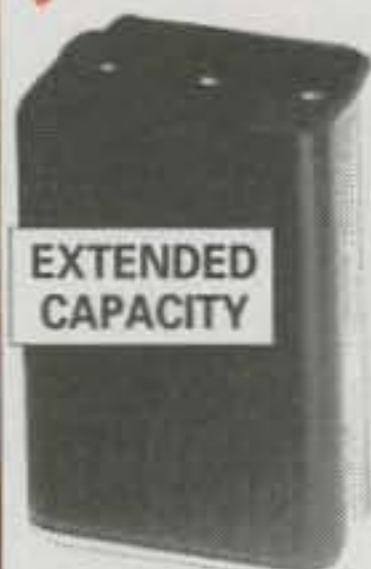
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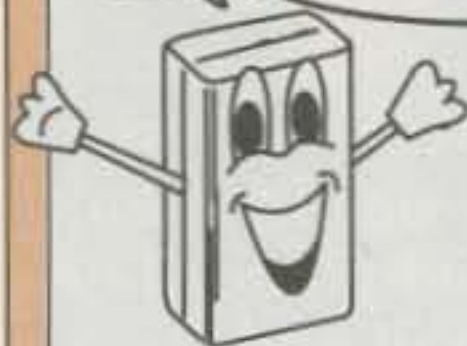
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Photo 8- KC6AST and an ever-increasing number of second and third harmonics. "Last one to get his license is a . . ." Well, you're late!



Photo 9- Presentation of the 1992 "POTY" Award for Tennessee. The award went to Robert Perkinson, KC4NEH. The Packeteer Of The Year (POTY) award is given to packeteers who have made outstanding contributions to the hobby of packet radio.

vides a near perfect match at the operating frequency. This kind of match performs other good functions, too.

It helps make the band-pass wider, it has an impedance characteristic that appears closer to the actual impedance of the attached transceiver, and it makes SWR tuning easier via the radiator length adjustment. According to MFJ, the antenna provides a match that is better than 1.5 to 1 across the entire 4 MHz of the 2 meter band.

The mounting hardware is designed for easy installation on masts ranging from 1 inch to 1 1/2 inches in diameter. The "U" bolts for mounting are included.

Here's the best part: This 1/8-wave, base-

station ground-plane is priced at \$19.95. It is available as Model MFJ-1750 through most MFJ dealers.

If you would rather reach out farther, MFJ has covered that base as well. Well, maybe they have gone beyond the "base" with the compact, portable, 3-element, 2 meter beam (see photo 7). The MFJ-1763 boasts a gain near that of a 4-element Yagi. This beam has three sets of threaded elements that simply screw into the boom, which is less than 3 feet in length.

The MFJ-1763 can be mounted either vertically (for FM work) or horizontally (for SSB contacts). It is great for the DXer who wishes to side-mount the antenna on a tower leg to enable connecting to a distant node of a DX packet spotting network. The fact that this compact, 3-element beam can be set up or taken down in a matter of seconds is one of the reasons why the MFJ-1763 finds its place in the wagon on the way to the mountaintop for the CQ contests or Field Day.

Coax feed-line decoupling is achieved via a high-performance ferrite balun attached to the input SO-239 coax connector at the rear of the beam. "U" bolts for mounting are included with the MFJ-1763, which sells for \$39.95.

For more information about either the MFJ-1750 or the MFJ-1763, contact MFJ Enterprises, Inc., at P.O. Box 494, Mississippi State, MS 39762, or call 601-323-5869. To place an order, call toll-free 1-800-647-1800.

Here's hoping we see you at Dayton, and until next month . . .

Happy Packeting, de Buck4ABT.

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Termination _____ Type N female

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A LOOK AT THE WORLD AROUND US

An April Special: Radio Elixir and Wind Screens For Bugs

Although this month's column is short, April is here once again and we simply could not resist sharing with you views of two more K4TWJ delights: Dr. Dave's Radio Elixir and wind screens for bugs. Now, for the first time, you (yes, you!) can add big-time radio performance to your HF or VHF setup for only pennies! Indeed, the following items are so breathtaking and revolutionary we started to apply for a patent but opted for sharing them with our good friends around the world instead. Is that not true devotion? Read on!

Before delving into specifics of each item, we must highlight how they brought indescribable joy to our test users. After a few friends tried Dr. Dave's Radio Elixir, they began working rare and exotic lands such as XU/Burma, VK0/McQuarie, and VU/Andaman Island via long path while using only 250 mw of power to a random-wire antenna 5 feet off the ground. One fellow applied it to his tribander which was balanced on a garbage can, and it produced such outstanding results that he took down his tower and sold it. Another fellow coated his VHF ducky with the radio elixir, mounted it on the rear deck of his car, and contacted stations throughout Europe on 75 meters CW while mobile—and that was only running 10 watts!

The wind screen is perfect for use on classic bugs if your shack has a draft or when mobiling with the windows down. The little fingerpiece cover eliminates wind noise just like a microphone wind screen, plus it also keeps your fingers warm in cold weather. We understand the wind screen can also be used with electronic paddles. However, more testing is necessary in this crucial area. Let's take a closer look at each of these incredible items.

Radio Elixir

A genuine and authentic sample bottle of Dr. Dave's Radio Elixir is shown in the photo. This item is a combination antenna wax and etherical grease. Its prime ingredients consist of liquid silicone, atomizable hydrogen, scrapings from leaves of the rare caruaba plant in South America plus Mexican chili peppers (red hot radio indeed!).

4941 Scenic View Drive, Birmingham, AL 35210

There is also a special "secret ingredient" we have yet to refine and define in this new high-tech product.

Technically speaking, Dr. Dave's Radio Elixir adds super conductivity to your antenna(s) so signals slide off with absolutely no opposition. At the same time, the signals pick up and carry particles of the ionizable hydrogen as they travel. In addition to becoming super reflective, so your signal sounds stronger to the distant station, residual etherical (*sic—ed.*) grease left on the ionosphere will help the distant signal come back through that same path with greater strength... and just to your QTH! Theoretically, this can be explained with the following formula:

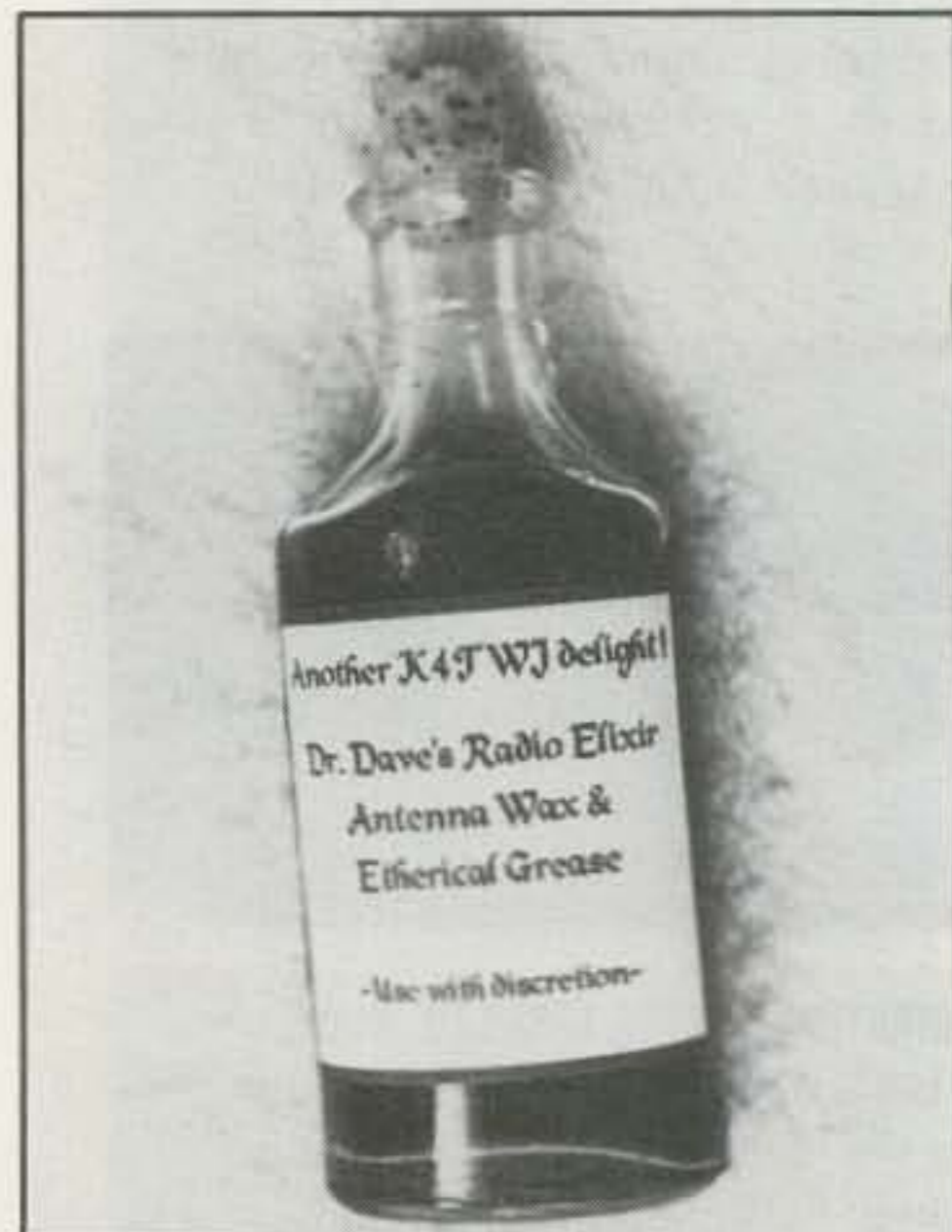
$$Z = \sqrt{X^2 + Y^2}$$

($E = MC^2 + 3 \text{ dB}$). What does that mean? Don't ask!

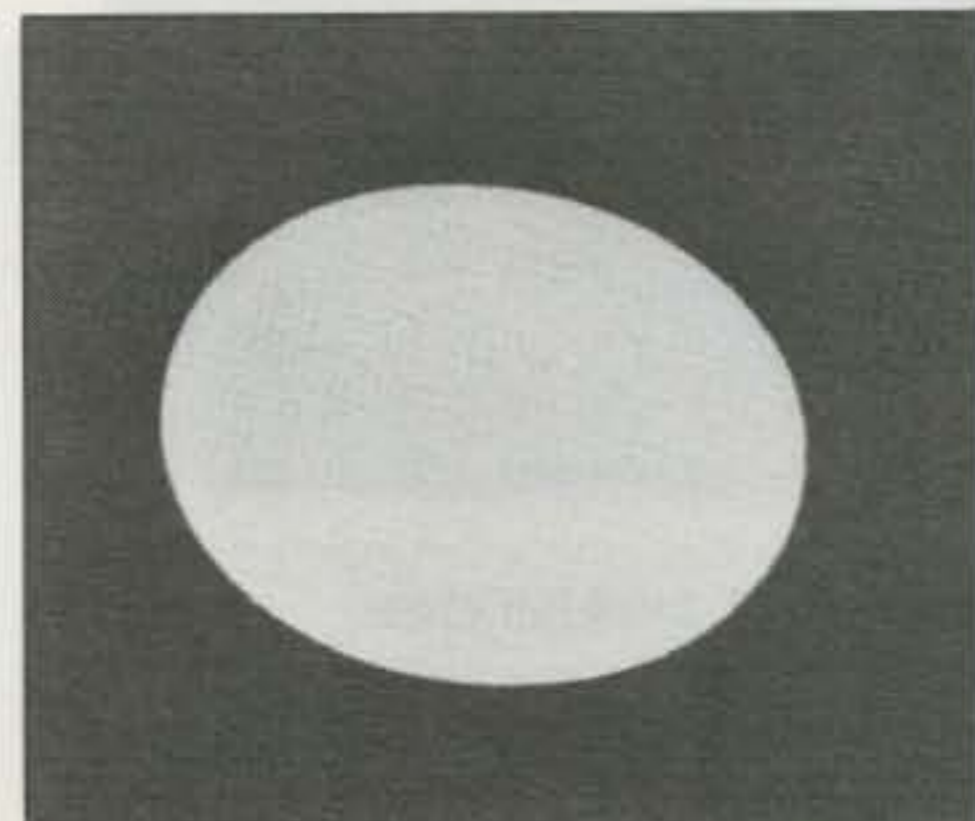
Does K4TWJ's Radio Elixir really work? We passed out samples to a few test friends (or was that test samples to a few friends?) and asked for their opinion a couple of weeks later. The first two with whom we checked were still babbling strange noises from all the DX they had worked, and we were told the others were away on a little vacation to some off-the-wall institute (hope they remembered to carry rigs!). Obviously, that can be interpreted as unbelievable results!

Simply explained, the elixir is applied to your antenna(s) with a small cloth. One application typically lasts two or three weeks, depending on your daily operation. After application the antenna will shine like new. When it begins to dull, it is a sign the elixir has been transmitted into space and it is time for a new application. For best results, the elixir should be applied around dawn of a week day. Optimum results have been noted when you wear a bandana around your head, throw rice before applying the elixir, and then softly chant during the actual application. A secondary party with long hair and a few loose curlers can give assistance by mumbling and occasionally throwing both hands in the air, similar to an Indian war dance. One tester suggested an accompanying bonfire. However, we have yet to confirm or deny its advantage.

A limited supply of free K4TWJ Radio Elixir samples are available to on-the-air contacts. Simply ask us about the anten-



Dr. Dave's Radio Elixir—a real octane booster for low-power signals.



Moon over Miami at midnight. No, it is a soft and cuddly wind screen for a bug.

na wax and etherical grease when we QSO.

Wind Screens for Bugs

This remarkable item, shown in the accompanying photo, slips over the fingerpiece of a big or electronic paddle and serves the same purpose as a wind screen on a microphone. The difference is this wind screen works for CW rather than SSB! If you operate CW mobile (and who doesn't!), you immediately recognize the disadvantage of road noise and wind rum-

ble affecting your transmitted Morse. Not only does this wind screen improve your transmitted signal quality, but it also lets you transmit at least 5 WPM faster while adding 10 miles per gallon to your fuel economy. Unconfirmed rumors also suggested it minimizes chirps and birdies in and out of the car! The only additional dope we know for mobiling is extra grease for the nut holding the steering wheel. Big-time mobiling indeed!

A few samples of this rare and exotic wind screen are available. However, you can roll your own (no pun intended) by visiting cosmetic supply stores and purchasing their most expensive make-up applicator. Warning: Do not leave this item in your car's glove compartment before informing the XYL!

Additional information on these new items is limited and still forthcoming. Some details are available on the air (we frequent 14.180-14.225 MHz Sundays from 2200-2300 GMT). Letters of inquiry are not encouraged at this early time (don't call us; we'll call you). Finally, a disclaimer. The users of radio elixir and wind screen for bugs are a rare and elite group, and their high standards may not be appreciated by everyone. Use with discretion. Stated another way, if you get caught using the products unauthorized, we don't know you! Next April we will tell you how to degauss the cat and eliminate those late-night howls on 40 meters. 73, Dave, K4TWJ

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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

Last time we got together, we examined some good books and catalogs for you to peruse in your spare time. We haven't turned to publicly answering reader mail in some months, so we'll do just that now.

Special Delivery

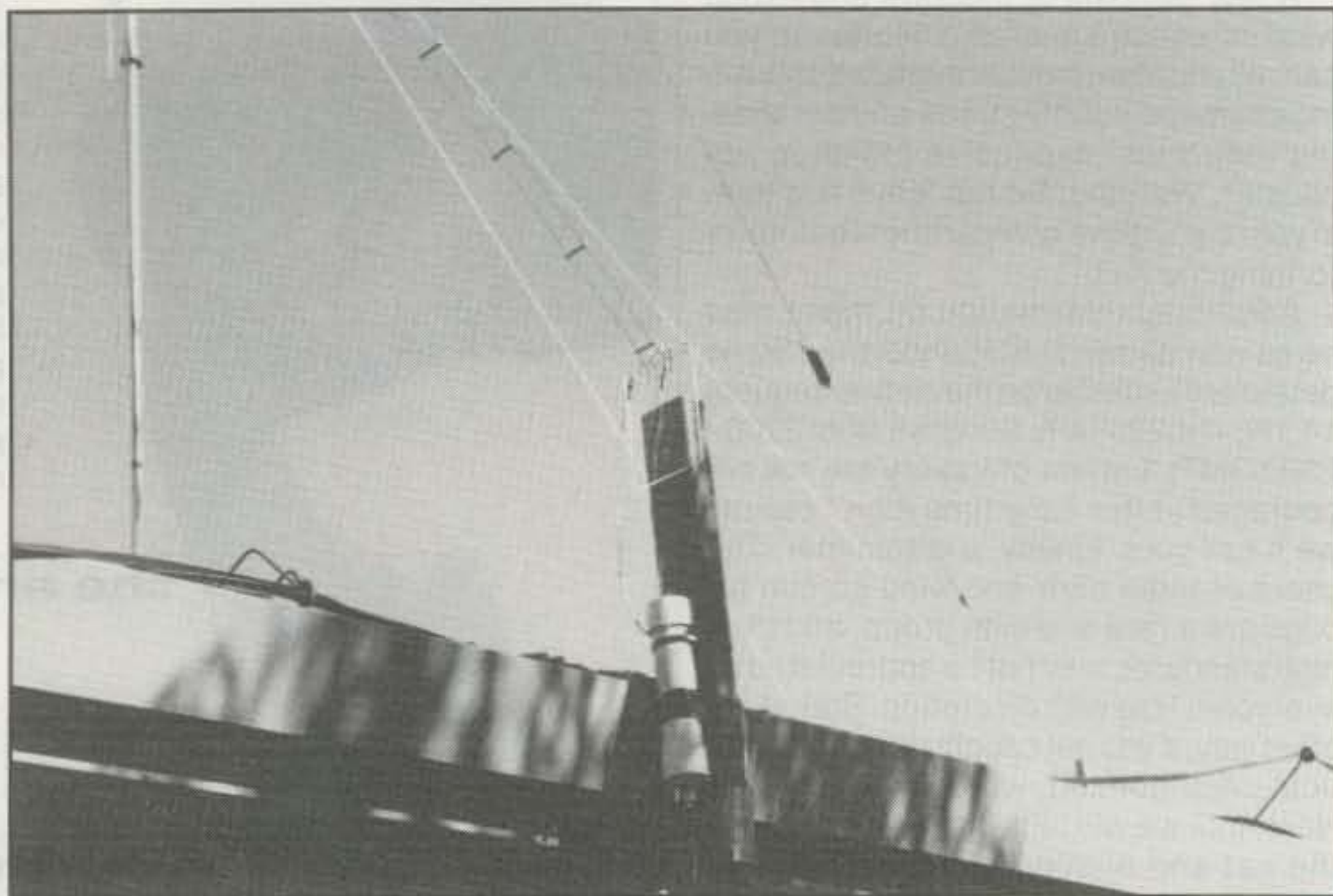
Antenna Notes de Roy Wilson. Roy L. Wilson sent us a lengthy letter that presented us with a variety of provocative antenna topics, issues, and positions—more than we could possibly reprint in the column. In his letter Roy alerted us to one of his favorite books on wire antennas, *Practical Wire Antennas* by John D. Heys, G3BDQ (RSGB, 1989). There are some very interesting and novel designs in the book, notes Roy, including the simple, so-called W3EDP singlewire. First described in a pre-World War II edition of the RSGB *Amateur Radio Handbook*, the 85 foot singlewire, combined with a 17 ft. counterpoise and fed through a transmatch, is said to behave much like an endfed Zepp on 7, 14, and 21 MHz. The antenna also is claimed to work well on 3.5 and 28 MHz, where the counterpoise is not used. Roy also had some interesting observations which he shared with us on very long wires (including using the Beverage for transmitting), large horizontal loops, continuous-coverage HF wire antennas (such as the B&W AC 1.8–30 MHz multibander), small capacitively tuned loops, spiral antenna elements, and other unusual antennas.

UA1DZ Broadband Vertical via N2FZ. Bill Mollenhauer, N2FZ, sent us a translation of a Soviet radio publication that described the "UA1DZ broadband vertical radiator," designed by Georgi A. Rummyantsev, UA1DZ.

While the reproduction of the antenna's sketch isn't clear enough to either show here or describe the proper interconnections, it appears that this HF wire vertical consists of eight phased broadband vertical elements made up of 2 to 3 mm diameter wire. At the top and bottom of the assembly the wires that form the radiator are insulated from the mast and are interconnected, while in the center the wires are connected to the mast. The uppermost dipole is connected to the coax center conductor, while the lower one is connected to the braid. The load-carrying mast is made of 40 to 50 mm diameter tubing, and the supporting crossbars are made of 10 to 20 mm diameter tubing. Reportedly, using 100 ohm coaxial cable SWR does 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.

Has anyone constructed the UA1DZ broadband vertical or does anyone have more details on its construction and theory of operation?

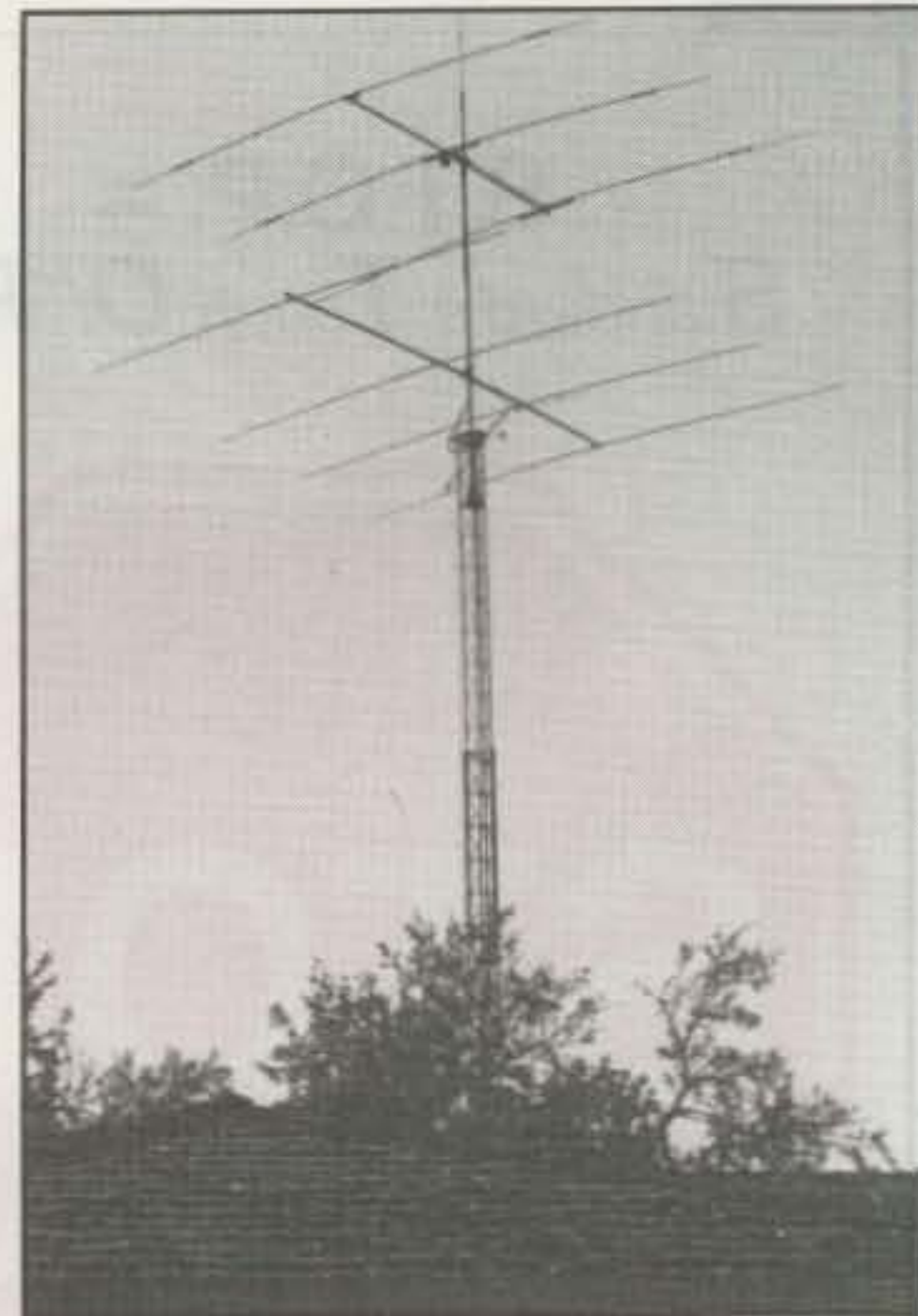
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Here's a closeup of the feed system on Mike, K6URI's G5RV antenna, which uses ladderline to a current balun; only a 6 ft. run of RG-213 coax is used between the balun and the antenna tuner. The flattop is 130 ft. long with about 10 ft. on each end bent away from the support poles. (Photo courtesy K6URI)

K6URI G5RV and Windom Notes. Mike Zane, K6URI, is a frequent contributor to the column and is an inveterate experimenter with HF wire antennas; he's sent us the results of several on-the-air comparisons and analyses, especially involving the G5RV antenna. Mike recently advised us that his local amateur club used both a G5RV and a Carolina Windom, both installed at the same height, for the 1991 Field Day and compared their results. He reported no real difference in either antenna's performance across the HF bands, at least in terms of received signal strengths on either end. However, neither antenna seemed to work as well as a no-frills, 130 ft. multiband dipole centered directly with open-wire ladder line through an antenna tuner; next year his club is going to try a fixed-in-one-direction wire beam. Elsewhere in this column are some photos showing Mike's own G5RV installation and his attractive tower. Sometimes simplest is best!

C.A.T.S. Kudos de KF0LT. On several occasions, most recently in the June 1991 column, we've mentioned the reportedly good rotor repair service offered by Craig Henderson, N8DJB's C.A.T.S. rotor repair (7368 S.R. 105, Pemberville, OH 43450). We have never had occasion to use his repair or reconditioning services, and have no connection with the firm. But we should mention that C.A.T.S. is one of the few firms for which we regularly receive unsolicited letters that praise their service and that suggest mentioning their good performance in the col-



Mike, K6URI, also sent us this snapshot of his good-performing Yagis. On top is a 3-element TET HB33SP; on the bottom is a Cushcraft 4-element Yagi for 15 meters. Just barely visible on the left side of the tower is a coil-loaded 160/80/40 meter sloper. (Photo courtesy K6URI)

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umn. Typical of these letters is one we received from Asa B. Wilson, KF0LT:

"In a world of declining respect for service, a good job can easily be seen in the crowd. My intent in writing is to share a very positive comment about C.A.T.S. and their rotor repair service. I recently bought a tower, rotor, and beam package from a local ham who was gradually 'retiring' from the hobby. I had no idea about the rotor or its control box until I got it home. I boxed the two pieces and sent them off to C.A.T.S. with a cover letter plus no cash or credit card, only a promise to call later in the week. I was delayed two weeks because of a business trip and didn't call until almost 3 weeks later. They were super kind, respectful, helpful, and forgiving of my delay. They had diagnosed the problem, fixed it, and had it ready to return within 2 days of my call!"

Enthusiastic Ham-to-Be. Responding to a "Short Burst" item in last September's column regarding the benefits to beginners of computer networking and joining a computer user's group, Mike D. Thompson, Sr. wrote to tell us briefly of his experience with the online service QuantumLink.

Mike says that in the late 1970s he wanted to join the amateur ranks, but the difficulties involved in learning both sign language and computer BASIC at the same time precluded his working on Morse. As the owner of a Commodore Vic-20, C-64, and now the C-128, he recently began studying for his "ticket" and reached a breakthrough when he went online with QuantumLink, which specializes in supporting Commodore users. Mike notes that QuantumLink has an online hamshack area that has public domain Morse code tutor and communications software

for the C-64 and C-128 available for downloading. Glad you discovered the fun of online computing, Mike!

Software for the Commodore 128. This brings us to another point regarding Commodore computers: the current availability of software for the popular Commodore 8-bit machines. I used a Commodore PET in the late 1970s and early 1980s, and later became enamored of the Vic-20, C-64, and C-128. But 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 there presently seems to be little development of new commercial software for Commodore computers.

However, I still receive many letters inquiring about amateur radio software for Commodore machines. Typical of these letters is one received from Ray Burke, VE1JET, who wants to put a C-128 on RTTY and wonders if there is any software available for this purpose.

Aside from QuantumLink and Commodore-specific bulletin boards, have any readers found good, *current* sources for amateur radio software for Commodore machines? Let us know, and we'll share these sources with readers.

Needs Dual-Band Antenna Tuner. Robert A. Hogan, N5TSF, is a new amateur who is looking for a dual-band antenna tuner to cover 6 and 10 meters to use with his ICOM 575H 6/10 meter all-mode radio. Robert indicates that Daiwa makes the CNW-319 II for 3.5-54 MHz, but only sells this particular antenna tuner on the European market.

There would seem to be several ways around this problem, including the basic fact that an antenna tuner usually isn't needed on 6 and 10 meters since most VHF antennas are designed for direct coax feed. However, if any readers have a current source for an all-in-one HF/VHF tuner such as the apparently unavailable Daiwa unit, contact Robert Hogan, N5TSF, P.O. Box 643, Conway, AR 72032.

In Praise of ClusterLog. Bob Armbruster, KB2MY, wrote to tell us that he enjoys our column to the extent that it is a "must read" for him each month. That's nice to hear, Bob!

Bob also mentioned his unbridled enthusiasm for ClusterLog, a fairly new software database/packetcluster product by PAYL Software (an accessory for their basic logging and awards program, DXLOG) that he's been using for several months. He is a hardcore DXer with a DX log containing 3000-plus QSOs in 312 confirmed countries and 800-plus band/countries. For him a major problem was recordkeeping. He tried several products with limited success, and recently discovered the PAYL PacketCluster software. Notes Bob:

"The author, K3PA [Drew Smith]... did a free file conversion for me on purchase of the program. The file conversion is a must have for anyone with a large QSO backlog. [I have found ClusterLog is highly effective. In the CQ WW Phone test I worked 37 new band countries. I was able to tell immediately whether a country was a 'new' one either by spotting it myself or from the cluster. The program is bug free and has many highly useful features such as automatic Zone/Oblast tracking, DXCC totals on demand, adjustable filtering of the cluster spots and more."

While we haven't taken a look at PacketCluster in the column, and no software worth its salt is *totally* bug free, we have reviewed several versions of PAYL's basic product, DXLOG (most recently in last June's column) and have found it

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to be an excellent one that is well-supported by the author. Information on either program is available from PAYL Software, P.O. Box 926, Levittown, PA 19058.

Antenna Notes

Aztec Baluns. Baluns are popular devices to provide for the proper connection of an unbalanced coaxial transmission line to a balanced antenna such as a dipole, Yagi, loop, or quad. The so-called "current type" of balun is getting a lot of attention these days; its proponents claim it is the best, most error-free wide-band 1:1 balun to deliver equal currents to both halves of the antenna element. While there is a lively technical argument as to the real need for this type of balun over more conventional "voltage type" designs, adherents of the current type balun claim several advantages for them. Some of these advantages include low insertion loss, lack of a core to saturate, no transformer coils to arc or break down, no phase ambiguity, ruggedness to withstand high power and mismatched loads, a more precise transformer function, and resultant cleaner antenna patterns.

Glenn Rattmann, K6NA, offers the DXB series of baluns. These current baluns have no cores to saturate and no transformer coils to break down when the line is mismatched. Rather, the balun uses a known length of Teflon coax, loaded with ferrite beads over the outer shield, to introduce a high impedance at the upper end of the outer coaxial shield. The Aztec baluns are optimized for wideband HF use over the range 160-10 meters.

The DXB-1 includes a heavy-duty top cap with stainless eyebolts and a hang-up hook for wire

antennas. For monobanders and tribanders the DXB-2 is furnished with universal boom-mounting hardware and is especially suitable for split-dipole Yagi elements, whether fed directly or in conjunction with a hairpin matching network. Both baluns have similar electrical characteristics, having a surge impedance of 50 ohms and a tested power-handling capability of at least 1500 watts (continuous duty at a 6:1 VSWR at 28 MHz). The baluns are epoxy-potted and are furnished with Teflon UHF (SO-239) connectors; Teflon N connectors are available. Either balun is \$49.95 plus shipping.

For a spec sheet contact Aztec RF, P.O. Box 1625, Valley Center, CA 92082.

Sommer Beams and a New Vertical. The Sommer trapless multiband beams have been around for several years, being the product of Walfried Sommer, W4/DJ2UT. These clean, no-trap driven arrays were developed in an attempt to overcome trap losses, initially in tribanders, to hopefully make multiband beams perform as well as monobanders despite the problems involved in overcoming the narrow bandwidth and low resistance of closely spaced designs. The resultant Sommer multibanders effectively use a complex system of active and inactive driven elements, depending on the particular band in use.

Presently, four basic beam designs are available that cover either 10/15/20 meters or 10/12/15/20 meters, with booms ranging from 8 to 24 ft. Expansion kits are available to cover 17, 30, and 40 meters, so that a single trapless beam can be made to cover 10 through 40 meters. Basic beam prices range from \$450 to \$1045, depending on boom; the expansion kits range from \$30 to \$108, depending on band.

Mechanical construction is rigid and uses a twin square tubing boom, cast aluminum mounting brackets, and stainless steel hardware. All beams are semi-assembled with element pieces already mounted on boom brackets. A single 50 ohm coax feedline and an air-core balun are used.

A new Sommer offering is the Tele-Command-System TCS80, a flexible vertical antenna system that covers all HF amateur bands from 75 through 10 meters (3-30 MHz continuously). The TCS80 comes with an 18 ft. vertical radiator and a remote tuning system. A counterpoise is used in conjunction with the system and uses untuned radials 6-20 ft. in length. According to the manufacturer, use of a 42 ft. radiator allows the antenna's lower frequency limit to be extended to 160 meters; other configurations are possible using radiator lengths of 5 to 60 ft. The low power (750 watt) version is \$410, and the high power (full legal limit) version is \$495.

Complete spec sheets on the multiband beams and the TCS80 system, along with reprints of two beam product reviews, are available from Sommer Antennas, 395 Osceola Road, Geneva, FL 32732.

Lakeview Update. On several previous occasions we've mentioned the inexpensive and good-performing mobile antennas and accessories made by George Shira, WD4BUM. We often run into George at southeastern hamfests where he exhibits and sells his latest antenna designs. Some of George's recent innovations include the Carolina Bug Catcher for 40-10 meter mobile work, the single band HF mobile fiberglass "Ham Sticks," and the WD4BUM Inducti-Match for mobile whip feedpoint matching.

George now is semi-retired and his son, G.



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A. "Butch" Shira III, N4WHB, has taken the reins as company president. In a conversation with Butch he indicates that he will keep the innovations flowing and the service (including technical support for his products) up to his dad's high standards.

For a flyer and a fact sheet on "What You Need to Know About Mobile High Frequency Antennas," contact the Lakeview Co., Inc., 3620-9A Whitehall Rd., Anderson, SC 29624.

Soft Topix

Computer Clock Accuracy (at Last). Or, stated differently, "Program Pair Provides Prolonged Precision." This play on words isn't our doing. Rather, it's taken from a joint news release from two shareware software authors who, working independently, have developed a pair of programs that try to "fix" the notorious unreliability of the PC/MSDOS system time of day clock.

Tom Becker, of Air System Technologies, has come up with a memory-resident program called RightTime, which regulates both the PC's CMOS and DOS clocks. RightTime can keep both clocks accurate to within a fraction of a second for weeks at a time. Pete Petrakis, of Life Sciences Software, is the author of TimeSet, which can set a computer clock within about 5 milliseconds of true time by means of a telephone call to the cesium beam clocks of the U.S. Naval Observatory in Washington, DC, or to the National Institute of Standards and Technology in Boulder, Colorado.

Used together, the two programs make a powerful combination. TimeSet synchronizes the computer clock with the most accurate time

sources available, while RightTime ensures that the high initial accuracy continues. The latter program works by continuously applying corrections to the CMOS and DOS clocks. It also learns and refines the corrections by determining the clock drift rate each time a call is made to one of the atomic time services using TimeSet.

Since the two programs are mutually enhancing, the authors have arranged to provide each other's program along with their own to those who become registered users of either program. Version numbers may be higher by the time you read this, but RightTime 1.1 is found as the archive file RITM11.ZIP on CompuServe's IBMHW Forum, and TimeSet 6.00A is available on CompuServe's IBMSYS Forum as TSET6A.ZIP. Both programs also are available on ZIFFNET's Tools and Utilities Forum.

Either program is available directly from its author; the registration fee is \$25 for RightTime and \$35 for TimeSet. TimeSet is available from Life Sciences Software, P.O. Box 1560, Stanwood, WA 98292. RightTime is available from Air System Technologies, Inc., 14232 Marsh Lane, Suite 339, Dallas, TX 75234.

PXDB: Prefix DataBase. John H. Boston, WB4RUA, sent us a copy of his specialized database program for the amateur radio prefix chaser, which is designed to keep a running record of prefixes worked and confirmed for CQ magazine's WPX Award. It will also print out the calls and prefixes to mail to the WPX Award manager for application and endorsements. The program runs under MS-DOS or PC-DOS 2.1 or later on an IBM PC or compatible computer, using either a color or a monochrome display.

John began work on PXDB in 1988 in his effort to computerize his paper WPX records. Not a logging program in the strictest sense, PXDB

has evolved into a specialized database that is tailored to the WPX Award and has enough room for 10,000 entries. However, PXDB can be on-line and running while you are on the air tuning for new prefixes to work, such as in the CQ WW WPX Contest. The program can maintain log files for mixed, CW, and/or SSB modes; one log file is needed for each mode. PXDB also can optionally maintain log data for the WPX Honor Roll. John notes that the program is not designed to sort prefixes by band, mode, or continent as is needed for the WPX Award of Excellence. Any good database program can be used for that task, he stresses, and in any case the Award of Excellence is a one-time affair, whereas the general WPX Award and the WPX Honor Roll are ongoing.

PXDB looks like a good bet for accomplishing its stated purpose; it's available on several amateur radio bulletin boards and also is available directly from the author. The program is shareware. You have 60 days to try it, and after that time you're asked to send in the registration fee of \$30; registration is \$35 if you request PXDB on diskette from the author. Minor updates are free and major updates carry a nominal charge. Contact John H. Boston, WB4RUA, P.O. Box 354, Calhoun, GA 30703-0354.

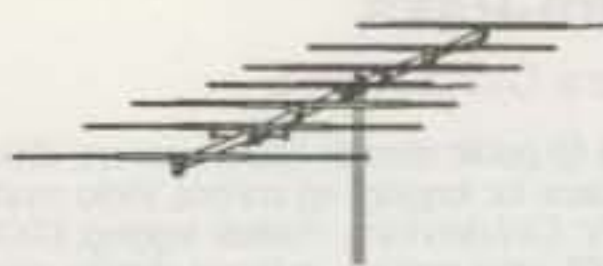
DISKPIX. Charles J. Okstein, KG7JD, says he's an avid reader of our column, and so he sent us his shareware utility program DISKPIX, noting that he has registered users all over the world.

DISKPIX is a small but useful disk utility that graphically displays the state of all the hard disk drives in a PC or on a network. Used with a system having EGA or VGA graphics, it presents pie-chart displays showing the amount of free space on each drive and, most importantly, the percentage of the drive that has not yet been backed

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up. Running the program is an easy and fun way to get a quick picture of when you need to run a backup on your system. The program works with up to 26 hard drives or RAM disks, displaying either a single drive image or groups of four drives at a time.

DISKPIX is available on many computer bulletin boards. Shareware registration is \$5 from the author: Charles J. Okstein, KG7JD, 8585 South College Lane, Tempe, AZ 85284. Figs. 1 and 2 show samples of the images DISKPIX produces.

FastBack Plus 3.0. We're a dedicated FastBack Plus user, having reviewed an earlier version of FastBack Plus in the April 1989 column. Fifth Generation Software has continued to upgrade their flagship hard disk backup program over the past three years, tossing in many bells and whistles that have helped make their product one of the best-selling software packages around.

New features of FastBack Plus 3.0 (which actually total about 20) include a Windows-like interface with mouse support, a streamlined "Express Menu" system that lets you start an entire backup or restore with a single mouse click, fully automated scheduled and unattended backups, network file server support, an improved macro capability, dBASE-compatible history files that let you search precisely for the files you need to restore, advanced error correction for improved data security, and more.

Fifth Generation Systems claims that Version 3.0 is the fastest backup program ever created for the IBM PC. The new version runs about 15% faster than Version 2—up to 10 MB per minute on high-speed PCs and 3 MB per minute on PC-AT class machines. If you really want to get fancy, the new version lets you make password-

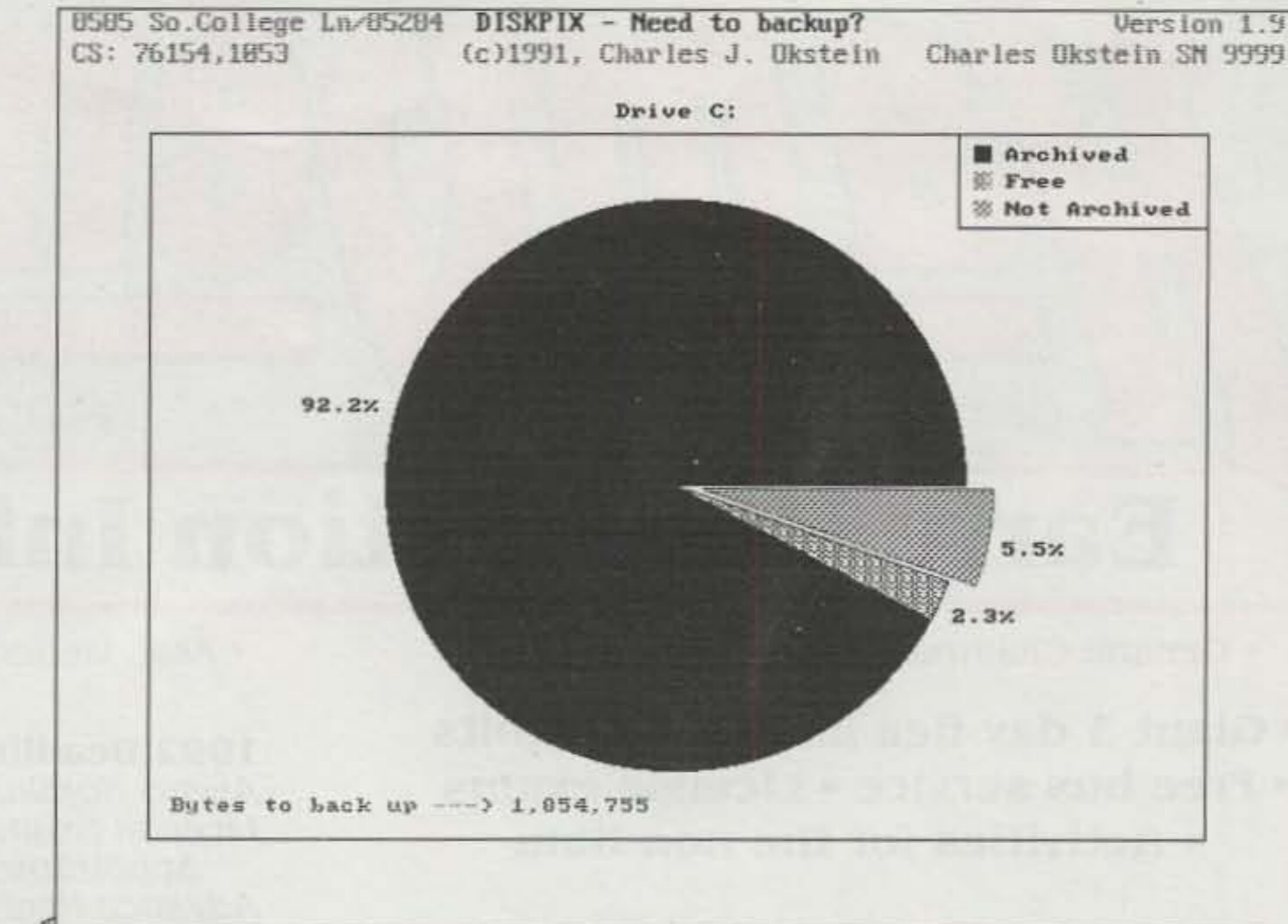


Fig. 1—DISKPIX is used to graphically display the state of all the hard disk drives on your computer system or network. Shown here is a full-screen image of the default disk drive. The pie-chart displays show the amount of free space on each drive and most importantly, the percentage of the drive which has not yet been backed up.

protected backups with optional U.S. government standard DES encryption that are safe from prying eyes. Overall, the program's many convenience and data security features make it difficult to rationalize not making regular backups to protect your valuable files and data.

There were some problems with the first releases of Version 3, some of which I experienced in reviewing the software. These included complaints that the new release was not very keyboard friendly, backward compatibility with older versions was lacking, and some features of

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Lodging Information: (513) 223-2612

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HAMVENTION is sponsored by the Dayton Amateur Radio Association Inc.

Advance Registration Form

Dayton Hamvention 1992

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Flea Market Reservation Deadline: February 1

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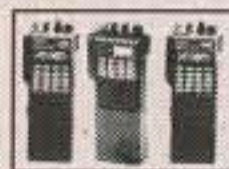
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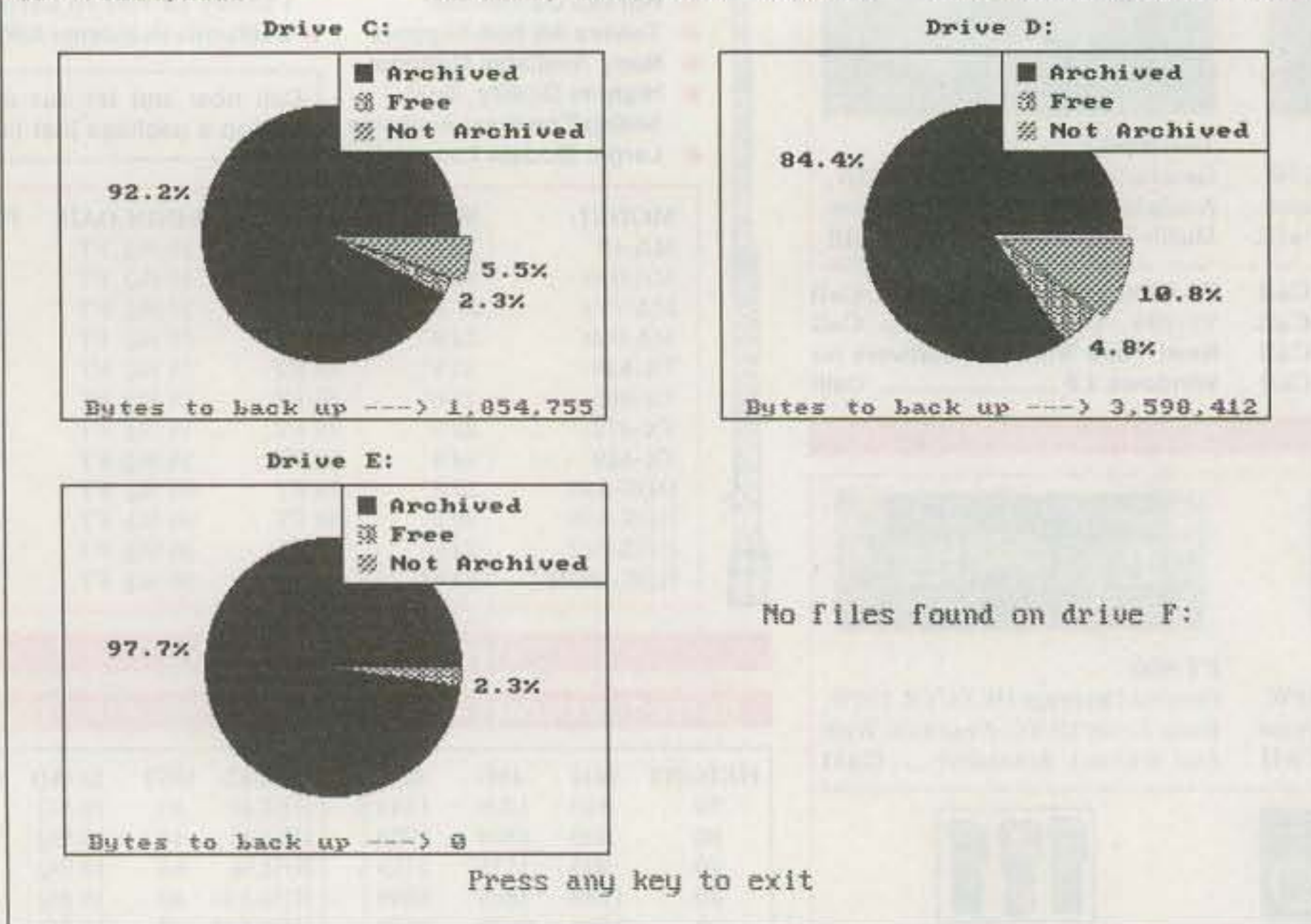


Fig. 2- DISKPIX also can display quarter-screen images of all the hard drives on your system, as shown here. The program works with up to 26 hard drives or RAM disks (just in case you happen to have that many drives!).

the old, familiar Version 2 were missing in the new version. Also, Version 3 seemed unstable on my system, especially when using a mouse. In fairness, the manufacturer got busy on these complaints and problems very promptly and issued free updates to registered users. Version 3.04 seems to have corrected these problems, and the even newer Version 3.1 enables you to back up to QIC tape drives. In addition, FastBack Plus for Windows also is available.

I also should point out that, to their credit, the manufacturer has adopted a "five points pledge" of customer satisfaction that is unusual in the software industry. Included in the pledge is that all of their products come with a one-year money-back guarantee and 24-hour toll-free customer service. They also certify that their products will perform as promised, and that any unresolved customer support problems will be

handled personally by the company's chief executive officer.

While the new version is list priced at \$189, it is available discounted from mail-order firms, and upgrades are reasonably priced. For more information, contact Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809-4562.

DESQview 386 Combo. This is a very unique and highly capable product that is actually two separate software programs rolled into

one. DESQview 386 is both a memory manager (QEMM-386 V6.0) and a task switcher (DESQview V2.4) bundled into one neat package. The combination is a simple but fast multitasking environment that works similarly to Microsoft's Windows 3.0, but without all of the memory and central processing unit (CPU) "overhead" that is associated with graphical user interfaces (GUIs) such as Windows. DESQview supports Windows (should you want to use a GUI), and it also works with the new DOS 5.0.

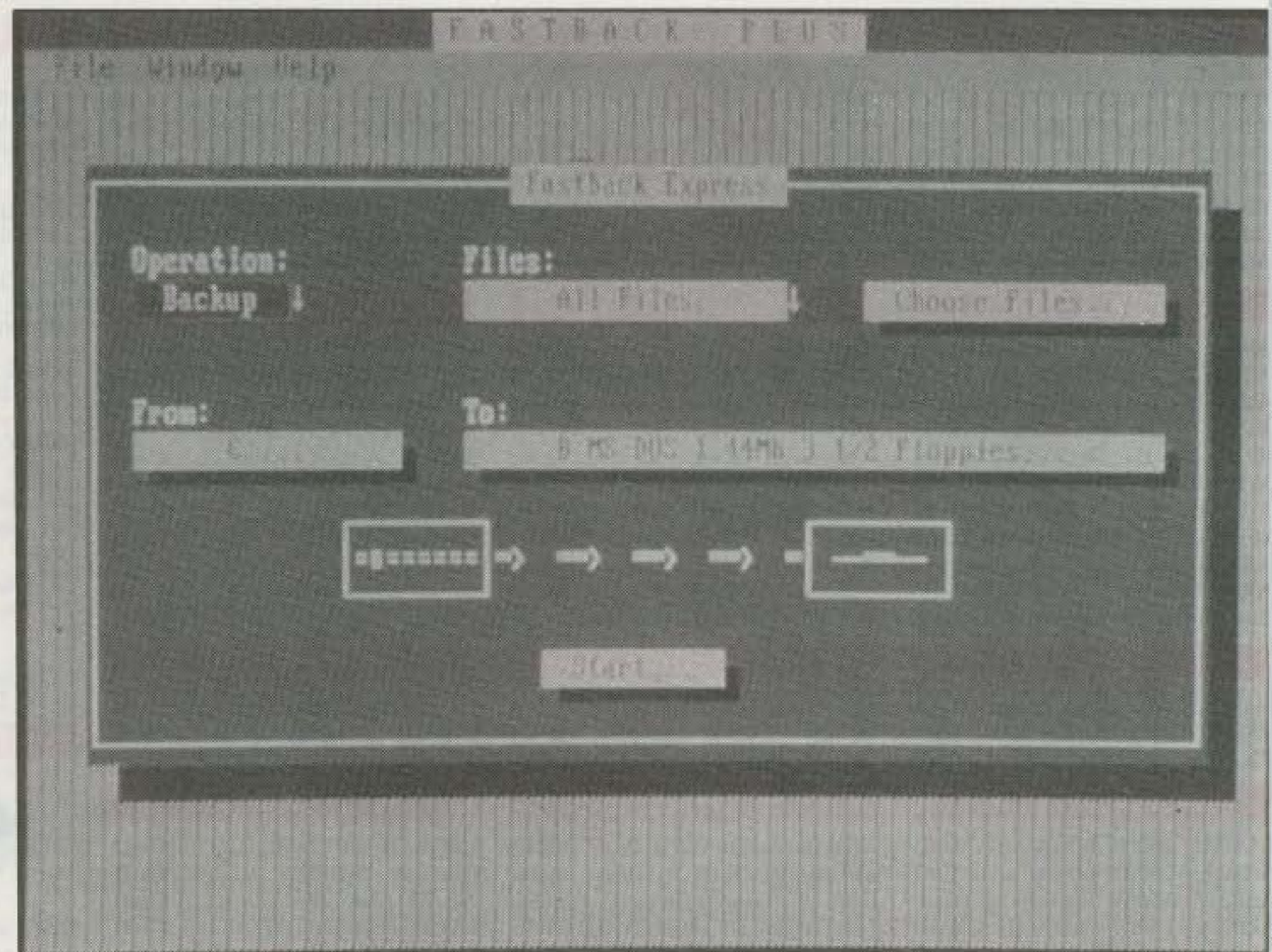
DESQview 386 is a true multitasking, multiwindowing control program for 80386 or 80386SX based PCs and IBM PS/2s. Using the formidable capabilities of the 386 chip, you can run multiple DOS programs in several windows side-by-side while using as little as 9K of conventional memory, depending on your PC's configuration.

The Quarterdeck Expanded Memory manager (QEMM-386) is an intelligent, high-performance expanded memory manager that allows automatic or custom-configured management of all PC memory, whether conventional, expanded, extended, or so-called high memory (sometimes known as high RAM or upper memory blocks). QEMM-386 version 6.0 includes several new features that allow many PC users to claim up to 115 KB or more additional mappable high memory. This gain, possible on many PCs, results from using a new feature called "Stealth" which subtly senses a PC's memory utilization pattern and "remaps" ROMs to effectively hide a PC's ROM code, making its memory addressable as high RAM and thus usable for other purposes. The bottom line is the potential for a much lower level of "RAM cram."

Included in the QEMM package is Manifest a very thorough and easy-to-use memory analyzer that clearly shows exactly how your PC's memory is being used. Another feature is VIDRAM, a utility that can produce a further 96K memory gain on many EGA- and VGA-based sys-



FastBack Plus 3.0 is the latest FastBack incarnation, and is reportedly the fastest IBM PC backup software in the industry. It will back up hard disks at up to 10 MB per minute on high-speed PCs and 3 MB per minute on more modest PC-AT class machines. (Photo courtesy Fifth Generation Systems, Inc.)

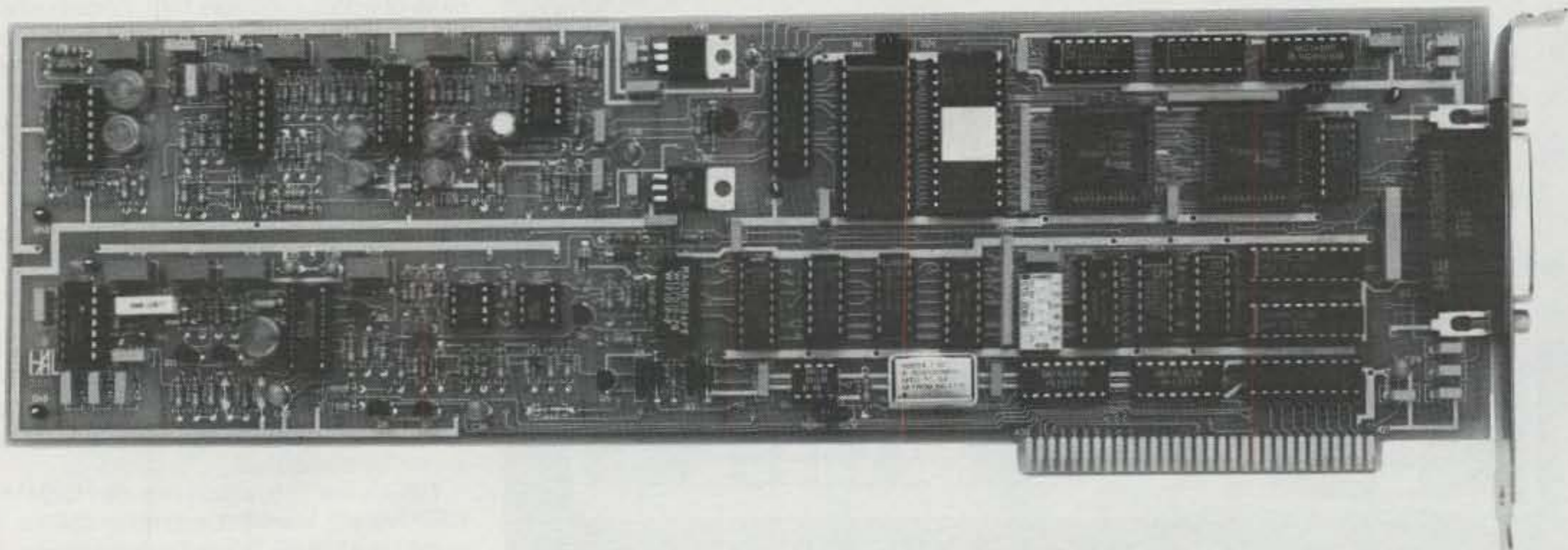


FastBack Plus 3.0's new mouse-compatible interface gives you amazingly simple control over your backups. The new "Express Menu" system is straightforward and lets you immediately back up and restore files without wading through a hierarchy of commands and menus. (Photo courtesy Fifth Generation Systems, Inc.)

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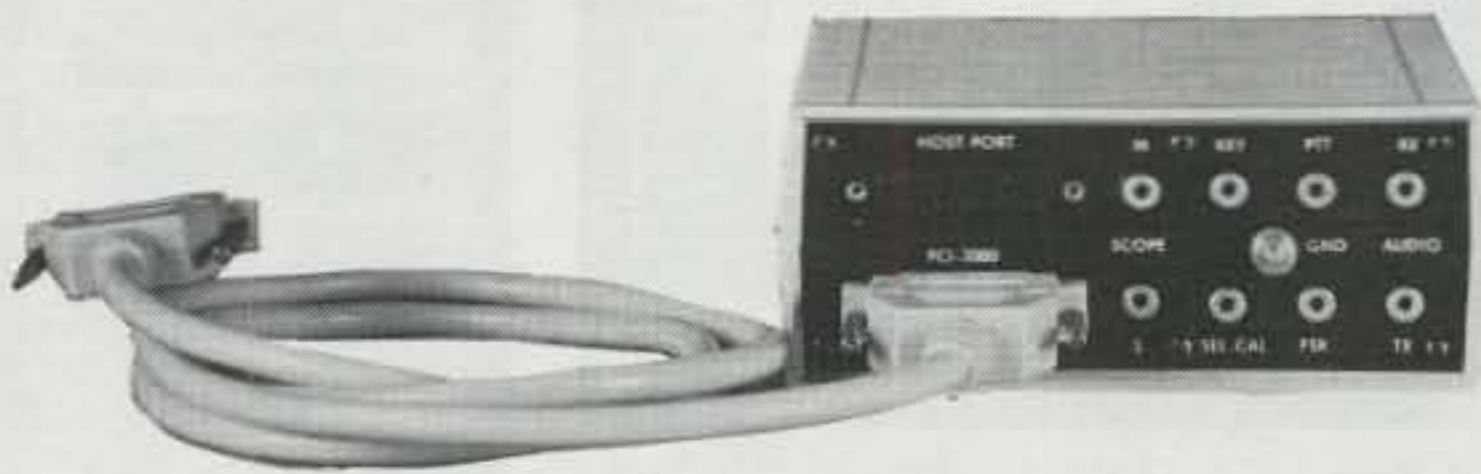


SPT-2 Spectra-Tune

The SPT-2 makes tuning AMTOR, RTTY, and CW signals a breeze. It connects to the PCI-3000 via the supplied cable. The radio connections for the PCI-3000 are then made to the phono connectors on the SPT-2 rear panel. The tuning indicator is a 30-segment LED bar graph representing a 600 Hz range of the audio spectrum. The RTTY and AMTOR tuning range is centered at 2210 Hz. In CW mode the range is centered at 800 Hz. Simply tune the receiver until the signal is centered on the proper calibration marks.

FIL-1 AMTOR/RTTY Filter

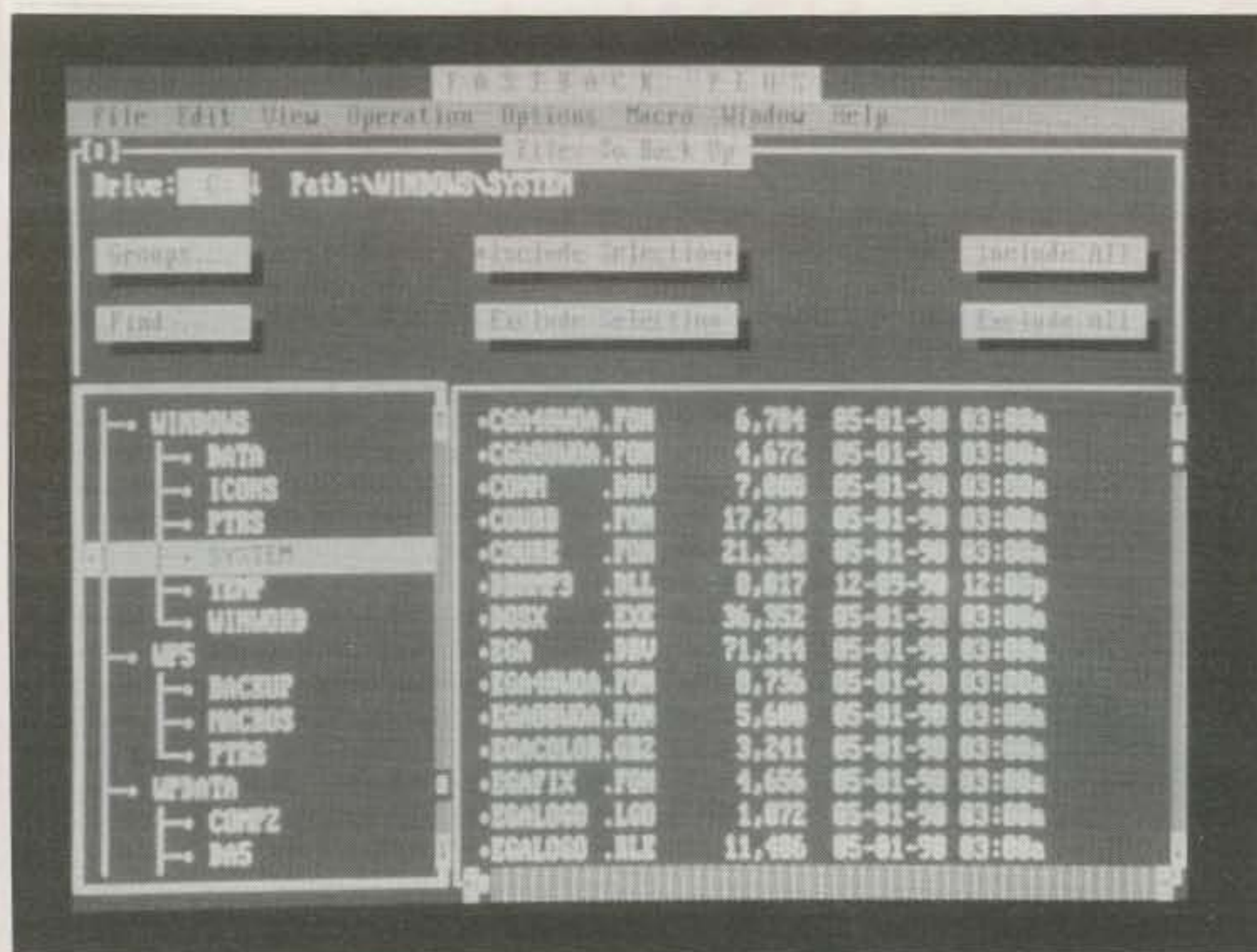
If your transceiver doesn't have good RTTY filters, install the FIL-1 in your Spectra-Tune. The FIL-1 is a 500 Hz wide filter centered at 2210 Hz to optimize AMTOR and RTTY copy. The FIL-1 greatly reduces the noise input to the PCI-3000. This can mean the difference in barely detecting a signal and solid copy.



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FastBack Plus 3.0's graphic directory tree lets you "point and click" to choose the files and directories you want to back up or restore. You also can select files by "wild card" specifications, date range, size, attributes, or archive status. You can save selections to a setup file for recall when you make future backups. (Photo courtesy Fifth Generation Systems, Inc.)

tems by temporarily borrowing the unused video memory when you're running character-based programs.

DESQview 2.4 creates a true multitasking environment that lets you load multiple programs (applications), instantly switch between them, transfer (cut-and-paste) data from one program to another, and even process data in the background of one application while you're working with another program. Microsoft's popular Windows program lets you do all this, but it extracts a heavy price in terms of the large hard disks,

fast processors, lots of memory, and fast video cards that are required to obtain satisfactory performance. On the other hand, DESQview works quite well as a task switcher, even on modest systems with 8088 and 80286 microprocessors. In fact, it's probably the only program that does creditable task switching on low-end systems. DESQview, which is crammed with

features, is non-graphical and thus works with almost any DOS program, and it comes complete with good documentation. In the hamshack consider the possibilities of multitasking a contest logger, a propagation program, an awards database, and other programs at the same time!

I found DESQview 386 quite simple to install and had it up and running in an hour or so. The ease of installation was remarkable considering the many powerful memory management and task switching functions it offers. However, to maximize performance and squeeze out the last few KB of memory is an involved process. Getting the Stealth and VIDRAM features to work on my PC proved to be quite difficult, but these difficulties involved only "nice to have" marginal benefits and did not detract from the overall usefulness of the software. As it turned out, even not using the Stealth option allowed me to access 116 KB of high RAM using DOS 4.01 into which I could stuff a variety of drivers and terminate-and-stay resident (TSR) programs. DESQview lets me multitask to my heart's content, even with a medium-horsepower 386SX computer.

DESQview 386, which includes QEMM-386, DESQview 2, Manifest, and other utilities, is list priced at \$129.95; upgrades from previous versions are modestly priced. Contact Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, CA 90405.

Wrapping It Up

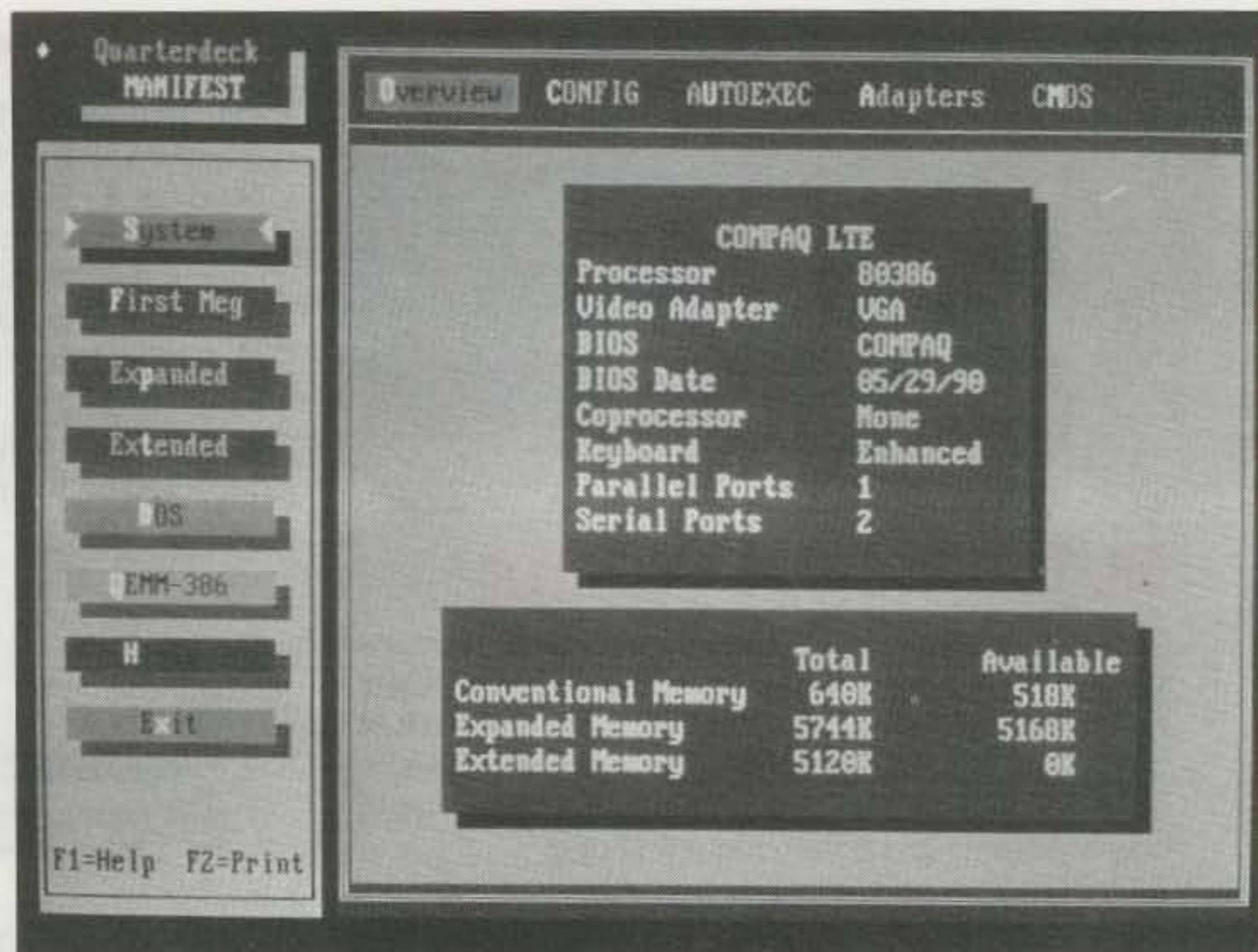
That's it for this time, gang. Next time more Antennas & Accessories topics of current interest. See you then.

Overheard: The size of the typical hamshack junkbox tends to increase to fill the space available for its storage.

73, Karl, W8FX



DESQview 386 is a hybrid software utility package that actually consists of two separate major programs, DESQview 2 and QEMM-386. DESQview 2 provides a true multitasking DOS operating environment, while QEMM-386 is a control program for your PC's memory. The two programs can be purchased separately. (Photo courtesy Quarterdeck Office Systems)



Quarterdeck Manifest is a part of DESQview 386. It's a powerful memory analysis and reporting tool for the IBM PC and compatibles or the PS/2. With it you can learn all about your PC's memory (conventional, extended, expanded, and so-called "high memory") to more efficiently use and manage this scarce resource. (Photo courtesy Quarterdeck Office Systems)

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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Contesting in the Year 2071

This weekend I decided to put in some operating time in the Novice Roundup. I've always had some affection for that contest because it played a major role in my personal contest beginnings. As I operated, I found myself reflecting on the changes in contesting over the years (you get a lot of spare time to reflect while operating in the Novice Roundup). Although I don't have the insight of some of the old timers, I marvel at the enormous differences in the "contesting model" of today when compared to 20-plus years ago.

When I started contesting in 1969, the world had not even invented the computer, much less integrate it as an essential part of a contest station. We didn't have digital VFOs, memory keyers, electronic voice recorders, digital clocks, computer-controlled amplifiers and antenna switching, packet radio, or interference with our neighbor's CD players! It was a simpler world for the casual or serious contesteer.

Today contesting is largely influenced by the availability of technology. Few self-respecting contesters use paper logs anymore. What would the ham shack be like without our packet screens beeping with rare DX? As an aside, I'm going to be soliciting selected views from some of our founding fathers and most experienced peers on this topic, but we'll save that for a later column.

So we all know the contesting world of today, but what about the future—the future around the year 2071? Why the year 2071? I don't know exactly except that it is the 100th anniversary of the *National Contest Journal*, and it seemed like a nice touch. You may recall a year or so ago that I published some fictitious CQ WW rules that poked at this subject. I admit that I was amused when an irate reader confronted me at Dayton and complained that we had finally pushed the rules past the limit. All kidding aside, many contesters feel that it is conceivable that not only will contesting disappear by 2071, but so will the hobby itself as we know it. I tend to take the optimistic view, however, and have fun thinking how different it might be.

For starters, in 2071 few of us will be around; this means that all our efforts in recruiting contest operators will have paid off in a new group of enthusiastic compe-

Calendar of Events

Mar.	28-29	CQ WW SSB WPX Contest
Apr.	1	Poisson d'Avril Contest
Apr.	4-5	Connecticut QSO Party
Apr.	4-5	SP DX Contest
Apr.	11-12	MARAC SSB County Hunters
Apr.	18-19	SARTG WW AMTOR Contest
Apr.	25-26	Swiss Helvetia Contest
Apr.	25-26	Georgia QSO Party
May	2-3	ARI International DX Contest
May	2-3	Oregon QSO Party
May	30-31	CQ WW SSB WPX Contest
June	13-15	ARRL June VHF QSO Party
June	27-28	ARRL Field Day
July	1	Canada Day Contest
July	11-12	IARU HF World Championship

titors. I think that we can barely imagine the layout of ham shacks in 2071. My guess is that the only similarity to today will be the fact that no one will have yet figured out how to make a reliable rotator that costs under \$1000 (today's dollars)! The radio of 2071 will be much simpler and easier to use. Most features we employ today will either be irrelevant or encapsulated in our computers and emulation packages. There will in fact be a merging of the radio and computer. AES and HRO will be advertising the "new \$20,000 raputer—your link to the world of amateur radio" in *CQ* and *QST*.

The environment of the late 21st century will be QRM-free. Traditional contest QSOs will be replaced with the concept of "linking up" as receivers and transmitters intelligently scour the bands looking for each other to work. In many respects, the skill of contesting will have transferred to strategy and knowledge of propagation rather than copying weak signals in the noise. Receivers, in fact, will have become so sophisticated that many of the features we demand (e.g., notch tuning, IF shift, etc.) will not be needed. You won't need an RIT, because everyone will always call you perfectly on your frequency as executed by the computer portion of your raputer system.

The contest computer will of course exceed the power of today's Cray-like mainframes. It will actually be totally integrated with the same device that controls your house and other aspects of life. The logistics of contest meals will now be a breeze, as prepackaged, ARRL-approved contest

meal kits (customized for geographic differences) will be prepared and waiting for you as the weight of the contest wears you down.

Jesse Wolff (K1EA's son—you would recognize him as a friendly guy sporting a full beard and suspenders with a large crowd of CT groupies crowding nearby) will be a world-renowned computer genius. He will be, of course, carrying forward his dad's tradition as CT Release 33.01 (small bug in 33.00) starts to ship.

Speaking of large crowds, the Dayton Hamvention will have carried on with attendance figures exceeding 100,000 amateurs. The fleamarket will remain mostly as it is today—50 rows of computer equipment and a single table of used R4Cs near the exit. With contest popularity at an all-time high, the traditional contesteer's hospitality suite will be replaced by a giant gathering at Cincinnati Reds Stadium courtesy of a special family trust arrangement by K3TUP.

And there is the matter of scores and clubs. Contest clubs in 2071 will still exist, but will have changed dramatically in character. The Frankford Radio Club will be celebrating their 83rd consecutive win in the CQ WW club competition. The Yankee Clipper Contest Club, on the other hand, will have evolved into the New England Regional Computer Club (replacing the current Boston Computer Society). Nevertheless, clubs and individuals will still continue to submit their scores. Of course the results will be processed and communicated within seconds after the close of the contest.

1992 Dayton Hamvention Update

After reading my 20th Anniversary *NCJ* issue, I could not resist the temptation to report on a scheduled Dayton Hamvention event that caught my eye. For the first time there will be a three-night Contest/DX Party sponsored by the North Coast Contesters and Frankford Radio Club (April 23, 24, 25). Located in the Miami Room of the infamous Stouffer's Hotel, I'm willing to bet this will be a happening to be remembered with station videos and good old-fashioned contest chatter beginning at 7:00 PM. You can count on me being there. Hope to see you!

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SL SERIES



MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
•	•	•	7	11	2 3/4 x 7 7/8 x 9 3/4	11

- LOW PROFILE POWER SUPPLY

RS-L SERIES



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

- POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE



RM SERIES

MODEL RM-35M

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
•	•	•	•	•
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

- 19" RACK MOUNT POWER SUPPLIES

- Separate Volt and Amp Meters

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.)
•	•	•	•	•
RS-12M	9	12	4 1/2 x 8 x 9	13
•	•	•	•	•
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

- Switchable volt and Amp meter

- Separate volt and Amp meters

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MODEL VS-35M

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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
•	•	•	•	•	•	•
VRM-35M	25	15	7	35	5 1/4 x 19 x 12 1/2	38
VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

- Variable rack mount power supplies

RS-S SERIES



MODEL RS-12S

MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-7S	•	•	5	7	4 x 7 1/2 x 10 3/4	10
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

- Built in speaker

In 2071 there will be over 700 DXCC countries, so the establishment of scoring records will continue. Hard copies of contest results will be available, albeit collector's items. Because of the ever-growing popularity in contest operating and high scores, any single operator score under 10 million points will be listed as a check log.

With the advancement of technology, the CQ WW Contest Committee and ARRL Communications Department will become obsolete. Now all attempts to modify your raputer's firmware to transmit simultaneously as a single operator on two or more bands or utilize packet spots will be easily detected and dealt with accordingly.

Finally, through the miracle of modern medicine, Frank, W3LPL, will break all geriatric records and still be alive in the year 2071 at the ripe age of 121, building yet another 200 foot tower at his multi-multi estate in Maryland. At last count he would be up to 306 towers at his current clip.

Needless to say, I've had a little fun with this one. The future of contesting is a matter that I have dealt with from a variety angles over the past few months. I would love to hear your views on contesting's future. If you feel so inclined, send them along.

The Poisson d'Avril Contest 1991 Results

By Doug Grant, K1DG

The results for the 1991 Poisson d'Avril Contest are finally in. Participation was up significantly this year, with literally several entries received in numerous entry categories, despite the fact that the contest began at the same time the CQ WW WPX Contest ended. Since the traditional date of the Poisson d'Avril Contest (the first full day in April) falls on a Wednesday this year, there will be no conflict with this year's CQ WPX Contest.

On-the-air activity was quite good, especially for the first half hour or so on 20 CW, with many stations in the Philadelphia area contacted, in addition to several Europeans, a few UA9s, ZD8VJ, and some guy calling in as "8X8A." A lively half hour on 3830 SSB followed, with numerous even stranger callsigns logged. All in all, another enjoyable operating event—rapidly becoming my personal favorite, since I won again—which I'm looking forward to again this year.

The winners in the various categories for 1991 were as follows:

Single-Operator, All-Band: K1DG (new World Record)

Single-Operator, Incapable: ZS6BCR (new African Record). (ZS6BCR received the announcement of the contest in June, and was thus incapable of operating. But we're pretty flexible, so we counted his entry. By the way, he submitted his log on disk, but since he failed to fill the entire

thing, he cut off one corner and just sent that piece in.)

Single-Operator, Dog Owner: WA6LYE. (WA6LYE planned to claim the bonus points for a QSO with a famous ham [whose photo appeared on the cover of a major amateur magazine], but said that the dog "defaced" the magazine cover. He did submit his log on the requested 8 inch floppy disk.)

Single-Operator, Just-Fooling-Around: N0MCD. (N0MCD claims he lost his 15 KW amplifier and 16-element quad in a storm, so after a careful reading of the rules, he decided to operate on a randomly-chosen date—which just happened to be his birthday—and QSOed himself by looking in a mirror, thus qualifying for a whole bunch of bonus points.)

Single-Operator, Little Gun: K1VUT. (K1VUT demanded that a new "little gun" category be created for guys with 5.25 inch floppy disks and 20 MB hard drives so they don't have to compete with the big guns using those 8 inch floppies and 100 MB monsters. Well, okay this time, Dave, but the Committee takes a dim view of whining.)

Single-Operator, Europe, Portable, VHF/Telephone: HB9/G4CLF/P. (G4CLF found a way to get on the air while vacationing in HB9. He also submitted his entry on 8 inch disk—log data handwritten in silver ink on the disk itself. Not exactly what we had in mind, but a nice touch.)

Multi-Operator, Indivisible: NW1U. (NW1U's entry was unique. Paul, who is the sales manager of the Salem, New Hampshire Ham Radio Outlet store, mounted a major effort. He submitted his logs by UPS [they were actually real logs—oak, I think, and damned heavy]. I figured out which log was for which band by counting the rings. He also enclosed some toothpicks [VHF logs], a box of Irish Spring soap [for the EI multiplier and "soapbox" comments], a Bermuda onion [for VP9], and a 1990 Massachusetts income tax form [I knew someone would make that mistake, since the mailing deadline for both P d'A logs and income taxes was April 15]. He claimed telepathic QSOs with Elvis, Shirley MacLaine, Houdini, Nostradamus, V31BB, and everyone listed in the April 1990 and 1991 Silent Keys column. I didn't know Elvis was a ham [although he got to looking pretty porcine in his later years . . .]. And he claimed telephone contact with all the listings in the 1989 Italian Business Yellow Pages, and sent a copy of the book for proof. Bonus points were claimed for contacting a famous ham [N6RJ, his boss—talk about brown-nosing!], and N1HBO on his birthday. In accordance with the recommended guidelines for score enhancement, Paul also included brochures on the FT-1000, TS-950SD, and IC-781 as a hint of possible bribes available to the Committee. [I swear I am not making any of this up.]

NW1U has received the 1991 Poisson

d'Avril Trophy, sponsored by the P d'A Committee (actually it was a tennis trophy from some high school in Ohio I found in a fleamarket for a buck, but the tennis racquet looks sort of like a mutant D-104 and official looking). A hearty congratulations to all the winners!

Final Words

I can't resist the temptation to tell you of another project I've dreamed up. One of the common themes in contesting is the support (or lack thereof) we get from our spouses or girlfriends/boyfriends. In an upcoming column it will be their chance to tell the world how they feel. Although I don't think that *Time Magazine* needs to worry about ratings, this may be the first time in contest publishing that we have dared to let our counterparts speak their minds. Put your seatbelt on. This one is going to be enlightening!

Remember, the deadline for the July issue is May 1st.

73, John, K1AR

42nd Annual Poisson d'Avril Contest

0000-1954Z Monday, Apr. 1

Sponsored by the French organization Legion International des Radio Professionnels et Amateurs et Les Omelettes avec Oignons et Fromage, this is the 42nd running of this old classic. The purpose is to promote the humorous use of amateur radio for international goodwill.

Eligibility: All present regularly issued licensees, friends, or other licensed stations.

Exchange: RS(T), serial number (actually any number you want), QTH (yours or that of anyone you choose), and birthday (yours).

Scoring: Stations may be worked on all bands as many times as possible, but only once per QSO. Count one point for each station heard, worked, or imagined. Bonus points may be claimed for working any amateur whose picture appears on the cover of an amateur radio magazine or Wheaties box. Extra bonus points for making at least one QSO without using commercial, generator, nuclear, fossil fuel, battery, solar, chemical, biological, thermoelectric, or similar power sources. Other arbitrary bonus points may be claimed.

Multipliers: Every station worked or heard counts as a multiplier, but only once per QSO. Exception: Stations in the District of Columbia do not count as multipliers unless they have flown aboard the Space Shuttle. Stations contacted while on board the Space Shuttle also count as DC.

Frequencies: Most activity is expected on 20 CW and 75 SSB. CW—1825, 3579.545, 7025, 10025, 14025, 18025,

21025, 24025, 28025; SSB—1850, 3799, 3830, 7095, 14220, 14256, 14313, 21200.5, 28888; SSTV, RTTY, AM/FM, Packet, AMTOR, CONDOR—usual frequencies; Telepathy—Vulcan digital protocol.

Entry Categories: Single-operator unassisted, single-operator assisted, single-operator incapable, single-operator improbable, multi-operator incompatible, living-legend, just-fooling-around, hell-bent-for-a-trophy, QRP, QRPp, QRO, and *really* QRO. Logs may be submitted on computer disk in anything *except* the standard ARRL format; 1 GB optical R/W drive with warranty in factory-sealed box preferred. All entries must include a signed declaration that the rules of the contest have been obeyed at least once.

Club Competition: Any club may submit an aggregate score. The winning club will be announced at the Greater Enon Amateur Radio Convention and Kitefly (GEAR-VAKf) in Dayton, Ohio on April 25. Clubs may claim any known participant as a member without the usual meeting attendance requirement. ARRL affiliation is not necessary, nor is the existence of an actual club. We're easy.

Awards: There is an extensive awards program for this contest. Really extensive. No kidding. The actual awards are too numerous to list, but you will be notified if you are a winner by a uniformed U.S. Government employee. Members of the P d'A Contest Committee are ineligible for awards other than first place. Awards will be given based on score, entry creativity, and amount of cash enclosed with the log. The decisions of the judges are arbitrary and final.

Deadline: Logs must be postmarked by April 15, 1992. All logs to P d'A Contest Committee, 144 Kendall Pond Road, Windham, NH 03087. Include SASE and substantial compensation for results.

Polish "SP" DX Contest

1500Z Apr. 4 to 2400Z Apr. 5

Sponsored by the Polski Zwiagek Krotkofalowcow (PZK), this one is held the first weekend of April, and generates a good level of activity by the SPs.

Classes: Single operator, single and all band. Multi-operator, single transmitter (all band only), and SWL.

Exchange: Signal report plus a three-digit serial number. SP stations will include a two-letter province abbreviation.

Multiplier: Polish provinces (total of 9).

Scoring: 3 points per QSO times the number of Polish provinces worked (maximum 49).

Bands: 160-10 meters (no WARC bands).

Awards: Certificates to winning stations in each class in each country.

Mailing deadline for logs is 30 days af-

ter the end of contest. Mail to Polski Zwiagek Krotkofalowcow, Contest Committee, P.O. Box 320, 00-950 Warsaw, Poland.

Connecticut QSO Party

2000-0200Z Sat., Apr. 4 to Sun., Apr. 5
1200-2000Z Sun., Apr. 5

This is the annual running of the Connecticut classic sponsored by the Candlewood Amateur Radio Association. Each station can be worked once per band and mode, and may be worked again in different counties.

Exchange: RS(T) and QTH (CT county, state/province, DXCC country).

Scoring: Count 1 point for SSB QSOs; 1.5 points for CW, RTTY, AMTOR, Packet, and 2-way ATV; 5 points for OSCAR; and 10 points for working the CARA club station, W1QI and W1AW.

Multipliers: CT counties for stations outside of Connecticut. Inside Connecticut, use CT counties, states/provinces, and a single DX multiplier credit (regardless of the number of DXCC countries you work).

Frequencies: SSB—1860, 3927, 7280, 14280, 21370, 28370, 50150, 146550; CW—band edge plus 40 kHz; Novices use their band edge plus 25 kHz.

Awards: Certificates will be awarded to the high scorers in each state/CT county. In addition, certificates are available to the highest CT club and participating member. A special certificate will be awarded to any station working all Connecticut counties.

Logs must be postmarked no later than May 6, 1992. Please send your results to: Candlewood Amateur Radio Association, P.O. Box 271, Danbury, CT 06813-0271.

MARAC County Hunters SSB Contest

0001Z Sat. Apr. 11 to 2400Z Sun., Apr. 12

The Mobile Amateur Radio Awards Club is sponsoring the 21st running of this event. Mobile and fixed operation from every county in the United States is welcome. Mobiles and portables may be worked each time they change counties or bands.

Exchange: RS(T), U.S. county and state (province/country for others).

Scoring: 1 point for fixed stations; 15 points for mobiles; US/VE contacts with DX countries are worth 5 points. Final score is computed by the total QSO points times U.S. counties worked.

Frequencies: 3880, 7240, 14270, 21340, 28340. Fixed stations should operate above the suggested frequencies and allow mobiles to operate below.

Awards: Certificates will be awarded to winning fixed stations in each state/province/country (with 1000 or more points); mobiles in each state operating in 3 or more counties with a minimum of 10 QSOs

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2SAT	2 meter HT S series	319.00
3SAT	220 mhz HT S series	299.00
4SAT	440 mhz HT S series	299.00
229H	2 meter 50 watt mobile	359.00
38A	220 mhz 25 watt mobile	344.00
3220A	2mtr/70cm 25/25 watts	569.00
3220H	2mtr/70cm 45/35 watts	599.00
2410H	2mtr/70cm 45/35 watts	769.00
275H	2mtr all mode 100watts	1189.00
725	HF tranceiver 100watts	749.00
726	HF 100watt XCVR 6mtr	1049.00
735	HF tranceiver 100watts	899.00
751A	HF tranceiver 100watts	1199.00
765	HF tranceiver tuner/ps	2349.00
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PS-55	20 amp external ps	199.00
R-1	.1-1300mhz am/fm/wfm	529.00
R-71A	100khz-30mhz receiver	869.00
R-72	30khz-30mhz receiver	799.00
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FP-757HD	hvy duty ps speaker	279.00
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FT-2400H	2 mtr alpha-num 50w	341.00
FT-290R/II	2 mtr all mode 25w	509.00
FT-690R/II	6 mtr all mode 10w	619.00
FT-790R/II	70cm all mode 25w	569.00
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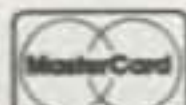
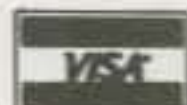
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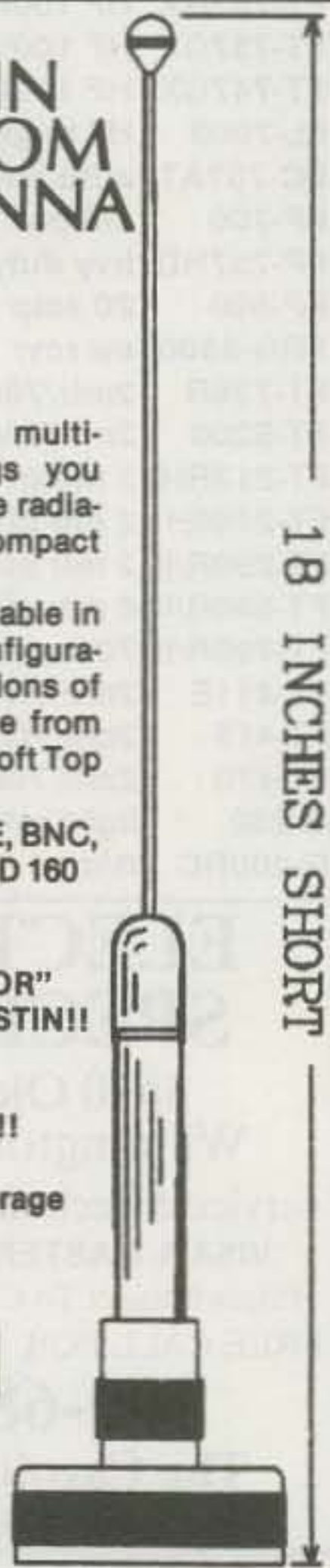
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per county. MARAC plaques to the highest scoring first- and second-place mobile stations in the U.S., North American fixed station, and DX station who scores at least 50,000 points.

Completed logs, summary sheets, and check sheets must be received by May 12, 1992 and go to: WA5DTK, Barry Brewer, 1542 Keaton Ln., Colorado Springs, CO 80909-2731. Include an SASE for final results.

SARTG WW AMTOR Contest

0000-0800Z Saturday, Apr. 18
1600-2400Z Saturday, Apr. 18
0800-1600Z Sunday, Apr. 19

This is the second worldwide AMTOR contest sponsored by the Scandinavian Amateur Radio Teleprinter Group (SARTG). If you are new to this interesting mode, this contest is for you.

Classes: Single operator, all bands and single band, multi-single and SWL. A single operator, all band entrant may also enter on a single band of his or her choice.

Exchange: Signal report, name, and serial number starting with 001.

Scoring: QSOs within your own country count 5 points; when working other countries in the same continent 10 points; other continents are 15 points. VK/VE/W/JA call areas will be considered separate countries. Final score is total QSO points times the total multiplier. SWLs use the same scoring system but based on stations and messages copied.

Multipliers: Each DXCC country worked on a new band, including the first contact with Australia, Canada, Japan, and the USA. Each call area counts as an additional multiplier per band for VK, VE, JA, and W.

Awards: Top scorer in each category in each qualifying multiplier location will receive an award provided the total number of QSOs is reasonable.

Only AMTOR is allowed. Use FEC for calling CQ and ARQ for contest exchanges. Exchanging messages in FEC or means other than ARQ is not allowed and will be grounds for disqualification. Send your entries to: SARTG Contest Manager, Bo Ohlsson, SM4CMG, Skulsta 1258, S-710 41 Fellingsbro, Sweden. The mailing deadline for entries is June 10, 1992. Please feel free to include any comments or soapbox information.

Georgia QSO Party

1800Z Sat., Apr. 25 to 2200Z Sun., Apr. 26

This QSO party is sponsored by the Dixie DX'ers Contest Club. Stations can be worked on each band and mode. Mobile and portable QSOs are valid each time they change counties. Stations operating on county lines will be counted as only one

QSO. Georgia stations may work each other for QSO and multiplier credit.

Classes: Operating categories include mobile, portable, fixed stations, CW and SSB, single and multiple operator.

Exchange: Serial number and QTH (county for GA stations plus state; state, province, or DXCC country for others).

Scoring: Two points for each SSB QSO; 4 points for each CW QSO except for 80 and 160 where CW contacts are worth 8 points. Final score is total QSO points times multiplier (GA counties for non-GA stations; states, provinces, DXCC countries (10 maximum), GA counties for others. GA stations may add 200 bonus points for each county where they work at least 10 stations.

Frequencies: CW—1810 and 40 kHz from bottom of band; SSB—1840, 3850, 7230, 14230, 21300, 28400, 50240. Try 160 meters at 0300Z.

Awards: Certificates will be awarded to high scores in each operating class. A trophy will be given to the highest scoring Georgia station.

The mailing deadline is June 1, 1992. Logs are sent to: Alfred Roloff, N4UZ, 755 Waddell Road, Bremen, GA 30110. Include the usual summary sheet and a large #10 SASE for your certificate and contest results.

Swiss Helvetia Contest

1300Z Apr. 25 to 1300Z Apr. 26

This is a good chance to build up your Canton total for the Swiss Helvetia Award which requires confirmation of all 26 Cantons.

Frequencies: 1.8-28 MHz (no WARC bands). Phone and CW.

Exchange: RS(T) plus a 3-digit serial number. Swiss stations will also include a two letter abbreviation for their Canton.

Scoring: Only contacts with Swiss stations count. Each contact with an HB station is worth 3 points. You may only work a station once per band regardless of the mode.

Multiplier: The sum of the Cantons worked on each band (26 per band).

Final Score: Total QSO points multiplied by the sum of Cantons worked.

Awards: Certificates to the top scorers in each country and each USA and VE call area.

Logging: Indicate a Canton in a separate column for each band the first time it is worked. Check your log for duplicates and include a summary sheet showing the scoring and your name and mailing address in block letters. Also include the usual signed declaration.

Mailing deadline for contest logs is June 1, 1992. All logs to: USKA Traffic Manager, Walter Schmutz, HB9AGA, Gantrischweg 1, CH-3114 Oberwiltach, Switzerland.

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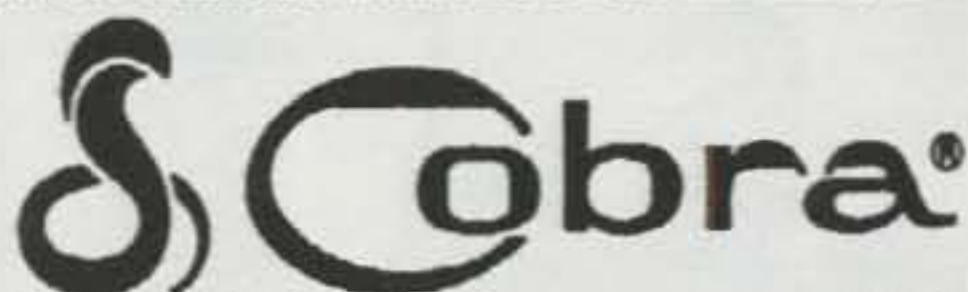
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ALL ABOUT THE WORLD ABOVE HF

First USA To Cuba 2 Meter EME QSO

VHF and above continues to be the location of "firsts" in amateur radio communications. Gary Crabtree, KB8RQ, and Arnie Coro, CO2KK, added to that list of "firsts" by making the first ever USA to Cuba EME QSO on 2 meters on January 21 between 0030 and 0055 UTC. What makes the record so remarkable is that Arnie was running only 21 watts! Arnie used two vertically polarized five-element one-wavelength long beams (for a total of ten elements). By comparison, Gary was running 1500 watts into a 24 M2 2M18XXX 18-element array (for a total of 432 elements). Nevertheless, as Gary reported, "It was one of those nights that just clicked."

Three major factors contributed to making the QSO possible. First, the QSO took place during moonrise for both stations. Therefore, they were able to take advantage of ground gain, which is as much as 6 dB. Second, the sky noise registered an incredibly low 171 °K during the QSO period, which is about as low (or cold) as is possible for 2 meters. Third, perigee, the closest the moon is to the earth, occurred the previous day, the 19th (local time). Additionally, they had the advantage of having a near full moon.

Gary first reported hearing Arnie's signal during one of Arnie's two minute sequences. On the following sequence (Gary's), Arnie reported that Gary's signal sounded like a local station. They completed in short order after those initial receptions.

To put Arnie's station in another perspective, it would be the kind of station one would use to work a repeater in a fringe area, without the brick! Additionally, because of the lack of parts (no radio stores in Havana), Arnie is forced to use very lossy coaxial cable. To date Arnie's station has the lowest power and the least efficient antenna array ever used to complete a QSO via EME. The previous unpropitious record holder was HL9TG, running a single array and 80 watts. Last year Gary reported that he had to make three separate attempts to complete a very marginal QSO with HL9TG.

Another active EME operator, Bev Cavender, W4ZD, was fortunate enough to monitor the QSO. Bev reported hearing Gary very well. He also reported hearing Arnie sending "Os" to Gary. Bev, who has worked Arnie via tropo and other terrestrial modes several times, was amazed that this night he could not hear Arnie when he swung his beam directly onto him.

Dave Blaschke, W5UN, the holder of the first 2 meter DXCC, provided coordination relaying between Gary and Arnie on 20 meters. Dave has scheduled Arnie for subsequent "good" moon days. Hopefully, by the time this is published Dave and Arnie will also have completed.

With this QSO Gary now has 96 countries worked on 2 meters. Gary feels that this year



Peter, PY5CC, who has shown up in many DXers' logs (both Europe and North America), will be active from grid square GG53 in late March. (Photo courtesy PY5CC)

he will complete the remaining four QSOs in order to obtain the second 2 meter DXCC.

Gary, along with Mike Stahl, K6MYC, the owner of M2 Antennas, the maker of Gary's antennas, received a bit of notoriety from the QSO when Arnie called them, interviewed them, and aired the interviews on Radio Havana several times during the following day.

Gary ran the QSO sked almost as a lark. He wanted to pique Arnie's interest in EME and agreed to run as a way to heighten that interest. Ultimately, Gary wanted Arnie to follow an unsuccessful QSO with going to his government voicing the argument, "If I had a higher power limit, I would have been able to make the contact." To their delight, they failed to have an unsuccessful QSO!

Shep, W7HAH, and Kari, OH2BC Complete on 6 Meter EME

The day following Gary and Arnie's success, Shep Shepard, W7HAH, and Kari Leino, OH2BC, completed a 6 meter EME QSO. Shep was using 1000 watts driving a single M2 6M2.5WL antenna at a height of 65 feet. Once again, ground gain and sky noise were favorable for the

QSO. Shep reported that he worked Kari on Shep's moonrise and that the sky noise was only 191 °K. Shep recounted that Kari's signal was 529X, a solid signal. He also stated that he had only 0.3 dB of path loss between him and Kari.

Shep has previously run with other stations and hopes that his use of a single Yagi (albeit a long boom) has proven that it is possible to use EME as a viable mode on 6 meters. Indeed, Bob K6QXY, is in the process of constructing a very large array for just such a purpose, and Victor Frank, K6FV, has reserved the side of a hill to construct a gigantic 6 meter array that will also be used for EME communication. Watch for more EME activity on 6 meters as the F2 propagation disappears with the decline of the current sunspot cycle.

First ZL WAC

Two months ago I reported the possibility of the first ever ZL WAC. Now the details: The honors go to Bob, ZL4AAA. But let's start at the beginning of those exciting days. On 10 November at 0914 UTC, Kerry, ZL2TPY, worked I4XCC, for the first ever ZL to Europe QSO. In addition to Kerry, Bob, ZL4AAA, Cliff, ZL1MQ, ZL1AGI, ZL1UBG, and ZL1KT also worked Europeans during that brief opening between 0914 and 1004 UTC. Then at 1816 UTC on 11 November, Martin, ZL1ANJ, worked Joel, CN2JP (N6AMG), for the first ever ZL to Africa QSO. In rapid succession Joel was also worked by Bob, ZL4AAA (for the first WAC), and ZL1AKW. My appreciation goes to Shel Remington, NI6E, and "The 50 MHz DX Bulletin" for filling me in on the details.

Survey Results

What was going to be the lead topic in this month's column has been pushed farther down the page because of the great EME and WAC news. That is as it should be because this is your column and you are the news makers. I am merely the lucky reporter.

Now, let's get to the survey. Thanks to you, the column's loyal readers, the survey was a success. Thanks also goes to Bob, WA6IJZ, for reprinting the survey in his "West Coast VHFer" newsletter. Bob took the special effort to key the survey to a different color of paper, so I would know from where the survey was coming. What follows are the results of your survey.

There were a total of 77 respondents. Five, or 6.5%, of the surveys came from Bob's newsletter. All but two of you chose to give your call-sign. You have no shame in expressing your opinion. Some of you also have no shame in how you expressed your opinion in the comment section. A few well-chosen quotes will appear later in this summary.

Years active on VHF and above: The realm of activity ranged from one month to 44 years.

P.O. Box 73, Oklahoma City, OK 73101

The median time on VHF was 16.61 years.

Bands active on VHF and above: You operate all over the spectrum of VHF and above. Obviously, the majority of you operate on the two most popular VHF frequencies, with 64 of you indicating you are on 6 meters and 70 indicating 2 meters. Not surprisingly, the next two highest bands had the next two highest occupancy rates in reverse order, with 28 of you indicating 222 MHz and 47 stating 432 MHz as a band you frequent. Understandably, the higher bands showed less activity. The breakdown is as follows: 902 MHz, 11 respondents; 1296 MHz, 20; 2.3 GHz, 7; 3.4 GHz, 4; 5.7 GHz, 5; 10 GHz, 9; 24 GHz, 2; and laser, 2.

Satellites, EME Operation, and Super Stations: Twenty-one of you indicated that you are on satellites, with most stating current interest in the Russian and Oscar 13 birds. Among those of you who responded, 11 indicated operation on EME, with almost all of you reporting 2 meters as the principal band of operation, and a few of you reported 70 cm as your primary band. Finally, on the subject of your station, 20 of you indicated that you run a "super station."

CQ World-Wide VHF WPX Contest: This section contained 12 questions related to the VHF WPX Contest. A total of 61 of you responded to one or more of the questions. Your responses to those questions are as follows.

1. Should the date of the contest be moved?
Yes: 22 No: 34
2. If Yes, to what new month?
 - a. June: 8
 - b. August: 1
 - c. Some other month (you specify): 13
(Most of you picked October or April.)
3. Should Grid Squares be used as a multiplier?
Yes: 55 No: 6
4. Should Countries Worked be used as a multiplier?
Yes: 29 No: 29 (no consensus here)
5. Should Prefixes be eliminated as a multiplier?
Yes: 35 No: 23
6. What, if any, changes should be made to the exchange?

Several of you did not indicate any change. However, those of you who voted for counting grid squares also indicated that the exchange should include grid squares. Makes sense to me.

7. What changes in categories would you like to see in the contest?

Rovers seemed to be the most popular category. Also showing high interest were home stations competing among themselves as a separate category from portable stations competing among themselves.

8. Should the starting and ending times of the contest be staggered to reflect the different parts of the world?

Yes: 13 No: 38

Since this is a question that would affect overseas operators the most, I looked at the five overseas respondents separately. They voted as follows:

Yes: 1 No: 3 No opinion: 1

The following three questions (9-11) asked for suggestions for start and stop times for the various regions of the world. The most often suggested start-stop time was 0600-2400 local time.

12. What other changes would you like to see?

This is the kind of question that survey takers dread because it is an "open ended" question. The answers I got ranged from more comments on the types of categories, to "Have one in 1992"

(yes, we will; more later), to "Make it a 24 hour contest," to "No more contests!", to suggesting using counties as multipliers, to having club competition, to having a 14-16 day contest, to extra points for CW contacts (hum!), to more advanced notice. All of your suggestions were noted and considered and will be used to develop the revised rules.

Watch next month's CQ for the announcement of the VHF WPX contest and the revised rules. Yes, there will be changes. What kind of changes? Wait until next month to see.

VHF County Hunting Award: The following questions dealt with establishing or modifying the existing county hunters award.

1. Should CQ sponsor a VHF-only county award?

Yes: 33 No: 28

2. If yes, your comments on the award.

Many of you used this space to inform me that SWOT already has an award. I knew that. However, I forgot to tell you that I knew that, so you correctly took me to task. Yes, SWOT has a good award in place. Its rules mirror the rules of CQ's county hunting award, but the entry requirements are 100 counties for 6 and 2 meters; 50 counties for 222 and 432 MHz; 25 counties for 902 and 1296 MHz; and 5 counties for 2.3 GHz and above. Our award, however, has a minimum of 500 counties, regardless of band (yes, you can get a band endorsement for 6 meters). That rule was put into effect when the USA-CA Award was first started almost 40 years ago. There were good reasons for the minimum number of counties then, and these reasons remain in place today. Nonetheless, VHF, above 6 meters, presents the infinite challenge of being able to work those 500 counties. And at this time, the survey results, although positive, are not strong enough to convince the management to develop another award program.

This is where the SWOT award fills that void. You can obtain a copy of the rules by sending an SASE to SWOT Counties Award, c/o Len Parsons, W5AL, 3316 Edenburg, Amarillo, TX 79106. Award fees are \$4.00 for members and \$5.00 for nonmembers and endorsements are \$1.00 for everyone.

VHF WPX Award: The following questions dealt with establishing or modifying the existing WPX award.

1. Should CQ sponsor a VHF-only WPX award?

Yes: 26 No: 37

2. If yes, your comments on the award.

You have spoken. Your response seems to indicate that there is not the interest in pursuing this kind of award at this time. Therefore, unless there is a significant change in opinion, there will be no interest taken in sponsoring such an award. However, if an organization wants to sponsor an award that mirrors ours but with VHF type rules, please advise me and it will receive a mention in this column.

Other awards: This was another one of those open-ended questions. And I led you on your answers. Around one third of you responded with an answer. Most of those answers were related to the grid square sprint award. About half of you interpreted that to mean some sort of another contest, and I guess that it appeared to be such. Judging by the small number of responses and lack of direction in the question, I have to say that it was a poor question. Remember when you took a test in school and the teacher threw out one of the questions because it was a bad one? Well, this is one of those "bad ones." Therefore, I am throwing it out. However, I am not throw-

ing out the idea of a sprint contest. One such contest was covered in last month's column.

AMSAT news: The following questions related to AMSAT coverage in this column and/or CQ.

1. Do you want to see AMSAT news in the "VHF Plus" column?

Yes: 18 No: 48

Your answer is clear. Very little AMSAT news will appear in this column.

2. If Yes, what percentage of column space? From the response to the above question the results to this question are moot. Nevertheless, the percentage was 16.7% among the yes respondents.

3. If no, do you want to see a separate column?

Yes: 38 No: 7

Your results (and wishes) have been forwarded on to K2EEK.

222 MHz: This question was in response to Mike Owen, W9IP's guest editorial in Bill Tynan, W3XO's "The World Above 50 MHz" column in QST.

1. Do you think that everyone should operate vertically polarized on 222 MHz?

Yes: 14 No: 48

The results have been forwarded to Mike.

50 MHz DX Window: This question generated the most response and the most comment of all of the questions of the survey.

1. Do you think that there should be very limited stateside to stateside activity on 50.110 MHz (i.e., contacts would be for very short duration for the purpose of establishing that propagation exists for DX that might be listening?)

Yes: 36 No: 36

As you can see, the results of the answer to the question were a tie. Curiously, one comment (as you will see below) inferred that those who have not been on 6 meters long would not understand the DX window and therefore would not be educated enough to vote properly. Therefore, just for the fun of it, I separated all the persons who had more than 5 years VHF experience and tallied their vote. Results: Yes, 25; No, 24. Still, almost a tie. Nevertheless, some of you were very vocal in your comments. An example of one of the more fiery ones in opposition to the question is the following:

"Why would you mess up something that's working! You obviously don't work 6 meter DX. It took Bill, W3XO, years to get this going. See QST (October 1989, page 62 and September 1991, page 56). We have 4 MHz of 6 meters. Above 50.125 MHz is fine for propagation and ragchewing. You have a brand new column. Be creative and go a different direction instead of messing up what others have done. Tell TI2NA to build a cavity filter! Everyone has a birdie on 113!"

One of the more reasoned response was this: "Six meters seems to be the patient band. Things can happen fast and we need one frequency for DX." In favor of the question was this comment: "All too often I miss a DX opening because I would be monitoring 125 or vice versa miss an E opening." Another comment: "Because, as sunspot activity declines, the DX window becomes a wasteland."

Three of you (including the above fiery quote) sent in "fixes" for Eric's problem. The simplest one is the following: "If you have programmable memories, then program the memories to skip the birdie frequency and program 125 as one of the frequencies. Then, scan your memories."

Well, now, what is all this fuss about? It is about a gentlemen's agreement that has been

in place for awhile. It has now had the ARRL imprimatur (with their inclusion in the 50 MHz band plan approved last year, a band plan which, by the way, is under severe attack by repeater users and is currently being reviewed by the members of the VUAC and VRAC committees and repeater coordinating councils across the US; but that's another story). It went into effect amid controversy (but what change has ever *not* caused controversy). Some of the old timers on 6 meters detest the change, while some love the change.

Is it working? Well, yes and no. Generally, stateside to stateside contacts do not take place. However, as one respondent states, he avoids QSOs in the window "like the plague," except when the other station happens to be in a rare grid square; then he might make an exception for a "very brief QSO." For the most part, the serious DXer, the one who is trying to make DXCC on 6 meters and has been around for awhile, really appreciates the window. Citing pandemonium during the last cycle, their general reaction is to say that the situation is infinitely much better than before. These DXers state that the window has helped the little guy. Well, the window has been a contributing factor. Another very strong contributing factor is the (unheard of on HF anymore) gentlemen's conduct. Time and time again, many of the DXers who have worked a DX station will "hold back" from making yet another contact so the "little guy" will have a chance to work that (most likely for him) new country.

Why did I ask the question in the first place? Judging from some of your fiery answers, I guess that some of you wonder the same thing. Well, as I have previously explained, I developed the question from my conversation with Eric Roy, TI2NA. Following my conversation with Eric, I thought about his situation. Part of my reasoning for asking the question included my experience on 75 meters two sunspot cycle lows ago. Then the band was just beginning to experience the DX window and the Extra class licensee subband. As more and more countries were getting privileges to operate inside the Extra class subband (sounds like the 6 meter DX window today, so far) certain "gentlemen's agreements" were evolving. As always, there were super stations and not so super stations. When the DX was coming through the super stations were hearing the DX first. However, it can only take so long for the super station to make a QSO with the DX station. So, after the super stations worked the DX, they would often stand by and assist the weaker stations who were also trying to work the DX. Additionally, cooperation existed to the extent that a station on the west coast hearing a DX station and east coast stations simultaneously would inquire if there was propagation between the DX station and the east coast. If so, then an impromptu list operation would evolve and function as long as the propagation existed. Naturally, a few super stations also had super egos and would have nothing to do with such gentlemen's agreements. However, for the most part, they were ignored and were left to talk to their buddies, who stroked their egos.

I picked up this experience and carried it with me to 6 meters. When I took over this column, I was a novice in so many ways. One of those ways was the understanding of 6 meters from the perspective of the serious DX operator. Those of you who took me to task for my lack of understanding of 6 meter propagation and "on the air" activity were correct in doing so.

Therefore, I listened to the band and got a feel for what was going on. I saw both sides. I too missed an opportunity when a VO2 was coming through to my QTH on 130 and I was listening to 110. Nevertheless, I also gained an opportunity by having my receiver "parked" on 110 one morning, when "out of the noise" came Costa, CU1EZ. I and several others in W5 land were able to work him during an opening that lasted all but 15 minutes. This opportunity would never have taken place had there been stateside to stateside QSOs underway on that frequency.

There still needs to be some definition of what represents DX. Is a station that is often heard on that frequency DX? Is it "wrong" for stateside stations to work "common" DX in the window? My friend Bob Magnani, K6QXY, cited an example that had no apparent solution. He referred to a day when Hawaiian stations were being heard on the west coast, east coast, and in the Caribbean. He said that the east coast stations were trying to work the Hawaiians, the Hawaiians were trying to work the Caribbean stations, and the west coast stations were trying to work the Caribbean stations, all inside the DX window. The east coast stations were upset with the west coast stations. The west coast stations were upset with the Hawaiians, and the Hawaiians were upset with everybody else. Ultimately, no one was the winner. But how often does this kind of event occur?

So what is the bottom line? A gentlemen's agreement will work only as long as we are gentlemen. Therefore, if we continue our gentlemanly conduct, it is possible that it will make the agreements work. And being the gentlemen as we are, we will also be gentlemanly when we ask someone to please QSY out of the DX window.

It is my opinion that the window is not the best, but it is much better than nothing. It remains, though, that as conditions change, the gentlemen's agreement should be subject to change. Evolution that brings about positive change should not be opposed outright, but should be debated in a positive, constructive, open forum.

One final question: Finally, I asked, "What other comments do you have about operating on VHF and above?"

Most of you used this space to continue commenting on your feelings about the window. However, some of you made some other constructive comments. One of you offered the proposal of a 6-meter-only contest (a proposal that has also surfaced in "The 50 MHz DX Bulletin"). Another one of you proposed a VHF WAZ program with entry levels of less than all 40 zones. Others of you took the space to tell me nice things about the column (thank you very much) and to make suggestions for topics in future columns. Still others told me about their stations.

Again, I thank you very much for your contributing to the survey with your completed response. We will do it again sometime soon.

ARRL 222 MHz Petition RM-7869 Update

The deadline for comments and reply comments on the ARRL's petition for a regulated segment of the bottom part of 222 MHz passed in late January. There were approximately 64 comments, of which two thirds were against a regulated segment and one third was in favor.

In last month's column we spoke of compromise. And indeed, compromise seems to be surfacing. In their January meeting the SMA formed

a committee to see what kind of compromise could be worked out. Among the committee members was Chip Angle, N6CA, representing the weak-signal interests. The committee was to have presented a report to the SMA board in late February, with the SMA, as a whole, voting on the report this month.

Parallel to the SMA activities was the ARRL's rethinking of their position, as reflected in their reply comments. Within the comments was an olive branch extended to the SMA and repeater coordinators in general. The ARRL's position is that fellow hams are not enemies. The situation arose as a result of the FCC's removal of two megahertz of amateur radio spectrum. Citing that the previous segment of the band was regulated and that all other bands below 902 MHz have a regulated segment, it stood to reason that 222 MHz should also have a regulated segment. Therefore, the ARRL's position remained that a weak-signal segment should be regulated. The reasoning at the League was that having a regulated weak-signal segment would *benefit* the repeater coordinators, especially when they are faced with a "renegade" repeater owner who places an uncoordinated repeater on the air. The reasoning continues that the uncoordinated repeater would most likely fire up in an area of the band that does not have repeaters. And without FCC enforcement, the coordinating group could have no way of telling the offending owner to cease operation. The ultimate result would be problems for more than one type of user of the band.

However, the olive branch that was extended had to do with the size of the segment. The ARRL's position was evolving to say that the size of the segment was open to discussion and compromise. From your editor's perspective, it appears that a segment of the band 100 kHz wide, located between 222.000 and 222.100, could be a segment that could satisfy most interests. A guard segment of 10 kHz wide just above the weak-signal segment would accommodate beacons. This seems to be the one surfacing from the work of the SMA committee. From within the ARRL is the position that possibly a 100 kHz dimension is a livable size.

The tightrope that everyone seems to be walking centers around whether or not the SMA perceives any regulation as being "shoved down their throats." It will be up to the reasonable leaders of this issue to mount a convincing argument that the compromised size is the best for all concerned and that the compromised size should be regulated for the protection of all users' interests. Your editor will keep you advised of the progress of this issue.

On The Air

Six Meters Continues to Play Fickle. Following submission of last month's column, the 6 meter band continued to play on, at least for a few days. Propagation between the east coast and Europe continues, as well as propagation between the west coast and Pacific. On January 10 a transcontinental opening lasting almost two hours was reported between southern California and northeast U.S. and Canada. The next day, the 11th, in the morning, east coast operators reported excellent openings to Europe. Fred, K3ZO, reported that he had the best opening to G-land since November 11, 1989. Later, California and other parts of the U.S. had an opening to the Caribbean and northern South

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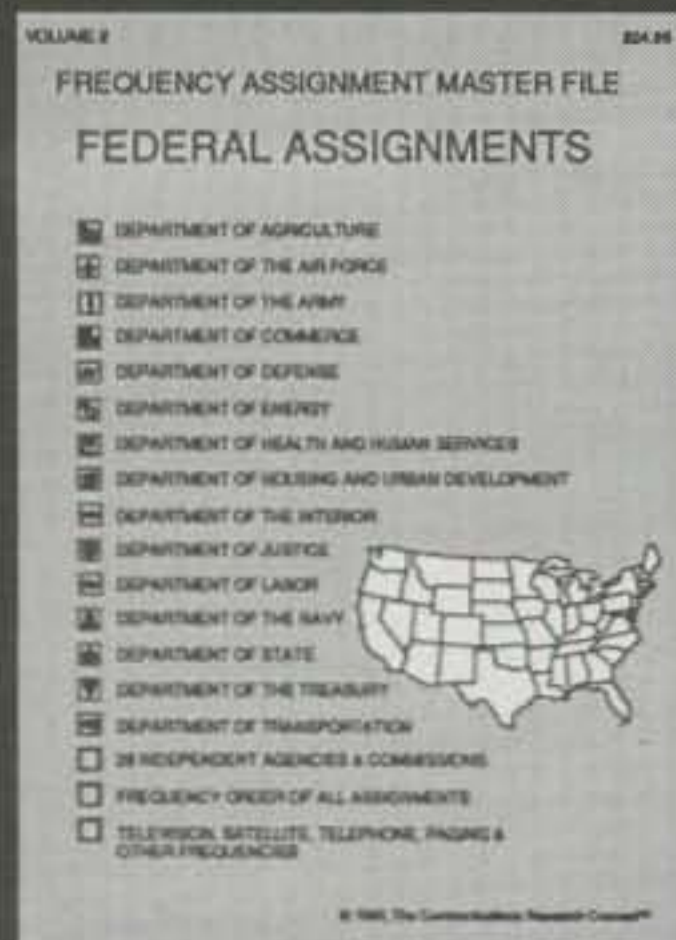
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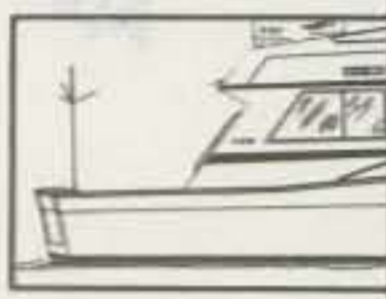
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America. Operators reported included: YV5ZZ, 6Y5IC, NP4NP, KP4EIT (and other KP4 stations), FM3AG, VP2MO (Bobby making a very welcomed reappearance on the band after a long absence), FO5DR, and C6A (2). On January 12 another transcontinental opening between the west coast and east coast lasted for four hours. Also heard announced on the coordinating frequency, 28.885 MHz, were reports of propagation between parts of the U.S. and Canada and the following DX stations: 9Y4VU, TG9NX, YS1ACB, PJ9EE, PJ9VT, YV5ZZ, VP2MO, NP4NP, FM3AG, HK4EB, TI2KD, TI2NA, TU4DH, CU1EZ, I0, IS0, and other European stations, NI6E/KH6, KH6IAA, ZL1ANJ, and AH6LE.

Then late that afternoon Tim, V73AT, made his appearance on the band. When he did, he seemed to have the band to himself. During the brief opening he had momentary propagation to most of the U.S. On the coordinating frequency operators on the east coast were lamenting their inability to get through the west coast curtain, only to have their own opening to Tim a few minutes later. It was truly remarkable to listen to reports from around the country as operators would announce completion of a QSO with Tim. After it was all over, Tim showed up on the coordinating frequency and disclosed that only that morning had he reinstall his 6 meter beam. So isolated was the opening that other stations in the Pacific listened to the coordinating frequency with amazement at the fact that they too were not getting the propagation. One brief exception to that absence was a short opening between northern W7 and Retita, T30BY, that occurred while Tim was working his 33 stations.

The next two days (13th and 14th) contained more of the same. On the 13th east and west coast reported propagation to Hawaii. On the 14th another transcontinental opening was reported, this one lasting around 2½ hours.

On the 15th the band went dead.

Over the weekend of the ARRL VHF Sweepstakes some stations, particularly in the southwest and west, reported propagation via sporadic-E which lasted for hours. Emilio, XE3EB, and XE1GRR were heard for hours at your editor's QTH. I also logged CO2KK and YS1AG, as well as KB5IUA, KC5FP, KM5X, and WA0TKJ. Stations on the west coast reported all three XE prefixes active and sporadic-E contacts around the southwest. Meanwhile, the northern latitude stations received little propagation during the same days.

Until the end of the month the band stayed dead, with one notable exception. On Saturday, January 25 at around 2100 UTC Frank, 9Y4VU, announced on the coordinating frequency that he was hearing the P43AS beacon. An alert stateside station, having heard George, P43FM, also on the coordinating frequency a few minutes before, called him and told him of Frank's observance. It was quickly determined that Frank and George could not hear each other on 10 meters. Therefore, through the stateside station, the frequency and mode of operation were passed between Frank and George. Within seconds of QSYing to 6 meters, Frank had bagged his 75th country. What makes Frank's accomplishment more astonishing is his equipment. Frank works only CW, using a converted FM radio and just a dipole for an antenna.

The band started showing signs of life the last day of January and the first weekend of February. Reports of PJ9JT and P43FM were surfacing all over the central and eastern parts of the U.S. and southeastern parts of Canada on the first and second of February. George reported

working over 150 stateside stations during one opening on Saturday. Also, on February 1 Costa, CU1EZ, reported working three ES stations, a UL7 (GCC?), and ZF8AA, to bring his country total to 87. KP2A reported working ES5MC (see separate item on him later in this topic). W4DR reported also working ES5MC. VE2DFO reported working brothers ON4ANT and ON4GG on Aurora. Rick, CN8ST, reported three new countries: ES, RA, and 3D2. Chet, PJ9EE, logged a page of Scandinavian contacts. Once again, Europe was being reported on the east coast on Saturday, Sunday, and Monday.

On Tuesday, February 3 European stations reported working ZS stations. Several east coast operators reported QSOs with Europe. Several east coast operators, including N4KWX and WB4NFS, also reported working 7Q7CM. Shel, NI6E/KH6, reported the first significant propagation in a couple of weeks. He was heard throughout the west coast and southwest for a couple of hours.

On these early days of February the sun's numbers have been increasingly encouraging. However, the band has not been playing quite up to the expectations of the experts. On February 5 the 6 meter band behaved like a taunting mistress, tantalizing those who listened with hopes that it will open. Operators in Canada and New England were reporting that indicators, such as 48.250 MHz video signals from Europe, were 20-40 over nine. However, except for some brief openings in the early morning, 6 meters remained quiet. On February 6 many stations in southeast Canada, the New England area, and W3's reported European contacts. One of the more notable ones was VE1BVL logging a contact with ES6QB. John, OY9JD, reported Russian indicators for three hours. However, he made only one contact with a UL7 and a few stateside, including K1JRW. Once again this part of the column is being written last so that the latest information can be reported in it. And once again your editor is forced to send this column in with hope hanging on the line. Look to next month's column for possible further reports of goodies on 6 meters.

This and That. Two reports of individual accomplishments reached me after the close of last month's column. First, my long-time friend Terry, N6CW, reported that on January 6 he *finally* worked Europe when he worked F1FHI. His not-so-record-breaking accomplishment took only 15 years. Next, Chuck, K3QMX, on the same day worked DF7VX, YU3ZV, OE6DGG, and LX1JX, for countries 98-101. Finally, Chuck added Tim, V73AT, on the 12th, to make a DXCC total now standing at 102. Chuck states that for the last two years he has been using a Drake TR6 and a 5-element Telex at 45 feet.

Contrasting Terry's accomplishment was a report I received from Emilio, XE3EB. He stated that on November 3 he worked LU8DOE. On November 9 he worked WA6BYA and JA4MBM. On November 10 he worked VK3OT. On November 22 he worked CN2JP. Finally, on November 23 he worked CT1BH for WAC in 20 days!

Speaking of Bob, WA6BYA, it appears that he is the first west coast recipient of DXCC. But for an odd mixture of peanut butter, jelly, grandkids, and 6 meter DXCC QSL cards, K6ODV would have made the honor. As of this writing, 'ODV reports most of the damaged QSL cards have been replaced. Imagine the DXCC desk having to read through that mess!

First Ever 10 Band DXCC. Rarely does the mailman ring twice anymore. However, on February 3 the mailman rang once with two cards

for John, KP2A, to complete his 6 meter, and thus the mythical ten band, DXCC. A check with the DXCC desk indicated that no one had ever applied for ten band DXCC because there is no such award at this time. The DXCC desk will accept endorsements for 30 meters for CW or mixed DXCC. However, by agreement with IARU, the ARRL will not at this time issue a separate band endorsement for 30 meters. Thus, the mythical award and the satisfaction of being the first to do it.

John stated that he had never applied for individual band DXCC awards before, and he was contemplating how he was going to send over 1000 cards to the ARRL for processing.

Not only was the postman good to John in early February, so was the 6 meter band. On Saturday, 1 February John worked ES5MC for a new one (and probably the first NA to ES QSO). Then on Sunday John worked two Isle of Man stations for yet another new one. John, I sure hope the rest of February was as good as the start!

bands, frequencies not normally allowed Thai stations. Fred reports that with only 10 watts they made nearly 500 QSOs, with most of them in Japan. Unfortunately, the solar storm of November 9 shut down the operation for the remainder of the convention. Nevertheless, at least for a short time another country was activated for 6 meters.

Mini-DXpedition to 6Y5. Dick, N4HSM, and Steve, WS4F, mounted a mini-DXpedition to Jamaica last November 15-18. Their trip coincided with the lull in 6 meter propagation for that month. Nevertheless, they were able to make 310 contacts, with the breakdown as follows: 6 QSOs in Central and South America; 7 QSOs in the Caribbean; 245 QSOs in the U.S. (with the breakdown of 210 W6's, 30 W7's, 3 W0's, and 2 W4's); 50 QSOs in Europe; and two QSOs in Africa. Looks like a lot of W6's were made very happy as a result of this DXpedition.

Bill, KM1E, Reports from C6A. While you are reading this, Bill, KM1E, is wrapping up his second stay in C6A. He sent the following report for his first stay.

Bill was in the Bahamas from December 8 to January 20. While there, he made 641 QSOs of which 557 were in North America, 80 contacts were in Europe, one contact was with CU1EZ, and three contacts were in South America. He reported that he worked 155 grid squares in North America. He recounted that he worked all U.S. call districts and VE1-3, and VE5-7. In Europe he worked DL, F, G, GI, GJ, GM, LX, OK, ON, PA, YO, and YU. Unfortunately, he could hear but not work two stations in Greece due to a high local noise level in Greece. We will have a wrap-up report for Bill's last-month operation in a couple of months. Hopefully, you will be in his log by then.

A Real-Live Operator at OX. Pete, WA5JCI, reported that John, WB5URO, signing WB5URO/OX, was active between early February and late March. If you worked him, you can QSL via Pete at: Pete Petri, WA5JCI, Rt. 4, Box 4462, Palestine, TX 75801.

South Sandwich on the Air. The following information arrived too late for inclusion in the March column. However, this operation is underway now, and a check of the bands might net you a QSO. A group—including WA3YVN, WA4JQS, K0IR, W6MKB, W7KNT, JE3MAS, K5VT, and OH2BH—started an operation on Thule Island in the South Sandwich Island chain effective March 21. They will conclude their operation around April 4. This is a major operation, with stations on 160 through 2 meters. They are using the callsign VP8SSI and are running a beacon on 50.117 MHz. They are running 2 meter EME skeds, with coordination of the skeds being through VE7BQH, who can be found on 14.345, as the MC of the 2 meter EME net. Random QSOs may be attempted on their frequency of 144.028. Their grid square is HD60. QSL cards go to KA6V for CW and EME QSOs and to AA6BB for SSB QSOs. Thanks to Shep, W7HAH, for the information on this operation.

Peter, PY5CC, on from GG53. Another report reaching me very late is that of Peter, PY5CC's plans to activate grid square GG53 in the latter part of March. If you get this issue in time, look for him on the coordinating frequency. Also, look for him on HF with a special prefix during the WPX Contest. Thanks to Shel for this report.

Tell John, KB5IUA, and Pat, W5OZI, Where to Go. Following their very successful trip to DL88 last summer, John and Pat are looking for another place to activate during the summer

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sporadic-E season. If you have a suggestion, drop John a line at: John Godwin, P.O. Box 475, Sweeny, TX 77480. John has a beautiful photo of their operation from DL88 that he has printed as his QSL card, which he uses for confirming his VHF QSOs. Across the front he has printed: **Very Honorable Friends/Ultimate Ham Facet.** Kind of says it all, John.

Current Contests

ARRL VHF/UHF Sprints. The ARRL VHF Sprint Contests are scheduled for this and next month during 7 PM to 11 PM local time (except 50 MHz) as follows: 144 MHz, April 6; 222 MHz, April 14; 432 MHz, April 22; 902 MHz, May 1; 1296 MHz, May 7; 2304 MHz, May 14; 50 MHz, 2300 UTC May 23 to 0300 May 24. Exchange is grid square. Each contest is separate and will be scored separately. Each QSO is worth one point. For final score, multiply number of QSOs by number of grid squares worked. Send logs to the ARRL by

one month following the last contest. Results are to be published late fall in *NCJ*.

N0DXP/9 Needs A Book

Robb French, N0DXP/9, came across an orphan, a Trio TR-5000, 6 meter transceiver. Robb reports that he has been able to obtain a schematic from Kenwood's Customer Service in Japan. However, the schematics are in Japanese. Kenwood advised him that the radio was a non-export type, and that no manuals are currently available. Robb is looking for a manual, preferably in English. If anyone can help him, contact him at: Robb K. French, N0DXP/9, 710 South 11th Street, Chesterton, IN 46304-2952.

A Word of Caution

Some of your reports have also indicated catch-

ing a case of F2 Flu or some other such malady on the day the DX is rolling in. I must caution you by telling you about the time a fellow "got sick" to attend the San Diego Open Golf Tournament, only to have his picture (as part of a crowd shot) appear on the front page of the *San Diego Union*. A word to the wise . . .

And Finally

The December 1991 issue of *Glamour* magazine had an editorial entitled "Practice random acts of kindness and senseless acts of beauty." The editorial focused on doing something nice for the pleasure of it. It cited examples of people unexpectedly helping their fellow human being. It also told of bumper stickers with the above quote having popped up and billboards promoting the "underground movement" also having appeared around the country.

I bring this to your attention as a lead in to my final topic in this month's column. Earlier in this column I spoke of how we are, for the most part, gentlemen when it comes to operating on VHF and above. This editorial brought focus to my innate sense of "doing something nice" for my fellow ham. As a section manager, I have more contact than most amateurs with the prospective amateur, new amateur, or the amateur who is trying something different within the hobby. I am always (pleasantly) amazed to see the positive involvement of you, my fellow amateurs, in trying to help out your friends. As editor of this column, I also see the efforts of amateurs trying to help their fellow amateurs get on VHF, or build equipment, or design and build antennas, or just try to learn something new. To a large extent we are already performing random acts of kindness. And I want to use this space in the column to say thank you and encourage you to keep up the beautiful work.

If you are looking for something to do that will not take too much effort, you can perform the following "act of kindness." My friend Joel Paladino, N6AMG, over the years has contributed much to the world of VHF. He has been on DXpeditions and contributed equipment, money, and much time (often behind the scenes) toward furthering activity on the "higher frequencies." When Joel sent me his DXpedition report (parts of which appeared in last month's column) he advised me that the trip last fall may be his last one. Joel (as some of you know) has a blood disease. The successful treatment of his disease is either through a bone marrow transplant or through chemotherapy. The report on his condition I received a few days before this column was being mailed is that doctors have located a donor match for the bone marrow transplant. Joel will be undergoing treatment at the Stanford Medical center for at least two months. By the time you are reading this, hopefully Joel will be in the final stages of a successful transplant. What you can do to perform your random act of kindness is to drop Joel a QSL card with some kind words written on it. I am very certain that he will appreciate hearing from you very much. Please send your QSL card to Joel Paladino, N6AMG, 5070 Hill Top Dr., El Sobrante, CA 94803.

This is all the news for this month. Please write to me or call me at 1-405-528-6625 if you have late-breaking news for your fellow reader. Hopefully, I will see you at Dayton. Come by the CQ booth and tell me what you would like to see in your column. Until next month . . .

73, Joe, N6CL

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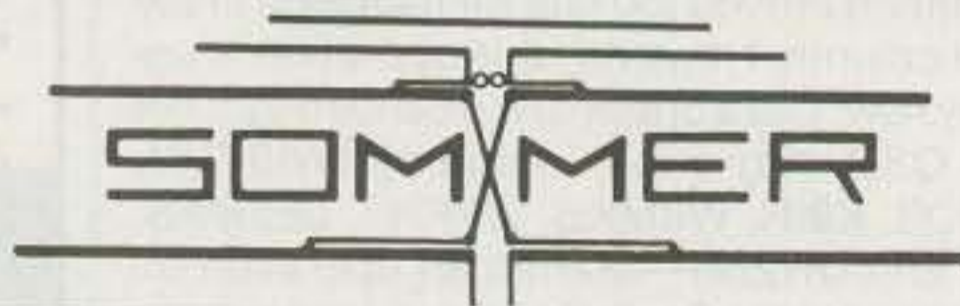
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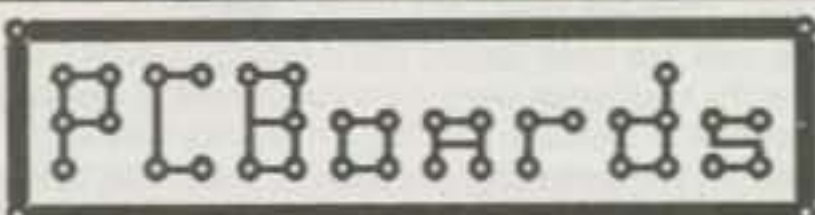
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Announcements (from p. 6)

Apr. 4, **Arkansas Hamfest & ARRL Delta Div. Convention**, North Little Rock Community Center, Little Rock, Arkansas. Contact James Warlick, AA5ZI, 501-835-1728. (VE exams)

Apr. 4, **First Annual Marshall County Hamfest**, Albertville Recreation Center, Albertville, Alabama. Contact Marshall County ARC, c/o Ann Jordan, KC4UUV, 134 Bearden Rd., Albertville, AL 35950 (205-878-0880). (VE exams)

Apr. 4, **Columbus ARC Hamfest**, Bartholomew County 4-H Fairgrounds, Women's Bldg., Columbus, Indiana. Contact Marion Winterberg, 11941 W. Sawmill Rd., Columbus, IN 47201 (812-342-4670).

Apr. 4-5, **Great Plains ARC Hamfest**, Mooreland, Oklahoma. Contact Gerald Bowman, WG5Z, Box 356, Mooreland, OK 73852 (405-994-5453). (VE exams 2 PM Saturday)

Apr. 4-5, **15th Annual Inland Empire Hamfest**, Spokane Youth Sports Bingo Hall, Spokane, Washington. Contact Inland Empire Hamfest '92, South 1405 Crestline, Spokane, WA 99203 (509-534-8443).

Apr. 5, **1992 SEMARA Hamfest**, Grosse Pointe North High School, Grosse Pointe Woods, Michigan. Contact 1992 SEMARA Hamfest, P.O. Box 646, St. Clair Shores, MI 48080-0646 (313-527-3497). (VE exams)

Apr. 5, **20th Annual Madison Swapfest**, Dane County Exposition Center Forum Bldg., Madison, Wisconsin. Contact MARA, P.O. Box 8890, Madison, WI 53708-8890, or call 608-249-7579.

Apr. 5, **Longmont ARC Hamfest & Computer Swap**, Boulder County Fairgrounds, Longmont, Colorado. Contact Jerry Schmidt, NØOUW, 303-772-6736. (VE exams at 1300Z, for info 303-530-2903)

Apr. 5, **Suffolk County Radio Club Hamfest**, St James Lutheran School, St. James, Long Island, New York. Contact Jim Heacock, KA2LCC, 516-473-7529. (VE exams)

Apr. 5, **Southington ARA Fleamarket**, Southington High School, Southington, Connecticut. Contact Steve,

N1GCV, 203-621-6191. (VE exams by preregistration only; send SASE to Southington ARA, P.O. Box 873, Southington, CT 06489.)

Apr. 5, **Blossomland BLAST**, Berrien County Sportsman's Club, St. Joseph, Michigan. Contact BARA, P.O. Box 175, St. Joseph, MI 49085. (Handicapped accessible.)

Apr. 11, **Lake Region ARC Hamfest**, Otter Tail County Fairgrounds Hockey Arena, Fergus Falls, Minnesota. Call 218-826-6274. (VE exams 9 AM, walk-in first come, first served.)

Apr. 11, **Chestnut Ridge Radio Club Fleamarket**, Education Bldg., Saddle River Reformed Church, Upper Saddle River, New Jersey. Contact Jack Meagher, W2EHD, 201-768-8360.

Apr. 11, **Auburn ARA Hamfest**, Auburn High School Gym, Auburn, New York. Contact John J. Casano, N2DXY, 94 Dunning Ave., Auburn, NY 13021.

Apr. 11, **11th Annual Durham Region Amateur Radio & Computer Fleamarket**, Pickering High School, Pickering Village, Ajax, Ontario, Canada. Contact Ron Brown, VE3WZ, 839-3711.

Apr. 11, **Ottawa Valley Mobile Radio Club Fleamarket**, Canterbury High School, Ottawa, Ontario, Canada. Contact Ken Barry, VE3KJB, 613-746-4823.

Apr. 11, **Springfest '92**, Indian River Recreation Community Center, Chesapeake, Virginia. Contact Rob Holt, N4SFH, 804-485-7703 before 10 PM. (VE exams)

Apr. 11, **Poor-Mans Hamfest**, Newberry, Florida. Contact W4TKE, or the Gainesville ARS.

Apr. 11, **Lawton-Ft. Sill ARC Hamfest**, County Fairgrounds, Lawton, Oklahoma. Contact Bob Morford, 1415 NW 33rd St. Lawton, OK 73505 (405-355-6120).

Apr. 11-12, **17th Annual Trenton Computer Festival**, Mercer County Community College, West Windsor, New Jersey. Call 609-655-4999. (VE exams)

Apr. 11-12, **Old Natchez ARC Hamfest**, Natchez Convention Center, Natchez, Mississippi. Contact N5YCY, P.O. Box 604, Natchez, MS 39121. (VE exams Sat. & Sun.)

OUR READERS SAY

Looking For Amiga Programs

Editor, CQ:

I have recently acquired a Commodore Amiga Computer, and as a result I have been looking for the following programs on 3.5 inch discs: log program, contest program, also a suitable program for recording QSL Managers. As I have not so far been successful, I was wondering if you are aware of any ham radio operators or Amiga groups in the States who may be able to help me. I would appreciate any assistance you can give me.

Frank Macklin, VK1ZL
1, Macartney Cres.,
DEAKIN, A.C.T. 2600
Australia

of our contests. If CQ could adopt that for the WW contests (e.g., no contesting above 14300), maybe the contesters and the noncontesters could live together more easily. Now if only the HF packeteers would abide by the Band Plan as well!

Peter E. Chadwick, G3RZP
Swindon, Wilts, England

Keep 'Em Coming

Editor, CQ:

I just wanted to write and say much I enjoy CQ every month. I especially enjoy the regular articles by Chod Harris and the articles by Dave Ingram. Please encourage Dave to continue writing articles on "classic" equipment from the 30s, 40s, and 50s. I'm not *that* much of an old geezer (only 49), but I certainly enjoy reviewing the old equipment.

James P. Rybak, WØKSD
Grand Junction, CO

Should Contests Be Abolished?

Editor, CQ:

AR's (John Door, K1AR) article in the November 1991 issue of CQ really deserves some sort of award! The subject of contesting can bring out real acrimony. It can almost start a family row here, as my father-in-law is anti-contest, and I like contests, although I will admit I get a bit bored after 4 hours of running at 150 an hour! I personally prefer multi-op because of this. But AR's analysis is masterly, and well thought out. What is needed to go with such an analysis, however, is the acceptance of formal contest free zones, such as we have in Europe for many

QRP-20 Errata

Editor, CQ:

I guess people *do* read CQ!! I have received several nice notes, and as a result have another *errata* for the QRP-20 article (November 1991 CQ, page 20.) The correct address for the source of the key paddle is: Galbraith Projects, P.O. Box 1733 (not 1773), Christchurch 8000, New Zealand.

Pete Hoover, W6ZH
Pasadena, CA

Apr. 12, **Charleston Area Hamfest & Computer Show**, Charleston, West Virginia Civic Center. Contact Jimmie Hewlett, P.O. Box 8364, South Charleston, WV 25303 (304-768-1142). (VE exams, preregistration Jim Langan, AC8K, 304-343-7251)

Apr. 12, **20th NCS ARRL Convention/Hamfest**, Jim Graham Bldg., NCS Fairgrounds, Raleigh, North Carolina. Contact Rollin Ransom, NF4P, 1421 Parks Village Rd., Zebulon, NC 27597 (919-269-4406). (Preregistration exams AA4MY, 919-847-8512) (Wheelchair accessible)

Apr. 12, **Framingham ARA Spring Fleamarket**, Framingham High School, Framingham, Massachusetts. Contact Framingham ARA, P.O. Box 3005, Framingham, MA 01701. (Preregistration for exams: send check for \$5.40 payable to ARRL/VEC to Dick Marshall, WA1KUG, 37 Lyman Rd., Framingham, MA 01701; no walk-ins after 10 AM.)

Apr. 12, **Eastern Connecticut ARA Ham Radio & Computer Fleamarket**, Point Breeze Restaurant, Webster, Massachusetts. Contact Roger, KA1LMN, 203-928-4883.

Apr. 18, **Joplin, Missouri ARC Hamfest '92**, National Guard Armory, Joplin, Missouri. Contact Joplin ARC, P.O. Box 2983, Joplin, MO 64803. (VE exams)

Apr. 18, **Hamboree '92**, Bowling Green Mall, Bowling Green, Kentucky. Contact Kentucky Colonel's ARC, P.O. Box 9781, Bowling Green, KY 42102-9781, or call Denver Eadens, N4WWA, 502-777-3681. (VE exams; handicapped accessible)

Apr. 19, **Tailgate Electronics, Computer, and Amateur Radio Fleamarket**, Albany & Main St., Cambridge, Massachusetts. Call 617-253-3776. (This event will also be held on May 17, June 21, July 19, and August 16.)

Apr. 24, **QCWA Banquet**, Friday evening of Dayton Hamvention, Neil's Heritage House, Dayton, Ohio. Contact Bob Dingle, KA4LAU, 1117 Big Hill Rd., Kettering, OH 45429-1201 (513-299-7114).

Apr. 26, **Wellesley ARS Hamfest**, Wellesley Senior High School, Wellesley, Massachusetts. Contact Gerry Driscoll, NV1T, 617-444-2686.

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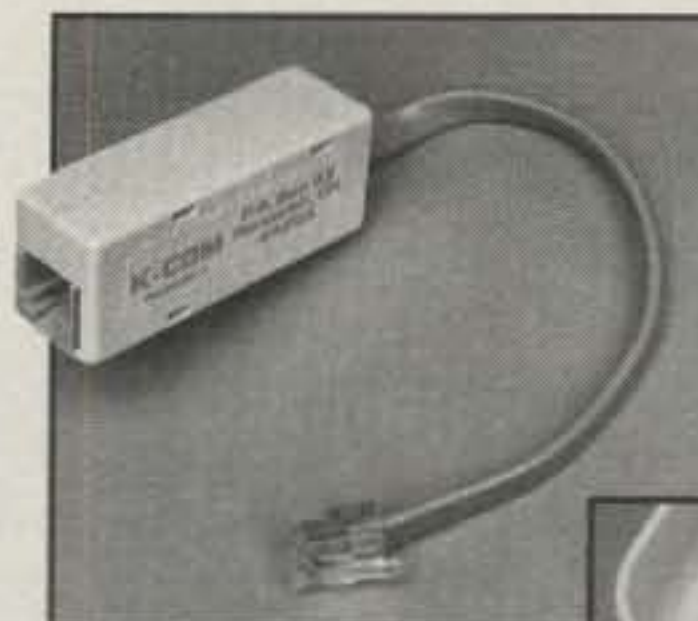
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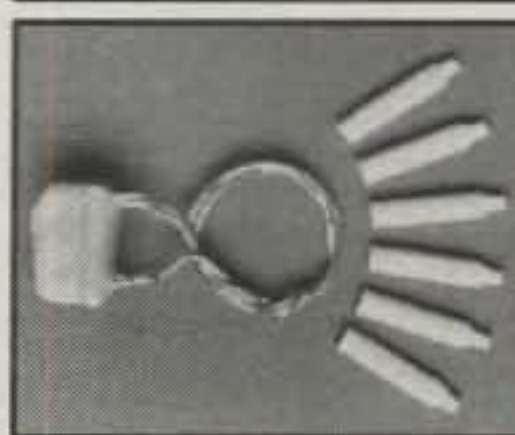
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DXCC Accreditation, or Will It Count?

"Pirate." "Don't work him; he has no license." These cries and more punctuate some DX operations and DXpeditions. How's a DXer to know if a given operation is properly licensed, or if it will count for DXCC credit?

Frankly, despite vociferous proclamations to the contrary, it is simply impossible for even knowledgeable DXers to determine "legitimacy" of a given operation. Some recent controversies illustrate the complexity of the DXCC accreditation process.

Accreditation criteria first appeared in the DXCC rules following the complete rewrite of those rules in 1988. These were not new rules; they had existed on an informal basis for many years, but this printing was the first official acknowledgement of the accreditation procedures.

The first rule may be the most important accreditation rule: "The vast majority of operations are accredited routinely without any requirement for submitting authenticating documents." In other words, the DXCC desk won't even question DXCC credit for 99% of all operations. They *do* look closely at operations from countries that have been reluctant to issue operating permission in the past, and at operations from countries with visiting restrictions. For example, Libya 5A seldom grants amateur licenses. Anyone operating from 5A should expect to provide some documentation of such license.

To accredit an operation, the DXCC desk seeks assurance of (a) proper licensing and (b) physical presence in that country. The DXpeditioner has to have some written operating permission and some proof that he or she was physically in the DXCC country at the time of the operation.

To this end, the DXCC looks for three items. First, they want a copy of the "license or operating authorization." This is obviously the key document. Note, however, that the rules specifically state "license or operating authorization." An amateur license *per se* is *not* required. This wording leads to many of the accreditation controversies. We'll come back to this point.

The second piece of paper the DXCC likes to see is the copy of the passport, captain's log, etc., that establishes the DXpe-



Mickey Mouse takes on a new meaning in amateur radio April 4-5 during the Disney Special Event. (The one on the right is obviously not a DXer.)

ditioner's physical presence in the country. For example, Romeo's **XYØRR** Burma operation was accredited for DXCC prior to the operation, pending receipt of entry and exit stamps proving Romeo was actually in Burma.

The third piece of paper that is sometimes required is landing or other access permission. For example, the owners of Palmyra Island KH5 have been hesitant to provide written permission to land on, and operate from, Palmyra, fearing legal liability in case of an accident. There are no licensing problems with Palmyra (*anyone* with a US license may operate from the island /KH5), and a DXpeditioner can provide proof of being on the island (probably in the form of a ship captain's log and dated photographs). However, for a Palmyra operation to be accredited for DXCC, the operator will probably have to provide a copy of written permission from the owners to land on, and operate from, the island.

These accreditation rules seem straightforward, reasonable, and easy to understand. But let's see how they apply in a couple of specific cases.

Mt. Athos SY

Baldur Drobica, DJ6SI, operated from Mt. Athos SY in 1991. His operation attracted



Back: Don, WB2DND, and Mike, HL9KT. Front: Bill, VS6BZ, Bill, VS6BG, and Steve, VS6XMQ, the last three officers of the Hong Kong Amateur Radio Transmitting Society. (WB2DND photo)

more than the usual number of claims that he lacked proper authority. Mt. Athos is notorious for controversy; most operations by other than Greeks have been challenged by SV and other amateurs. In one case, the Greeks actually prevented a Mt. Athos operation by some enterprising Italians by having the Italians' operating permission revoked. Baldur was certainly aware of this, and accordingly took extra pains to obtain adequate documentation. He submitted proof that he was in Mt. Athos, and a copy of his operating authorization to the ARRL, and his DJ6SI/SY operation was accredited for DXCC credit.

Other European amateurs immediately criticized this decision. They claimed that Baldur lacked Greek operating permission (a prerequisite for Mt. Athos operating permission), and therefore his operation lacked "proper licensing." DXCC credit for Baldur's operation was suspended while the DXCC continued its investigation into these charges.

As is customary, the DXpeditioner himself was asked to provide additional documents. After all, the DXpeditioner has the most at stake in accrediting an operation. In this case, Baldur provided a copy of the German rules for the CEPT European "common" license. The CEPT license is similar to the agreement between the US and Canada; amateurs may operate from any CEPT country without any additional paperwork, permission, etc. Just as a US amateur can simply step across the Canadian border and start signing VE3, or whatever, so can an amateur from most European countries operate in other CEPT

The WPX Program

Mixed

1538	DK7NP	1541	HL5AP
1539	—	1542	KK6N
1540	YZ3AA	1543	YU4EXA

SSB

2281	UA4CX	2286	YZ3AA
2282	IK7MCJ	2287	JA7HYE
2283	I0MOM	2288	VK4ARB
2284	KK6N	2289	—
2285	N4SLU	2290	KB9AIT

CW

2719	YZ3AA	2720	PA3EKP
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WPX

267	N0LYK	268	KB7FDS
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Endorsements

Mixed: 450 DK7NP, YZ3AA, HL5AP, PA-2164, YU4EXA, YU3NU, 500 DK7NP, YZ3AA, WV2B, HL5AP, YU4EXA, YU3NU, 550 AA7FL, DK7NP, YZ3AA, HL5AP, YU3NU, 600 AA7FL, DK7NP, YZ3AA, HL5AP, VE2DWH, WA0ZDR, YU3NU, 650 AA7FL, DK7NP, YZ3AA, OZ4ZT, HL5APO, JE1RRK, VE2OWN, WA2FKF, 700 AA7FL, DK7NP, NH6T, YZ3AA, OZ4ZT, 750 DK7NP, NH6T, YZ3AA, VE2DWH, 800 DK7NP, YZ3AA, VE2DWH, 850 DK7NP, YZ3AA, OZ1ACB, VE2DWH, 900 DK7NP, YZ3AA, OZ1ACB, VE2DWH, 950 DK7NP, YZ3AA, OZ1ACB, VE2DWH, 1000 DK7NP, YZ3AA, VE2DWH, 1050 DK7NP, KA5TQF, VE2DWH, 1100 K9BQL, KA5TQF, 1150 KA5TQF, 1200 KA5TQF, 1250 W3KH, 1300 W3KH, 1450 OK3IF, 1500 G4SSH, OK3IF, 1550 OK3IF, HA0HW, 1600 OK3IF, HA0HW, 1650 SM6CST, HA0HW, 1700 HA0HW, 1750 HA0HW, 1800 HA0HW, 1850 HA0HW, YU3EO, 1900 YU3EO, HA0HW, 1950 YU3EO, HA0HW, 2000 YU3EO, HA0HW, 2350 W2FXA, 2400 W2FXA, 2500 IN3ANE.

SSB: 350 UA4CX, IK7MCJ, WB3LTT, I0MOM, YZ3AA, JA7HYE, KB9AIT, 400 UA4CX, IK7MCJ, I0MOM, WB3LTT, YZ3AA, N3CYD, KB9AIT, 450 IK7MCJ, WB3LTT, I0MOM, YZ3AA, N3CYD, IK2JEX, 500 IK7MCJ, I0MOM, YZ3AA, IK2JEX, KB9AIT, 550 I0MOM, YZ3AA, OZ1DYI, KB9AIT, 600 YZ3AA, 650 KE7UN, YZ3AA, 700 YZ3AA, 750 YZ3AA, 800 YZ3AA, 850 YZ3AA, KA5TQF, 900 KA5TQF, KF4FP, 950 K9BQL, KA5TQF, 1150 KF7RU, 1200 KC9DS, 1400 PY4VX, 1450 I2TZK, 1500 I6SF, I2TZK, 1550 I6SF, I2TZK, 1750 LU8ESU.

CW: 350 YZ3AA, PA3EKP, 400 YZ3AA, PA3EKP, YU3NU, 450 YZ3AA, YU3NU, PA3EKP, 500 YZ3AA, PA3EKP, 550 W0ULU, 600 KA5TQF, 650 KA5TQF, 750 WB5MTV, 900 YU2HF, 950 YU2HF, 1000 YU2HF, 1550 YU3NR, SM6CST, W8IQ, 1600 YU3NR, W8IQ, 1650 YU3NR, OK2PO, 1700 YU3NR, OK2PO, 1750 OK2PO.

40 Meters: KV1M
80 Meters: I2TZK, OZ1DYI, IK2ILH
Asia: K3IXD
Africa: YU3EO, OZ1ACB, OK3IF
No. Amer.: OZ1ACB, KV1M
So. Amer.: KA5TQF, ZS6BCR
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82-202-1006 Type-N, Male, For Belden 9913	3.83
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April 1992 • CQ • 123

countries. Baldur's copy of the German regulations clearly mentions using /SY when operating from Mt. Athos, a good indication that the CEPT licensing agreement includes SY operation. Baldur also provided copies of hand-written letters wanting him operating permission.

Based on this additional documentation, the DXCC desk cancelled its suspension of DXCC credit for Baldur's Mt. Athos operation, and once again began accepting J6SI/SY cards for DXCC credit. Some amateurs continued their personal campaign to discredit Baldur's operation, in spite of the DXCC decision. They obtained letters from the authorities in Mt. Athos that stated that Baldur did not have "a broadcasting license" in Mt. Athos.

So where does this leave DXCC accreditation of the operation? We have to go back to the accreditation rules, specifically the one describing documents that prove "proper licensing." Baldur's documents show that he had "operating authority," even if he didn't have the "license" that

others have received to operate from Mt. Athos. But the accreditation rules say that a license or operating authorization is required, not both.

The effort to discredit Baldur's operation flounders on the rather loose interpretation of "proper licensing" in the DXCC accreditation rules. Merely because a DXCC expeditioner lacks what other amateurs may consider to be "proper licensing" does not mean that that operation would not count for DXCC country credit. There are many acceptable "operating authorizations"; an official "license" is but one of them.

As an aside, the effort to discredit Baldur's operation may have backfired on all DXers. The persistence and influence of the distractors may have convinced the Mt. Athos authorities to stop issuing amateur radio permission to anyone. In this case, all of DX loses the opportunity to work Mt. Athos because of the misguided efforts of a handful of amateurs. And the effort failed; the operation counts for DXCC.



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Daniel, 9J2DS, and Jim Henderson, KF7E, in Lusaka, Zambia. Jim is occasionally active from African spots such as Malawi 7Q7JH.

The Mt. Athos controversy clearly illustrates one important aspect of DXCC accreditation: an operator does *not* need an amateur license for DXCC credit. "Operating authorization" can take many forms. My own 6W8MM "license" is a letter signed by the Director General of Telecommunications of Senegal, not a license *per se*. A US amateur in Pakistan requested an amateur license, and his letter was returned from the Chairman of the PTC of Pakistan, with a hand-written note: "Allowed as per amateur radio license rules of Pakistan." Such "operating authorization" is acceptable proof of "proper licensing" even in countries that issue regular amateur licenses. Again, distractors claiming that an individual "doesn't have a license" are missing the point of the accreditation rules. The operator doesn't need a "license" for the operation to count.

Albania

The situation in Albania is similar. The ZA1A operation had the support of the Albanian PTT, the International Amateur Radio Union (IARU), and others. The ZA1A "license" was signed by a member of the Frequency Allocation Board, which is under the Albanian Defense Department. In fact, the ZA1A license is issued by the Albanian Amateur Radio Association, and not by any higher-ranking government official. The ZA1A operation was immediately accredited for DXCC.

On the other hand, some enterprising Hungarians, working through the Albanian Ministry of Culture, Youth, and Sport, obtained "operating authorization" as ZA1HA, ZA1QA, ZA0RS, etc. The Hungarian "licenses" are signed by Agim Zeka, the Vice-Minister of the Culture, Youth, and Sport Ministry. The Hungarians even got PREG Zogaj, the Minister of Culture, Sport and Youth, to write a direct letter to the DXCC desk stating that his ministry has the right to give out amateur radio privileges.

But the DXCC desk withheld the decision on acceptance of the Hungarian operations.

Since the Minister of Culture, Youth, and Sport is at a significantly higher level of the Albanian government than the person who signed the ZA1A license, one would think that the Hungarian operations would be immediately accredited. The DXCC desk wanted to see a letter from the Albanian Amateur Radio Association stating that the Culture Minister could issue amateur licenses, but this is similar to asking the amateur radio branch of the FCC to certify that the Secretary of Transportation can issue amateur operating permission.

Merely because the "operating authorization" comes from other than the local amateur radio organization does *not* mean that the Hungarians didn't have "proper licensing." In fact, the president of the Albanian PTT, the Minister of Defense, and Agim Zeka verbally agreed that the licenses issued by the Ministry of Sports, Youth, and Culture will be valid.

Since it is very clear that the Hungarians have valid "operating authorization" from the Albanian government, look for their operations to be accredited for DXCC credit, perhaps by the time you read this. And the next time you hear someone say "Pirate; he doesn't have a license," remember that an operator doesn't need

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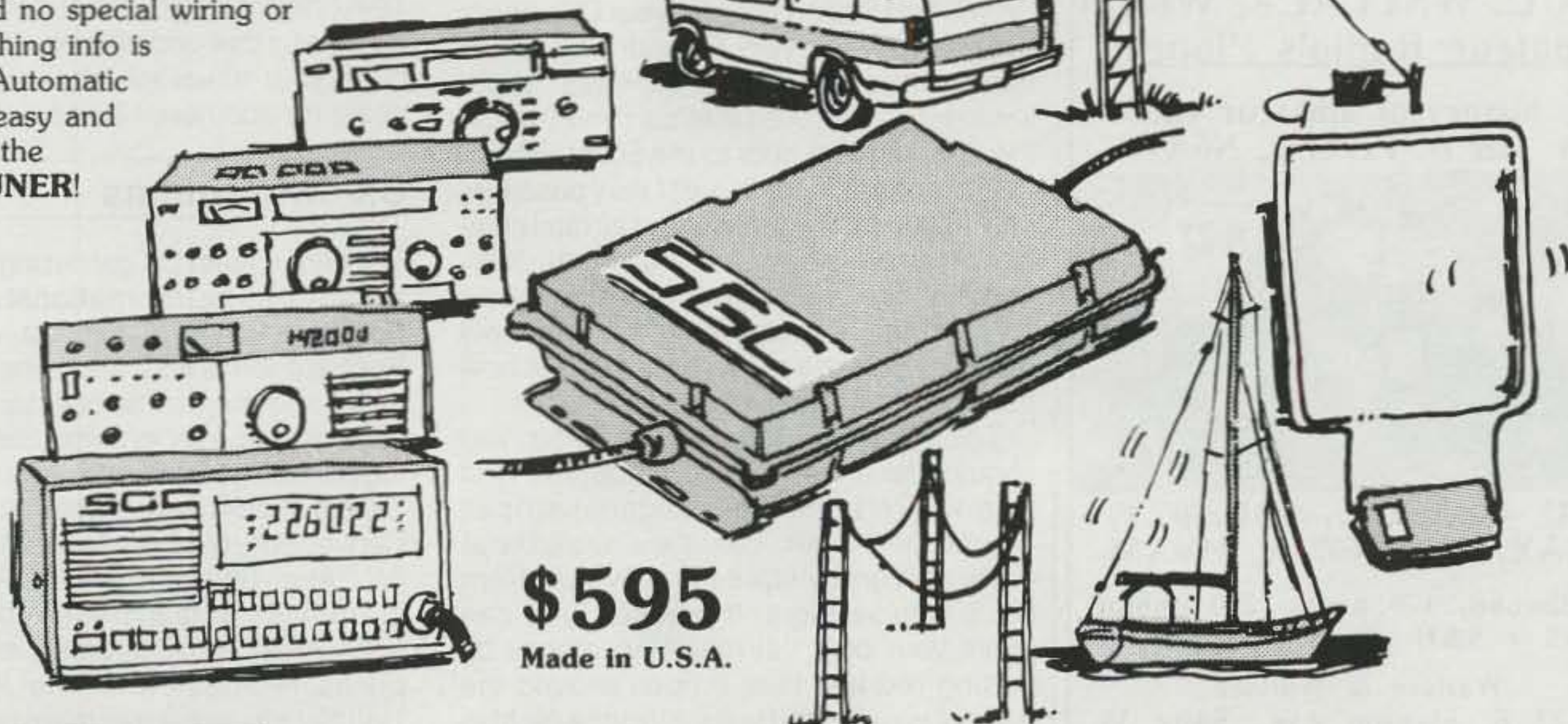
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15 Meter CW	
225	K2SX
20 Meter CW	
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3872	9X5SW	3885	K2ZGC
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7138	KC3LM	7148	DK6AP (CW)
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7140	OH3NG	7150	IK3JLV (CW)
7141	Y54NL	7151	N0AMI
7142	F5DE (CW)	7152	K2ZGC
7143	N4TL	7153	NW8F
7144	LA4OGA		

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a "license," and only the DXCC desk can make the accreditation decision. Efforts by outsiders to discredit operations, or even merely to denounce same on the air and in print, are beside the point, often harmful to amateur radio and DX, and are not in the amateur spirit.

Tip of the Month

Do you find that answers to your QSL cards seem to take forever? The individual DXer can do little about most slow QSL problems. However, the DXer can ensure that the QSL request gets to the DX station or QSL manager in the fastest way possible. Many DXers think that putting airmail postage on an envelope ensures airmail delivery. Not so. Unless your outer envelope clearly indicates airmail, your letter will travel by surface mail, regardless of how much postage you affix.

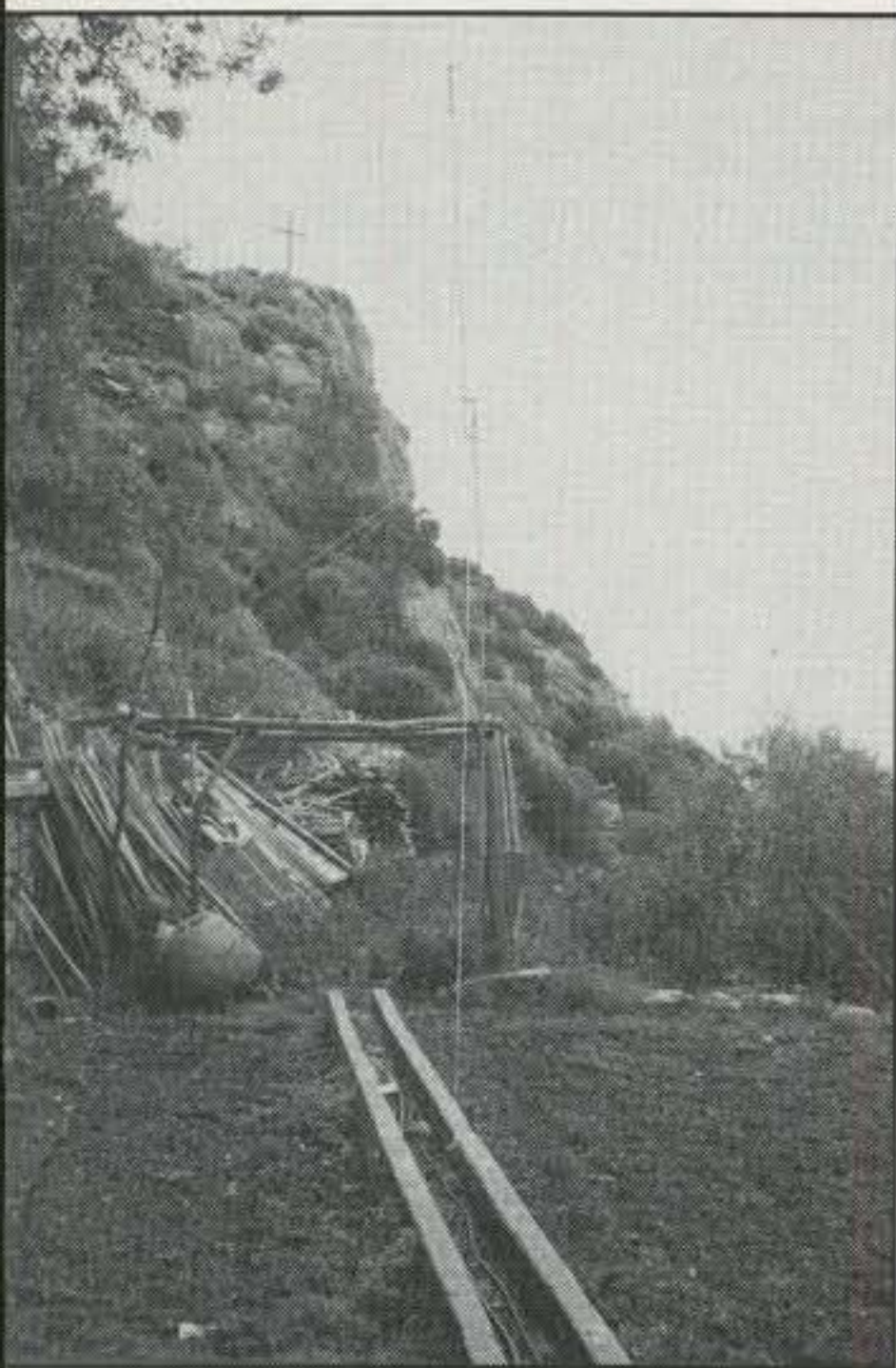
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envelope. This combination (plus airmail postage!) will get your QSL card to the DX station without delay.

Ray Husher, W5EW, passes along a hint in this regard. He says the US Postal Service now offers free yellow Air Mail/Par Avion stickers. These bright stickers can't be missed, and will make sure your mail doesn't accidentally travel by surface. Ask your local post office for a pad of Label 19-A (the big one) or 19-B (the smaller one). Be careful that adding these labels doesn't push your envelope above 1/2 ounce; it costs an additional \$0.45 if it does!

DX Conventions

The two biggest DX gatherings of the year are in April. The **International DX Convention** is in Visalia, California, April 10-12. Registration is \$50, and it includes all exhibits and programs, cocktail parties Friday and Saturday evening, Saturday evening banquet, and Sunday morning brunch. Send a check made out to International DX Convention, c/o Don Bostrom, N6IC, 444 Atoll Ave., Sherman Oaks, CA 91423. Program highlights include Albania operations, ARRL DXCC updates, and many surprises. Headquarters hotel is the Visalia Holiday Inn, but it has been booked since last year (shades of Stouffers in Dayton!).



Baldur, DJ6SI, sent this photo (among others) to show his presence and antenna in Mt. Athos SY.

try the nearby Lamplighter Hotel at 209-732-4511, or the Radisson Hotel in downtown Visalia at 209-636-1111. Your DX editor hosts the Friday evening cocktail party; stop by and say hello!
Two weeks after Visalia is Dayton. Again this year Stouffers is the DX and contesting headquarters, with a DX dinner Friday night, and hospitality rooms galore. Last year a bunch of radio clubs teamed up to sponsor a mass hospitality room at the hotel; check the signs posted all over the hotel for details of this, and the other rooms where DXers meet.

April DX Activity

Fran, W2BJI, is active this month from St. Kitts as **V47KJI**; QSL via his home call.

DH8EAF, DF2JQ, and DL3ECK will be in Namibia V5 beginning April 3. They have applied for licenses in both Namibia and in Walvis Bay ZS9, and hope to be active 10-20 meters, CW and SSB. QSL as directed.

JH4NMT is active as **5U7M** from Niger for another year, mostly CW. QSL via his home call, c/o JARL.

VI150SYD is a special-event station commemorating 150 years of the city of Sydney, Australia. QSL with a self-addressed envelope (SAE) and a 1992-dated IRC, or US\$1, to Wireless Institute of Australia (WIA) Special Event, P.O. Box 1066, Parramatta, New South Wales 2124, Australia. The station will be active all year.

And the third Disney Special Event will be April 4-5, with stations from Disneyland (N6MM), Disney World in Orlando, FL (WA4ABQ), Tokyo Disneyland (JL1YZB), the Queen Mary (W6RO), and the Radio Club de St. Maur in Paris, France (FF6KMX). Try 14250, 21325, and 28450 kHz. QSL with SASE and QSO number to the Disneyland Amateur Radio Club, Box 3232, Anaheim, CA 92803.

QSL Notes

CQ0A is usually QSLed via CT1CLR. However, Jose Emanuel Ribeiro de Sa, CT1EEB, operated under that callsign in the CQWW SSB test Oct. 26-27, 1991. QSL these contest contacts via Jose at Box 79, 3860 Estarreja, Portugal.

The **9Q5NW** and **TN4NW** logs are now on Dan Voils, KB9ABI's computer, thanks to the help of Tom Gregory, N4NW. Those

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The Hungarian ZA1QA operation had not been accredited for DXCC at the end of 1991.

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2955	N6JV	2523	YU7SF	2062	K5UR	1776	W6OUL	1468	K5DB	1208	I2EAY	850	I1ZOD
2243	W4BOY	2499	YT7DX	2062	4N7ZZ	1759	K2OLG	1455	YU7DR	1192	KS0Z	815	W6LC
2933	N4NO	2479	I2UIY	2042	SM6DHU	1737	W8UMR	1446	W7CB	1184	WB2ABD	754	K9AGB
2821	N9AF	2471	I6SF	2040	W0SFU	1730	YU7RU	1439	YB0TK	1164	W9IAL	749	NH6T
2817	YU1AB	2466	YU7BCD	2040	YT3AA	1678	K8LJG	1384	KS4S	1120	W0JIE	733	N3KR
2779	PY4OD	2458	N2AC	2036	SM0AJU	1667	VE3FXR	1379	I0AOF	1101	G4SDJ	684	K6DYP
2774	N4MM	2418	HA9DU	2013	UA3FT	1646	N2AIF	1332	YU3PG	1081	K9BOL	663	VE7CBH
2764	I2PJA	2409	K9BG	2010	YU3EO	1633	G4OBK	1329	F1HWP	1065	YV7QP	658	VE30MM
2761	PY1APS	2382	SM7TV	1970	HA0IT	1626	SM6CST	1323	YU1PJ	1060	NJ1T	642	VE3GOV
2760	W8YTM	2376	I8YRK	1956	HA0HW	1610	WB2YQH	1313	YU4BR	1041	I5ZTC	641	VE6BMX
2748	W9DWQ	2340	4X4FU	1945	KL7AF	1599	KB0G	1306	WB3DNA	1008	IK2BLA	634	WK3Z
2705	SM3EVR	2324	W2FXA	1938	W4UW	1589	YU2CO	1304	W3KH	994	WM0G		
2663	K0BLT	2320	YU2NA	1856	N6JM	1572	NV9S	1294	JA6GWU	975	F6CDJ		

SSB

3937	F9RM	2244	I4ZSQ	1841	HR1KAS	1468	N6FX	1142	IK2DUU	990	NG9L	748	EA3FHT
3634	I0ZV	2216	I8YZP	1812	I8KCI	1465	CX6BZ	1138	LU8DY	987	WB6SRK	728	YU1PJ
3253	K2VV	2211	I1EEW	1793	W4UW	1446	EA2AOM	1138	N2AIF	984	KA5TQF	708	EA3EQT
3170	ZL3NS	2193	I4CSP	1762	K5UR	1422	YU7SF	1136	I7VEZ	981	K8MDU	707	I6KYL
3020	VE1YX	2180	W8YTM	1758	LU8ESU	1414	IN3QCI	1112	WA2FKF	972	K9BOL	707	KE7UH
2863	K6JG	2124	KA5W	1718	PY40Y	1405	IK8GCS	1105	G4OBK	971	HP6AYV	697	A41JV
2753	K6XP	2111	I2UIY	1713	K5RPC	1394	K9LJN	1102	W5ILR	942	KC2FC	697	YV7QP
2747	I2PJA	2089	HA8XX	1687	KD9OT	1391	HA0IT	1101	FE6FNA	941	5Z4BP	695	NM5Y
2714	WD8MGQ	2985	I2MOP	1686	CT4UW	1349	K2POF	1097	W6OUL	941	KB2DE	690	I8ZYW
2622	I2PHN	2067	I8YRK	1673	EA4KK	1341	KE6KT	1090	I3ZSX	910	KB0G	664	SM6CST
2544	CT4NH	2037	EA8AKN	1665	I2EOW	1332	F1HWP	1084	K8LJG	898	IK2AEQ	646	KB8DAE
2515	N4MM	2024	W9DWQ	1652	WE2L	1317	N2AC	1081	K3IXD	894	N3ED	643	SM0FC
2484	ZP5JCY	2010	PY4OD	1633	KC8YM	1244	KA0ZFX	1073	KS4S	884	KK5P	632	IK5DNE
2466	I0AMU	1971	WF4V	1604	CT1BY	1236	LU7HJM	1061	K2EEK	881	WM0G	627	KA5RNH
2379	IT9TOH	1969	I5ZJK	1603	SM0AJU	1229	IT9JKY	1056	G4SDJ	855	AI6Z	625	G4XTA
2359	W8YDB	1948	WA4QMQ	1592	4X6DK	1219	WB8ZRL	1029	W5LLU	854	VE3FXR	624	YB1RED
2354	OZ5EV	1940	YU7BCD	1590	ZE1OX	1216	WN5MBS	1025	W3GXX	837	OE6CLD	610	JH6WMJ
2332	EA2IA	1913	K9QFR	1565	CT1AHU	1205	KF7RU	1019	CT1COK	829	KB4HU	609	VK5NVW
2292	NJ0C	1897	W3ARK	1522	SM6DHU	1200	ZS6AOO	1010	CT1DIZ	822	WD5KBB	608	CE5FSB
2264	N4NO	1889	EA3AOC	1511	KL7AF	1195	KB0C	1010	LU1VK	791	KA9MOM	608	VE3GOV
2256	PA0SNG	1856	KF2O	1508	I2TZK	1148	DK5WQ	996	W5AWT	787	CT1YH	605	TU2UI
2245	W4BOY	1852	YU2NA	1490	IK5ACO								

CW

3216	K2VV	2225	N2AC	1572	YU2NA	1433	F6HKD	1244	DL2HBX	1029	AI6Z	855	W0JIE
3083	WA2HZR	2211	I6SF	1533	EA7AZA	1430	W1WAI	1243	KB0G	1022	EA5AR	851	K9QFR
2933	N6JV	2085	4X4FU	1531	TI4SU	1420	K2POF	1230	DJ1YH	1010	YU1PJ	850	IS0FIC
2717	VE7CNE	2071	W8YTM	1529	W8IQ	1419	SM0AJU	1222	YU2CO	993	N3ED	846	AC5K
2555	N4NO	2005	LZ1XL	1526	HA0IT	1417	KF2O	1198	VS6UW	987	NJ1T	813	ZP5JCY
2486	PY4OD	1951	YU7BCD	1525	VE1RJ	1380	G3VQO	1195	I1EEW	969	WB8ZRL	808	YV7QP
2386	W3ARK	1883	VE7DP	1518	N6FX	1359	HA8XX	1187	YU3PG	961	KA1CLV	763	W4UW
2373	EA3IA	1861	KA5W	1517	SM6CST	1320	I7PXV	1179	K8LJG	951	N4IR	754	WB5MTV
2345	IT9TOH	1852	N4MM	1513	K9LJN	1319	W6OUL	1173	IK3GER	933	K3UA	752	EA6AAK
2362	K6JG	1710	N4YB	1500	KL7AF	1303	N2AIF	1167	VE3FXR	923	YU4BR	749	W8LRY
2344	I1YRL	1662	KA7T	1486	SM6DHU	1295	I8YRK	1109	W5AWT	907	IK2ECP	744	RB5MP
2328	K6XP	1656	G4UOL	1472	G4SSH	1294	ZS6BCR	1093	EA1AK	905	W9IAL	729	JA0BSL
2300	W4BOY	1642	I2UIY	1468	IK0ADY	1261	LA8XG	1091	NF5Z	859	AH6JF	714	KA5TQF
2299	YU7SF	1633	K5UR	1445	W9PWM	1248	G4OBK	1051	I2EAY	858	KS4S	648	4X6DK
2252	W9DWQ	1632	IT9VDO	1439	YU3NU								

still needing these cards can obtain them from Dan at 9640 North 940 East, Brownsburg, IN 46112.

Carl Bethel, K4OD, says he once again can confirm contacts with his previous callsigns: **HP1XOD** (July 1970 to March 1971), **EQ2ITU** (Iran, May 1976), **9D5B** (Iran Nov. 1976 to March 1977), **EP2OD** (July 1975 to March 1977), **PY1ZAL** (April 1972 to Feb. 1973), **OA4DX** (March 1969 to August 1972), and **KY4ITU** (May 1974). Contact Carl at Box 1340, Front Royal, VA 22630. Note that HP1XOD and OA4DX have since been reassigned; Carl can't help with contacts on other dates.

VP9NMW is a new Bermuda station; QSL to WB2YQH. Upon upgrading, he'll be VP2MW.

Jacques Quillet, **FR5ZU/G**, has confirmed via B.P. 347, F-97490 Sainte Clotilde, Ile de la Reunion, via France.

The callsign structure in St. Lucia J6 has changed. Fully licensed nationals now use **J69** prefixes, resident Novices sign **J66**, and visitors use **J67**. QSL to the corresponding J6L calls.

S79KMB reminds DXers that the Seychelles bureau doesn't work well; QSL to KN2N.

Romeo, 3W3RR, says all **YA0RR** cards

have been answered, including those who received a card personally while he was in the US. If you haven't received your card by this time, try again via the Sofia address.

CT4A in the CQ WW CW test will be confirmed 100% via the bureau. For a direct card, go via EA4KK.

Also in CQ WW CW, QSL **C56A** via Tom Ylinen, OH6EI, Kirkkokuja 12 C, 0123 Vantaa, Finland. QSL **C56B** via Ka Lehtimaki, OH6LK, Maininkitie 4A3, 0232 Espoo, Finland.

QSL **HC5R** in CQ WW SSB, and **HC5I** in CQ WW CW, via Ted Jaramillo, HC5K Box DX, Cuenca, Ecuador, South America.

CQ DX Awards Program

SSB

1932 KB9AIT 1935 KJ6GC
 1933 WA8NPX 1936 KA1LMR
 1934 WD0CNU

CW

848 DL1KT

RTTY

12 KA1LMR

SSB Endorsements

320	W4UW/323	310	WB5TED/319
320	DL6KG/323	310	KZ4V/318
320	OZ5EV/323	310	SM6CST/317
320	K5OVC/323	310	W5LLU/312
320	AA4KT/323	310	N6CGB/312
320	N7RO/323	310	K4JLD/312
320	W3AZD/323	310	YV1CLM/310
320	K9BWQ/323	300	KB7VD/308
320	N4KG/323	300	WA2FKF/307
320	K3UA/323	275	KB9AIT/283
320	K2ENT/323	275	KJ6GC/275
320	W7OM/322	200	WD0CNU/203
320	OA4OS/322	28 MHz	KB9AIT
320	VK4LC/322	28 MHz	KA1LMR
320	K9HQM/320	3.5/7 MHz	KA1LMR

CW Endorsements

320	SM6CST/323	310	KZ4V/312
320	AA4KT/323	310	IT9QDS/312
320	N4KG/323	310	N7RO/310
310	K9BWQ/318	300	W3BBL/303
310	K2ENT/318	275	K4JLD/296
310	W1WAI/315	150	KE5PO/167

RTTY Endorsements

200 N6CGB/220 150 KE5PO/171

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.

Dennis Palmer, **TJ1PD**, has returned to the US, but Dr. Jerry Fluth continues to use the call. QSOs prior to June 1991 may be confirmed immediately via John Duke, N5DRV. Later contacts with Dr. Fluth require an on-the-air sked for confirmation; please be patient. N5DRV's new address is 1431 Pleasant Drive, Dallas, TX 75217.

F6GVH, QSL manager for **FT4WC**, reports that his address in the Callbook is incorrect; QSL to Godefert Michel, Le Migneret, 45700 Villemandeur, France.

Pirates, Corrections, and Not Managers

QSL **C6A/K1XA** via AB1U, not via K1XA.
 QSL **C6A/WB2CHO** via K1RH, not via WB2CHO.

QSL **8R1K** in CQ WW CW via OH2BH; not via K1RH.

The **4K1ZI** station is definitely a pirate, according to the Central Radio Club.

ZK2XD QSLs via W6YA, not W6XA.
 QSL **XX3JP** via Associacao de Radio-amadores da Regiao da Madeira (ARRM), P.O. Box 4694-9058, Funchal, Madeira Island, via Portugal (not via CT3BX).

Kantronics Technical Seminars

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1 Overview of Packet Radio - 9:00am-10:30am

This session introduces Packet Radio, explains how packet works and defines what is required to set up and operate your own packet station.

2 Connecting your Equipment - 11:00am-12:30pm

The mysteries of connecting your computer to your TNC and your TNC to your radio are revealed. Detailed examples using state of the art computer and radio equipment, make it easy for you to get your station up and running fast.

3 Getting on the Air - 1:30pm-3:00pm

Included here are the basics of your first connect, digipeating and the meaning of the indicators on your packet TNC. Additional topics such as gateway operation, networks and packet bulletin boards will be discussed.

4 Open Forum - 3:30pm-5:00pm

The signaling techniques and operating practices of the "other" modes of operation including WEFAX, RTTY, ASCII, AMTOR, NAVTEX/AMTEX and CW are discussed.

Kantronics Technical Seminar Schedule

Gaithersburg	MD	Sep 91
Los Angeles	CA	Oct 91
Oklahoma City	OK	Dec 91
Orlando	FL	Jan 92
Minneapolis	MN	Mar 92
Denver	CO	May 92
Birmingham	England	May 92
Louisville	KY	Jul 92
Columbus	OH	Sept 92

please call for exact date & location 30 days prior to the scheduled seminar date shown above.

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QSL Manager Volunteers

Gene Nadolny, W2FXA, 21 Hidden Valley Drive, Elma, NY 14059, offers his services as a QSL manager.

Dennis Heaton, AB4LX, 5666 Marbut Road, Lithonia, GA 30058, does likewise.

And Bob Blakeslee, N2IHO, 1 1/2 Macomber Ave., Binghamton, NY 13901 does too.

Ex-USSR QSL Notes

RT1U will be used in 1992 contests by the KICAE Radio Club. QSL to UT4UXW, P.O. Box 785/1, Kiev 252058 Ukraine.

RT9U is the 1992 contest call of Jerry Onipko, UT4UZ. QSL to UT4UXW, P.O. Box 785/1, Kiev 252058 Ukraine.

Jerry says he handles cards for **RJ6R**, **RK5O**, **ER5U**, **EX3TM**, **EO6AAS**, **EU5T**,

RT7U, **RT9U**, and **RY6U**. Contact him at the same address.

Jack Tatashvili, RW6AC, is QSL manager for **TA2BU**, **RZ6AZA/A**, **RF8V/RW6AC**, and the **UF7V** DXpedition. His address is Box 16, Armavir 352900, Russia.

Victor Tel'nov, RB3MO, says that the **RI3B** and **RB3MO/UI9B** contacts may be confirmed via Vasil M. Kasyanenko, UW6HS, Box 20, Georgievsk 357800, Russia. UW6HS also handles cards for **UA2FGG**, **UA2FGU**, **UZ2FXA**, **UA9YC/UAY**, and **UV3DDC/UAI**.

Alim Mamedov, **RF6FO**, says his address is Box 1, Tbilisi 380002, Georgia Republic.

UA9AB, Box 17, Troitsk 457100, Russia, handle cards for: **UA9AN/UI**, **UAUBG/UA8V**, **UW8V/UAUBG**, **UG/UV3ZZ**, **UH8YP**, **UH9WWA**, **RH8AY**, **UI8DAF**, **UI8DAT**, **UI8GM**, **UZ9AXB**, **UJ8RA**, **RI8BQ**, **UD6DFF**, **UD6DV**, **UF6QAC**,

QSL Information

2E8AAX to G3OIL
3B9UF to F6FNU
3D1EA to EA4CJB
3D2KA to JA1CMS
4K2CC to UV3CC
5B4/YU3PR to YU2AJ
5B4ADR to YU2AJ
5V7AK to OZ1LLC
5W1VJ to G4ZVJ
5Z4BI to W4FRU
7P8EN to ZS4TX
7Q7JH to K7UP
7Q7LA to G0IAS
7Z1AB to WB2QMP
8P9AH to NE1O
8P9EM to G3VBL
8R1K to OH2BH
9H3OZ to DL1SBR
9H8E to HB9DLE
9J2B0 to W6ORD
9J2CF to WQ5Y
9J2EG to DL3FAK
9J2SZ to SP8DIP
9K2LX to ON4LX
9K2MU to 9K2AR
9K2TK to ON7LX
9K2ZZ to W8CNL
9M8FH to N5FTR
9Q5US to DL3KBH
9X5SW to DL1HH
A35CP to KQ1F
A35DN to DL1SDN
A35DX to DF2UU
A35WM to DJ1WM
A61AC to ON7LX
A71/DF6UQ to DF6UQ
AP/WA2WYR to KK6TX
AP2JZB to K2EWB
C56/G4GZG to G4GZG
C9RAC to NV1U
C9RTC to IK4QIZ
CN5A to F6EEM
CN8ST to K8EFS
CY2AC to KA8SOF
EAB/DK7ZB to DK7ZB
EJ2VLP to DK7UY
EJ5HN to DF6NA
EL3HW to N5CE
EM3W to UZ3AYR
EN3AP to UA3PPF
FJ5BL to F6AJA
FK8GA to WB9HPR
FM5WD to W3HNK
FY5FP to ON4ZD
H61T to SM0KCR
HC7SK to SM6DYK
HF8POL to SP9DWT
HG8IE to HA8IE
HS8AC to KM1R
HV3SJ to I0DUD
I15ONU to I5KKW
J37ZF to LA4LN
J39BS to WB2LCH
J5AUA to G4ODV
J68AM to W8ILC
J68AN to W8FN
J68AS to N9AG
J6LNJ to W8QID
J79DX to AA5DX
KH4/N7TNL to Pirate!
KH8/DJ1WM to DJ1WM
OG3JF to OH3JF
OG6MO to OH6NIO
OG6NIO to OH6NIO
OH8BT to DL4DBR
OX3KM to F6FNU
OX3XR to OZ3PZ
OY2VO to OZ9DP
OY3QN to OZ1ACB
P29DN to N5FER
P38JE to 5B4JE
P48W to N2MM
P43FM to PA0FM
RC9WAZ to UC2WAZ
RF6FP to UF6FZ
S42U to ZS2U
S03MAQ to DJ0MAQ
TA5LL to N5NLL
TJ1SR to IK2CKR
TU4SR to OH8SR
TU4XM to ON7XM
TZ6VV to N0BLD
UH8EA to W5BWA
UR8G to RB5GG
V31DX to KA6V
V63AO to KC6IN
V63NW to DF6FK
V73AT to K2CL
V85KX to G3JKX
VA1S to VE1AL
VP25EBY to HB9BYL
VP25EE to KA3DBN
VP25EQ to KC8JE
VP5VEU to NS7F
VP5VEY to KS3D
VP8CFM to GM4KLO
VP8CIN to G3RHP
VP8ICB to G0DBE
VP8LVI to GM0LVI
VP8SAR to GM0LVI
VQ9QM to W4QM
VQ9RS to ND0F
VS6WV to K9TLM
VU2JG to VU2DIG
VU2TE to K9JUR
XU8DX to JA1NUT
XX9AS to N6LVY
XX9AW to KU9C
Y88POL to Y32WN
YJ8RN to N9DRU
YV5ZZ to K8EFS
Z24JS to W3HNK
Z80K to GW0FJT
ZF20Q to N4UCK
ZF2RS to N9KAE
ZK1RY to HB9DCQ
ZK1XB to HB9DKQ
ZP9AC to DK1ZH
ZS8Z to ZS6BCR
4K4BCU to P.O. Box 3233, Dickson Island 663241, Russia
4S7WP to P.O. Box 80, Colombo, Sri Lanka
7P8SR to P.O. Box 333, Maseru 100, Lesotho
BZ4RBD to Liu, P.O. Box 538, Nanjing, PRC
BZ4RDX to P.O. Box 538, Nanjing, PRC
FH8CB to Elio, P.O. Box 50, Mayotte 97810, via France
KH3AF to P.O. Box 976, APO 96558
P29KH to P.O. Box 997, Madang, Papua-New Guinea
RL7PC to P.O. Box 336, Karaganda 470033, Kazakhstan
UA8KG to P.O. Box 223, Magadan, 685030, Russia
V73CT to P.O. Box 88, Wellston, OK 74881
VP8CGQ to P.O. Box 260 CGQ, Stanley, Falkland Islands
ZB2CF to P.O. Box 292, Gibraltar






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- Estimate how antenna height affects system performance. Would 20 feet higher solve your link problem?
- Plot a computed field strength contour surrounding a site or plot many contours to form a coverage map.

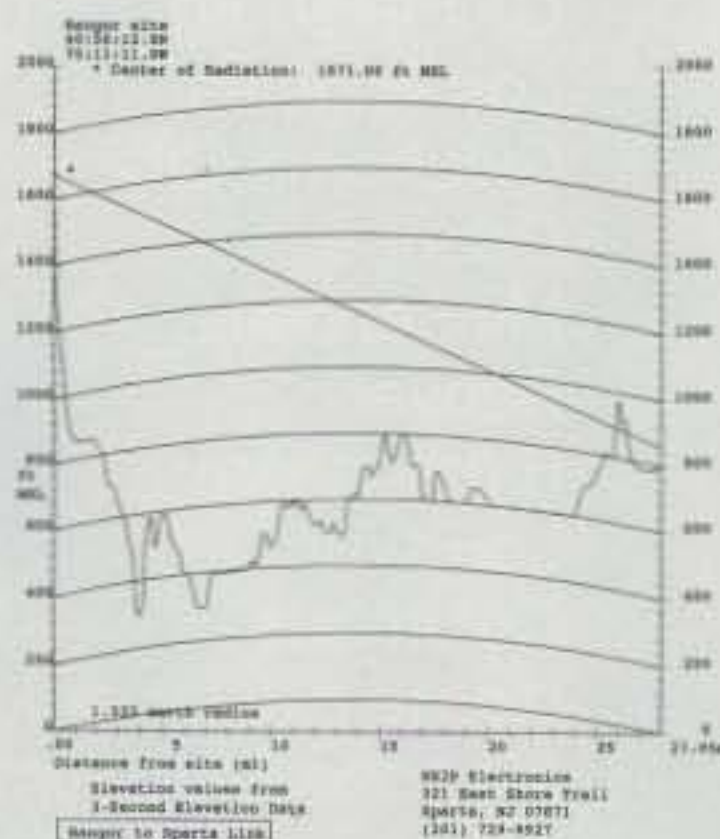
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In addition to selling this software, we provide a number of propagation services ourselves (i.e. Path Profile plots for \$19.95). For more information on this software and/or our services, please contact us. For a demo disk please send \$3.00 and specify 3.5 or 5.25 disk (IBM format only).



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Terrain Cross Section Plot



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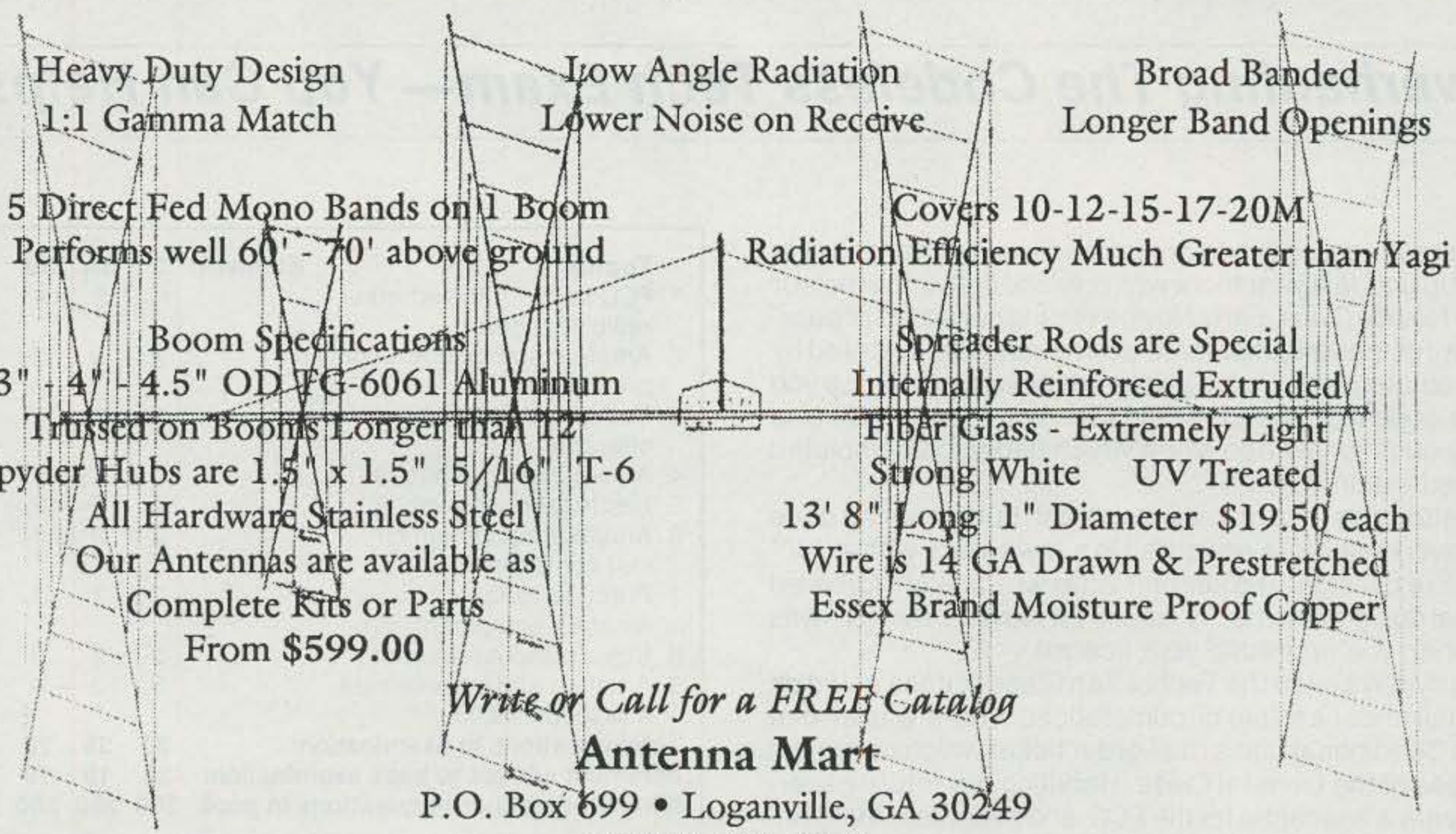
Oleg Mir, ES1RA, Box 806, Tallinn 200017, Estonia, Europe, says he can confirm all his Oblast DXpeditions, as well as **UM8BA**, **UR2RCU**, **RU2RCU**, **UR3RA**, **U6TLN**, **EO1R**, **EU2R**, **RR2WCY**, **ES1WN**, **ES1WW**, **UM8MM**, **EO8M**, **EK8M**, and Oblast DXpeditions by **UM8MM**.

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CIRCLE 94 ON READER SERVICE CARD

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Overhauling The Codeless Tech Exam— You Can Help!

Amateur radio testing of beginners has certainly changed over the years! Up until last year there was only one path into amateur radio—the Novice Class. Early Novice testing consisted of passing a five words-per-minute Morse code exam administered by a licensed amateur serving as a volunteer examiner. Once you passed the code test, the VE would then write to the FCC and obtain a 20-question written exam which had to be completed and returned within 30 days.

The questions were of unknown content, but if you had done your homework you were rewarded in a few weeks with a "W" or "K" prefix callsign. The second letter was an "N" followed by a regional designator; the "N" stood for Novice. The "N" was dropped when you upgraded your license.

In the early days even the Technician Class license could be taken by mail under certain circumstances. There was also at one point a Conditional Class mail-order ticket which conveyed the privileges of the General Class. Handling the return paperwork was really a headache for the FCC, and eventually the Commission phased out all volunteer examinations except the Novice ticket. If you wanted to upgrade, you had to travel to the nearest FCC field office.

In the early 1980s the FCC began getting out of the radio operator testing business—both commercial and amateur. In 1982, at the urging of Senator Barry Goldwater (himself an amateur radio operator, K7UGA), the Reagan administration approved the privatizing of the FCC's amateur radio testing program. Public Law 97-259 not only approved amateur testing by senior-level amateurs, but the preparation of all examinations as well.

While it was generally considered that the nation's largest amateur radio association, the American Radio Relay League, would manage U.S. amateur testing, it didn't happen! The League refused to apply! Their view was that it would be too costly for them to handle. The ARRL demanded a way to recoup amateur examination expenses before they would participate. Tired of waiting, the FCC then elected instead to go with a system of regional administrators called Volunteer Examiner Coordinators (VECs).

By early 1984 more than a dozen organizations—including the W5YI Group—had applied to be coordinators. Once Congress approved expense reimbursement in mid-1984, the League also agreed to become a VEC. Today there are 18 different coordinating groups. Each approves Advanced and Extra Class level amateurs to conduct amateur operator examinations according to their instructions. Actually, the questions used by each VEC organization are, by law, exactly the same. There are some minor differences in the way the test session paperwork is handled, however. VECs also screen each Form 610 application sent to them by their testing teams for proper completion before forwarding to the FCC's licensing facility in Gettysburg, Pennsylvania.

In short, a VEC acts as the intermediary between the volunteer examiner, who administers the amateur radio license examinations, and the FCC, who issues the operator licenses. VECs also are charged with developing and periodically revising the examination outline (syllabus) and individual questions. This job falls

Topics	Element:	2	3A	3B	4A	4B
1. FCC rules for the amateur radio services		10	5	4	6	8
2. Amateur station operation procedures		2	3	3	1	4
3. Radio wave propagation characteristics		1	3	3	2	2
4. Amateur radio practices		4	4	5	4	4
5. Electrical principles		4	2	2	10	6
6. Amateur equipment circuit components		2	2	1	6	4
7. Practical circuits, amateur equipment		2	1	1	10	4
8. Signals and emissions		2	2	2	6	4
9. Amateur station antennas and feedlines		3	3	4	5	4
Total questions in examination:		30	25	25	50	40
Minimum correct to pass examination:		22	19	19	37	30
Minimum number of questions in pool:		300	250	250	500	400

Table I— Each amateur radio operator license examination must consist of a specified number of questions selected from the above nine topics. Each question pool must consist of at least ten times the number of questions as will appear in any one examination. All questions, multiple choices, and answers are known to the public and widely published.

to the VEC's internal Question Pool Committee, the members of which are elected at their annual conference. The QPC consists of three VEC members who agree to maintain the examination questions for all license classes. Your author, Fred Maia, W5YI, is Vice-Chairman of that committee.

Question pool maintenance consists of periodically review-

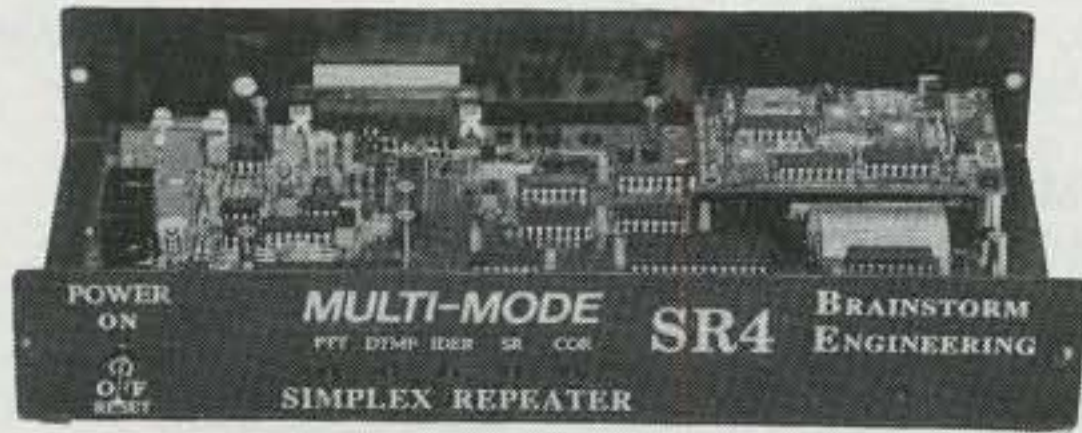
Public input on examination outline (syllabus):	July 1, 1991
QPC begins work on revising outline:	Oct. 1, 1991
QPC releases updated/revised outline:	Feb. 1, 1992
Public input on suggested questions:	Feb. 1 to June 30, 1992
QPC begins work on revising questions:	July 1, 1992
QPC releases new pools in digital format:	Dec. 1, 1992
QPC furnishes written copies of new pools:	Jan. 1, 1993
New study material availability date:	May 1, 1993
Date new questions will be used in examinations:	July 1, 1993

Table II— The above schedule was adopted by the Question Pool Committee as a timetable for developing and implementing the Element 2 and 3A amateur operator license examinations. These two tests are the sole requirement for the new code-free Technician amateur operator license.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

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SYLLABUS—ELEMENT 2 (NOVICE CLASS)

SUBELEMENT N1—COMMISSION'S RULES

[10 Questions, 10 Groups]

- N1A Basis and purpose of amateur service and definitions.
- N1B Station/operator license.
- N1C Novice control operator frequency privileges.
- N1D Novice eligibility, exam elements, mailing addresses, U.S. callsign assignment and term of license.
- N1E Novice control operator emission privileges.
- N1F Transmitter power on Novice sub-bands and digital communications [limited to concepts only].
- N1G Responsibility of licensee, control operator requirements.
- N1H Station identification, points of communication and operation, and business communications.
- N1I International communications, authorized and prohibited transmissions.
- N1J False signals or unidentified communications and malicious interference.

SUBELEMENT N2—OPERATING PROCEDURES

[2 Questions, 2 Groups]

- N2A Choosing a frequency for tune-up, operating or emergencies; understanding the Morse code; RST signal reports; Q signals; voice communications and phonetics.
- N2B Radio teleprinting; packet; repeater operating procedures; special operations.

SUBELEMENT N3—RADIO WAVE PROPAGATION

[1 Question, 1 Group]

- N3A Radio wave propagation; line of sight, ground wave, sky wave, sunspots and the sunspot cycle, VHF/UHF signals.

SUBELEMENT N4—AMATEUR RADIO PRACTICES

[4 Questions, 4 Groups]

- N4A Unauthorized use prevention, lightning protection, and station grounding.
- N4B VHF/UHF safety precautions, safety interlocks, antenna installation safety procedures.
- N4C SWR meaning and measurements.
- N4D RFI and its complications.

SUBELEMENT N5—ELECTRICAL PRINCIPLES

[4 Questions, 4 Groups]

- N5A Metric prefixes—i.e., centi, pico, micro, milli, kilo, mega, giga.
- N5B Concepts of current, voltage, conductor, insulator, resistance, and the measurements thereof.
- N5C Ohm's law (any calculations will be kept to a very low level—no fractions or decimals) and the concepts of energy and power, and open and short circuits.
- N5D Concepts of frequency, including AC vs DC, frequency units, AF vs RF and wavelength.

SUBELEMENT N6—CIRCUIT COMPONENTS

[2 Questions, 2 Groups]

- N6A Electrical function and/or schematic representation of resistor, switch, fuse, or battery.
- N6B Electrical function and/or schematic representation of a ground, antenna, bipolar transistor, or a triode vacuum tube.

SUBELEMENT N7—PRACTICAL CIRCUITS

[2 Questions, 2 Groups]

- N7A Functional layout of transmitter, transceiver, receiver, power supply, antenna, antenna switch, antenna feed line impedance matching device, SWR meter.
- N7B Station layout and accessories for telegraphy, radiotelephone, radioteleprinter or packet (possibly including block diagram).

SUBELEMENT N8—SIGNALS AND EMISSIONS

[2 Questions, 2 Groups]

- N8A Emission types, key clicks, chirps or superimposed hum.
- N8B Harmonics and unwanted transmitted signals, equipment and adjustments to help reduce RFI to others.

SUBELEMENT N9—ANTENNAS AND FEEDLINES

[3 Questions, 3 Groups]

- N9A Wavelength vs antenna length.
- N9B Yagi parts, concept of directional antennas, and RF safety near antenna.
- N9C Feedlines, baluns, and polarization via element orientation.

Table III—Syllabus amateur radio examination Elements 2 and 3A.

ing each question to ensure that it properly reflects current technology, government regulations, and amateur practices. During this routine evaluation some questions are eliminated, some are revised, and some new ones are added. There are nearly 2000 questions in the 5 question pools; each pool contains approximately 250 to 500 questions.

FCC regulations (Part 97, Subpart "F" Section 97.503) specify that the objective of each written examination is to prove that the applicant has the necessary qualifications to be a control operator for the class of license examined. Each of the five written examinations (Element 2/Novice, Element 3A/Technician, Element 3B/General, Element 4A/Advanced, and Element 4B/Amateur Extra) must contain a specified number of questions from each of nine topics. Questions must relate in some way to the operating privileges obtained. (See Table I.)

Today, as you all are very much aware, we have two entry routes into amateur radio—the traditional Novice, which requires telegraphy knowledge, and the new Codeless Technician. The requirements for the Novice remain 5 words-per-minute code knowledge and a 30-question multiple-choice written test. The Technician criteria let you pass another (Element 3A) 25-question written test instead of the 5 wpm code. The new code-free Tech license has proven to be very popular, and the

number of new amateurs is now doubling month after month! Amateur radio is indeed "on a roll."

The VEC's Question Pool Committee routinely revises each question pool every three years on a staggered basis. Element 2/Novice and 3A/Technician are handled together since they are the requirement for the new (code-free) Technician Class. A revision timetable is established which allows the amateur community to participate in the modification process. Note that we are now in the time phase that requests public input on new and revised questions. (See Table II.)

On February 1, 1992 the Question Pool Committee approved revised guidelines for the new question pools. These guidelines included a new system for numbering questions. Instead of the previous FCC-supplied question designators, the QPC will be using new four-part question designators. For example: Question 2B-2-3.1 becomes N2A1. The "N" stands for Novice, Subelement "2" (see Table III), Group "A," and the first question in that group. The next question in that group becomes N2A2, and so forth. The number of groups coincides with the number of questions required to be asked in that subelement. See Table III for the outline (syllabus). The Question Pool Committee is now asking for suggestions from the amateur community for Element 2 and 3A questions on each subelement and group.

SYLLABUS—ELEMENT 3A (TECH CLASS)

SUBELEMENT T1—COMMISSION'S RULES

[5 Questions, 5 Groups]

- T1A Station control, frequency privileges authorized to the Technician class control operator, term of licenses, grace periods, and modifications of licenses.
- T1B Emission privileges for Technician class control operator, frequency selection and sharing, transmitter power, space operations.
- T1C Digital communications, station identification, ID with CSCE.
- T1D Correct language, phonetics, beacons, and radio control of model craft and vehicles.
- T1E Emergency communications; broadcasting; permissible one-way; satellite and third-party communication; indecent and profane language.

SUBELEMENT T2—OPERATING PROCEDURES

[3 Questions, 3 Groups]

- T2A RST signal reporting, repeater and simplex operation, repeater input/output offsets, frequency coordination, courteous operation, RACES, and emergency communications.
- T2B Simplex operations, repeater input/output splits, repeater frequency coordination, courtesy.
- T2C Distress calling and emergency drills and communications—operations and equipment.

SUBELEMENT T3—RADIO WAVE PROPAGATION

[3 Questions, 3 Groups]

- T3A Ionosphere and the layers thereof, solar radiation.
- T3B Ionospheric absorption, causes and variation, maximum usable frequency.
- T3C Propagation, including ionospheric, tropospheric, line-of-sight and scatter propagation, and MUF.

SUBELEMENT T4—AMATEUR RADIO PRACTICES

[4 Questions, 4 Groups]

- T4A Electrical wiring, including switch location, dangerous voltages, and currents.

- T4B Meters, including volt, amp, multi, peak-reading, RF watt, and placement and ratings of fuses and switches.
- T4C Marker generator, crystal calibrator, signal generators, and impedance-match indicator.
- T4D Dummy antennas, S-meter, RF exposure to the human body.

SUBELEMENT T5—ELECTRICAL PRINCIPLES

[2 Questions, 2 Groups]

- T5A Definition of resistance, inductance, and capacitance and unit of measurement, calculation of values in series and parallel.
- T5B Ohm's law.

SUBELEMENT T6—CIRCUIT COMPONENTS

[2 Questions, 2 Groups]

- T6A Resistors, construction types, variable and fixed, color code, power ratings, schematic symbols.
- T6B Schematic symbols—inductors and capacitors, construction variable and fixed, factors affecting inductance and capacitance, capacitor construction.

SUBELEMENT T7—PRACTICAL CIRCUITS

[1 Question, 1 Group]

- T7A Practical circuits.

SUBELEMENT T8—SIGNALS AND EMISSIONS

[2 Questions, 2 Groups]

- T8A Definition of modulation and emission types.
- T8B RF carrier, modulation, bandwidth and deviation.

SUBELEMENT T9—ANTENNAS AND FEED LINES

[3 Questions, 3 Groups]

- T9A Parasitic beam and non-directional antennas.
- T9B Polarization, impedance matching and SWR, feed lines, balanced vs unbalanced (including baluns).
- T9C Line losses by line type, length and frequency, RF safety.

Here's Your Chance To Help!

So there you have it, the complete outline of what will eventually become the question requirements for the Novice and Technician amateur operator license. If you feel there is something that needs to be included, here is your opportunity to submit a question that covers it! Your suggestion for a new or revised Novice or Technician question should simultaneously be sent to each of the Question Pool Committee members. They are: Ray Adams, N4BAQ (5833 Clinton Hwy. #203, Knoxville, TN 37912); Fred Maia, W5YI (P.O. Box 565101, Dallas, TX 75356); and Bart Jahnke, KB8NM (225 Main St., Newington, CT 06111).

No oral submissions will be considered. Although not necessary, a special question submission form is available from this office (W5YI, P.O. Box 565101, Dallas, TX 75356) if you prefer to use one.

Only one question should be on each 8½" × 11" sheet of paper. Each sheet must contain your name, mailing address, amateur callsign, license class, and expiration date. No question may contain more than 250 characters, but a limit of 210 characters is preferred. Indicate the examination element, subelement,

and group, and if it is a new or revised question. Please list three suggested distractors (wrong answers), the correct answer, and an answer reference. Try to limit each answer/distractor to 140 characters.

All material submitted to the Question Pool Committee—including questions, answers, distractors, illustrations, and references—becomes the property of the Question Pool Committee and may be used, modified, or rejected as the Committee shall determine. No material will be returned.

Those are the ground rules! Why not submit some recommended questions for the Element 2 and 3A question pools? You have the opportunity to influence the manner in which newcomers are trained in and inducted into amateur radio.

The QPC has agreed that the reading level of the new Element 2 and 3A questions should be on a 7th grade (age 13) level. Furthermore, the committee will be using grammar-checking computer software (both RightWriter and Grammatik-4) to ensure that all questions may be easily understood by a youngster. These two pieces of software output a reading grade level.

Each question group must have at least ten questions to conform to FCC regulation 97.523 which requires: "Each question pool must contain at least 10 times the number of questions required for a single examination." Let us hear from you!

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar Cycle Progress

The good news for all users of the high-frequency spectrum continues. Solar activity, as measured by the sunspot cycle, remains in an exceptionally high range.

The Royal Observatory of Belgium, the world's official keeper of sunspot records, reports a monthly mean sunspot level of 141 for December 1991. A daily high value of 209 was reported on December 9th, while the lowest number recorded was 80, which occurred on December 22nd.

December's mean sunspot count results in a 12-month running smoothed sunspot number of 145 centered on June 1991. This is the same level as the previous month. In fact, Cycle 22 has remained in the 140s range with only slight movement since April 1990.

According to daily observations made at Penticton, British Columbia by the Dominion Radio Astrophysical Observatory of Canada, the adjusted mean level of 10.7 cm solar flux for December 1991 was 217. This results in a 12-month running number of 207 centered on June 1991.

While solar flux levels and sunspot numbers are very closely interrelated, the solar flux measurement is less subjectively determined than is the sunspot count, and more accurately represents levels of solar energy. According to the smooth values of 10.7 cm solar flux for the period June 1990 to June 1991 (which are the latest values available), Cycle 22 may in fact be slowly rising towards another sub-maximum high point.

At the present stage of Cycle 22 it is difficult to forecast its future. It could be stalled in the 140 region for awhile yet, it could be increasing very slowly for a short period of time, or as nature decrees, it will begin to decline again towards its natural minimum. At this time we are leaning towards nature and forecast a smoothed sunspot number in the range of 116 (plus 10 to minus 5) for April 1992. A corresponding 10.7 cm smoothed solar flux level of approximately 190 is expected this month.

April Conditions

Generally good shortwave propagation conditions can be expected during April. The effects of *equinoctial* propagation

11307 Clara Street, Silver Spring,
MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for April 1992

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 8, 10, 24	A	A	B	C
High Normal: 6, 9, 14-16, 18, 21-23, 25	A	B	C	C-D
Low Normal: 3-5, 13, 17, 26, 29-30	B	C	D	D-E
Below Normal: 2, 7, 11, 19, 27-28	C	C-D	D-E	E
Disturbed: 1, 12, 20	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 S0 and S3, and with considerable fading and noise.
 E—No opening expected.
 3dB 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 poor (D-E) on April 1st, fair-to-poor (C-D) on the 2nd, good-to-fair (B-C) on the 3rd to 5th, good (B) on the 6th, etc.

should continue through much of the month, to the advantage of DX openings between the USA and the southern hemisphere.

A seasonal decrease is expected in generally east-west DX openings on 10 meters, but this and the 12 meter band should continue to remain open to many areas of the world during the daylight hours. Optimum DX during the daylight hours is expected on 15 meters, with openings possible to most areas of the world, and with 17 meter openings not far behind. Peak DX conditions are forecast for 20 meters for an hour or two after local sunrise and again during the afternoon hours. Daytime openings on 10, 12, 15, 17, and 20 meters should follow the sun. Signals should peak before noon in the quadrant extending from the northeast to the southeast. Openings towards the north and south should maximize during the afternoon hours, and signals toward the sector from the south-

east to the northwest should peak during the late afternoon and sunset periods.

During the hours of darkness expect some 15 and 17 meter openings towards the south and west until as late as midnight. Twenty meters is expected to remain open to many areas of the world during the night. Thirty, 40, and 80 meters should continue to produce good DX openings from shortly after sundown, through the hours of darkness, and into the sunrise period. Some DX may also be possible on 160 meters during this same period.

As thunder storm centers move farther towards the north during April, a seasonal increase in the atmospheric noise or static level is expected during the month. This should be most noticeable on the 30, 40, 80, and 160 meter bands, but may also be bothersome on the other bands as well.

For short-skip openings during April use the 40 and 80 meter bands during the day for distances less than 250 miles, and 80 and 160 meters at night. For distances between 250 and 750 miles, try 30 and 40 meters during the day, and 80 and 160 at night. Twenty meters should be optimum for daytime openings between distances of 750 and 1300 miles, with 30, 40, and 80 meters best during the period of darkness. For openings beyond 1300 miles, try 20, 17, and 15 meters during the day, with 30, 40, and 80 meters expected to be optimum at night. Some good openings may also be possible on 20 meters during the night.

The DX Propagation Charts in this month's column contain DX propagation predictions for each amateur band between 6 and 160 meters for the period April 15 through June 15, 1992. Beginning this month and continuing through the summer and fall months, the times shown in the charts will be given in local *daylight* time (EDT, CDT, MDT, and PDT). For detailed predictions of short-skip openings between distances of 50 and 2300 miles, see the Short-Skip Propagation Charts which appeared in last month's column.

VHF Ionospheric Conditions

Fewer DX openings are expected on 6 meters this month as a result of expected seasonal propagation changes. Some openings should still be possible, however, from the USA towards southern and tropical areas such as the Caribbean, South Ameri-

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 daylight time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP 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.

**April 15 - June 15, 1992
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe & North Africa	10-13 (1) 13-17 (2) 17-18 (1)	07-09 (1) 09-11 (2) 11-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-21 (1)	09-13 (1) 13-15 (2) 15-17 (3) 17-21 (4) 21-01 (3) 01-04 (2) 04-07 (3) 07-09 (2)	19-20 (1) 20-21 (2) 21-00 (3) 00-02 (2) 02-03 (1) 20-21 (1)* 21-22 (2)* 22-00 (3)* 00-01 (2)* 01-02 (1)*
Northern Europe & European USSR	10-15 (1) 15-17 (2) 17-18 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-18 (2) 18-19 (1) 22-00 (1)	06-09 (2) 09-13 (2) 13-16 (2) 16-20 (3) 20-22 (4) 22-02 (3) 02-03 (2) 03-06 (1)	19-20 (1) 20-23 (2) 23-01 (1) 20-23 (1)*
Eastern Mediterranean & Middle East	14-17 (1)	10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	12-16 (1) 16-18 (2) 18-21 (3) 21-00 (4) 00-02 (3) 02-03 (2) 03-06 (1) 06-08 (2) 08-09 (1)	20-22 (1) 22-00 (2) 00-01 (1) 21-23 (1)*
Western Africa	10-11 (1) 11-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-20 (2) 20-21 (1) 10-13 (1)**	07-08 (2) 08-10 (3) 10-13 (2) 13-16 (3) 16-20 (4) 20-23 (3) 23-04 (2) 04-07 (1)	07-14 (1) 14-16 (2) 16-18 (3) 18-02 (4) 02-05 (3) 05-07 (2)	20-22 (1) 22-02 (2) 02-03 (1) 22-02 (1)*
Eastern & Central Africa	16-17 (1) 17-19 (2) 19-21 (1)	08-12 (1) 12-14 (2) 14-16 (3) 16-19 (4)	14-16 (1) 16-18 (2) 18-19 (3) 19-22 (4)	21-01 (1) 22-00 (1)*

		19-20 (3) 20-21 (2) 21-22 (1)	22-01 (3) 01-04 (2) 04-06 (1) 06-08 (2) 08-09 (1)	
Southern Africa	10-11 (1) 11-13 (2) 13-14 (1)	08-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-16 (1) 01-03 (1)	12-14 (1) 14-16 (2) 16-17 (3) 17-18 (2) 18-19 (1) 00-01 (1) 01-02 (2) 02-04 (3) 04-05 (2) 05-06 (1) 06-08 (2) 08-09 (1)	21-22 (1) 22-00 (2) 00-02 (1) 22-01 (1)*
Central & South Asia	19-21 (1)	09-12 (1) 15-18 (1) 18-20 (2) 20-22 (1)	16-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-00 (1) 05-06 (1) 06-08 (2) 08-09 (1)	05-07 (1) 19-21 (1)
Southeast Asia	18-21 (1)	08-11 (1) 18-20 (1) 20-22 (2) 22-23 (1)	06-07 (1) 07-09 (2) 09-10 (1) 16-17 (1) 17-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	05-07 (1)
Far East	18-20 (1)	08-10 (1) 15-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-10 (1) 16-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-08 (1)
South Pacific & New Zealand	15-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-22 (1) 15-18 (1)**	09-11 (1) 13-15 (1) 15-17 (2) 17-18 (3) 18-21 (4) 21-23 (4) 23-00 (2) 00-01 (1)	19-21 (1) 21-22 (2) 22-23 (3) 23-04 (4) 04-08 (3) 08-09 (2) 09-10 (1)	00-02 (1) 02-05 (2) 05-06 (3) 06-07 (2) 07-08 (1) 02-07 (1)*

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Caribbean, Central America & Northern Countries of South America	11-12 (1) 12-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1) 11-14 (1)**	07-08 (1) 08-09 (2) 09-14 (3) 14-20 (4) 20-22 (3) 22-23 (2) 23-00 (1)	02-06 (2) 06-07 (3) 07-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-23 (4) 23-02 (3)	19-20 (1) 20-21 (2) 21-05 (3) 05-07 (2) 07-08 (1) 21-02 (1)* 02-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	08-10 (1) 10-14 (2) 14-17 (3) 17-19 (4) 19-20 (2) 20-21 (1) 11-15 (1)**	07-08 (1) 08-11 (2) 11-14 (1) 14-15 (2) 15-16 (3) 16-20 (4) 20-22 (3) 22-23 (2) 23-00 (1)	05-06 (1) 06-09 (2) 09-15 (1) 15-17 (2) 17-19 (3) 19-00 (4) 00-02 (3) 02-05 (2)	20-21 (1) 21-04 (2) 04-06 (1) 23-03 (1)* 03-04 (2)* 04-06 (1)*
McMurdo Sound Antarctica	17-19 (1)	16-18 (1) 18-20 (2) 20-21 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-07 (2) 07-08 (1)	20-01 (1) 01-05 (2) 05-06 (1)

Time Zones: CDT & MDT (24-Hour Time) CENTRAL USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	11-15 (1) 15-16 (2) 16-17 (1)	07-09 (1) 09-11 (2) 11-14 (3) 14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	05-09 (2) 09-14 (1) 14-17 (2) 17-19 (3) 19-21 (4) 21-23 (3) 23-01 (2) 01-05 (1)	19-21 (1) 21-23 (2) 23-01 (1) 00-01 (1)*
Northern & Central Europe & European USSR	14-16 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-17 (2) 17-18 (1) 21-23 (1)	01-07 (1) 07-09 (2) 09-14 (1) 14-19 (2) 19-23 (3) 23-01 (2)	19-21 (1) 21-23 (2) 23-01 (1)
Eastern Mediterranean & Middle East	15-18 (1)	10-13 (1) 13-17 (2) 17-18 (1) 20-22 (1)	13-15 (1) 15-17 (2) 17-20 (3) 20-22 (4) 22-00 (3) 00-01 (2) 01-03 (1)	20-00 (1)
Western Africa	10-12 (1) 12-14 (2) 14-17 (3) 17-18 (2) 18-19 (1)	09-13 (1) 13-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-23 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-23 (4) 23-00 (3) 00-01 (2) 01-03 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Eastern & Central Africa	14-16 (1) 16-18 (2) 18-19 (1)	12-14 (1) 14-15 (2) 15-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-23 (3) 23-01 (2) 01-03 (1) 07-09 (1)	20-23 (1)
Southern Africa	10-11 (1) 11-13 (2) 13-14 (1)	09-11 (1) 11-13 (2) 13-14 (3) 14-15 (2) 15-16 (1) 00-02 (1)	14-16 (1) 16-19 (2) 19-22 (1) 22-00 (2) 00-02 (3) 02-04 (2) 04-05 (1) 05-07 (2) 07-08 (1)	20-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Central & South Asia	18-21 (1)	16-18 (1) 18-21 (2) 21-22 (1) 09-11 (1)	05-07 (1) 07-09 (2) 09-11 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-00 (1)	06-08 (1) 19-21 (1)
Southeast Asia	18-20 (1)	09-11 (1) 11-13 (2) 13-15 (1) 17-19 (1)	23-03 (1) 03-07 (2) 07-09 (3) 09-11 (2)	05-07 (1)

Far East	17-18 (1) 18-20 (2) 20-21 (1)	08-11 (1) 15-16 (1) 16-17 (2) 17-21 (3) 21-23 (2) 23-00 (1)	23-02 (1) 02-04 (2) 04-06 (3) 06-08 (4) 08-09 (3) 09-11 (2) 11-13 (1)	03-05 (1) 05-06 (2) 06-07 (1) 05-06 (1)*
South Pacific & New Zealand	11-14 (1) 14-16 (2) 16-20 (4) 20-21 (2) 21-22 (1) 14-18 (1)**	08-09 (1) 09-11 (2) 11-14 (1) 14-17 (2) 17-18 (3) 18-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	16-19 (1) 19-20 (2) 20-21 (3) 21-03 (4) 03-07 (3) 07-09 (4) 09-10 (3) 10-11 (2) 11-12 (1)	00-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1) 02-04 (1)* 04-05 (2)* 05-06 (1)*
Australasia	15-17 (1) 17-19 (2) 19-21 (3) 21-22 (1) 15-18 (1)**	08-09 (1) 09-10 (2) 10-11 (1) 16-18 (1) 18-20 (2) 20-22 (4) 22-23 (2) 23-00 (1)	05-07 (3) 07-08 (2) 08-10 (3) 10-12 (2) 12-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-01 (3) 01-05 (4)	02-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-12 (1) 12-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 11-14 (1)**	07-09 (1) 09-11 (2) 11-14 (3) 14-19 (4) 19-21 (3) 21-22 (2) 22-23 (1)	03-06 (2) 06-08 (3) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-23 (4) 23-03 (3)	19-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-07 (1) 21-23 (1)* 23-04 (2)* 04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	08-10 (1) 10-14 (2) 14-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1) 11-15 (1)**	07-08 (1) 08-11 (2) 11-14 (1) 14-15 (2) 15-16 (3) 16-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	05-06 (1) 06-09 (2) 10-15 (1) 15-17 (2) 17-19 (3) 19-00 (4) 00-02 (3) 02-05 (2)	21-22 (1) 22-00 (2) 00-02 (1) 02-05 (2) 05-07 (1) 01-05 (1)*
McMurdo Sound, Antarctica	18-20 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-23 (2) 23-00 (1)	16-18 (1) 18-19 (2) 19-02 (3) 02-04 (2) 04-06 (1)	20-22 (1) 22-00 (2) 00-02 (1) 02-04 (2) 04-06 (1)

Time Zones: PDT (24-Hour Time) WESTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	09-12 (1) 16-17 (1)	08-11 (1) 11-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	01-07 (1) 07-10 (2) 10-13 (1) 13-17 (2) 17-19 (3) 19-21 (2) 21-23 (3) 23-01 (2)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
Central & Northern Europe & European USSR	14-16 (1)	11-14 (1) 14-16 (2) 16-17 (1) 22-00 (1)	02-07 (1) 07-09 (2) 09-13 (1) 13-16 (2) 16-18 (3) 18-22 (2) 22-00 (3) 00-02 (2)	19-23 (1) 21-22 (1)*
Eastern Mediterranean & Middle East	NIL	09-11 (1) 11-15 (2) 15-19 (1) 19-21 (2) 21-22 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-17 (3) 17-20 (2) 20-22 (3) 22-23 (2) 23-03 (1)	20-23 (1)
Western Africa	10-14 (1) 14-17 (2) 17-19 (1)	08-12 (1) 12-15 (2) 15-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	02-06 (1) 06-08 (2) 08-15 (1) 15-17 (2) 17-18 (3) 18-22 (4) 22-00 (3) 00-02 (2)	20-23 (1)
Eastern & Central Africa	15-18 (1)	10-12 (1) 12-14 (2) 14-17 (3)	11-15 (1) 15-17 (2) 17-19 (3)	19-22 (1)

		17-19 (2) 19-21 (1) 21-23 (2) 23-00 (1)	19-21 (2) 21-23 (3) 23-00 (2) 00-02 (1)	
Southern Africa	09-11 (1)	07-09 (1) 09-11 (2) 11-12 (1) 12-14 (2) 14-15 (1)	07-09 (1) 13-15 (1) 15-18 (2) 18-22 (1) 22-23 (2) 23-01 (3) 01-02 (2) 02-03 (1)	19-20 (1) 20-22 (2) 22-23 (1) 20-22 (1)*
Central & South Asia	17-18 (1) 18-19 (2) 19-20 (1)	08-09 (1) 09-11 (2) 11-16 (1) 16-17 (2) 17-19 (3) 19-21 (2) 21-23 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 16-18 (1) 18-21 (2) 21-23 (1)	05-08 (1)
Southeast Asia	13-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-20 (1)	08-09 (1) 09-12 (3) 12-17 (1) 17-18 (2) 18-20 (3) 20-21 (2) 21-23 (1)	04-07 (2) 07-10 (3) 10-11 (2) 11-13 (1) 22-00 (1) 00-02 (2) 02-04 (3)	04-07 (1) 05-06 (1)*
Far East	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (1) 15-18 (1)**	08-10 (1) 10-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	04-07 (2) 07-08 (3) 08-09 (4) 09-10 (3) 10-11 (2) 11-12 (1) 12-14 (2) 14-21 (1) 21-23 (2) 23-00 (3) 00-03 (4) 03-04 (3)	01-03 (1) 03-07 (2) 07-08 (1) 03-06 (1)*
South Pacific & New Zealand	11-13 (1) 13-15 (2) 15-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-23 (1) 12-18 (1)**	09-10 (1) 10-12 (3) 12-16 (2) 16-17 (3) 17-21 (4) 21-00 (3) 00-02 (2) 02-03 (1)	06-08 (2) 08-11 (3) 11-12 (2) 12-17 (1) 17-19 (2) 19-21 (3) 21-02 (4) 02-06 (3)	22-00 (1) 00-02 (2) 02-07 (3) 07-08 (4) 08-09 (1) 01-02 (1)* 02-06 (2)* 06-07 (1)*
Australasia	13-14 (1) 14-15 (2) 15-17 (3) 17-19 (4) 19-20 (2) 20-21 (1) 14-18 (1)**	13-16 (1) 16-18 (2) 18-19 (3) 19-22 (4) 22-00 (3) 00-02 (2) 02-03 (1)	05-07 (2) 07-09 (3) 09-10 (2) 10-12 (1) 18-20 (1) 20-21 (2) 21-23 (3) 23-03 (4) 03-05 (3)	01-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1) 02-03 (1)* 03-05 (2)* 05-06 (1)*
Caribbean, Central America & Northern Countries of South America	10-12 (1) 12-14 (2) 14-15 (3) 15-18 (4) 18-20 (2) 20-21 (1) 11-14 (1)**	07-08 (1) 08-09 (2) 09-13 (3) 13-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	00-03 (3) 03-05 (2) 05-06 (3) 06-09 (4) 09-11 (3) 11-15 (2) 15-17 (3) 17-00 (4)	19-20 (1) 20-21 (2) 21-00 (3) 00-02 (4) 02-03 (3) 03-04 (2) 04-06 (1)* 21-00 (1)* 00-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	08-11 (1) 11-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 11-15 (1)**	07-08 (1) 08-11 (2) 11-14 (1) 14-15 (2) 15-16 (3) 16-19 (4) 19-21 (3) 21-22 (2) 22-23 (1)	00-02 (3) 02-03 (2) 03-05 (1) 05-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-00 (4)	19-22 (1) 22-03 (2) 03-04 (1) 20-03 (1)*
McMurdo Sound, Antarctica	15-19 (1)	15-16 (1) 16-18 (2) 18-20 (3) 20-22 (2) 22-00 (1)	16-18 (1) 18-19 (2) 19-21 (3) 21-01 (4) 01-03 (3) 03-05 (2) 05-07 (1)	21-22 (1) 22-00 (2) 00-05 (1) 05-07 (2) 07-08 (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.
 **Indicates best times to listen for F-2 layer openings on 6 meters.

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.

ca, Africa, the south Pacific area, and Australasia. Look for possible openings towards the southeast and south from shortly before to an hour or two after noon. Best bet for openings towards the south and southwest should be the late afternoon hours. Openings are more likely to occur when conditions are High Normal or better.

Sporadic-E produced short-skip openings begin a seasonal increase during April. Some openings should be possible on 6 meters during the month over distances ranging between approximately 750 and 1300 miles. When the skip is beyond 1100 miles on 6 meters, check for sporadic-E openings on 2 meters. An occasional 2 meter ionospheric opening may be possible during April. While sporadic-E openings may occur at any time of the day or night, there is a tendency for them to peak between 8 AM and noon and again between 6 and 9 PM, local daylight time.

Widespread auroral activity often occurs during April. This can produce in-

tensely ionized regions which are capable of reflecting 6 and 2 meter signals over distances up to approximately 1300 miles. Check for likely auroral activity on the VHF bands on those days shown as Below Normal or Disturbed in the Last Minute Forecast, which appears at the beginning of this column.

There is a good chance for some meteor-scatter openings on the VHF bands during April 19-22. This is the time that the Lyrids meteor shower is expected to appear. A maximum of 15 large-sized meteors may enter the earth's atmosphere hourly during this shower.

Some trans-equatorial (TE) ionospheric openings between the southern areas of the USA and South America may be possible during April. The best time to check for TE openings on 6 meters is between 8 and 11 PM local time. A rare opening on 2 meters may also be possible this month. At best, expect very weak signals with strong flutter fading.

73, George, W3ASK

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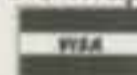
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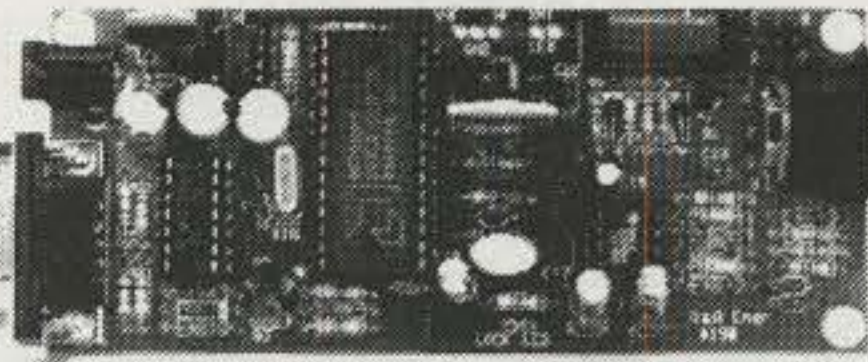
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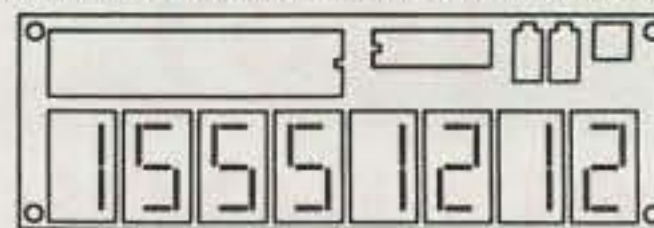
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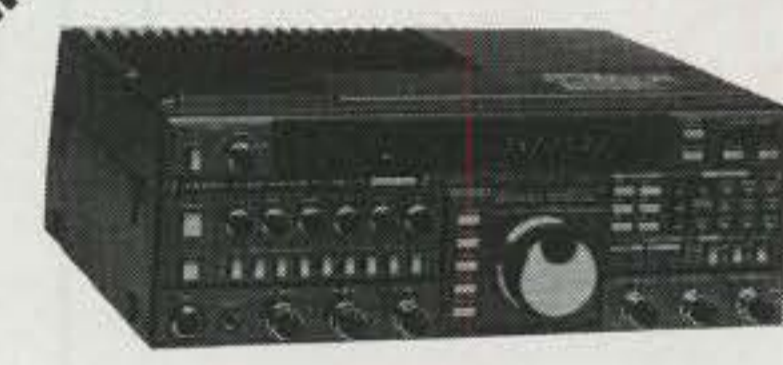
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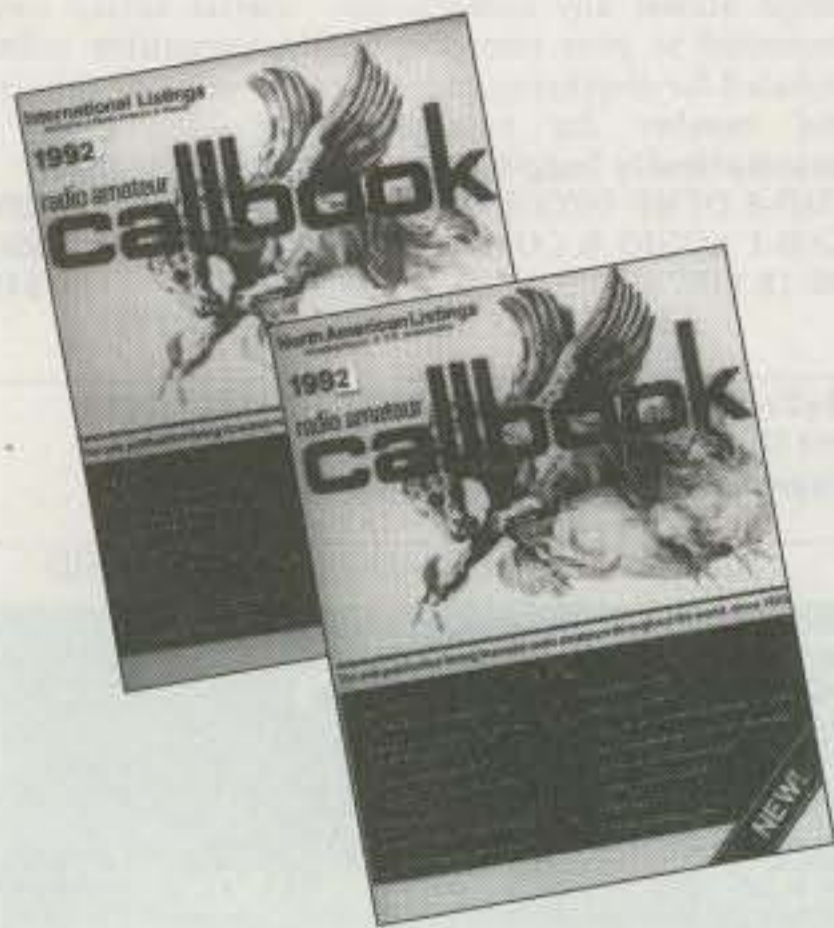
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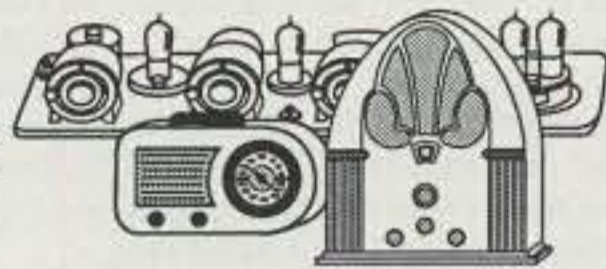
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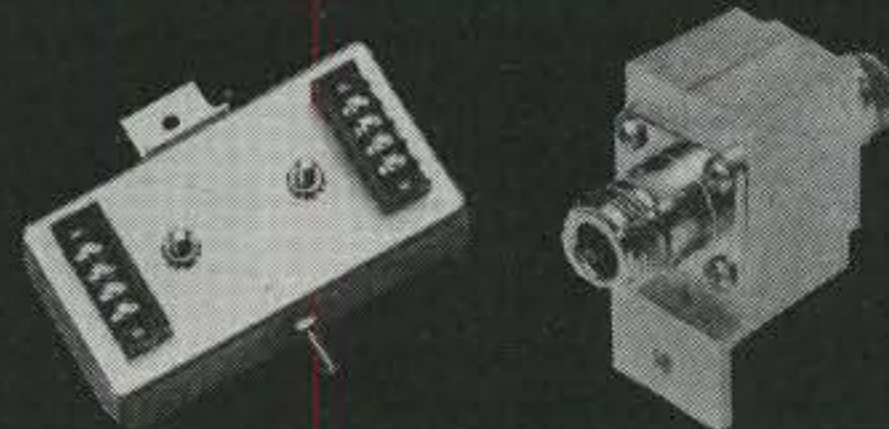
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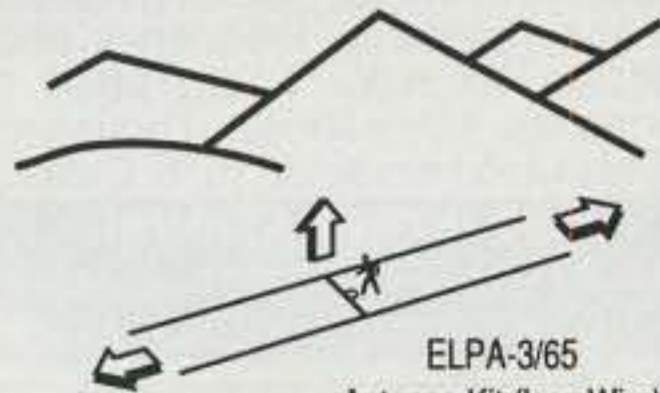
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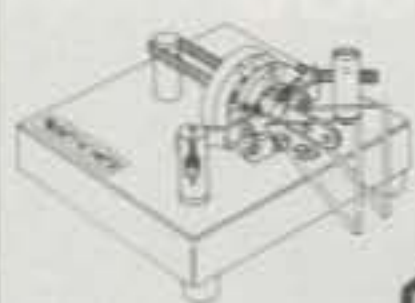
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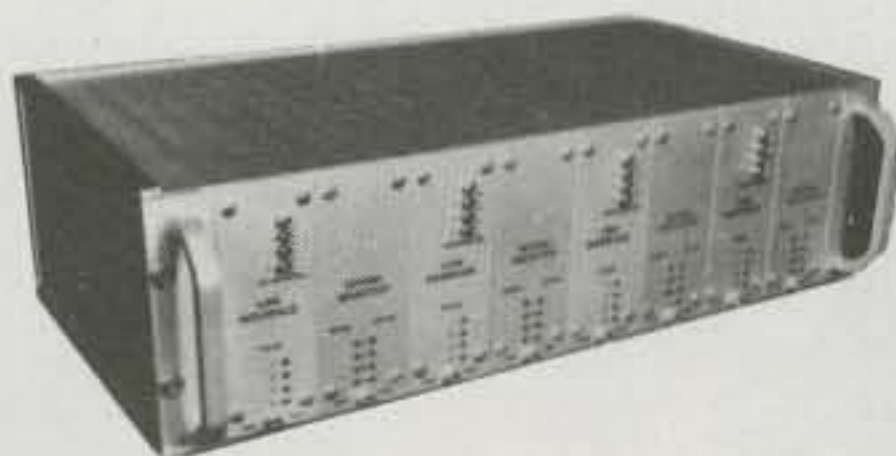
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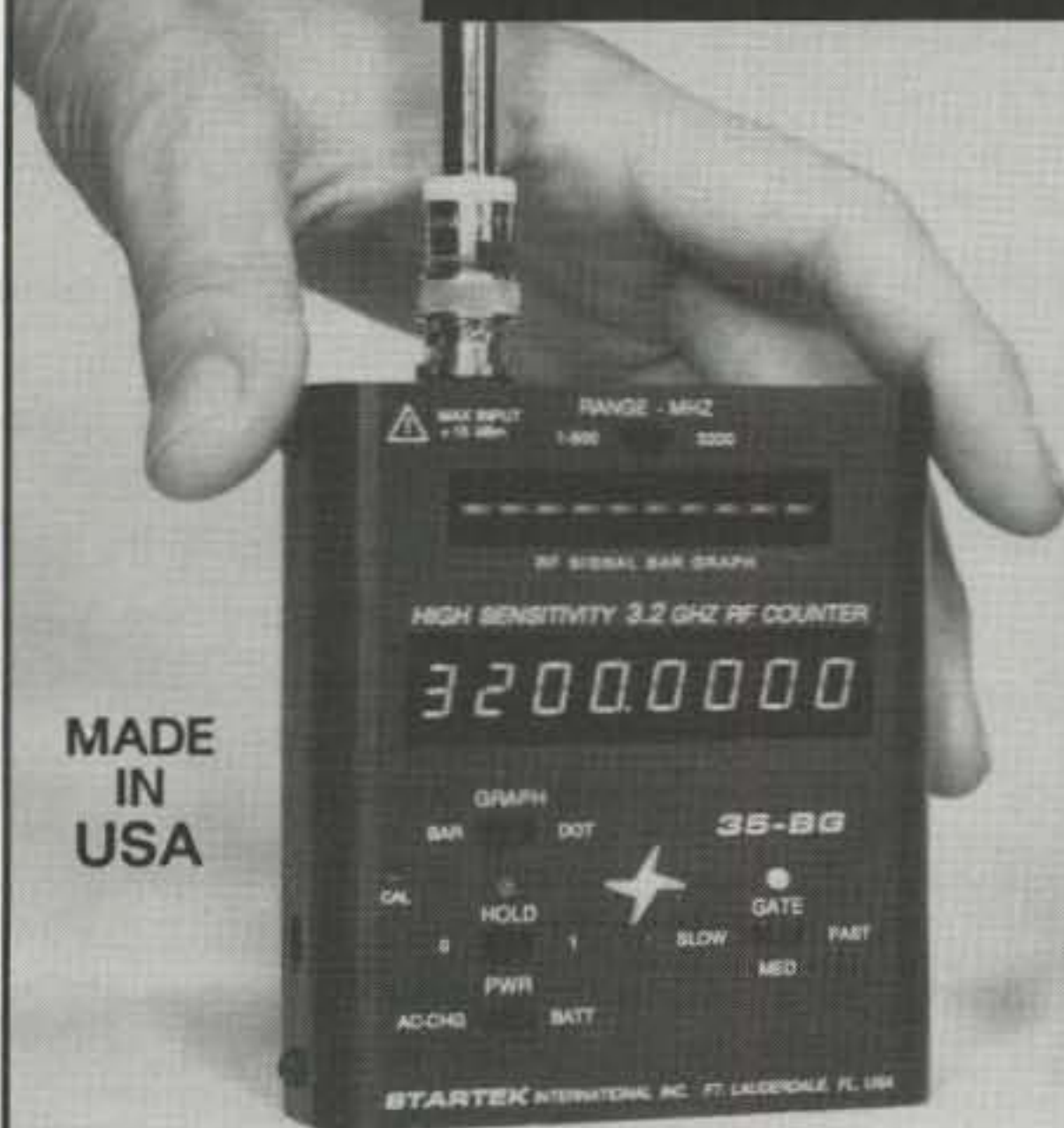
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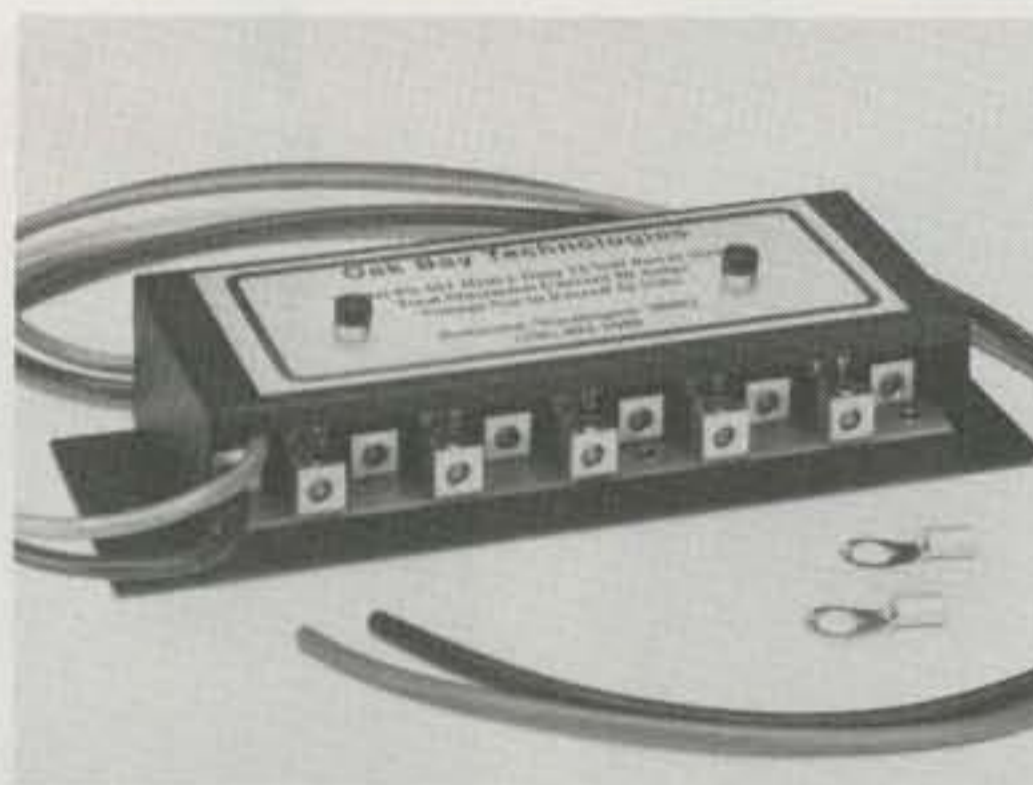
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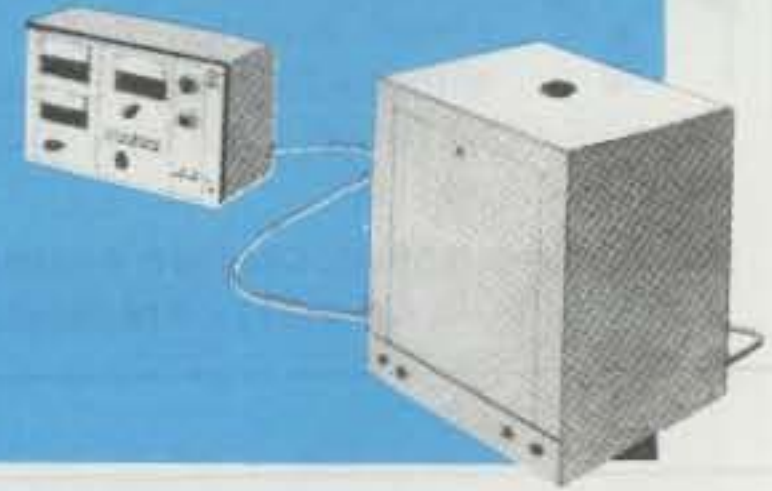
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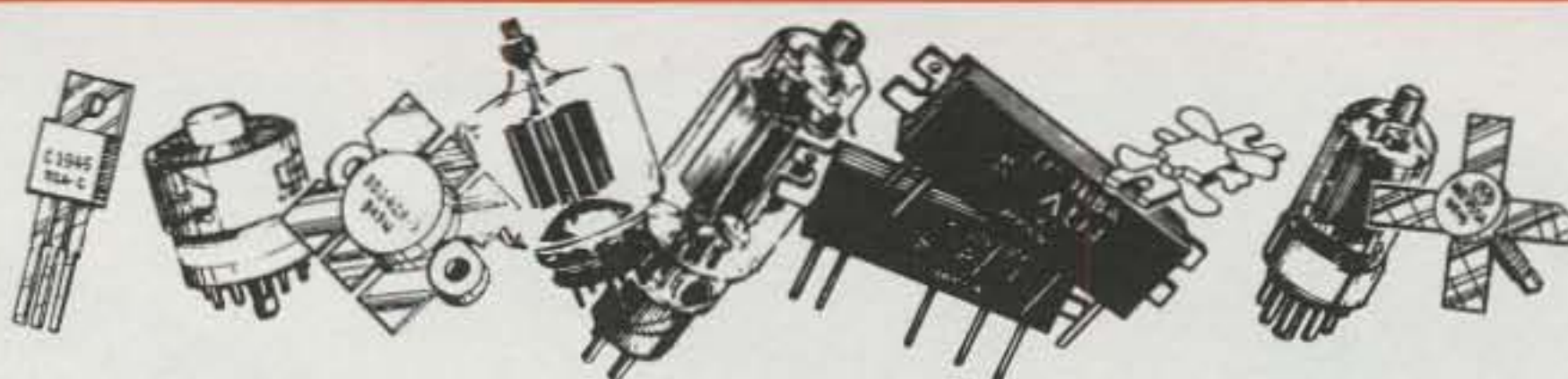
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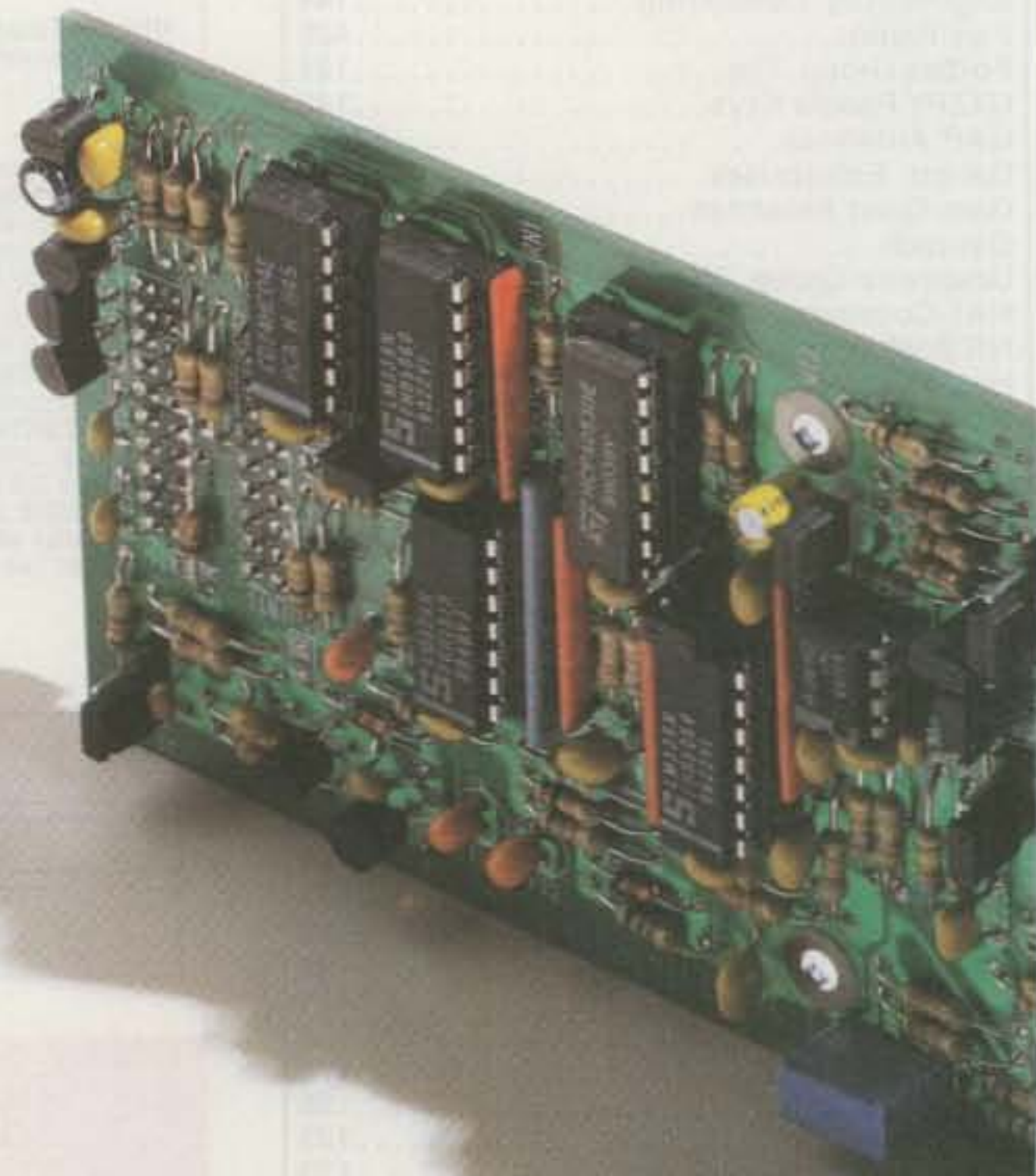
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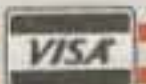
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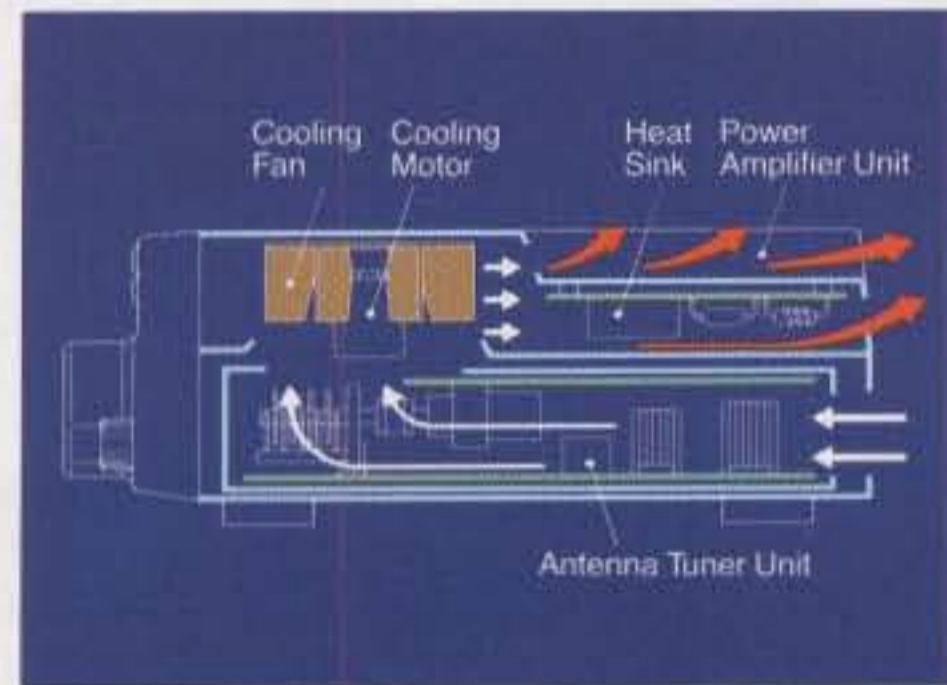
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Antenna Tuner: High speed with 31 memories automatically stores most recent antenna matching settings for instant recall while changing operating frequencies.

Superior Performance

The FT-890 is an extraordinary achievement, featuring DLT (Digital Linear-phase Tuning) for silky smooth tuning. Including the advanced RF Front End design of the FT-1000 for superior receiving performance. Compare the advantages for yourself, it's ready to go when you are! Call your nearest Yaesu dealer for one of the best DX-pedition radios ever.

YAESU

Performance without compromise.SM

Specifications subject to change without notice.
Specifications guaranteed only within amateur bands.
One Year Limited Warranty on all Amateur Products.



Radio & Matching Power Supply: The FT-890 is ideal for home, mobile or field use with the optional power supply. Significantly smaller and lighter than competing units.

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IC-725 HF TRANSCEIVER

Your First Step



If you've been looking for an entry-level HF and assumed an ICOM was out of your price range, read on.

The ICOM IC-725 is surprisingly low priced, while offering features and performance found on radios costing much, much more.

Band Stacking Register enables you to store frequency and mode for automatic return.

Ultra Quiet Operation. The IC-725's super-sensitive low noise receiver, with ICOM's Direct Feed Mixer (DFM) provides clear, fatigue free reception. It's specially designed cooling system with quiet fan reduces operational noise to a whisper.

ICOM's **DDS** (Direct Digital Synthesizer) generates ultra-clean waveforms, resulting in clear crisp reception and low distortion transmission.

Durable ICOM Construction means higher performance and reliability for years to come (i.e. sturdy aluminum die-cast frame and integral, efficient heat sink).

System Design. Rather than buying a radio you will soon outgrow, the IC-725 is designed to become an integral part of a high performance ICOM System.

The IC-725. Priced to be your first. Built to be your last. For more information, see your ICOM dealer or call the ICOM Brochure Hotline 1-800-999-9877.

...toward a First Class System



IC-725 HF Transceiver, PS-55 AC Power Supply, IC-2KL 500 watt fully solid state Linear Amplifier, IC-475 UHF Transceiver, IC-275 VHF Transceiver. All units can be computer controlled.

All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 7251291

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CIRCLE 173 ON READER SERVICE CARD