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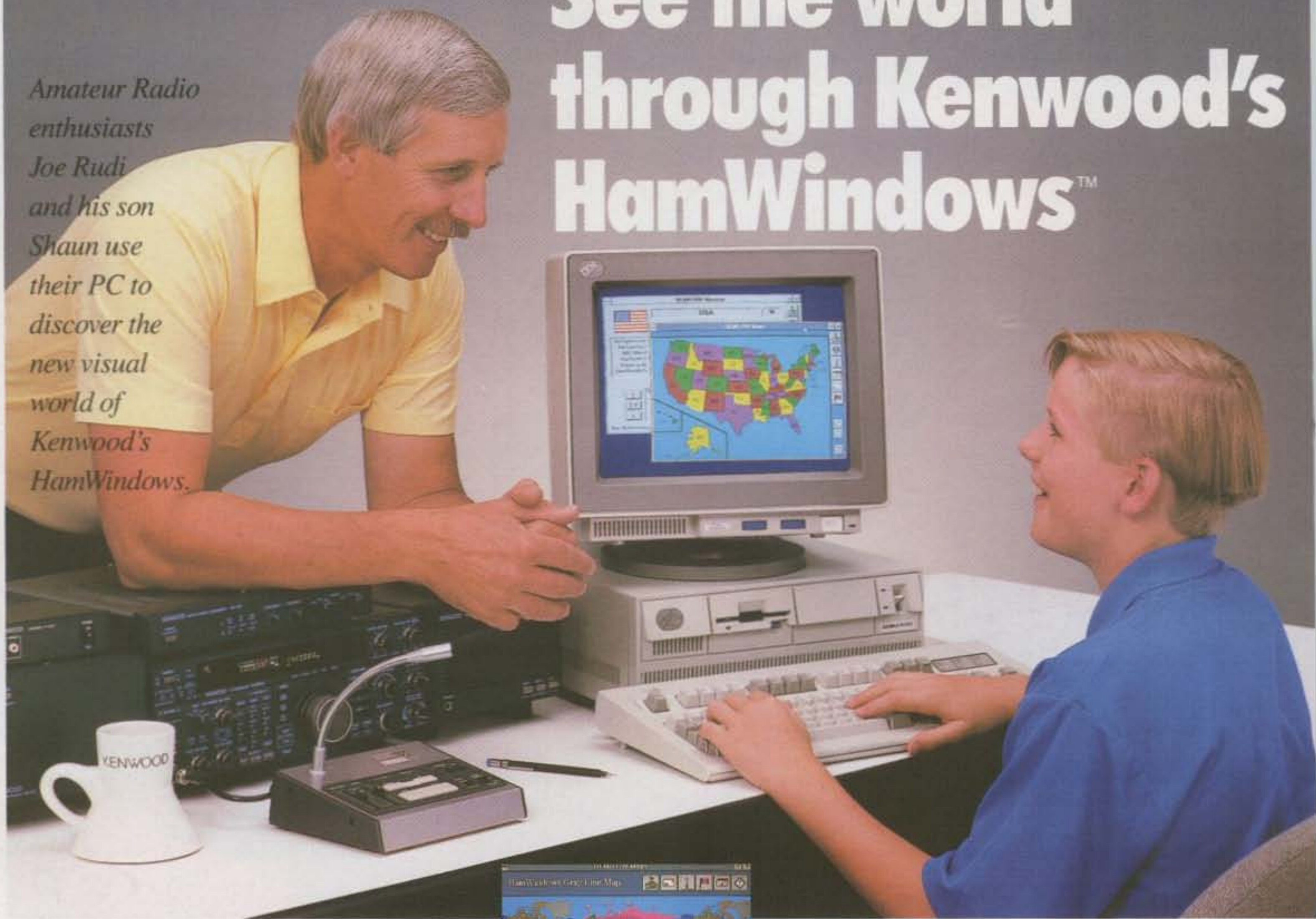
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WB4OSN, Margate, FL

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- **BC-15:** Rapid charger for PB-13, 14
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- **HMC-2:** Headset with VOX and PTT
- **PB-13:** 7.2 V, 700 mAh NiCd pack
- **PB-14:** 12 V, 300 mAh NiCd pack
- **PG-3F:** DC cable with filter and cigarette lighter plug
- **PG-2W:** DC cable
- **SC-30:** Soft case
- **SMC-31:** Standard speaker mic
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- **SMC-33:** Compact speaker mic with controls
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The Radio Amateur's Journal

ON THE COVER: More "modern" modes of Amateur Radio communication may come and go, but c.w. seems to go on forever. Our photographer-at-large catches the nimble fingers of WB4OSN at the paddle as he warms the ionosphere on the low end of 20. (Photo by Larry Mulvehill, WB2ZPI)



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Perchance To Dream

Most of us grew up being taught by our parents that it is impolite to talk about money—our own, or what other people have. As a social norm we tend to accept that and not question how much things cost. However, with amateur radio, at least, we do have a sense of the value of things and where we fit in in the affordability continuum (from “perhaps” to “never”). I also know the old adage “If you have to ask how much it costs, you can’t afford it.”

Recently I got a few letters from readers who wrote adamantly about the money spent on the PJ9W operation. I guess by most people’s standards it was a lot of money. However, it was a dream come true for a lot of very involved Finnish amateurs. While most of us have dreams and aspirations, few of us can make them come true. I thought it was a terrific opportunity to plan something without regard (well almost) to cost and go ahead and do it. It’s called imagination and spirit. I know there’s a subtle difference between buying 1,000 feet of hardline and liberating 1,000 feet of hardline, but I’m not quite sure how to define it. If you bring it with you it’s one thing; if you have it shipped it’s another.

Sour grapes aside, I started to think about various groups who search out rare and exotic areas to put on the amateur radio map. We’ve all heard DX pile-ups from these places, and most of us have been drawn into the fray at one time or another. Remember Bouvet or more recently Albania? Over the years many groups have gone out of their way to make us happy and increase our country totals. While a few amateurs might have complained about requests for green stamps, most of us never gave a thought as to how this operation was being financed. I don’t recall a pile-up being stopped by someone asking how much it cost and who paid for it. I can’t picture anyone anxiously awaiting a QSL card complaining about the money spent for the DXpedition.

Over the years I’ve seen pictures of and also had the pleasure of visiting several “Big Gun” DX and contest stations. It is sort of like amateur radio’s version of “Lifestyles of the Rich and Famous” on TV. Without a doubt, there is a slight bit of envy in me, but on the other hand there is also that unspoken “wow” that I feel. Somehow the concept of overkill doesn’t enter my mind. I remember one station that had ergonomically designed operating tables and

chairs specially built, something I found fascinating.

Now imagine, if you will, groups of amateurs precariously traveling thousands of miles (without benefit of frequent-traveler miles or complimentary beverages) for extended periods of time, their sole reason for the trip being to provide you (preferably early on and at no cost) with an astounding 5/9+ signal report, which you richly deserve and have a right to (then your dream world is just as rich as everyone else’s). For some reason we expect people to do this for us on a regular basis, never once asking about the mechanics of it or what our share of the cost is.

What this says, though, is that amateur radio is an open-ended hobby whereby there is no cap on what can be spent by any individual or group. The only apparent limit is imagination and desire. Funding somehow can be arranged. We all dream of wonderful things now and then, but most of us leave it at that. A few take those dreams and act on them. Somehow we have fostered the expectancy that we have an inexpensive hobby whereby the most exciting accomplishments can be done with no money.

As we start a new year this month let’s give some thought to how a lot of what we take for granted is being done. Before we rush off to complain about how long a QSL bureau takes or how fast a particular QSL manager is or isn’t, think about how much work is involved and what you’re paying for it. There are groups and clubs plus commercial interests who donate money towards DXpeditions and QSLing, but I think we all would be amazed at how much money is really spent on our “inexpensive” hobby.

Whatever PJ9W spent or didn’t spend doesn’t really matter. It was a great dream that came true. I’m sure there were people who planned different dreams for the contest, but unfortunately theirs didn’t come true. There’s probably a group of amateurs out there somewhere picking apart the PJ9W operation and planning something twice as elaborate and costly right now. It says that all things are possible in a hobby built on dreams.

Most of us are hedonistic enough to go along with the dream and not ask questions. Above all we are polite. The small number of people who take themselves really seriously and who nitpick and complain should be sent the bill for the whole thing.

New Ten-Year Rule For WPX Award

Recently Norm Koch, K6ZDL, our WPX Award Manager, commented that his home was inundated with cartons filled with old WPX Award records. We discussed how long he should save them while he questioned whether or not some of these amateurs might now be silent keys. It’s hard to say how long a respectable inactive period might be. After all, even banks stop paying interest on inactive accounts. We decided initially on ten years, assuming that some amateurs’ interest rises and falls with the sunspot cycle. So as of this month, any WPX Award standing that has been inactive for ten years or more will be discarded, including the files. Amateurs who subsequently emerge will have to reapply and start over.

Norm has computerized more recent applications and updated records. If you would like a printout of your standing, send \$5.00 plus an SASE to Norm Koch, K6ZDL, 880 CR13, Clovis, NM 88101.

Lester A. Cushman, W1BX

Les Cushman passed away on November 12, 1991 at the age of 86. If the name sounds sort of familiar, it should. Les and his wife founded Cushcraft Corp. in 1946. Les proved the American dream: with hard work and perseverance you could build a successful antenna manufacturing company. I’m sure that over the years many of you met and talked with Les at hamfests, exchanging ideas on antennas.

I knew Les for quite a number of years and was impressed with his direct and honest approach to things. He always said what was on his mind; you knew what he liked and what he didn’t. I cannot think of an instance where this was ever cruel or malicious or carried over to even a minor grudge. Everyone I told about Les’s passing used the same words in describing him—gentleman and integrity.

In recent years Cushcraft’s president has been Bob Cushman, WA1QFY, Les’s son. Also, although retired, Les still made daily tours of the plant, maintaining an active interest in the company and its people.

Our sympathies go out to the Cushman family for their great loss. We all will miss him.

73, Alan, K2EEK

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ANNOUNCEMENTS

• **Military Amateur Database Update** - In late 1989 and early 1990 KA4SBE compiled a database of active duty and retired military amateur radio operators and mailed the list to those who responded. KA4SBE is now ready to update the list. If you would like to be added to the list or you have a change since the old list, send your information to Commander, I Corps and FT Lewis, AFZH-PAM-H Attn. CPT Godlewski, FT Lewis, WA 98433-5000. You may also send info to KA4SBE @ N7HFZ.WA.USA.-NOAM. If you have 10 meter capability, link with WUSA on 28.150 MHz and leave a message with the information. (KA4SBE was hoping to have the information compiled by the end of 1991 and in the mail by January 15, so we may be a bit late with this one.)

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

N1IFP, from Sidney, Maine's Bicentennial; James Bean Elementary School ARC; from 1200-2100Z January 29; on 7.265, 14.265, 21.365, 28.465 MHz. For certificate send QSL and SASE to N1IFP, Bean School, RFD 3, Augusta, ME 04330.

W2OW, from 100th anniversary of Johnson City, New York Fire Department; January 26 to February 1 (no times given); SSB lower 50 kHz of General 80-15 meter subbands and Novice portion of 10 meters, RTTY/AMTOR 40, 20, 15, 10 meter digital subbands. Send QSL and #10 SASE to Capt. Bob Blakeslee, N2IHQ, 1 1/2 Macomber Ave., Binghamton, NY 13901.

KI6YG, from sixth anniversary of Challenger Space Shuttle tragedy, San Diego, Califor-

nia; Challenger Junior High School Technology Club; 1500-2400Z January 28; Novice portion of 10 meters. For commemorative QSL send QSL and SASE to Challenger JHS, 10810 Parkdale Ave., San Diego, CA 92126.

RX3ADI, from Istra, USSR; January 10-12 (no times given). QSL direct to P.O. Box 48, Istra 143500 USSR.

• **The following hamfests, etc., are slated for January:**

Jan. 11, **20th Annual Midwinter Swapfest**, Waukesha Co. Expo Center Forum, Milwaukee, Wisconsin. Write with SASE to West Allis Radio Amateur Club Swapfest, P.O. Box 1072, Milwaukee, WI 53201. (Exams at 9 AM at Red Carpet Lanes.)

Jan. 18, **Second Annual Northwest Missouri Winter Hamfest**, Tri-Rivers Expo Hall, Cameron, Missouri. Contact NW Missouri Winter Hamfest, P.O. Box 182, Cameron, MO 64429.

Jan. 18, **1992 Hammond Hamfest**, SLU University Center, Hammond, Louisiana. Contact Ernest Bush, N5NIB, 331 Rock Road, Hammond, LA 70403 (504-567-1261 days; 504-542-0034 evenings). (VE exams.)

Jan. 18, **Marathon, New York Winterfest '92**, Civic Center, Marathon, New York. Contact Skyline ARC, P.O. Box 5241, Cortland, NY 13045.

Jan. 18, **Monterey, California Winterfest 1992**, Monterey Peninsula College Armory, Monterey, California. Contact Pat, KA6IRS at 408-649-4444, ext. 20, days; or Doug, KC3RL, 408-663-6117 evenings. (Amateur radio dem-

onstrations include CW and SSB, SSTV, computers, satellite, packet, MARS, and ARES.)

Jan. 19, **Metro 70cm Networks Giant Electronic Fleamarket**, Lincoln High School, Yonkers, New York. Contact Otto Supliski, WB2SLQ, 914-969-1053. (VE exams 10 to 2.)

Jan. 25, **Tennessee Valley Amateur Radio Network Hamfest and Packet Forum**, Tennessee Section National Guard Armory, Gallatin, Tennessee. Contact Bill Ferrell, N4SSB, 1120 Douglas Bd. Rd., Gallatin, TN 37066 (615-452-3962 after 5 PM). (VE exams, plus packet forum 10:30 to noon.)

Jan. 25, **12th Annual Citrus County Hamfest**, new National Guard Armory, Crystal River, Florida. Contact Sky High ARC, 9 S. Davis St., Beverly Hills, FL 32665, or call Ed Gaudet, K4BRC, 904-746-2371.

Jan. 26, **Columbia Area ARC Winterfare**, Historic Columbia Markethouse, Columbia, Pennsylvania. Contact Columbia Area ARC, P.O. Box 574, Columbia, PA 17512. (VE exams.)

Jan. 26, **Southfield High School ARC Hamfest/Electronics/Computer Swap & Shop**, Southfield High School, Southfield, Michigan. Contact Robert Younker 313-746-8675 or 313-746-8658.

Jan. 26, **Wheaton Hamfest**, Odeum Expo Center, Villa Park, Illinois. Call 708-629-8006.

Feb. 1, **Sevierville Hamfest**, Kerbel Shrine Temple, Knoxville, Tennessee. Contact Paul Baird, KY4A, 615-986-9562. (VE exams at 9:30 AM, no walk-ins; call 615-688-7771 for registration info.)

Feb. 1, **Niagara Peninsula ARC Hamfest & Dinner-Dance**, C.A.W. Hall, St. Catharines, Ontario, Canada. Contact NPARC, Inc., P.O. Box 692, St. Catharines, Ontario, L2R 6Y3 (416-934-3231) or VE3KLM @ VE3SNP. (Tickets only available in advance.)



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Forward Gain, dBd	8	8.9	8.0
Front to Back Ratio, dB	25	25	25
2:1 Bandwidth, KHz	>500	>500	300
Power Rating, Watts PEP	2000	2000	2000
Boom Length, ft (m)	14 (4.3)	18 (5.5)	14 (4.3)
Longest Element, ft (m)	27.7 (8.4)	32 (9.7)	25.1 (7.7)
Turning Radius, ft (m)	15.5 (4.7)	18.4 (5.5)	14.4 (4.4)
Mast Size Range, in	1.25-2.0	1.25-2.0	1.25-2.0
Wind Load, ft ² (m ²)	4.4 (0.47)	5.5 (0.51)	4.1 (0.38)
Weight, lb (kg)	27 (12.9)	37 (16.8)	22.5 (10.2)

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Our Readers Say

Corrections To The "Automatic Beam Aimer"

Editor, CQ:

I have discovered an error in the schematic for the automatic beam aimer for the HD-73 ("Automatic Beam Aimer for the HD-73 Antenna Rotator," January 1991, p. 12). The negative power supply accidentally repeats the positive supply instead of correctly showing the 7912 regulator. The 79XX regulator series uses pin 1 as ground and pin 2 as input. The capacitors are also reversed in polarity from the correct orientation.

I have also notified FAR Circuits of the error, as they have made up a board for the project based on the schematic in CQ. I have sent correspondents the following correctives to use on the board:

"If your board has the trace from the diode and filter capacitor going to pin 1, with the center pin grounded, you can correct the situation with just a little work. First, isolate the regulator pads for pins 1 and 2 by using a hobby knife to cut the traces. Pin 1 has one tiny trace to the diode pad. Pin 2 has two traces, one to the ground strip and the other to the 1 mF lead. Second, solder a tiny bare jumper wire under the board between pin 1 pad and the ground strip. Solder a second insulated jumper between the isolated 1 mF lead and the ground strip. Solder a third insulated jumper between the pad for regulator pin 2 and the diode pad. Check all work (including correct polarity for the capacitors) and test the supply with the 13741 and 311s removed."

I hope the error has not inconvenienced too many folks.

L.B. Cebik, W4RNL
Knoxville, TN

"QRP-20 Plus" Corrections

Editor, CQ:

With three minor exceptions, my article ("The 'QRP-20 Plus' 20 Meter CW Transceiver," November 1991, page 20) looks great.

First, someone used a bit of editorial license and went astray. Second paragraph, page 20, a parenthetical phrase was added referencing the January '89 article in *Ham Radio*. That's the correct magazine but the wrong article and wrong issue. Although I did not specify it, I was referring to the "Travel Radio" article that was written up in the June 1987 issue of *Ham Radio*. Once again, I added some of my own modifications. Over the years I have used my version of the Travel Radio from lots of nifty places including Lord Howe Island, Spitzbergen, Enderby Island (ZL9), and as ZL5/W6ZH/MM3 in McMurdo Sound, Antarctic (solar powered)!

Second, on page 20, third paragraph, Rick Littlefield's call is K1BQT (not K1QBT).

Third, on page 29 there is a typo in the caption on Photo G. I sure hope that the *real* W6NZ doesn't get to hoo-hoo (as our KH6 bruddas say) when he/she sees this.

Keep up the good work with CQ.

Pete Hoover, W6ZH
Pasadena, CA

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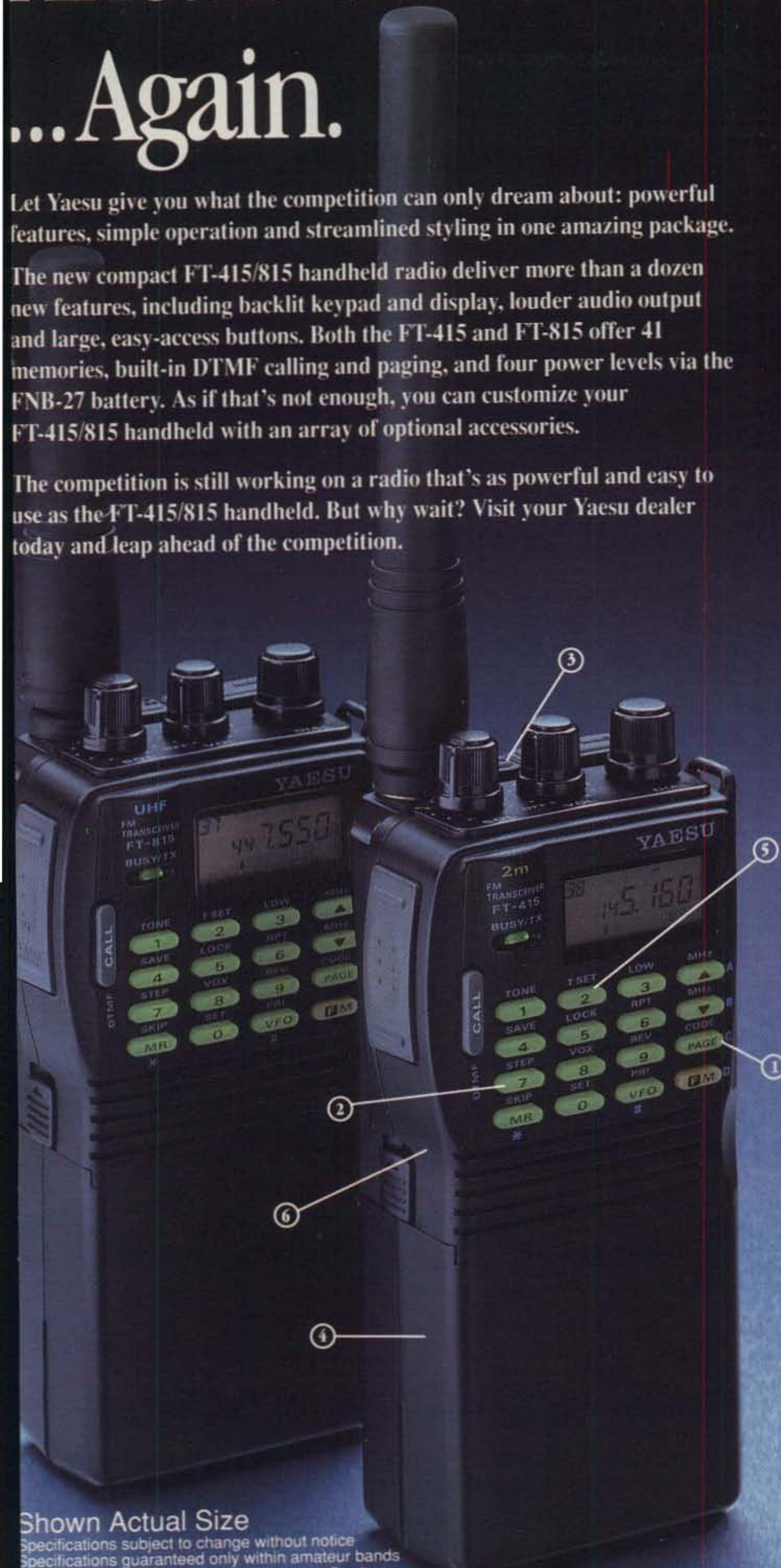
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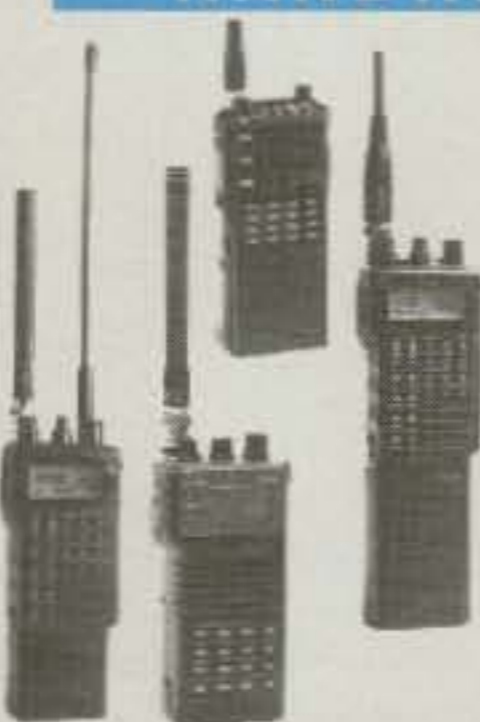


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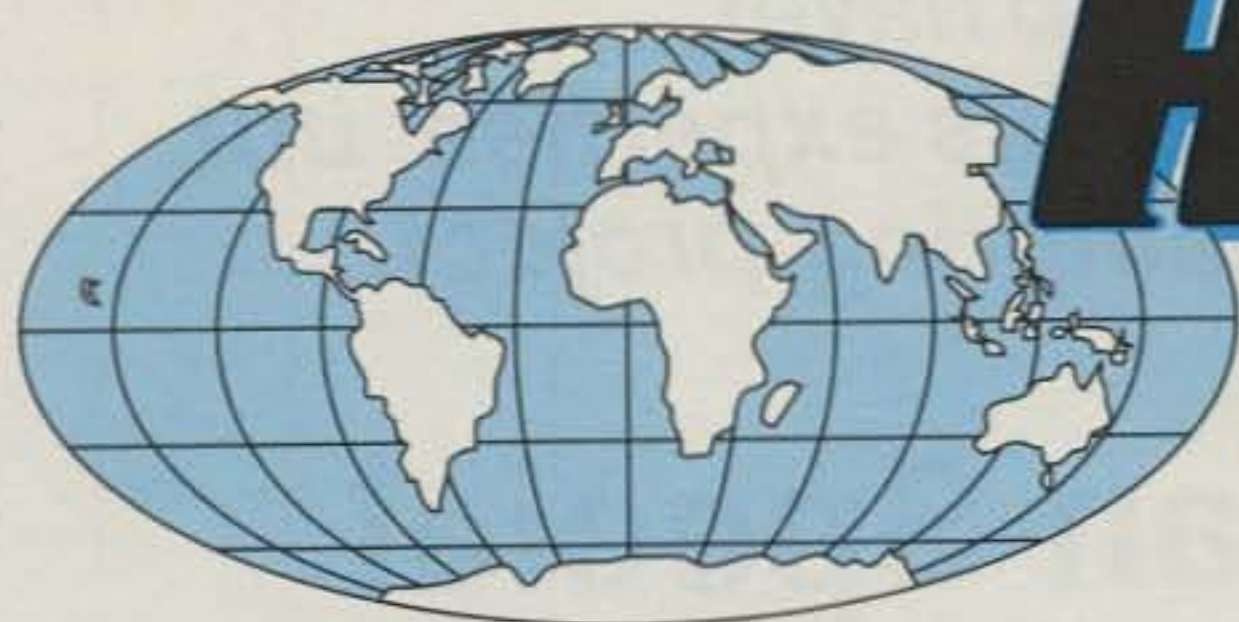
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BY ROSS CLARE*, GW3NWS

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—K2EEK

Would you believe me if I told you that my wife bought me a pair of 3CX800A7s for Christmas? Well, it's quite true. There they were on the table complete with bases and chimneys. I could hardly believe my eyes. If I could have gotten away with it, I would have abandoned Christmas then and there, gone to the shack, and started building this amplifier. However, I know on which side my bread is buttered! So I waited a respectable time and started on the 26th (Boxing Day in the UK). Thus began four months of furious activity in the shack. The result is an amplifier which will easily produce 1500 watts output, key down, any mode, for as long as you wish. In fact, in terms of performance, reliability, and features, this amplifier exceeds that of many commercially available units.

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The completed amplifier and power supply. The biggest ingredient in this project is patience, as it can be (and was) built with ordinary hand tools.

operate on 80 through 10 meters inclusive. If required, 160 meters could easily be added. At UK power levels and 1600 volts on the plate, the amplifier is only just ticking over. At US power levels the only thing that gets warm is the exhaust air from the chimneys. This amplifier and power supply are designed for continuous and reliable service.

Circuit Details

The amplifier and HV power supply are built as separate units. The amplifier chassis contains the filament and control supplies, and the protection, sequencing, and metering circuits. The control circuits are

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*Glenview, Newport Rd., Magor, Gwent NP6 3BZ UK

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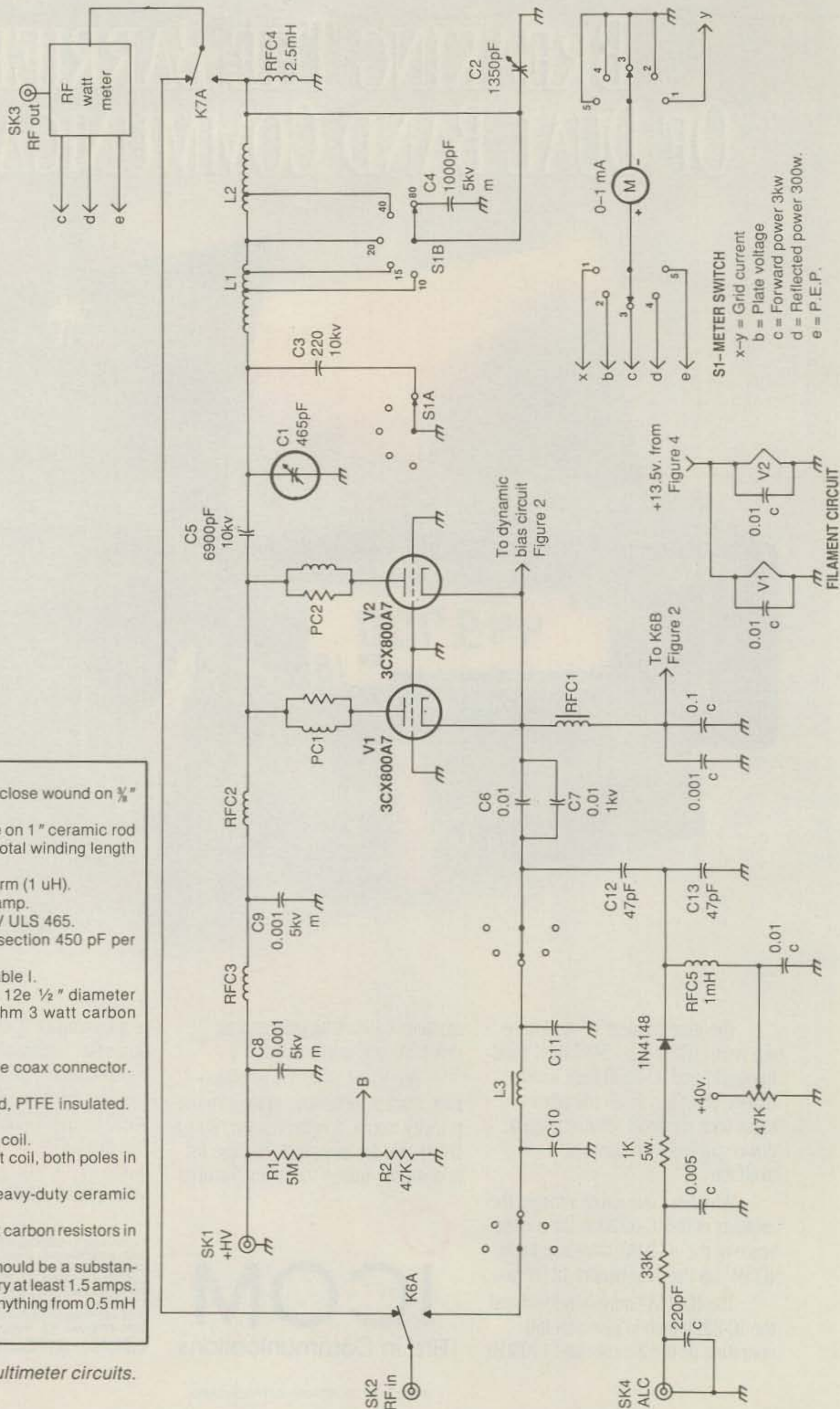

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 RFC 4—National 1 mH 1 amp.
 C1—Jennings 465 pF 5 KV ULS 465.
 C2—Jackson Bros. three-section 450 pF per section, 1 KV.
 C10, C11, and L3—See Table I.
 PC1 & PC2—2 Turns No. 12e $\frac{1}{2}$ " diameter spaced $\frac{1}{2}$ " over 22 ohm 3 watt carbon resistor.
 L1 & L2—See Table II.
 SK1—PET 100 high voltage coax connector.
 SK2—50 ohm BNC.
 SK3—SO-239, silver plated, PTFE insulated.
 SK4—Phono socket.
 K6—5 Amp 2 PCO 24 volt coil.
 K7—10 Amp 2 PCO 24 volt coil, both poles in parallel.
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Fig. 1—RF, ALC, and multimeter circuits.



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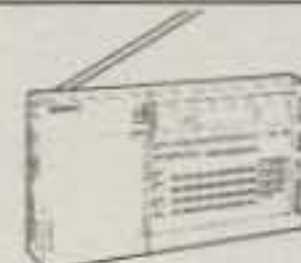
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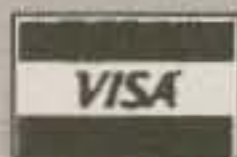
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Band	L3 (μ H)	Winding Information	C10	C11
160	3.0	25T close wound No. 20E	3400	3100
80	1.55	13T close wound No. 16E	1720	1900
40	0.77	7T close wound No. 16E	900	1000
20	0.38	4T close wound No. 16E	440	220
15	0.25	3T spaced $\frac{3}{8}$ " No. 16E	300	180
10	0.18	2 $\frac{1}{2}$ T spaced $\frac{1}{2}$ " No. 16E	220	150

Table I—Input network coil data ($ZK = 24$ ohms). All coils wound on $\frac{1}{2}$ " diameter forms with red cores. Capacitors are mica units, 1 KV DC working. Values are made up with parallel combinations where necessary. Note: The values quoted for C10 and C11 do not conform to calculated values; nevertheless they work very well! One-sixty meter values are included for information.

watts output. For this reason, the ALC threshold control is brought out to the front panel, allowing easy adjustment.

Forward, reverse, and peak power measurement are built in and indicated on the multimeter. Grid current and plate voltage are also indicated. Plate current is continuously monitored by the second meter.

Because I didn't have a suitable variable capacitor capable of withstanding the higher RF voltage present at the image impedance of a Pi L network, I decided to use the simpler Pi network and depend upon the excellent linearity of these tubes to keep harmonic products at a low level. The Pi network is designed for a plate impedance of 1000 ohms and a loaded Q of 12. This relatively low impedance means that the total inductance necessary in the output network is also relatively small, and the output inductor can be made entirely self-supporting. The amplifier also includes a dynamic bias circuit, which is in effect a high-speed switch, switching the tubes

from a conducting state to cutoff between syllables and pauses on SSB and between dots and dashes on CW. This mode of operation certainly reduces average plate dissipation and is noticeable by the reduction in exhaust air temperature when this feature is operational. The attack and decay times of the circuit are slow enough to ensure that the amplifier output spectrum remains clean, and fast enough to prevent clipping of either speech or CW. It also provides a worthwhile reduction in background noise, especially when using processed speech.

Control Circuits

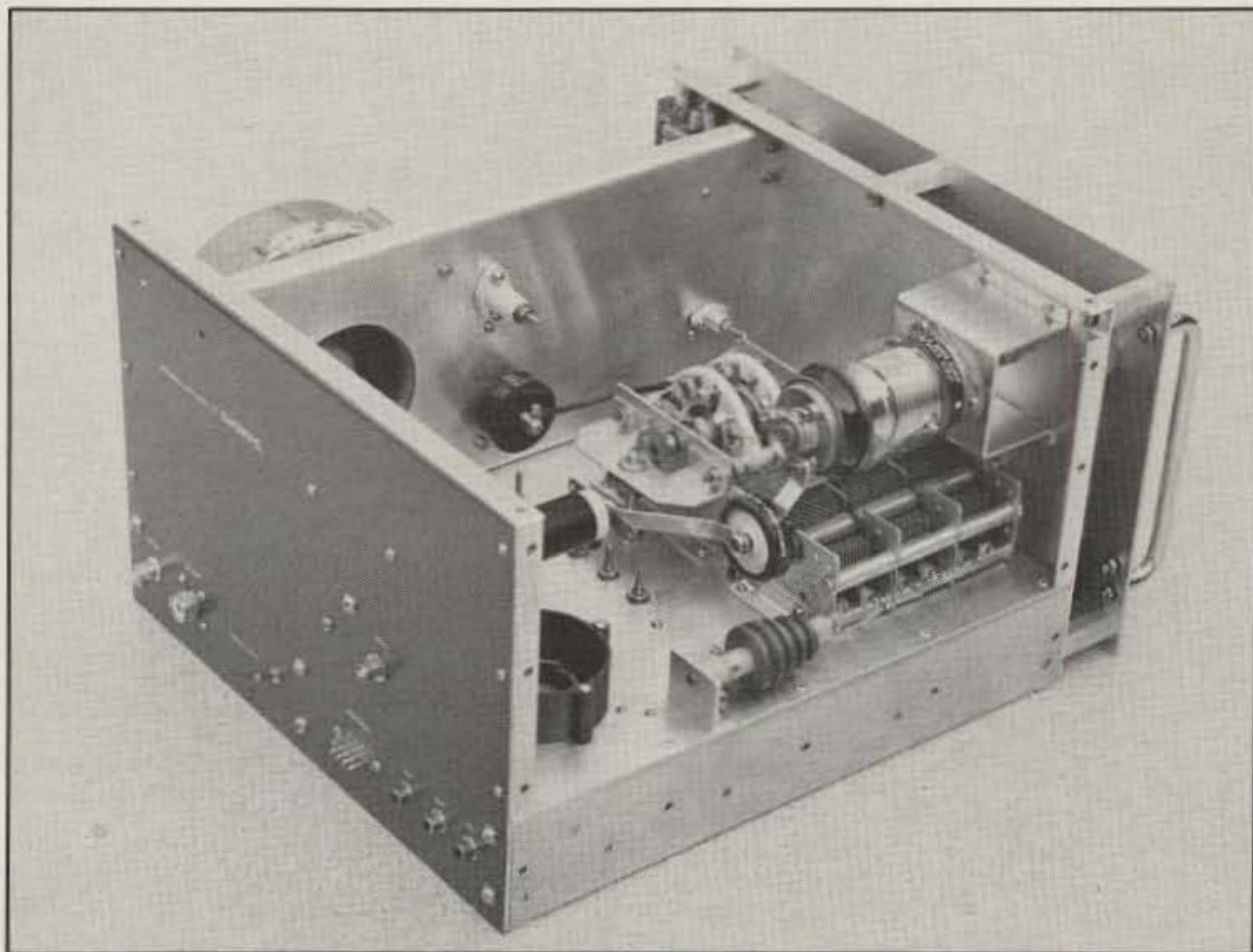
As can be seen from figs. 2 and 3, the AC 110 volt supply for the amplifier chassis is derived from the HV power supply unit via the control cable, and provided that the power supply is connected to a suitable

power source, closing SW1 will apply power to T1, the filament and control power transformer. Originally, T1 had two identical secondaries, 15 volts at 3.5 amps, but one secondary had to have a few turns added in order to provide the higher voltage necessary for the stabilized filament supply.

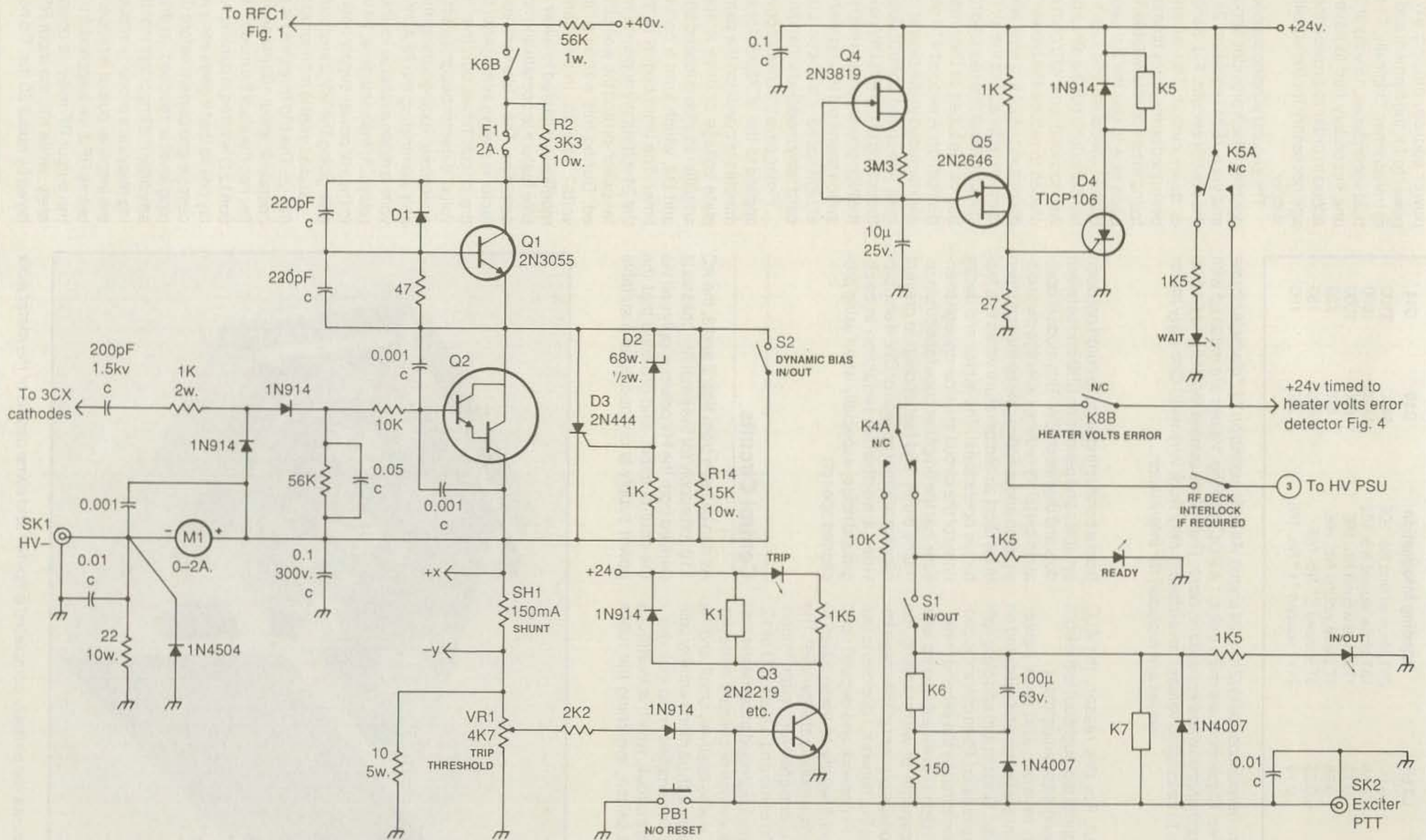
The second winding supplies a full-wave doubler, which provides about 40 volts DC and via a 7824 regulator, 24 volts DC for the control circuits. Fig. 3 shows the blower delay circuit. This arrangement has been used by me many times and has been found to be entirely reliable. It would have been nice to use the full capability of the blower (because you can't blow a tube hard enough), but the air turbulence noise was too loud, so a 470 ohm resistor is included to reduce the blower's speed and maximum output to a level where the noise is much reduced but the air throughout is still well above that required for safe operation of the tubes at their maximum plate dissipation. A second 470 ohm resistor is also included in the blower circuit and allows two-speed control depending upon the setting of the HI/LOW power switch. In the high-power position the HI/LOW power switch shorts out R1 and the blower will run at high speed. It also operates K1, a standard relay modified to handle high voltage.

Eimac says that heater power should be applied to the 3CX800s for at least three minutes to condition the cathodes before plate voltage or drive is applied. In this amplifier this job is looked after by Q4, Q5, and D4, which form a conventional UJT timer. The timer begins to time-out when the 24 volt supply appears immediately after switch-on and the wait LED is illuminated. During this warm-up time the "low volts" detector in the filament voltage monitor is inhibited to allow the slow rise time feature to operate and not lock out the amplifier. The "filament volts high" detector is always active. After three minutes the circuit times out, the "filament low volts" detector becomes active, and K5 is energized, extinguishing the WAIT LED and illuminating the READY LED, and 24 volts is made available for the amplifier RF relays. At the same time, 24 volts is routed to the HV power supply operating K3 and energizing the HV transformer primary.

Grid current is monitored by Q3 and K4 (fig. 2). The trip threshold is set by VR1 to operate at about 100 ma and trip the amplifier into the standby mode. The trip indication LED is wired in parallel with the trip relay coil so that it gives early warning of excessive grid current before the actual tripping level is reached. In any high-power amplifier it is important that the RF switching relays are properly sequenced so that the amplifier output is properly terminated before RF drive is applied. In this circuit K7, the output RF relay, is operated immediately, while K6, the input RF relay, is delayed by about 20 ms. Do not be tempted



This view shows the partially completed amplifier and some details of the metal work.



M1—1 ma MC meter, your choice, shunted for 0–2 amps.
 D1—7.5 volt, 1 watt zener diode.
 D2—68 volt, 1 watt zener diode.
 D3—500 volt, 4 amp thyristor, $I_g = 5$ ma (2N4444).
 D4—400 volt 1 amp thyristor, $I_g = 500$ ua (TIC P106M)
 Q2—200 volt 5 amp Darlington, $H_{fe} = 1000$.
 K4 & K5—Miniature 1 amp SPCO relay 24 volt coil PCB mounting.
 K6—5 amp 2 PCO power relay 24 volt coil.
 K7—10 amp 2 PCO power relay, both poles in parallel.
 PB1—1 amp N/O push button.
 SW1—2 amp 2 PCO toggle switch.
 SW2—2 amp SPCO toggle switch.
 SK1 & SK2—Phono socket.
 SH1—Grid current shunt, handmade to provide full-scale deflection of 150 ma on multimeter.
 The dynamic bias switch SW2 is mounted on the rear panel.
 All resistors are $\frac{1}{2}$ watt unless stated otherwise.

Fig. 2—Control circuits.

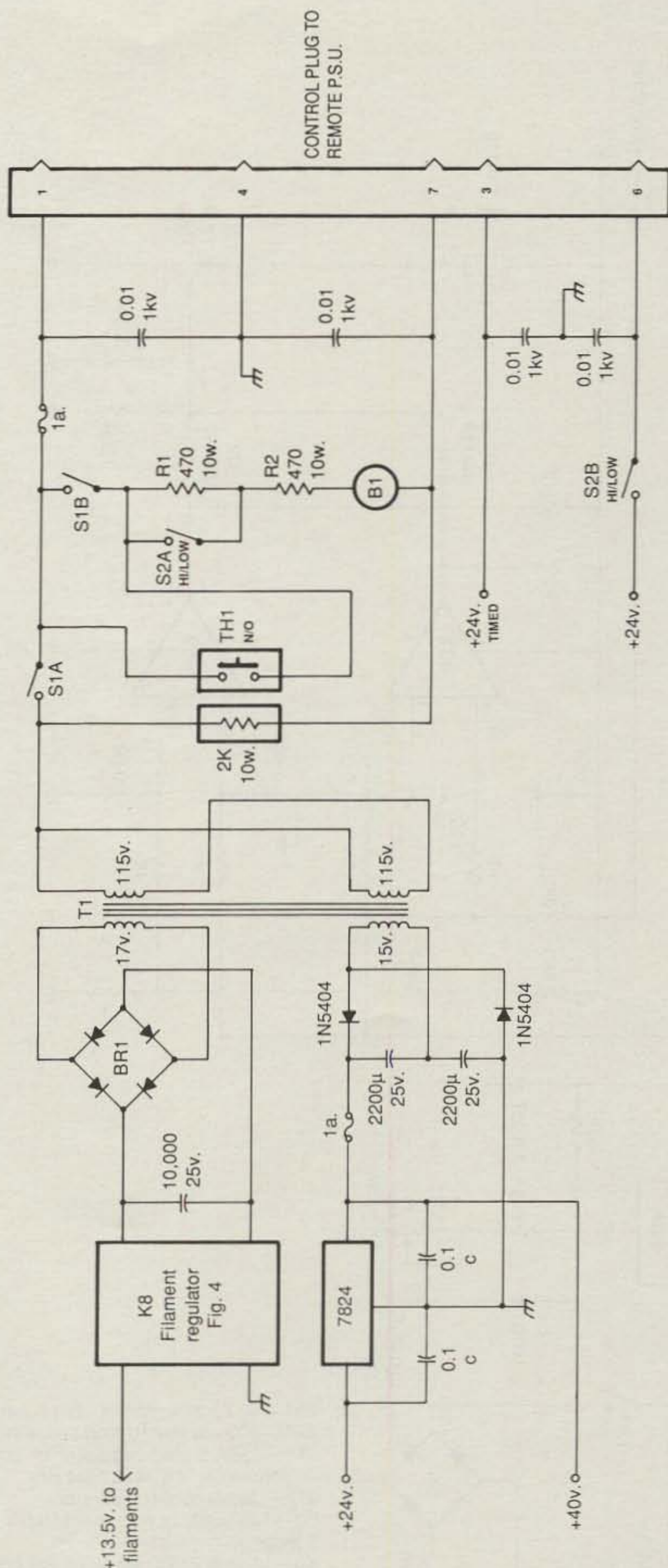
to use a single multi-pole relay to do this job.

The Filament Power Supply

On the face of it, the filament supply circuit (fig. 4) may appear to be overly complicated. However, Eimac recommends that the filament voltage not deviate by more than 0.6 volts for maximum tube life, and for what I (the wife) paid for these tubes, the extra effort that went into the design and building of the supply and its monitor circuit will hopefully be worthwhile. The 0.6 volt in 13.5 volts represents a change of 4.4% and the UK power companies only guarantee to hold it to $\pm 6\%$. This, coupled with other factors like being at the end of a line or operating the amplifier from a portable generator, etc., will almost certainly result in the filament supply operating "out of spec" for long periods of time. The filament supply secondary of T1 had to have eight turns added to raise the pre-regulator voltage to 17.5 volts to prevent the 338K regulator "dropping out" when the supply voltage sags.

B1—Model No. VBL 4/3 or equivalent (Air control Chard UK).
 T1—R.S. Components Ltd. stock No. 207–302 or equivalent (see text).
 TH1—Bi-metallic thermostat, N/O 5 amp, 70°C, epoxy cemented to the body of a 10 watt wire-wound resistor (see text).
 BR1—6 amp, 200 volt bridge rectifier.
 SW1 & SW2—2P, 5 amp toggle switch.
 R1 & R2—Values only suitable for specified blower.

Fig. 3—Blower delay and DC supplies.





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- UT-30 Tone encoder..... 18.50



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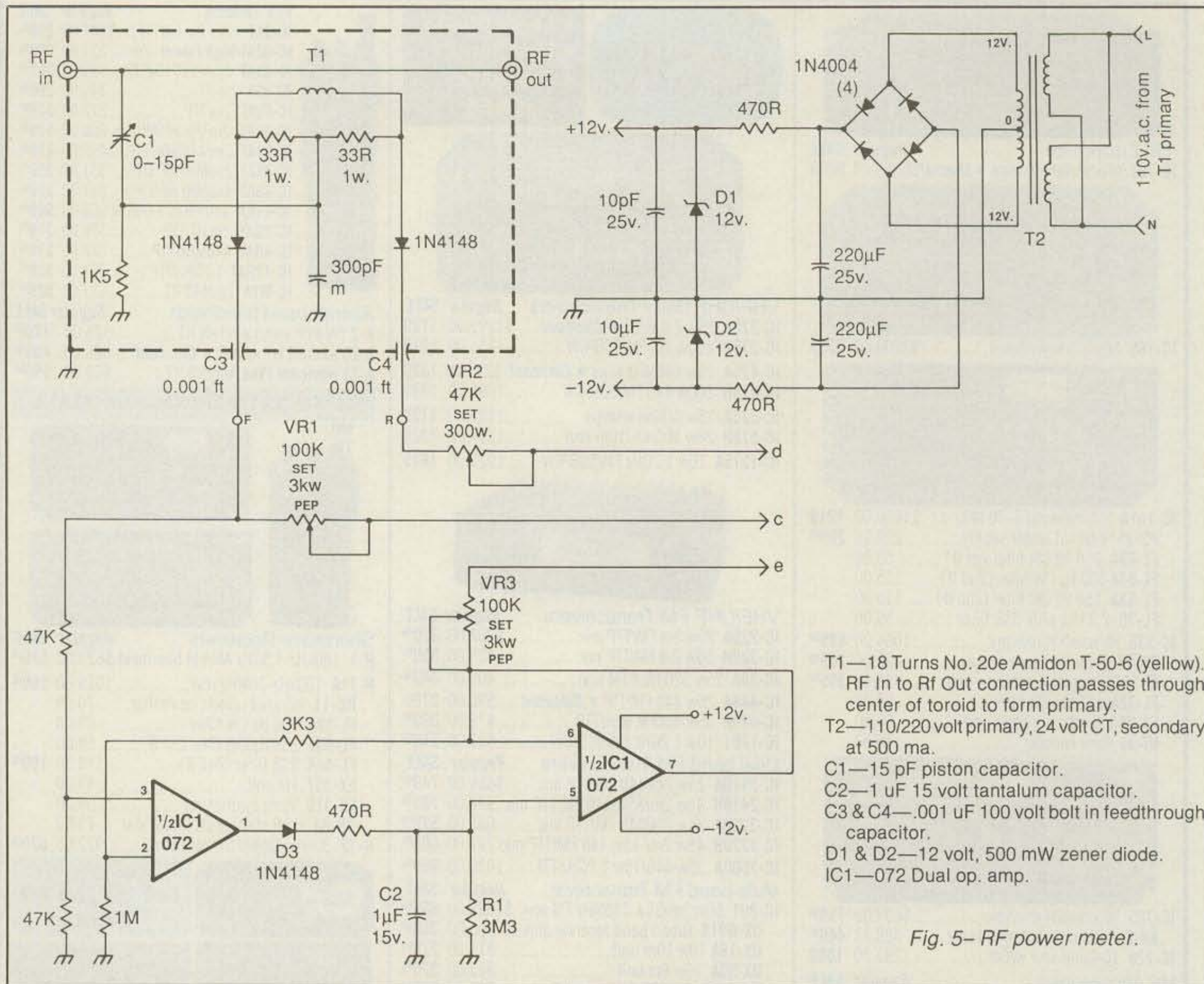
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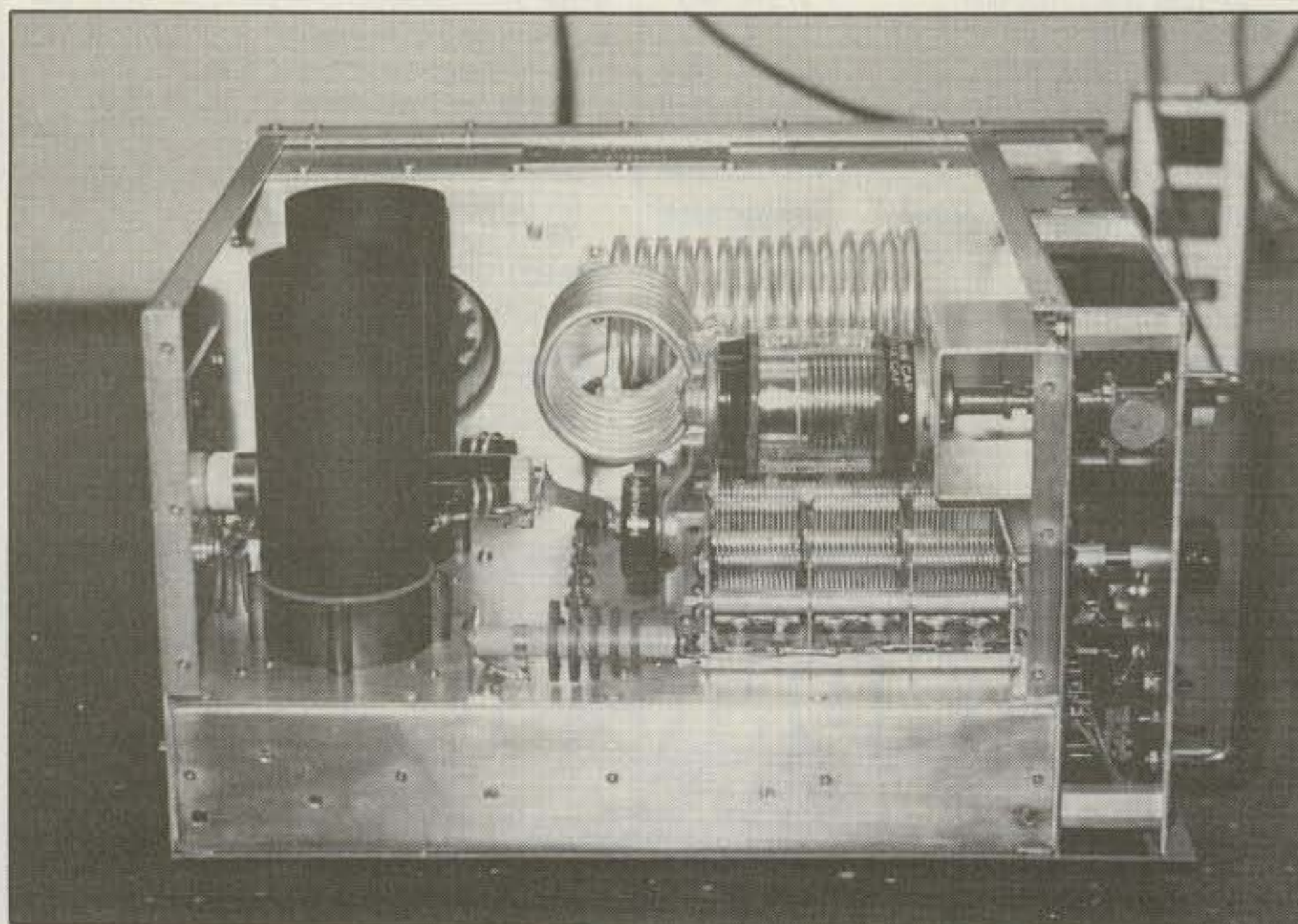
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Fig. 5— RF power meter.



After looking at the completed amplifier, it is obvious that a lot of thought and planning went into its design.

larger than normal. This choice of value was quite deliberate and may seem rather high, but when you consider the relatively low impedance presented at the plate side of the Pi network, this sort of value is necessary in order to avoid power loss and excessive heating of the component on the LF bands.

RFC 4 is essential. Its purpose is to provide a low-resistance DC path to the plate voltage, and in the event of the plate blocking capacitor failing, short circuit, the high DC current will rupture the HV fuse in the power supply, thus preventing the appearance of 2.5 KV on the antenna. The output band switch is a two-wafer assembly made entirely from "bits and pieces," but any heavy-duty ceramic switch should be okay. Again, because of the relatively low plate impedance of this amplifier, the 80 meter Pi network values can't be entirely accommodated in the variable tune and load capacitors, so C3 is placed in parallel with the Tune capacitor and C4 is switched in parallel with C2.

(To Be Continued)

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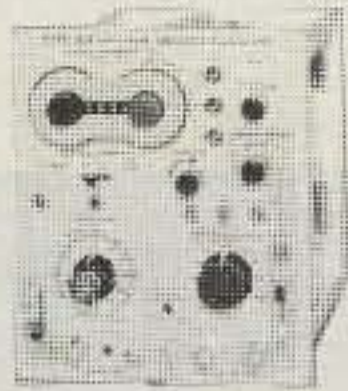
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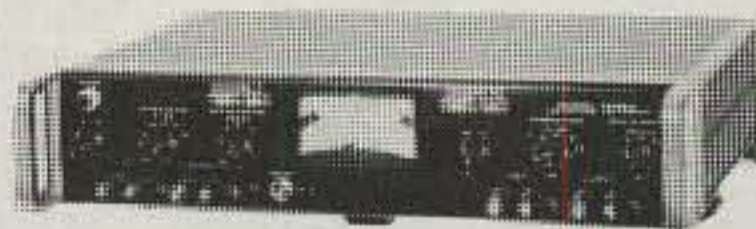
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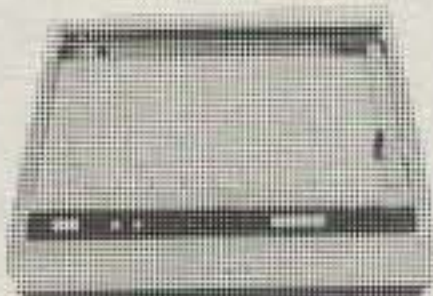
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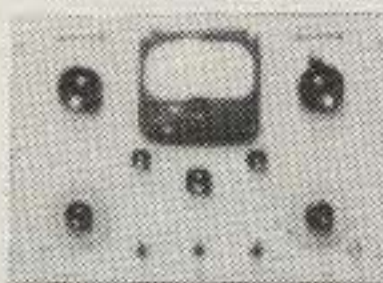
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CQ REVIEWS:

The Ham-Pro 15 Meter Beam

BY LEW McCOY*, W1ICP

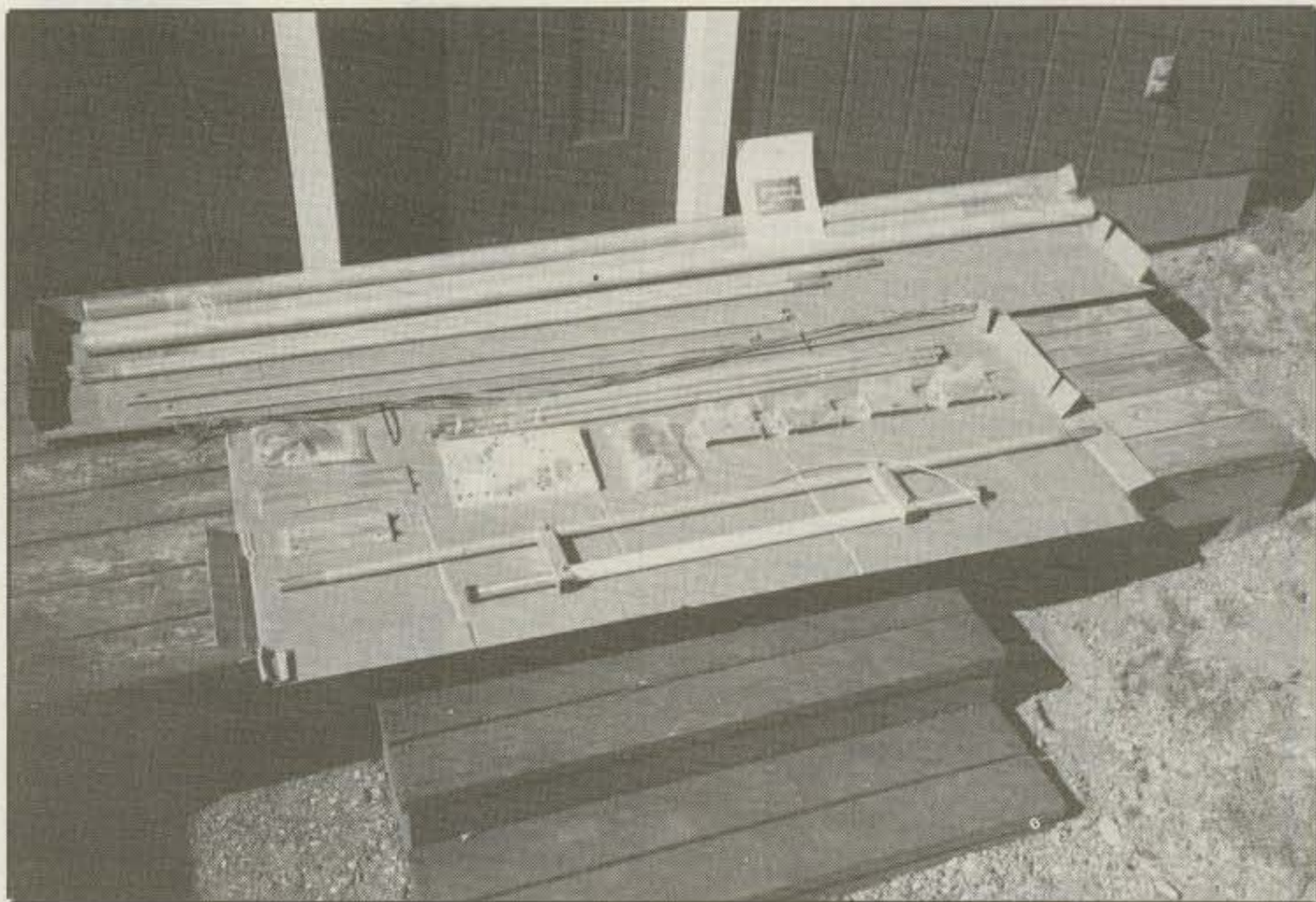
Ham-Pro Antenna manufacturers have been in the commercial TV and FM broadcast antenna field for over 30 years, and recently they entered the amateur field, making monoband beam antennas. At Dayton this year I had a chance to talk at length with Peter Onnigian, W6QEU, Director of Engineering, about their line of antennas. The result was that I have just finished testing one of their beams—the 15 meter 4-element unit.

Their antennas have several unusual features that apparently are not found in other beams. The most impressive is their feed system. They have invented (and patented) a balanced double gamma feed (see fig. 1). This method of feed has a distinct advantage over the single gamma in that it eliminates the radiation problems usually found with single-section gammas. One of the major problems with the normal gamma match is that it can radiate, and the radiation can upset the desired pattern of the antenna or cause skewing of the pattern, simply because it isn't balanced.

Study the photograph and fig. 1, both illustrating the balanced Ham-Pro gamma, and you will note that it is a symmetrical feed method. Not only is it balanced, but Ham-Pro has another feature that certainly bears mentioning. First, however, let me go back in my own history.

Many years ago when I worked in the Technical Department of the ARRL, I got involved in an antenna project that covered a couple of months of work. The job consisted of checking beam patterns (using VHF antennas for modeling), gamma feeds, and so on. I personally was pleased with my results. After all the work I brought my notes in to our Technical Director, George Grammer, W1DF. I showed him the results, expecting maybe a slight compliment.

George examined the material and my tests procedures, looked at me, and said, "McCoy, how did you keep the feed line out of the picture? What about feeder radiation?" It took me only a minute to realize



The antenna is shipped by UPS (two boxes), and this photo shows layout of the parts, getting ready for construction. The matching section comes preassembled. Each element assembly is separately marked. The special gamma section is the preassembled section at the front.



KB5PFO doing some careful instruction manual reading before applying a screw driver or wrench.

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

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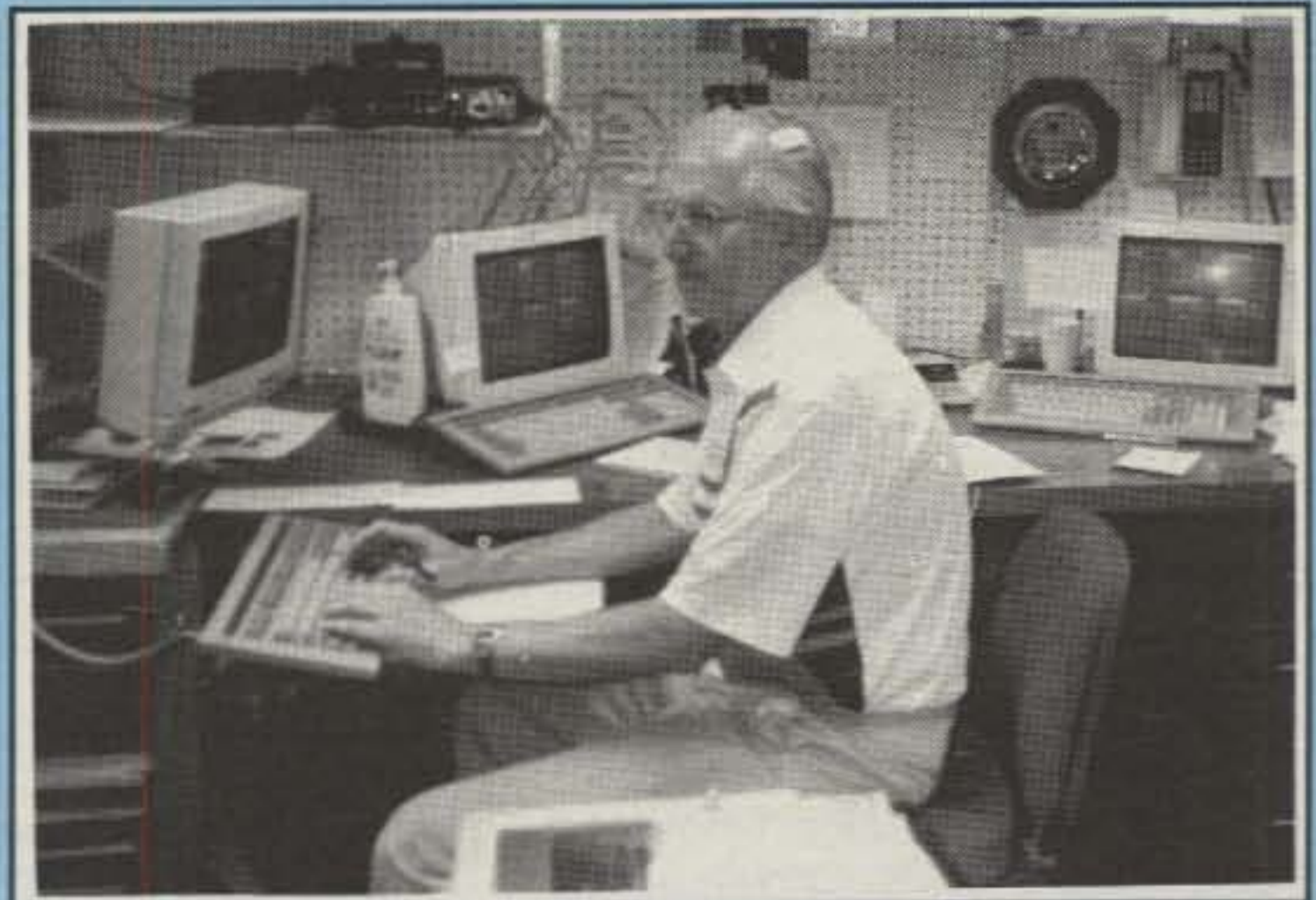
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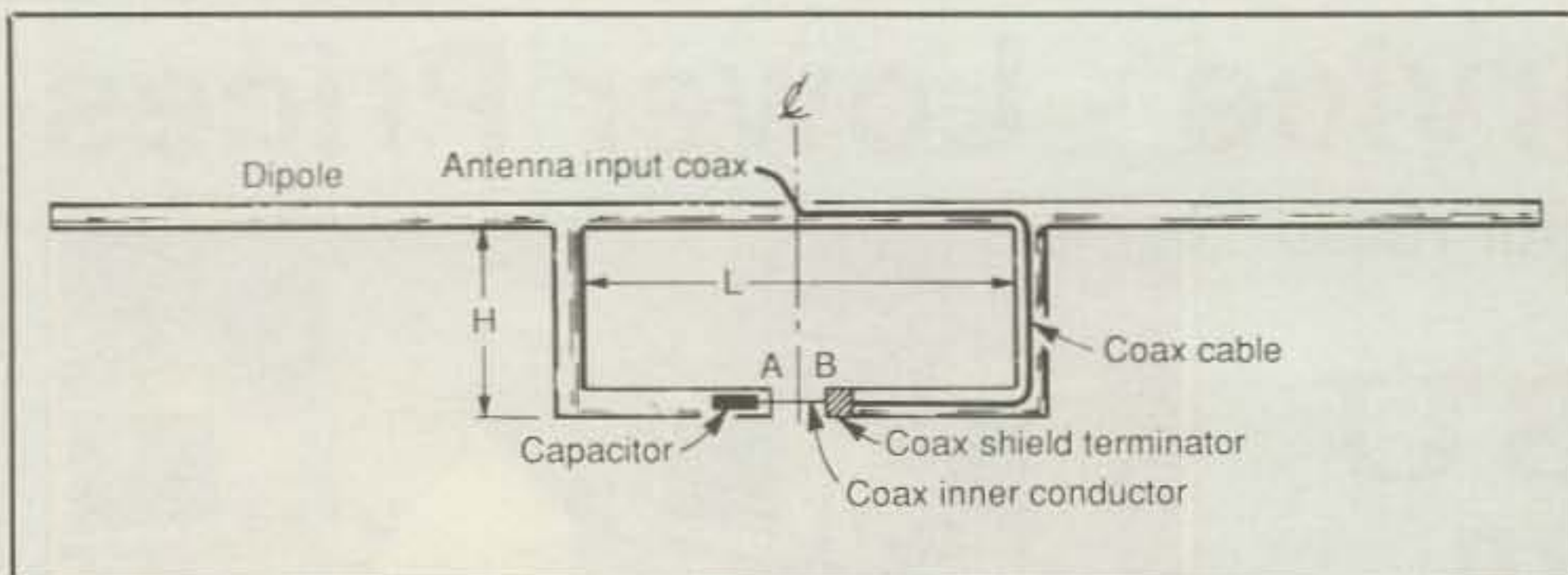


Fig. 1- This shows the method of feeding the double gamma. Note the feed line (coax) is brought up inside the dipole and then through one arm of the gamma. The coax shield is terminated on one side, and the inner conductor is capacitively coupled to the other side of the gamma.

that all my work—or at least most of it—was useless. I asked George why he hadn't stopped me earlier, and I will never, never forget his reply: "Mac, I wanted you to learn!" That's called the hard way! So if I am skeptical about some of the statements made by the so-called experts today, you can understand why. That certainly, however, does not apply to Ham-Pro in this case. Here is why.

The balanced double gamma feed provides a balanced feed system, but some of this could be ruined if the feed line proper was directly in the field of the balanced gamma. Ham-Pro, however, keeps the feed line *inside* the gamma and inside the boom, coming out at the mast to boom bracket. This makes for an exceptionally clean mechanical installation, eliminating incidental RF radiation.

Before discussing actual mechanical construction, a word or two about design is in order. Ham-Pro uses computer *aided* design. Note the emphasis on "aided." In other words, the computer provides basic

information as to best element spacing, boom length, etc. Then, however, Ham-Pro makes use of a test range to fine-tune the product.

In questioning W6QEU, he admitted there was a big step between computer modeling and physical realization, and that is what I have come to find out. As they point out in their literature, an example is where a computer calls for a first director to be 0.4015 wavelengths long. How do you know the correct length when the element is stepped (tapered) and sits on a boom saddle, plus a grounded boom and the boom itself? As they found out from actual range work, all this makes a real difference from the computer modeling. In other words, the computer gives you some basic needed information, but the actual product dimensions must be arrived at in the real world of testing, measuring pattern and gain.

As an aside, there has been some talk that we (all antenna manufacturers, and antenna people in general) all should pick

one particular computer antenna program as a standard. I don't agree, as there are just too many real-world variables. And I agree with Ham-Pro: Use the computer program as one tool, of many, to arrive at the best antenna.

One last comment on this subject. There is a set of standards for amateur antennas, and this was established a few years back by the Electronics Industries Association (EIA). The standards are in EIA RS-409 (EIA RS-409 is available from EIA, 1722 Eye Street NW, Washington, DC 20006 for \$11 a copy). These standards were arrived at by electrical engineers, antenna experts in both industry and the amateur community (ARRL provided much input), and others, including mechanical engineers. It would be very good for all of us if *all* antenna manufacturers used these standards.

As I stated above, the coax is run inside the balanced gamma to the mast mounting plate. Not just any coax is used, but actually Teflon dielectric RG-142. This permits 3.5 KW CW, and even higher PEP sideband! In the interests of keeping losses low, an N-type female connector is used at the mounting plate. In my case, we installed a male N-type connector on our coax for the tests, but there are adapters of N to UHF fittings available. Note I switched from "my" to "we." More in a moment.

Mechanical Details

All aluminum used in the beam is 6061-T6 for boom, elements, and extrusions. The boom length is 23.6 feet, 2 inch OD with .065 wall. The elements are tapered, 1.0/.75/.50 inches with 0.058 inch walls. Turning radius, antenna boom to longest element, is 17.1 feet. The support mast (customer furnished) can be from 1.5 to 2.5 OD. For wind survival, EIA rating with a steady wind is 87 MPH, and gusts to 112 MPH. The total wind catch area is 4.63 square feet. Last, the net weight is 39 pounds, 17.7 kilos.

Electrical Ratings

Rated gain of the 4-element beam over a dipole (dBd) is 8.8 dB as measured at mid-band, on a commercial 7000 foot long range, using RS-409 standards and Scientific Atlanta equipment. The rated front-to-back ratio—which will vary with height, frequency, and angle—is 13 to 30 dB. We used a calibrated receiver and found that in actual practice, some of the signals would run as much as seven to eight S units off the front, and would be inaudible off the back. This more than verifies Ham-Pro's 30 dB rating.

Front-to-side rating—again depending on height, frequency, and angles—is 21 to 40 dB. The (bandwidth) standing wave ratio across 15 meters is rated at better than 1.6 to 1 (21,000 to 21,450 kHz). My test antenna showed a match of 1 to 1 at 21,350 kHz



Here is one shot of the installed beam. The feed line is run from the boom to mast mount, and then down the support pipe. This is the special gamma matching assembly. The coax feed is brought up inside the mast, from the boom to mast mount, and then fed up through the gamma.

going up to 2.0 to 1 at the low band edge. More on this in a moment. The half power beam width is rated at 55 degrees.

Maximum power rating for the beam is 2500 watts PEP. All elements are at DC ground potential (Plumber's Delight type mounting).

Putting It Together

Note that a moment ago I used both pronouns—I and we. Long ago I decided that if "I" did something by myself, I would never use the editorial "we," which I feel confuses the reader. In this case, it so happened that a new amateur who lives in Reserve, New Mexico had to find someone to give him the Novice test. Reserve, New Mexico is the county seat for Catron County, one of the largest counties in the USA—a county as big as several states, but with very few people, and no other amateurs live there. In any event, Carl, the would-be amateur, called Silver City, which is about 100 miles away, and was given my name by our local chamber of commerce. (Just bear with me, as this all has to do with the product review.) Carl got interested in amateur radio because his son is a physician in the Comoro Islands and holds the call D68PM. Carl passed the exam with flying colors and got his call, KB5PFO. (Since then he has upgraded to General, getting 100% on the exam.)

We put up an antenna, what I like to call a "McCoy Special," which is simply a dipole long enough to fit between two supports and fed with open-wire line—for use on all bands. This antenna is about 116 feet long overall. We placed the orientation of the antenna so that it had a 3 dB gain lobe in the direction of the Comoro. Carl was successful in working his son on 10 and 15 with the wire antenna both on CW and phone, but not very well. In any event, I asked him if he wanted to have the Ham-Pro installed at his location and said I would test it there.

At this point, I would like to mention that all element parts are premarked, and the instruction manual is clear and to the point. (One would have to be pretty dense to make a mistake in assembly.) I let Carl do all the work (of course), and his conclusion was that the manual was easy to follow. The antenna went together in very short order.

We installed the antenna at only 23 feet above ground, mounting it on a pipe. (Since then Carl has acquired a tower, so we'll be going up 40 feet plus.) The 23 foot high mounting presents some problems simply because of the antenna proximity to rain gutters and house wiring. I know for a fact the SWR curve (which is excellent) will improve when the antenna is on the tower.

The real proof of the pudding so to speak was when Carl had a sked on 15 with his son. D68JM has a manager in the States who runs high power, has a good location, and keeps a regular sked. But in this very

first case (a matter of fact, the first contact with the beam), Carl, running only 100 watts, was several S units louder—hi! Comparison between the wire antenna and the beam? With the wire, D68JM could barely hear Carl, but with the beam, S6 to S8. Naturally, Carl was jumping up and down with joy.

In my own case, after years of experience designing, building, and testing scores of beams, it doesn't take long to evaluate an antenna. It was obvious from the moment we hooked on the feed line to the receiver that this was a "hot" antenna. The Ham-Pro showed both excellent front to back and front to side. The receiver we used is calibrated at 6 dB per S unit. In some instances, signals were S9 off the front and no reading off the back. I don't really believe the receiver calibration, because 9 time 6 equals 54 dB in anyone's book, but there was no doubt that this beam is a real performer. My rating from making many checks shows the beam to have a front to back from 20 to 30 dB, depending a lot on what I call the "attack" angle of the signal being checked. On the average, the front to back on most signals ran 4 to 5 S units.

List price of the 4-element 15 meter beam (H15-4) is \$340. The antenna is manufactured by Ham-Pro Antennas, a Division of Kopps Corp., 6199-B Warehouse Way, Sacramento, California 95826 (1-800-879-7569).

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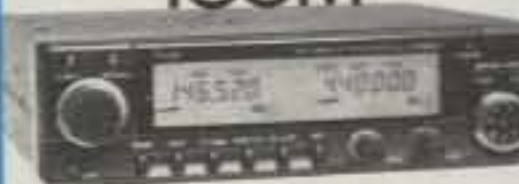
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Finding That Elusive Power-Line Noise

BY CHUCK CULLIAN*, KØRF, AND T.J. JASIEWICZ

Not even the top contest operators make it on skill alone. Skill enhanced by super locations, super antennas, and a quiet environment is what it takes to win. This combination might still fall short when competing with the east coast in a DX contest.

After ten years in Colorado (having missed the east coast by a scant 2000 miles) I found a location guaranteed to bring a gleam to the tired eyes of even the

most jaded DX contester. This was *the* spot.

The mesa dropped off 200 feet on all sides. The Rockies to the west were under the minimum horizon limits I had set for any location near the mountains. A switchback road provided easy access in the summer and a sore back with aching muscles in the winter. Perfect! A place from which a serious attempt could be made to shatter existing records.

It's Not Always What It Seems

One year, three towers, six Yagis, and miles of wire later, with all antennas test-

ed and optimized, it was contest time again. The installation was not complete, but it was good enough to go with. It was time for running JAs and EUs.

Late on Friday afternoon, before sunset, I heard the first EU on 40 meters. With any appreciable noise level I would not have heard him, but he went into the log, as did several others. One contact was lost due to a severe sputtering noise that appeared from nowhere, lasted a few seconds, and was gone. It appeared again. And again. I QSYed to 20 meters and tried a few CQs with no luck. When Bill, WØZV, called to ask why I wasn't working the pile-up on my frequency, it became obvious there was a serious

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problem. I turned off the rigs and sat down to think.

Chasing Noise

I have found only two kinds of noise problems: those which can be eliminated and those which are never found. For two years mine fell into the latter category.

The first steps taken were the obvious ones. There are not many transformers in my remote location, so with the aid of a portable radio I was able to check them and the power poles quickly. Next, the water pump at the foot of the mesa proved equally clean. During this time I found and repaired a few electric fences, which made me some friends but did nothing to solve my problem. Next step: enlist the aid of the local power company.

Power companies are usually cooperative and will respond when you call for help. They will expend the time and manpower required to solve the problem, and will usually do so if it is one which can be traced to loose pole hardware or noisy transformers. Mine was not that kind of problem. The power company responded when I called, but lacked the understanding and specialized equipment necessary to track the noise to its source. I had tried all the tricks I knew, but I needed to know more. It was time to open some books.

In Bill Nelson's *Interference Handbook*¹ I found that Micro Tech Mfg. Inc.² marketed a device called the "Super Snoop." What I needed indeed was something snoopier than the devices available to me. I called Micro Tech for help.

The Micro Tech Super Snoop

My conversation with T.J. (T.J. Jasiewicz) made me aware of the gaps in my knowledge of noise sources and how to eliminate them. For stubborn, elusive noise more sophisticated equipment than I had available would be required. The Micro Tech Model 910 Super Snoop sounded right for the job.

The Super Snoop is a UHF receiver employing a hybrid front end to take advantage of the latest SAW (Surface Acoustic Wave) technology. SAW devices are fabricated by printing metal patterns on the surface of a quartz wafer using semiconductor processing techniques.

An incoming signal to the hybrid front end is first filtered by a quartz SAW filter. This provides image rejection and LO beat rejection, plus excellent immunity to intermodulation distortion. The filter is followed by a low-noise amplifier which provides about 18 dB of gain. An additional 12.5 dB of conversion gain is provided by the mixer. The local oscillator is stabilized by a quartz SAW resonator and produces a 10.7 MHz IF output. The use of

SAW technology assures stable operation over a wide range of temperature and power-supply variations. The 10.7 MHz IF is filtered using a two-pole crystal filter and fed into an integrated-circuit AM-radio chip. This AM-radio circuit amplifies the audio signal and feeds it directly to the phone jack. For the operator who would rather not use phones, an audio amplifier with built-in speaker is available as an option.

This small, lightweight, battery-powered UHF receiver is portable. A directive antenna light enough to be carried and pointed makes it simple for an inexperienced operator to isolate a noise source to a single structure.

With the Super Snoop I found noise I had missed with my own equipment. There was enough noise present at all times to thoroughly confuse the issue. Being able to locate a noise source from several hundred feet away with the aid of a directive antenna gives one the advantage of confining the search to one direction at a time. The stock antenna that comes with the Super Snoop would be adequate for all but the most stubborn cases. It helped me locate nagging noises that were a constant annoyance. I was making progress, but still hadn't solved my problem. A higher gain narrower beamwidth antenna would help.

The first step was to modify the stock antenna. By splicing a length of dowel to the existing boom, I was able to add three elements. This modification is easily made using junk-box parts.

The mod turned up a few lower level noises, but not the one I was looking for. What now? Stamp collecting? More antenna?

Using IBM-compatible Yagi design software, a new seven-element antenna was designed to provide maximum forward gain compatible with the design goal half-beamwidth of 22 degrees.

This was a fun project. The performance closely paralleled the design goal. With the new antenna fitted to the Super Snoop, an HF radio, and my wife—Gail—in the car, the hunt was on.

We started by working all the poles and power lines and found nothing new; none of them produced the arcing, rasping noise that made contesting impossible for me. We were tiring of the search when we picked up a faint scratching, tearing sound at about 20 degrees from my shack. This was the first encouraging lead of the day. It was on the heading to Europe and in the direction where the noise peaked at my QTH. Tallyho! The fox was in sight and the hounds were bearing down. The noise grew louder in the headphones.

When the noise peaked up and started to fall off, we turned and went back, checking every pole and transformer on the way. The arc remained constant. We

decided to check out the few houses in the area. People were cooperative. We could look anywhere we chose if it would help us in what we were doing.

We didn't do all the houses. There was one tucked away from the others, visible behind some trees and directly under 135 KV power lines. We drove over there while the noise in the headphones increased from a growl to a roar. The long search was going to end in a power pole after all. But it didn't.

When the antenna was pointed up at the cross-arm on the pole, the noise dropped off. Next, we scanned the power line with the same result. With the antenna pointed at the house, the noise level rose again.

The man who answered the door wasn't aware of a faulty appliance in his home, other than a TV with a very bad picture. He had no objection to turning it on for us. It was a visual record of the problem that put an end to my contesting. The screen content was badly torn by shot noise. We told him that problem would go away when we solved ours.

Outside again, we swept the house with the antenna and found the noise dropped slightly. Turning it toward the garage caused the noise to increase. The garage was open and empty. There was a battery charger, an old refrigerator, a freezer, and a bare light bulb hanging from a cord. These were turned off one by one without effect. The light bulb was removed from the socket. No change. All appliances were turned off and another antenna sweep was made. The noise peaked up straight overhead. A sweep of the antenna along the 135 KV power lines crossing over the garage showed that the noise was not as strong as it was off the structure itself. There was nothing on the roof, but a visual inspection was in order.

In the end, it turned out that the metal flashing over the ridge pole was made of two pieces unsecured at the center. The arc was visible and audible from a few feet away. The existence of a potential difference large enough to bridge the gap between the two unbonded metal flashings was due to the voltage induced by the overhead power lines. Had we done the job at night, we would have spotted the arc from the house. A few nails cured the faulty joint and the problem. Now that I have that noise cleared up, I'm ready to make my own in the next contest.

I would like to give full credit to Micro Tech for producing the Super Snoop. Without it I would not have been able to track down and resolve the problem. The Super Snoop with stock antenna, except for the most difficult noise problems, does a respectable job and is probably sufficient for most cases.

About Power Companies

My power company has now added a Su-

per Snoop to its inventory of test equipment, but I keep mine handy so I can give instant chase to any new sources of noise. It is important to give specific information to the power company when reporting noise problems. The results are directly related to the quality of information you provide them.

WARNING: Do not touch power company equipment (including poles, guy wires, and accessories). It is illegal and potentially lethal.

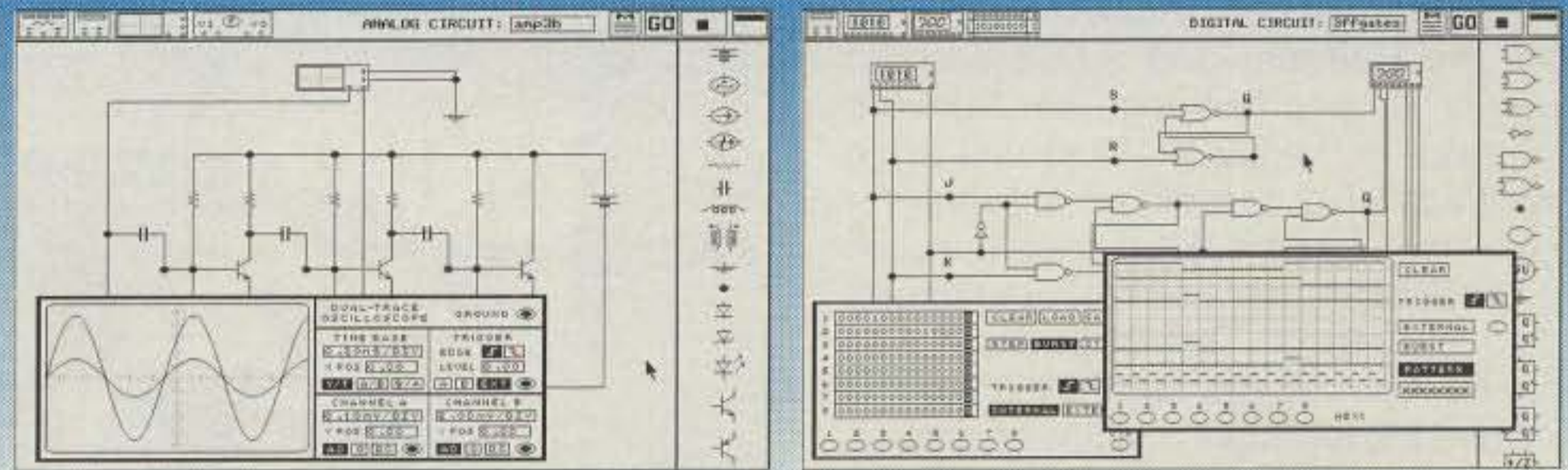
Footnotes

1. *Interference Handbook*, William R. Nelson, WA6FQG, Radio Publications, Inc., Box 149, Wilton, CT 06897. It is also available from The CQ Bookstore.

2. Micro Tech Mfg., Inc., 95 Grand Street, Worcester, MA 01610 (telephone 508-752-5212, FAX 508-754-2415). The Super Snoop retails for \$799.00.



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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.
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INTERACTIVE IMAGE TECHNOLOGIES



CIRCLE 25 ON READER SERVICE CARD

Times surely have changed! The Soviet Union and the United States are playing a great part in an unprecedented effort for world peace and friendship. The whys and wherefores of how the change is coming about are outside of our realm, but amateur radio was there at the forefront of these changing times.

4J6X From The Soviet Union

BY H.B. MUTTER*, N3CBW

On May 23, 1990, thanks to amateur radio, the Hammer and Sickle and the Stars and Stripes flew together from the same mast in the USSR. The mast flying those flags also carried an antenna for the CQ-sponsored 4J6X DXpedition, the first USSR/USA joint packet radio operation to the world. The DXpedition was conceived out of the spirit of changing times and the foresight of a few amateurs.

During a 1988 interview with the Chief of the Krenkel Central Radio club of the USSR (CRC) on radio amateur freedom in the Soviet Union ("Glasnost, Perestroika, and QSLs," *CQ*, March 1989), Col. Vasily Bonderenko alluded to the authorization of packet radio for Soviet amateurs—sometime in the future. Pressed for a more specific time frame, he hesitated and then said that time was unimportant, since there is no equipment for amateur packet in the USSR, so what's the rush! However, for Victor Tkachenco, UA6LA, from the city of Rostov-on-Don, as well as for other Soviet amateurs, the time was now for full freedom of operating authority.

UA6LA helped this author get the story for the *CQ* article of March 1989 and was present at the CRC during the interview. He spread the word to his friends that packet authority could be had. After I returned to the US, Victor, joined now by Michael Bondarev, UA6LU, and Boris Larionov, UA6LQ, pressed me for help in bringing about their new freedoms. In May 1989 it was agreed that having packet radio readily available in the Soviet Union would not only demonstrate radio freedom for Soviet amateurs and friendship between two former antagonists, but it would also be an opportunity for hard-pressed Soviet amateurs to receive the



Back row, left to right: Victor Evtushenko, UA6XD; Collective Farm Foreman; Vladimir Ligidov, Collective Farm Chairman and DXpedition host; Timur Krymshamkhalov, UA6XAC (deceased fall 1991); and S. Vartasaryan, UA6LD, Pres. Rostov Radio Sport Federation. Front row, left to right: Michael Bondarev, UA6LU; Victor Tkachenco, UA6LA; Boris Larionov, UA6LQ; Robert Curry, KC3VO; and Anotoly Kenzhukulov, UA6XT.

technical wherewithal to operate digital communications. (Technically, there had been special licensed packet stations authorized for limited purposes—e.g., for the disaster relief in Armenia and a North Pole expedition.)

The idea for a packet DXpedition to the USSR was presented in June 1989 to the publisher of *CQ*, Richard A. Ross, K2MGA, who welcomed the idea and agreed to act as a sponsor. Having such a formidable sponsor was instrumental in getting the DXpedition off the ground and getting Soviet approval and cooperation. The good news of *CQ*'s sponsorship was transmitted to a now growing number of

interested amateurs in Rostov, who then began to plan the site and logistics for the DXpedition. A formal request for the DXpedition was sent to the CRC by *CQ* in September 1989. In December 1989 a formal invitation from the Rostov Radio Sport Federation arrived authorizing the DXpedition and inviting myself and my friend Bob Curry, KC3VO, to visit the USSR and participate in the event.

The site of the DXpedition was the Autonomous Republic of Kabardino-Balkaria, UA6X land. The callsign 4J6X was awarded to the DXpedition by the CRC, and KC3VO and I were authorized portable operation as UA6L or UA6X. The

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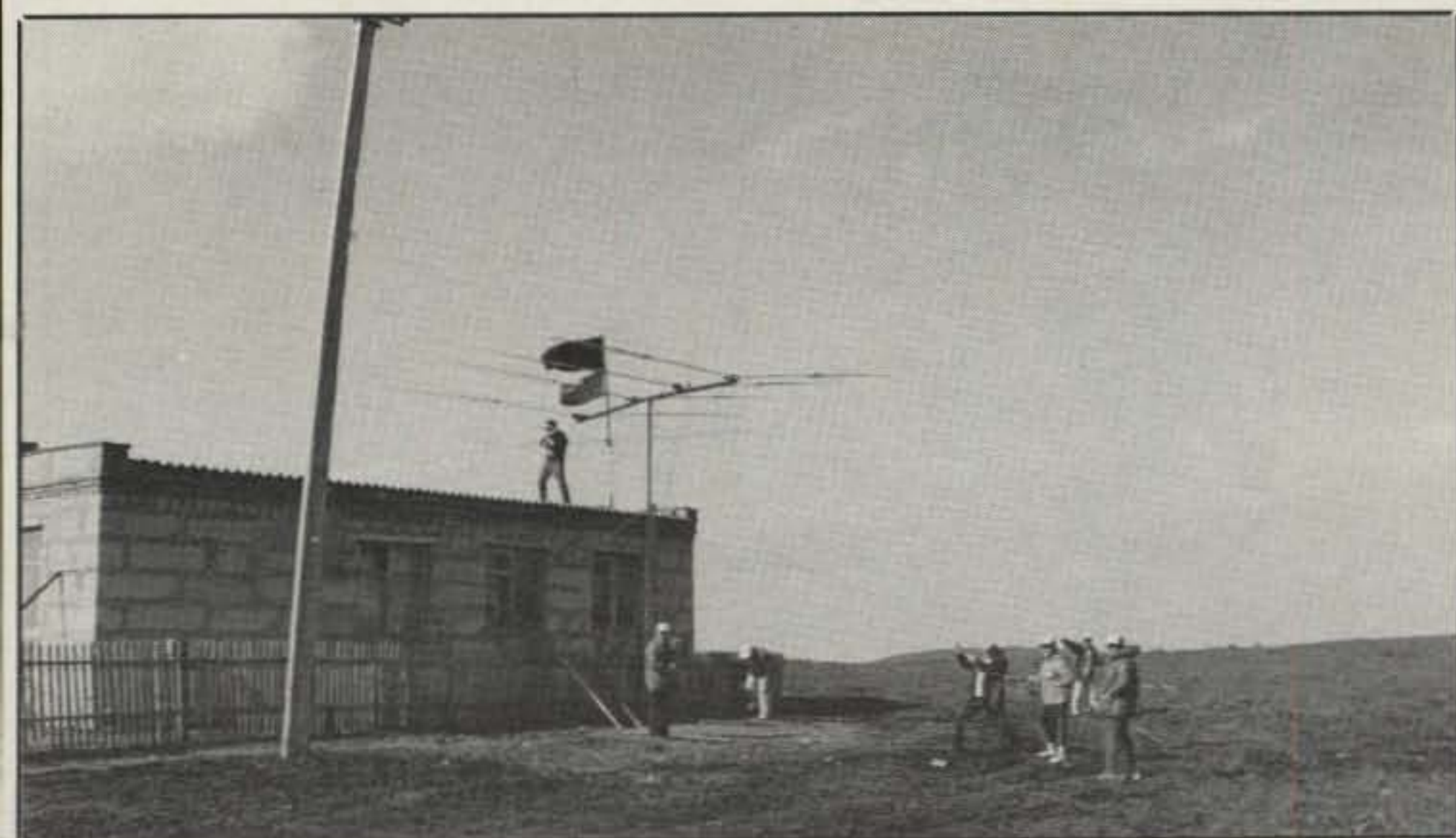
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CIRCLE 95 ON READER SERVICE CARD

January 1992 • CQ • 33



The beam goes up.

CRC followed up the invitation with authorization for packet radio in the USSR effective March 1, 1990.

The seed of an idea burst into a flower, but harvest time presented many problems. Some of the major problems were translating the official invitation to visas; defraying the costs of the undertaking; and the logistics for transporting over 200 kilos of equipment and supplies as well as personal baggage.

The official invitation for foreign visitors made by the Rostov amateurs was their first experience with inviting foreigners through official channels. They were not prepared for the bureaucratic ways of their Foreign Ministry, which authorizes

official visas. After considerable confusion and the passage of some three months, a friend at the Soviet Consulate in Washington, DC came forward and helped solve that problem.

Understanding that Soviet amateurs have practically no state-of-the-art equipment and really no computer capabilities, the DXpedition would have to rely totally on what could be brought over. Despite a major effort to enlist financial support, the financial burden of the DXpedition from this side of the ocean fell upon CQ, myself, and KC3VO. (AEA and MFJ provided equipment at cost; AEA donated 50 copies of *Digital Communications with Amateur Radio*; and Optoelectronics do-



Parting ceremony at Krenkel Central Radio Club of USSR. Left to right: Leonid Maksakow, RA3AT; Igor Petrashko, UT4UX; Boris Larionov, UA6LQ; Michael Bondarev, UA6LU; H. B. Mutter, N3CBW; Vasily Bondarenko, Chief, CRC; Nicholi Kazanskey, Deputy Director, CRC; Vera Sviridova, Box 88 Manager, CRC; and Victor Tkachenco, UA6LA.

nated a frequency counter). George Jacobs, W3ASK, who writes the Propagation column for CQ and who lent great moral support to the project, made his own donation at the eleventh hour to help.

One of the goals of the DXpedition was to leave packet capability in several areas of the USSR. However, the cost of such a hope was beyond our means. Nevertheless, airfares were spent and one transceiver, five TNCs, three computers, two monitors, etc., were taken and donated. All costs inside the Soviet Union except for airfare were borne by the Rostov and Nalchik amateurs or their Radio Sport Federation.

A major financial burden of the cost of transporting the 200 kilos of equipment and supplies and personal baggage was ultimately avoided at the last minute with the help of friends at high and low places at Aeroflot. It was a little more complicated coming home.

Flight SU 318 left Dulles International airport in May 14, 1990 at 1400 local time (2200 Moscow time) and arrived at Sheremetevo International airport on May 16, 1990 at 0945 Moscow time (0200 Washington, DC time). The flight was met joyously by amateurs from Rostov and Moscow, and after emotional greetings, a delegation commenced a battle with the Soviet Union's Customs Service. Three hours later equipment and baggage were released with a token payment of customs duty. By special bus, our entourage and equipment was transported to Vnukova (domestic) airport for the flight to Rostov-on-Don. At 1730 Moscow time we finally arrived in Rostov, where we were met by another delegation of Rostov amateurs. Despite the fact that we now had been without sleep for over 24 hours, our hosts presented us with a banquet, where we were kept awake with the aid of vodka. Little did we know that this set the tone for the next three weeks.

Between banquets and drinking vodka we had to find time to do a lot of work perfecting the packet software, interfacing the equipment with Soviet systems, and teaching packet radio. On the third morning work stopped and we were spirited away up the Don River to a summer camp for Russian R&R. The countryside was thrilling and the ride was exhilarating. A bus was used as if it were an ATV (All Terrain Vehicle). We learned about the Don fishermen and their techniques and about Sashlik (a form of shishkabob). The playful group of amateurs up the River Don numbered about 20 from Rostov, and then we were joined by several amateurs from Novocheerkassk, headed by Valentine, UA6LY. Mindful that the vodka still flowed for most of us, a swim in the Don was postponed for another time.

More banquets and parties and attending a special meeting of the Federation of Radio Sport of Rostov awaited our return.



Soviet-style celebration of successful arrival at DXpedition site.

Nevertheless, the equipment and software finally became operational in trials on the afternoon of May 20th, and that evening at 2200 hours we took a train for the 12 hour ride to Nalchik. The Rostov contingent for the DXpedition consisted of UA6LU; UA6LQ; UA6LA; Victor Sadtchikov, UV6LC; and Serge Vartasaryan, UA6LD, President of the Rostov Radio Sport Federation.

Nalchik is the capital city of the Autonomous Republic of Kabardino-Balkaria, Oblast 087, UA6X land. It lies in the Caucasus Mountains with the highest mountain peak in Europe, Mt. Elbrus, at well over 16,000 feet.

On arrival in Nalchik we were met by

that city's contingent of amateurs. Our hosts in Nalchik also provided their share of the Russian banquet, at which we also met their families. Victor Evtushenko, UA6XD; Anatoly Kenzhekulov, UA6XT; and Timur Krymshamkhalov, UA6XAC, joined us on the DXpedition. On May 23, 1990 we loaded our equipment and some of the guys into an army truck while the rest piled into two cars, and off we went to Mt. Elbrus. Along the 4 hour route we stopped at various local markets to pick up fresh fruit and vegetables as well as bread.

In the village of Sarmakovo, in the Zolski Region, we met the host for the DXpedition site, Vladimir Ligidov, Chairman of



Preparing to leave the city of Nalchik for the climb up to Mt. Elbrus to the DXpedition site. An army truck carried the load of equipment.

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CIRCLE 74 ON READER SERVICE CARD



Left to right: Robert Curry, KC3VO; DOSAAF Chief, Rostov Radio Sport Federation; and H.B. Mutter, N3CBW.

the collective farm that covered acres and acres of mountain and pasture land. We left the main road and started our trek up and down natural mountain roads, fording rivers until we finally arrived at a ranch house located approximately 40 miles from Mt. Elbrus, but thankfully below the snow line. A short celebration ensued with vodka and food, and then the work of establishing the station for 4J6X started. A resounding cheer went up, and we all felt the twinges of pride and camaraderie when one of our masts went up with the flags of the USSR and the USA flying together in a very stiff wind. By nightfall we were operational on all bands

on packet, SSB, or CW. The DXpedition operated an IBM-compatible computer, two solid-state HF transceivers, a homebrew transceiver, and an HF amplifier.

The site was uninhabited for many miles around except for a few Kabardino-Balkarian cowboys and their horses. It was range country for herds of cows, sheep, and horses. The terrain was barren of trees and marked by deep gorges. The chairman of the collective farm made every effort to see to the comfort and well-being of the DXpeditioners. Two women of the collective farm saw to all the cooking and cleaning and kept the hot water available for coffee or tea.

Except for the first day at the site where a wicked wind kept us dressed for winter, the remainder of the days were spent in the relative comfort of the late spring sun. Of course, it was a bit chilly at night. Not far from the ranch house lived the resident bull, who paid us a visit once in a while. On one of his visits he snagged a guy wire and began to bring down one of our antennas. No one volunteered to interfere, but then a cowboy came to our rescue. On another occasion, just before daybreak, two operators thought they had finally had too much to drink when they observed a transceiver slowly but inextricably headed out the window. This time a cow had tangled herself up in the feed line. In this case, she was no match for roughly awakened amateurs.

Outdoor washing and sanitary facilities were enjoyed by all—especially the cold water. The food was outstanding and sleeping accommodations were rough but warm—the floor and sleeping bags. Several hundred yards from the ranch house was a milking facility, which brought a herd of cows around us twice daily. We did, however, have a picket fence surrounding the house as a perime-



Farewell ceremonies at Rostov Radio Club and presentation of a packet radio station.

ter defense. Horseback riding was available for the asking. The Kabardino-Balkarian horses, although somewhat small, are noted for their stamina and excellent herding skills. The cowboys take great pride in their horses and we concurred. One day we spotted two majestic eagles at eye level just before they swooped down into a gorge. The area is also great hunting grounds for wild boar.

DXpedition operations were around the clock, and we worked approximately 6000 contacts. Only a small portion of these contacts, however, were actually on packet because of various reasons. HF packet is a very difficult proposition between continents. We had no difficulties in making all the contacts we wanted in Europe, but beyond was difficult. It seems that you really need power and more space for individual contacts. The mail boxes take up a lot of room and work very efficiently. Of course, I was most pleased to reach my mail box, N4QQ.

The packet software we used is entitled "Lan-Link" and was written by Joe Kasser, W3/G3ZCZ. It kept a nice log of our contacts and provided a down-loading, label-like program.

Visitors, including some amateurs, came to visit after word got out about our operations. They all remarked how surprised and pleased they were to first catch sight of the flags as they approached our site.

On May 26, 1990 KC3VO and a group of our hosts traveled mostly overland by a vehicle resembling a Jeep to Mt. Elbrus ski resort. (I had to return earlier to Rostov to attempt repair of a tooth problem, but that's another story.) KC3VO reported that the mountain was covered fully in snow and the skiing looked excellent. The vistas were breathtaking. It just so happened that the visitors met two young ladies skiing in scant bathing suits, which would have been the rage at any western beach. Needless to say, the women were from Siberia and were enjoying their skiing vacation.

The DXpedition broke up on May 27, 1990 and a farewell party was hosted by the collective farm chairman. That evening the Rostov group and KC3VO boarded the train in Nalchik for the return trip to Rostov. They arrived on May 28, 1990 and then the farewell parties began. On May 29 there was an official reception at the Rostov Radio Sport Federation, where a packet radio station was donated followed by speeches and many photographs. More parties were given that day and finally on May 30th KC3VO, myself, and several of the Rostov amateurs left for Moscow. (My special thanks to Alex Zhadan, UA6LHB, his wife, Olga, and his trusty car as my hosts while in Rostov.)


We met with the staff of the CRC and donated a TNC for their station. The CRC expressed their thanks for our efforts and

assured us of their cooperation with any future DXpeditions in the Soviet Union. That night we were driven outside of Moscow and lodged at a conference center for "party officials." It was odd for us in our casual attire, including baseball hats, to be among the elite. Nevertheless, we were accorded great hospitality and had very comfortable accommodations. Unfortunately, we had to rise at 4 AM to get to the airport the next day, so early to bed—that is, about 1 AM after a final party.

I think we brought home as much weight as we had arrived with. We were loaded down with vodka and Russian wine. We each had been given a Burka, a fur coat worn by Kabardino-Balkarian cowboys in the winter, and we had numerous gifts, including a 6 pound inscribed crystal vase. At any rate, we cleared customs in Moscow with dispatch when the custom's official noted our "CQ 1990" pins and found out it was related to amateur radio. He was a dedicated radio listener. We had a more difficult time at Aeroflot, when they wanted to collect over \$400 for excess baggage. Together with our Russian friends, after a little heated debate we persuaded the officials that it would not be in the best interest of world friendship if they did so. We were exempted and flew home without a further hitch. We arrived in Washington, DC after another 12 hour flight somewhat exhausted but very happy to have experience the DXpedition.

Aside from any technical accomplishment, the outstanding feature of the DXpedition was the cooperation of the CRC and the Radio Sport Federation of both the cities of Rostov and Nalchik and the friendships renewed or made anew. Indeed, the iron curtain is down. What does, however, remain is an exceedingly difficult overall bureaucracy not only for foreigners, but for the Russians as well. They are aware of this and hope that Perestroika will prevail.

The Soviet Union is a very big country with 11 time zones and over 100 different nationalities. They are in a difficult struggle to democratize and to restructure their economics to provide their citizens a better life. Although help from the west must come from respective governments for the overall salvation of the Soviet society, Soviet amateur radio operators look to western amateurs for help. They are starved for solid-state equipment and computers, for example. Perhaps we western amateurs (also the Japanese) should get something started to help them by donating our used equipment rather than putting it away in the attic or basement to gather dust.

There are many ways to end an article such as this—with platitudes, congratulations, and thanks—but all that need be said is that if we can accomplish freedom of the air waves, we should be in a good position to get peace on the ground. 

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CIRCLE 41 ON READER SERVICE CARD

CQ REVIEWS:

The Palomar Engineers SB Series Baluns

BY LEW McCOY*, W1ICP

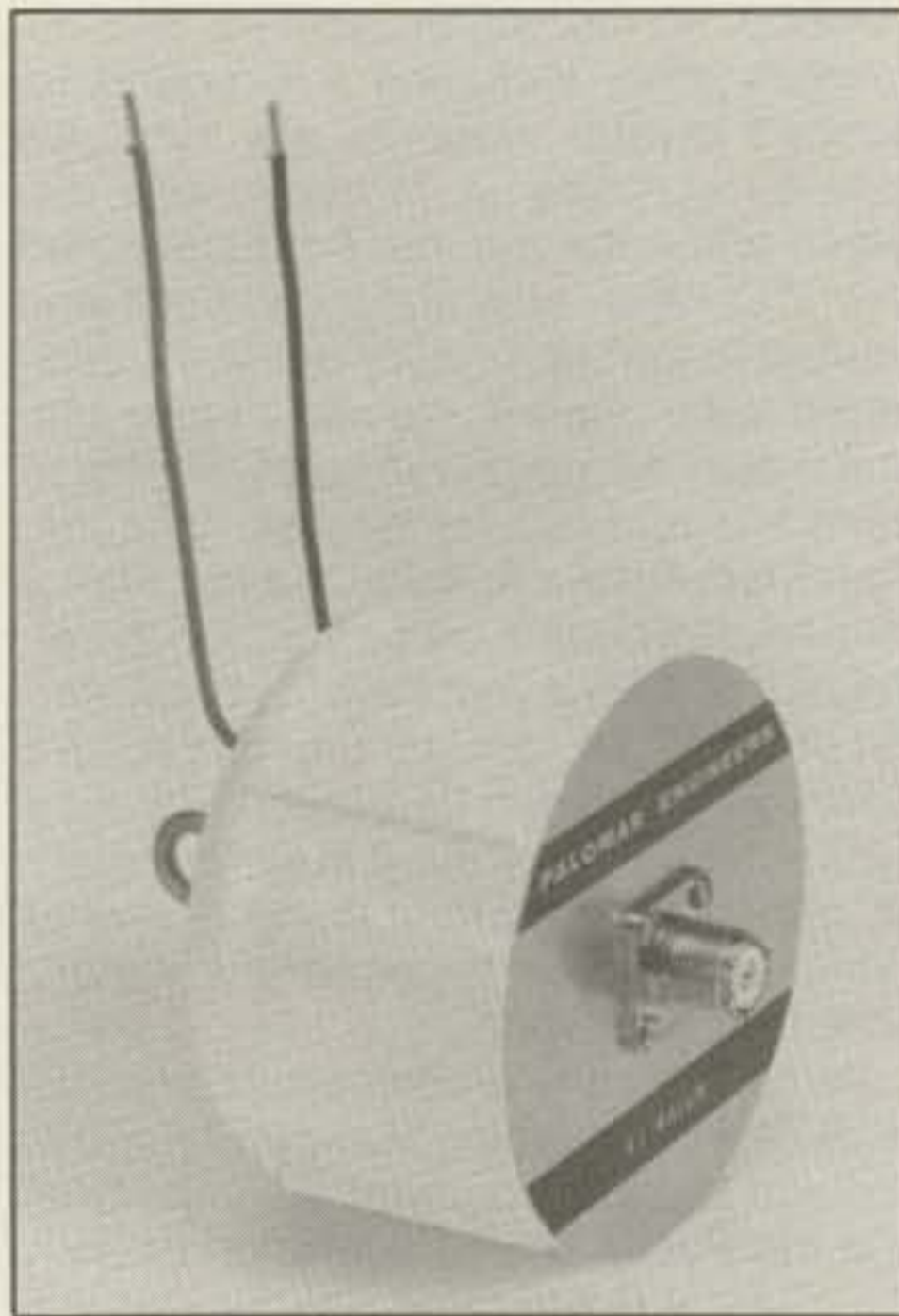
During the many antenna lectures I have given over the years the questions and problems of using baluns with high power have frequently been raised. I was reluctant to recommend any of the commercial baluns simply because they were not designed to handle high power and large SWR problems. What do I mean by problems? Well, for one thing, when a high standing wave ratio exists across a balun, either high current or high voltage can exist across the balun, causing blow out.

You may see a rating on a balun of 1 kilowatt (or 1500 watts), but if you check closely, the statement is usually made that such a balun must be used with an SWR of less than 2 to 1. Or even worse, the guarantee is void on a balun if it is used with a Transmatch. I have seen many horror stories—or rather, cases where baluns have blown up.

One particular instance involved a friend of mine who lived in a crowded area on Long Island. He operated primarily on 80 meters and ran a full kilowatt input. Because of high SWR, with the resulting high voltage, the windings in the balun he was using arced, causing an intermittent condition. We spent months trying to track down widespread TVI resulting from his 80 meter operation—with a harmonic problem that was practically unheard of.

What happened was the winding ends of the balun had been spot-welded in manufacturing, and while it was rated by the manufacturer at 1 kilowatt, it couldn't handle that power with any appreciable SWR. The result was that the amateur had a non-linear rectifier hanging directly across his antenna terminals. Believe me, such a rectifier can really generate harmonic TVI.

At the Dayton Hamvention last year I was talking to John Althouse, K6NY, the owner and design engineer at Palomar Engineers. He had come up with his SB series baluns, which were designed to take a lot of abuse plus handle gobs of mismatched power. For example, they are rated at 6000 watts PEP and 2 KW for CW at 10 to 1



The Palomar Engineering SB-4 balun.

SWR! I asked him if I could test one, because I wanted to give baluns a fair shake after bad-mouthing them for years. He was gracious enough to send me one—the Model SB-4, which is a current-type balun. The basic design was first described by Guanella¹ back in 1944. Jerry Sevick, W2FMI, in chapter one of his excellent book on transmission line transformers, goes into considerable detail on the Guanella design. Before going into my tests, let me go back a little in history.

When I first described The Ultimate Transmatch, back in the 1960s, I found I had a single-ended circuit (coax) that would match any load I attached to the output, and I do mean *any* load, some with extremely high SWRs. Earlier I described a Transmatch (that was when the word "Transmatch" was coined) that didn't have the matching flexibility of The Ultimate Transmatch. In any case, I found that after getting this wonderful circuit, I needed a transformer to go from single-ended output to balanced, or open-wire, lines. I also reasoned, and I might add correctly

(because many arguments erupted in amateur circles), that I needed a 4 to 1 balun (not 1 to 1) to get from my unbalanced Transmatch output to 450 ohm balanced line. Keep in mind that in using open-wire line we were thinking of multiband operation (most likely using a basic 80 meter half-wavelength antenna). This gave us a wide range of mismatches to handle, usually of a much higher value than 50 ohms, and most have plenty of reactance.

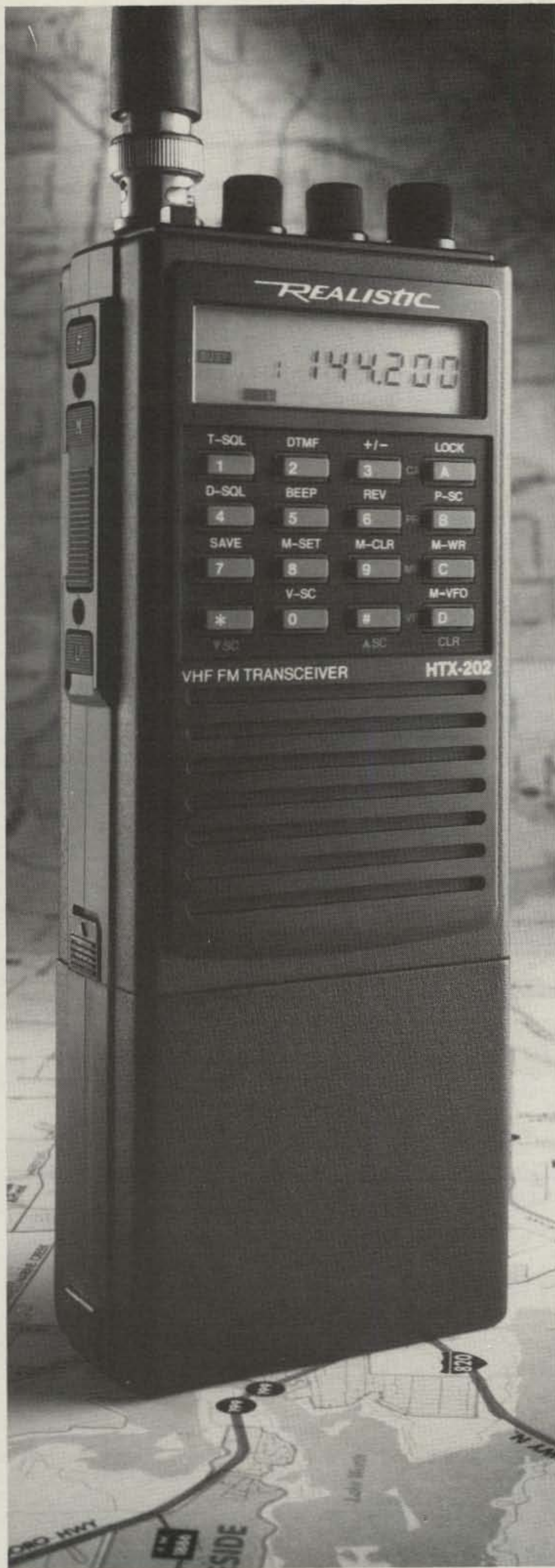
My first attempt at a balun consisted of bifilar enamel wire wound on a T-200 core, using about 12 or 13 bifilar turns. When I ran the power to over 300 watts, the core shattered. I talked over the problem with George Grammer, our Technical Editor, who, bar none, was as smart as they come in this business. He suggested that I stay with 4 to 1, agreeing with my reasoning, but try two cores stacked. I tried two cores, and while they had appreciable heating, there was no blow up.

I then experimented with different types of insulated wire. Certainly enamel or Formvar was useless. I finally settled on Teflon-covered No. 14, plus a special tape to cover the cores, plus one more core (three stacked cores). This did the trick—no heating at very high power (over 2 KW) under severe mismatched loads.

That is the history of the voltage balun as far as Transmatches are concerned. With the rising popularity of the current-type balun, there is an advantage in using one over my original Transmatch type because you tend to get better current balance on the feeders (on some bands) and less feeder radiation. That's the basic story of the presently used Transmatch balun.

There is one other important point here before discussing the SB-4. Many amateurs dislike bringing open-wire feeders directly into the house or shack. Most amateurs would rather have the open-wire line terminated outside the shack and then have some other means of coming into the house and into the Transmatch. Some have tried running coax out to a balun, but either have had problems of coax blow up, or balun destruction because the balun wasn't designed to handle the power and mismatches.

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



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Now let's get down to the nitty gritty and discuss the SB-4. This balun is designed, as I said, to take one heck of a lot of power and handle it well. Much of the design is proprietary, so I can't discuss the design except to say it is based on the Guanella concept. However, I can discuss performance.

I use an 80 meter extended double Zepp as my basic low-band antenna (but with the Transmatch, it can be tuned on all bands). The impedance of this antenna (fed with 450 ohm open-wire line) can present some very high and very low impedance loads, many with a lot of reactance. At first I mounted the balun at the back of my Transmatch using short lengths of high-quality 50 ohm coax for connection to an SWR bridge and then to the balun. The open-wire line went to the other side of the balun. I then tested it at 1500 watts output, on all bands, with all the various loads. I could monitor the SWR the balun was "seeing," plus the power flowing through. I used a Bird ThruLine² wattmeter in the line going to the balun so I could actually measure

power and SWR flowing in the coax and into the balun.

Almost at once, with very high power (over 1 kW) I noticed the power and SWR readings were jumping around as if something was arcing. I couldn't hear anything, and the balun seemed normal—no heating, etc. Finally, after readjusting my Transmatch several times for a perfect indicated match, the readings settled down. I showed a match at the Transmatch while the wattmeter indicated 1000 watts into the balun but at an SWR of over 10 to 1—actually about 15 to 1! At that point I decided to go out and check the antenna and feeders. Here I might add that this particular antenna and feeders had been up for about 8 years, and Silver City, New Mexico has a very dry climate. My open-wire line was of the ladder-line type, 450 ohm impedance. In any event, I found that the insulation on the feeders had dried to a point where the insulation was breaking away, and my feeders had shorted! They had actually welded together from my high power and the arcing. This left me with

about 80 feet of feeders, broken off from the antenna, lying on the ground, but still attached to the SB-4. Talk about a test to destruction! I had been running the rig into a mess, and the balun took all that abuse. I replaced the feeders with new material and then went through my tests again.

Palomar rates the balun at up to 10 to 1 SWR with a top rating of 6 KW PEP and 2 kW CW at 1.7 through 30 MHz. I had tested it with just a short connection of coax (10 feet) to the balun so I could tell if there was any heating. I couldn't detect any heating at my 1500 watts of power and SWRs of over 10 to 1. In fact, to be honest, I tried to blow out the balun but had no success.

I next used about 20 feet of a good grade of RG-8 type coax and mounted the balun outside. Keep in mind that such coax has RF voltage ratings on the order of 5000 volts. It is possible to reach these voltage with some high SWR conditions, but I couldn't do so. The SB-4 handled all these tests with flying colors.

I might add I tuned the system on all amateur bands, 160 through 10, with no difficulties. Because I anticipate questions from users of the G5RV, I also made a 102 foot G5RV, tuned the system with open-wire line (about 100 feet) down to the balun, and tested it on all bands. (I knew it would work, but I tested the system anyway.)

If you are planning a new multiband antenna system, or want to keep your open-wire feeders outside, then I can highly recommend this balun. I made add, though, and I would be less than honest if I did not, that changing to a current-type balun from a voltage-type is not really going to enhance the performance of your station. Some writers would have us believe that voltage-type baluns are a pox and curse on amateur radio—not so. In an amateur antenna multiband installation using open-wire line for feeders it is well nigh *impossible* to eliminate feed-line radiation. In theory, yes. In practice it is just not so. A lot of statements are being made these days about current baluns. I always remember what happened when I tried to make similar technical statements. George Grammer would say, "McCoy, prove it!"

The Guanella design of the Palomar Engineers SB-4 will provide you with an excellent balun installation that will move the open-wire line outside your shack, and that is what many of us want. The SB-4 lists for \$79.95 and is available from Palomar Engineers, P.O. Box 455, Escondido, California 92033 (619-747-3343).

Footnotes

1. Guanella, G., "Novel Matching Systems for High Frequencies," Brown-Boveri Review, Vol. 31, Sept. 1944, pp. 327-329.

2. ThruLine is a trademark of Bird Electronics.

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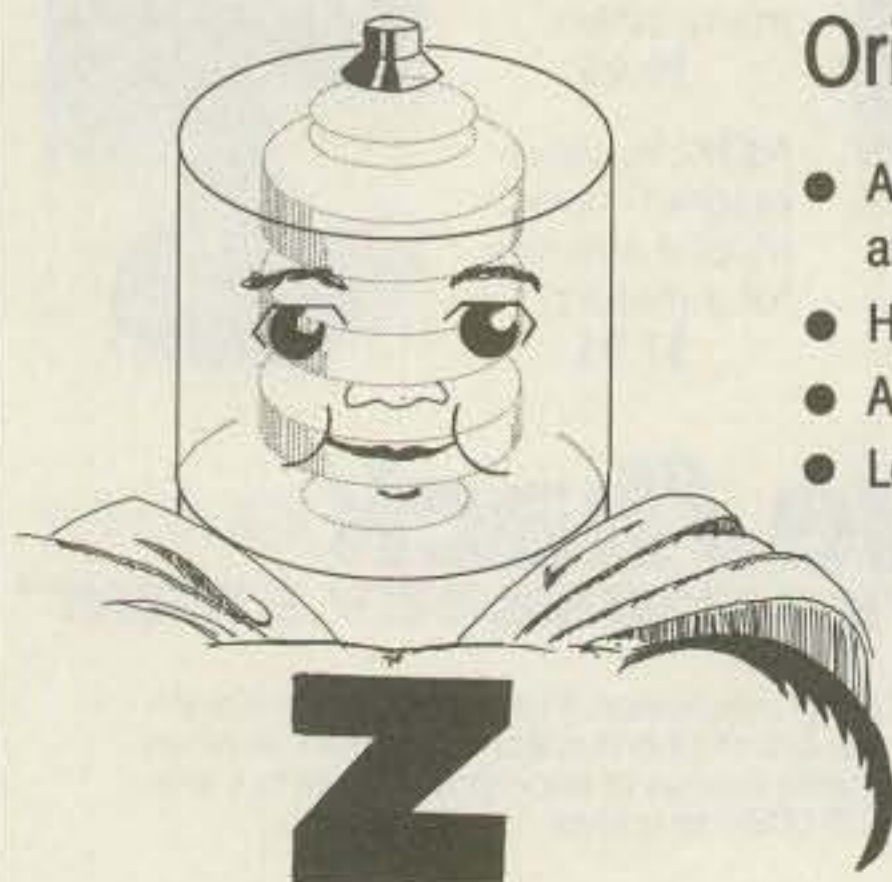
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How To Build An Indoor Transmitting Loop Antenna

Part II—40 and 80 Meters

BY ROBERT H. JOHNS*, W3JIP

The loop in this installment covers 40 and 80 meters using only two turns. Even though this sacrifices some efficiency compared to a single-turn loop, the antenna still works and is a manageable indoor size. In operation from a first-floor apartment the loop in fig. 1 has been a very pleasant surprise, giving many fine QSOs up and down the east coast and into the midwest on 40 and 80 meters. The calculated efficiencies are 47% at 7 MHz and 9% at 3.8 MHz, which are very good compared to other indoor antennas for these bands.

The antenna uses a structure similar to the smaller version for 10–20 meters described in Part I. A $\frac{3}{4}$ inch thin-walled copper pipe is soldered together with standard copper ells to form octagons, and the ends of the loop are brought close together to make a variable capacitor. An additional fixed capacitor, which is also made from copper pipe and simple insulators, is added for 80 meters (see figs. 2 and 3). For storage or portable operation the loop can be assembled with slotted ell joints that are tightened with hose clamps. Fig. 5 shows the antenna disassembled for storage or travel.

The antenna stands on a base plate and can be operated on the floor or on a table. For outdoor use a large hole in the base accepts a 1 inch dowel for mounting the antenna on a stake or on a tripod, as shown in fig. 7. The SO-239 input connector and gamma match are shown in fig. 3.

Frequency changes are made by loosening the slotted insulators and changing the spacing between the capacitor

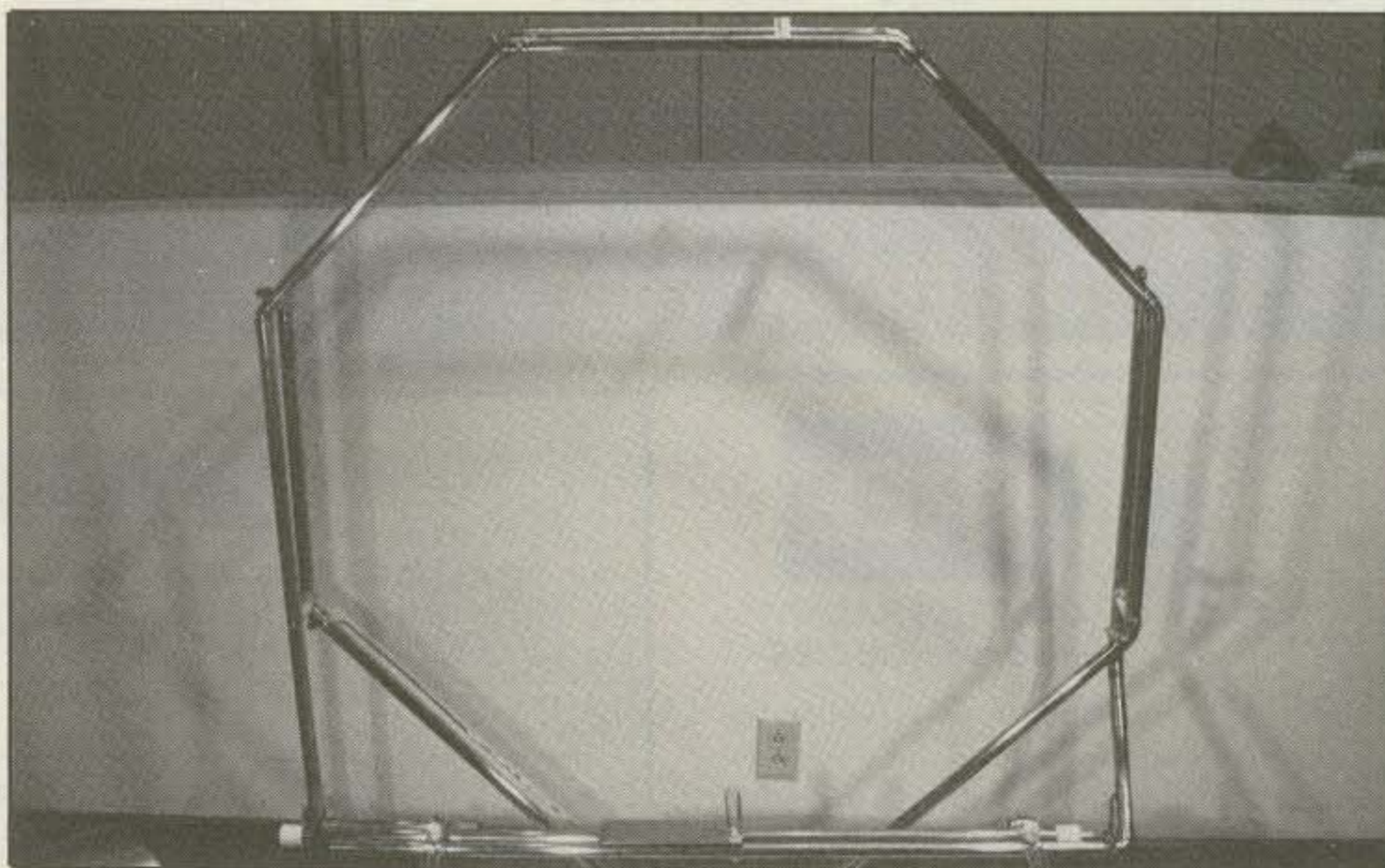


Fig. 1—The two-turn loop antenna for 40 and 80 meters.

pipes, as on the smaller loop for 10–20 meters. Ten calibration marks on the aluminum capacitor plate are a help in making small shifts. On 40 meters this capacitor changes the frequency by approximately 100 kHz, so that each of the marks represents 10 kHz. On 75 meters each mark is about 2 kHz.

Bandwidth

The 2:1 bandwidths of this antenna are very narrow—about 19 kHz on 40 meters and about 7 kHz on 75 meters. An antenna tuner can double these bandwidths, but you will notice a drop in effectiveness if you move very far off the antenna's resonant frequency. A trick to get a little more oper-

ating room on 75/80 is to set the tuner to match the antenna about 5 kHz away from its resonant frequency, and then switch between the "straight through" position on the tuner and the matched position.

Construction

Commonly available $\frac{3}{4}$ inch thin-walled Type M copper tubing and standard 45° and 90° copper ells are used for the loop conductor. The two turns are spaced apart by four $\frac{7}{8}$ inch Plexiglass rods 2.5 inches long, shown in fig. 4, that are drilled ($\frac{5}{32}$ inch) to accept #10 hex-washer-head sheet-metal screws 1.5 inches long. (Use a $\frac{5}{16}$ inch nut driver or socket wrench to drive these in.)

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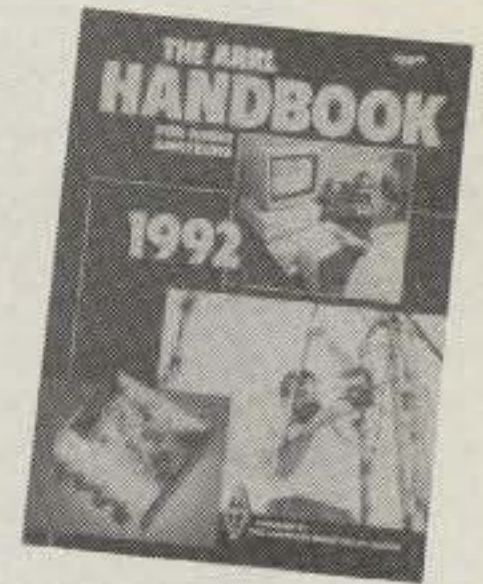
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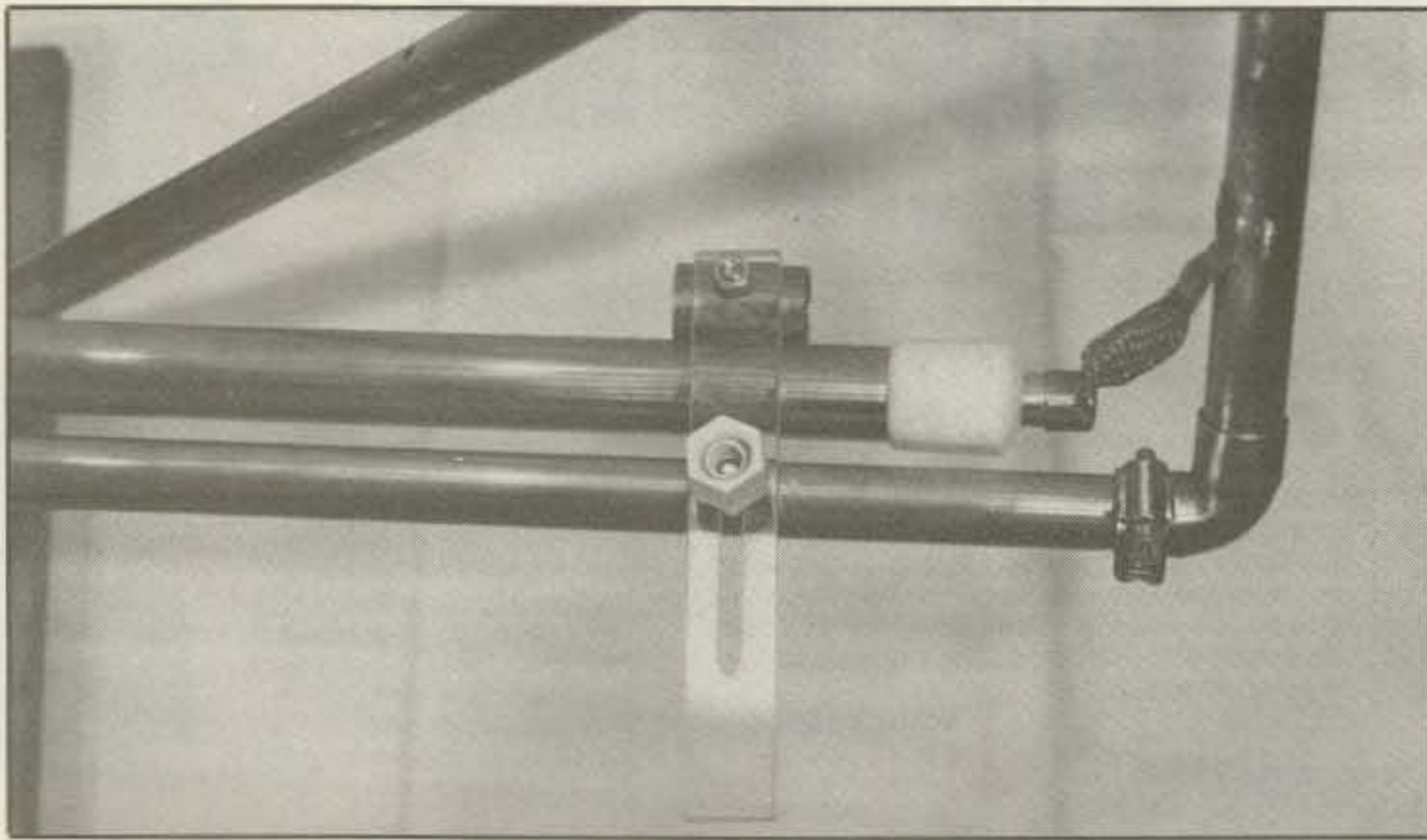


Fig. 2— The variable capacitor is adjusted by changing the spacing between the two pipes. The larger tube is a coaxial capacitor that is connected for 75/80M operation by the half inch copper cap and the braided strap.

The fixed capacitor for 80 meters is made from a 1/2 inch copper pipe mounted inside a 1 inch copper pipe by simple insulators. These are 1 1/8 inch plastic furniture tips drilled out to let the smaller pipe pass through. A 3/8 inch flat wood bit drills this hole, which makes a snug fit over the larger inside copper pipe. The plastic furniture tip

is easier to drill when it is mounted on a scrap of the large pipe.

A 1/2 inch copper cap is slotted and soldered to a braided strap to become the "switch" to connect the fixed capacitor into the antenna for 75/80 meter operation. This strap is also soldered to the nearby 3/4 inch pipe, as shown in fig. 2. The cap can

be tightened onto the inner capacitor pipe with a hose clamp, as the main loop joints are, but I have found that this is not necessary if the cap has been bent to make a snug fit. A way to determine whether this connection is contributing extra resistance is to carefully measure the bandwidth of the antenna, with and without the hose clamp. A wider bandwidth means more resistive loss, if everything else stays the same. Actually measuring very low resistances at radio frequencies is quite difficult, but comparing bandwidths across a high Q circuit like a loop is easy.

The 1 inch pipe is soldered to the 3/4 inch loop pipe and ell as shown in figs. 2 and 7. Strap the pieces together with a large hose clamp before soldering, and the job is not difficult. A 3/4 inch copper coupling is also soldered to the large 1 inch pipe near its other end to be a place to attach the slotted insulator.

The transition between different pipe sizes could have been made with a reducing coupling or ell, but this would complicate the capacitor, requiring a spacer inside the large pipe. I did not find an insulator material that was readily available and that would stand up to the high voltage there. Many plastics would withstand the RF when first applied, but then soften and cook under steady power. The nice feature of the furniture-tip insulators is that they are out of the strongest electric field be-

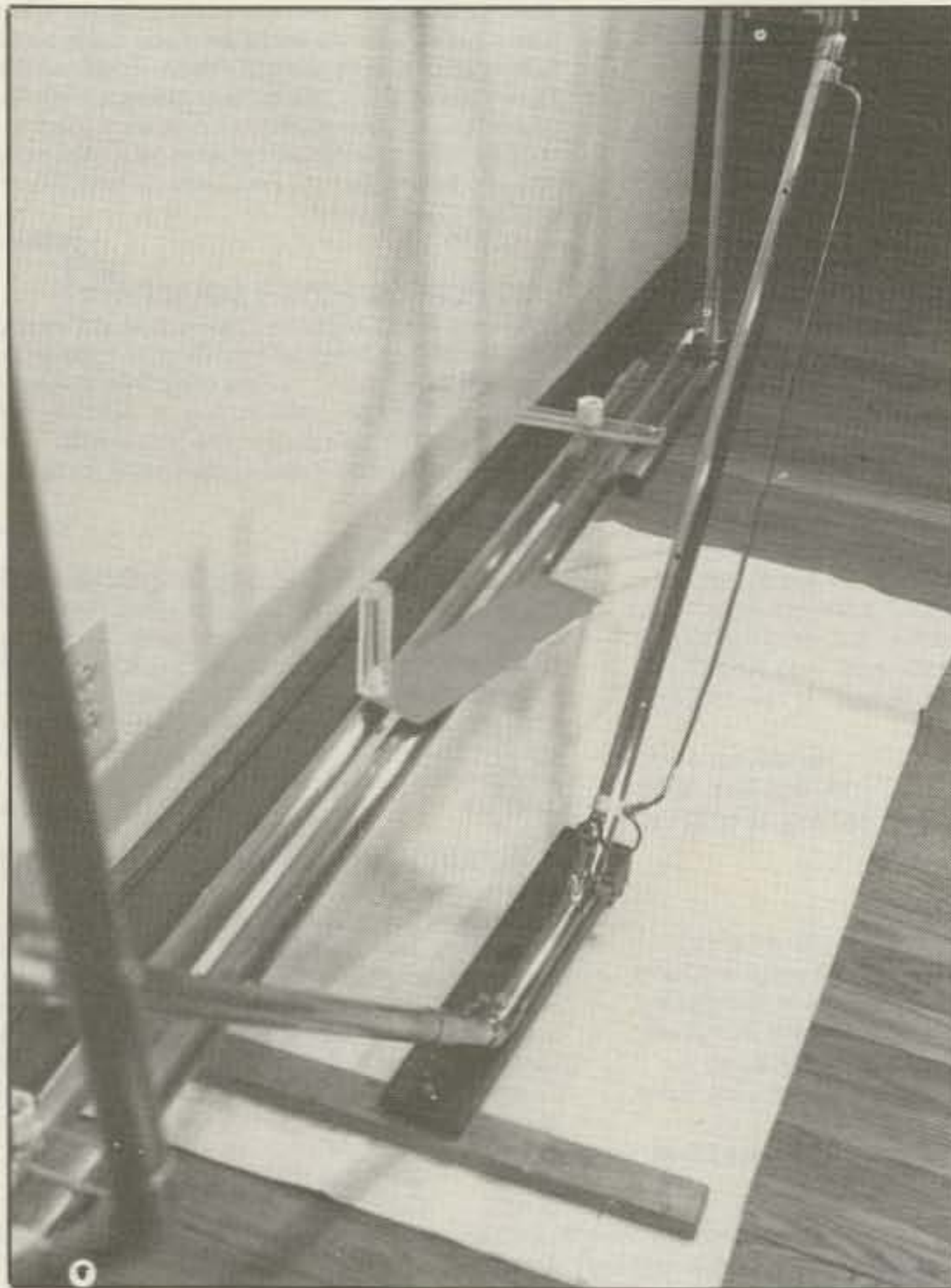
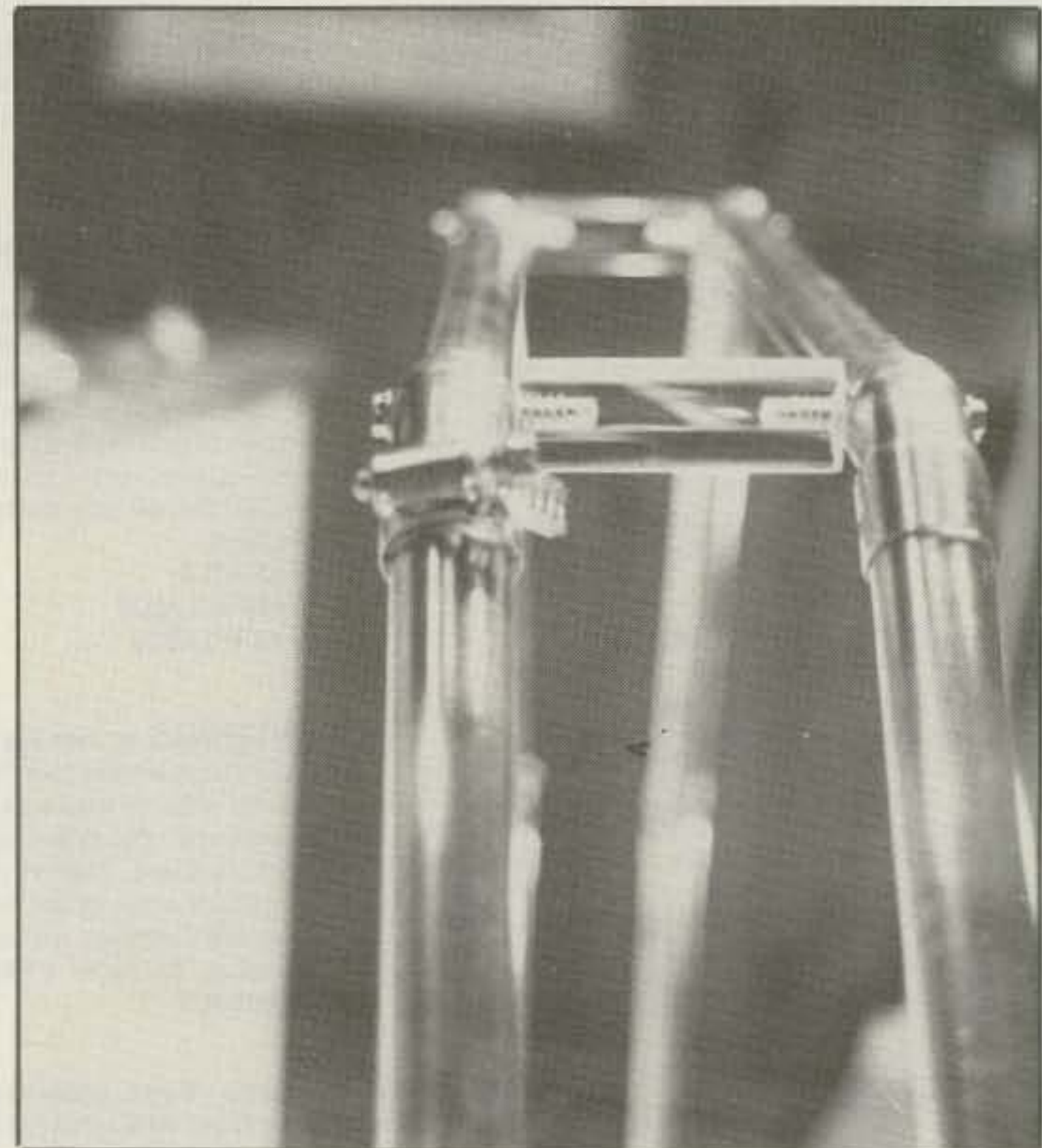


Fig. 3— The self-supporting base, the gamma match, and the capacitor plate for fine tuning the loop.

Fig. 4— The Plexiglass rods between the two turns of the loop are held in place by self-tapping screws through holes in the pipe.



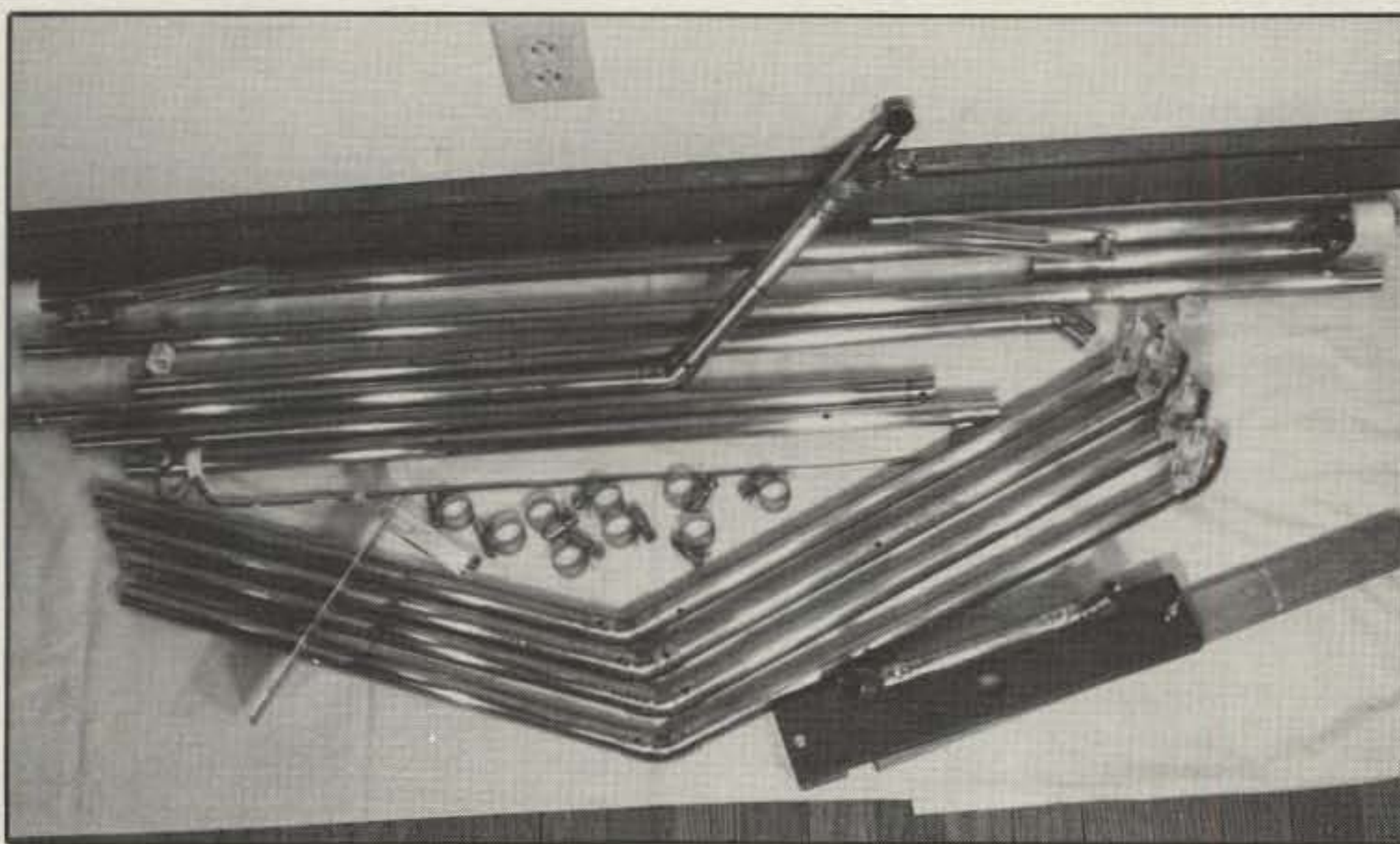


Fig. 5— The antenna disassembled for storage or travel.

tween the coaxial conductors, and only subjected to the smaller fringing field. But if, while operating, you notice the SWR changing during a transmission, shut down and check for insulators that are warming up. Another problem likely to appear is arcing, which can occur when insulators fail or are dirty. This will show up as a rapid jump in SWR. The surfaces of the pipes that make up the capacitor must be clean and smooth and free of things like wisps of steel wool, or sparks will jump across the capacitor gap. Even though this loop structure is simple and rugged, you must put care and attention into the construction of the capacitor.

The input SO-239 and gamma match are similar to the ones for the small antenna in Part I. The gamma rod is spaced about 2 inches from the pipe and should be placed on the side away from the tuning capacitors when building the antenna. The base plate and slotted insulator handles are the same as those on the small loop. Note that the base pipe section is only 6 inches here, however.

Assembly

Start assembling the loops by inserting the gamma section and its twin length into the base section and tightening them with hose clamps. Attach a Plexiglass spacer to each of the four bent sections, as in fig. 5, and build up a loop with overlap at the top. Connect the overlapping sections together with screws into the spacers at the top. Add the 30 inch pipe so that it descends down past the gamma match. Attach the other descending section so that the 45° piece crosses over the middle plane toward the other side of the loop to meet the capacitor (see fig. 6).

Assemble the two long capacitor pipes together with the slotted insulator handles, as in the photos, and connect the capacitor to the two descending sections.

Polarization

For an antenna that must be close to the ground, vertical polarization is preferred. This is because a vertically polarized wave reflected from the ground has little phase change, while a horizontally polarized wave undergoes a phase reversal. Waves reflected from a ground plane under a vertical antenna reinforce the direct wave as though they had come from an image antenna below ground. But the waves reflected below a low horizontal dipole would tend to cancel the high-angle radiation from the dipole. This is why a loop, es-

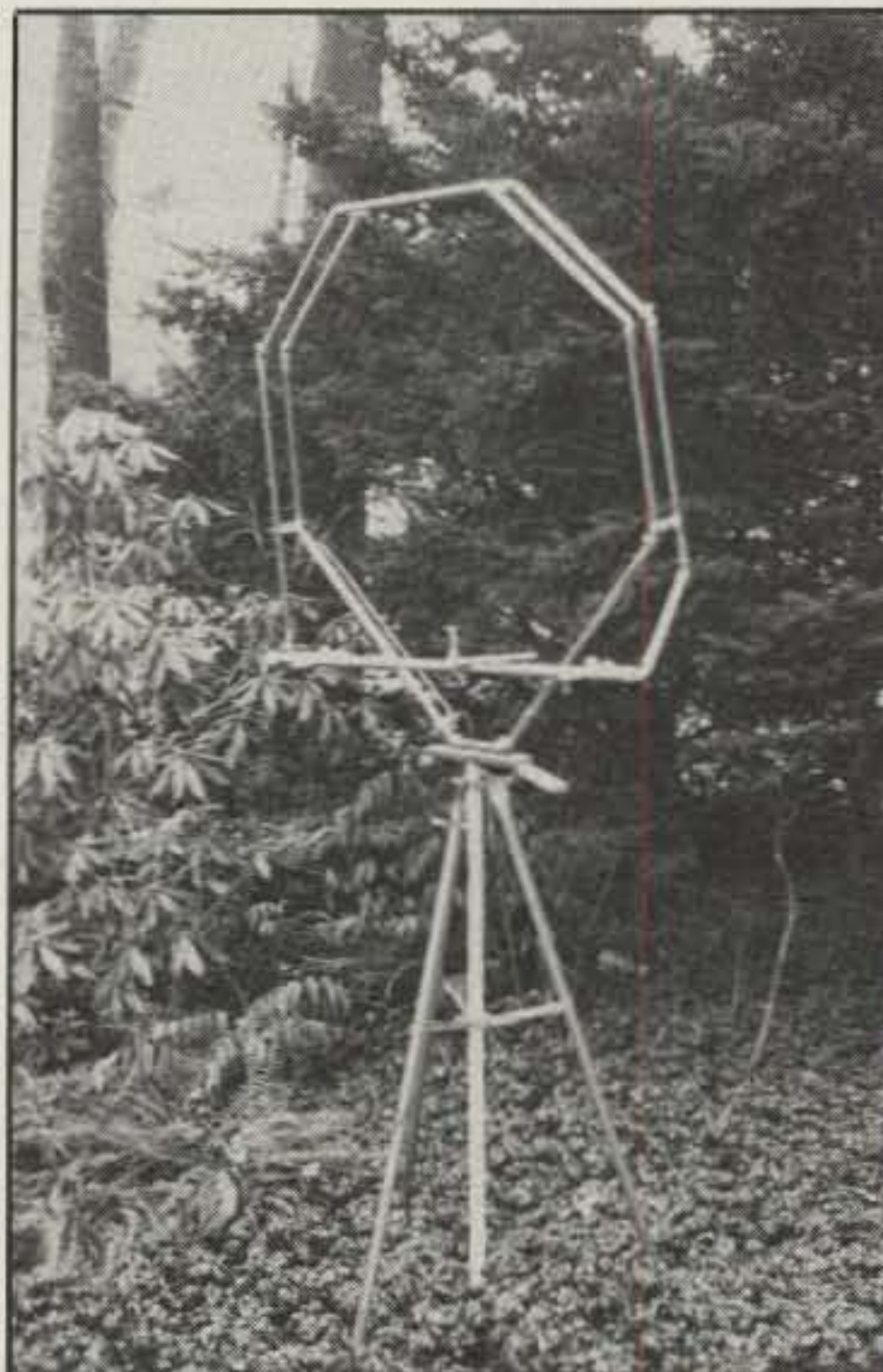


Fig. 6— For portable operation the loop is on a tripod. The capacitor at the base must still be accessible for changing frequency.



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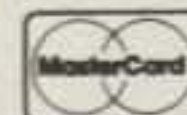
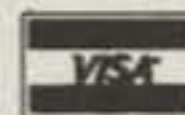
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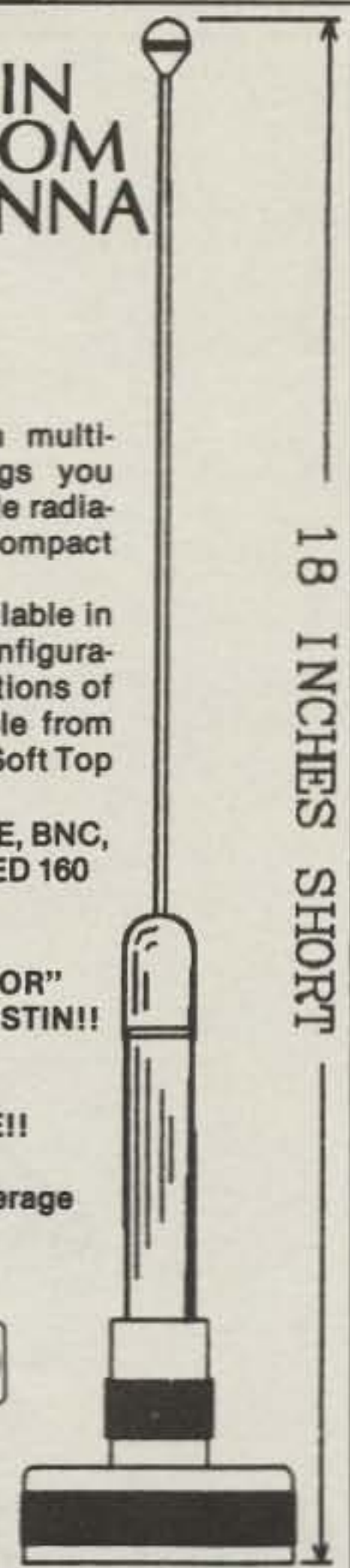
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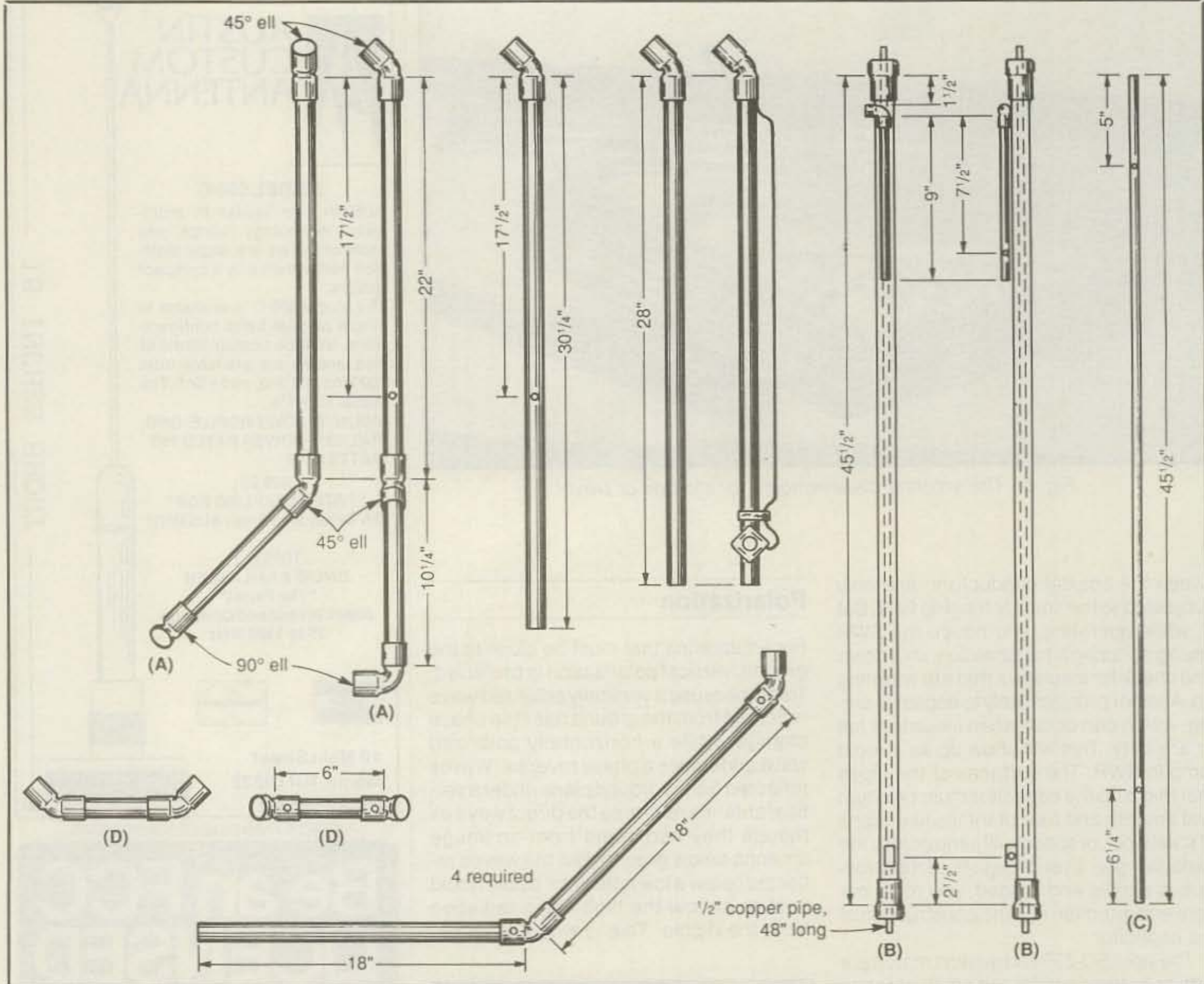


Fig. 7- Dimensions of the pipe components. All holes are 1/4 inch. The pipe lengths are the length of pipe to be cut, before an ell is added. The two views marked (A) are of the same pipe, to clarify the positions of the hole and the ells on it. Check the photos to make sure you see how this descending pipe fits and connects to the capacitor pipe (C), at the lower right of the antenna in figs. 1, 2, and 6. Two views are also shown of the large capacitor pipe (B). The 9 inch long pipe with a 90° ell at one end is soldered to the 1 inch pipe. This 90° ell connects to the 30 inch vertical pipe that is at the left of the antenna in figs. 1 and 6. Near the other end of the large pipe (B) is a small length of 3/4 inch pipe that also is soldered to the large pipe. The hole in this small piece is needed to accept the 1/4 inch bolt that holds the insulating handle to the large capacitor pipe. The short pipe (D) with two 45° ells is the base section that is bolted to the plastic or wood base. Twenty-six feet of 3/4 inch, 4 feet of 1 inch, and 4 feet of 1/2 inch copper pipe, Type M, are required. Also thirteen 45° and two 90° copper ells.

pecially one for the low-frequency bands, should be mounted vertically. In addition, the building services that include heating ducts, water piping, and electrical wiring tend to be distributed in layers, in the floors of a building. An apartment dweller is probably trapped between two "grounds," immediately above and below him/her. And there are also wiring and pipes in the walls! Most of the radiation that escapes this "cage" will come after several reflections, so the antenna should be oriented to produce the strongest, in-phase reflections.

The radiation pattern of a loop is a figure-eight, with a null along the axis of the loop. At high angles from a vertical loop, however, the doughnut pattern is almost omni-

directional. In practice I notice some directional effect on the higher frequency bands, and point the edge of the loop toward the DX I am working with the small loop. On 40 and 80 meters any directional effects are the result of the building layout, I believe.

Operation

To tune the antenna to a particular frequency, listen for a peak in received noise as the variable capacitor pipes are adjusted. This doesn't work as well when there are stations operating on or near that fre-

quency. Turn off the receiver AVC if possible. If you can't, you will get only a general peak and you will need to find the resonance with an SWR dip. Use minimum power and the most sensitive range of your SWR meter. (The MFJ-207 SWR Analyser would be ideal here.) As with the small loop, the insulator handles will slide the pipes lengthwise and change the frequency a little. Use the aluminum capacitor plate for fine tuning. This also lets you back away from the loop and reduce the hand and body capacitance to it.

It's an interesting project that will teach you a bit about antennas, operating, and the layout of your local home-improvement store.



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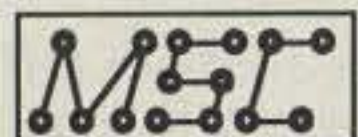
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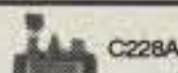


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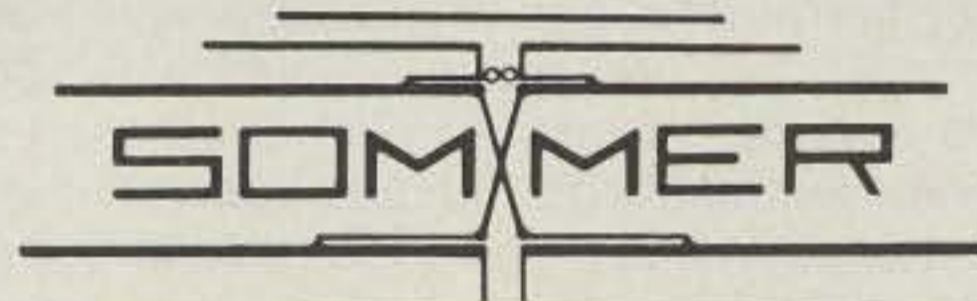
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CQ REVIEWS:

The ICOM IC-W2A Dual-Band 144/450 MHz Handheld

BY LEW McCOY*, W1ICP

The ICOM IC-W2A is the latest version of handheld dual banders. It covers (U.S. version) 140 to 150 MHz and 440 to 450 MHz. The radio has a multitude of functions, as you will see. However, first some background thoughts.

When I received the radio for this review, I was immediately impressed with how smoothly it fit into my hand. The IC-W2A measures 2.1 "W x 6.1 "H x 1.4 "D. The length can vary slightly depending on the battery pack in use.

The transceiver is capable of transmitting at several power levels. That's right. It has more than just a **High-Low** setting. In the **High** position output is more than 5 watts. There are three **Low** power settings: 3.5 watts, 1.5 watts, and 500 milliwatts. You can quickly see the value of this feature, as it can increase usage time considerably without recharging the battery. For example, I was provided with the BP-84 battery pack and it is capable of providing over nine hours of operation without recharging! In many instances you can be within the 500 milliwatt range, full quieting, to many repeaters. On the other hand, the high power is there if you need it.

There are a total of 22 multi-function operating control buttons on the front panel. Rather than go through a detailed description of every function, I have included two pages covering these controls from the very excellent instruction manual. Many of the buttons have as many as three functions each.

Incidentally, this is not a radio that you simply turn on and start operating. I required a minimum of one hour studying the manual and radio to even begin to familiarize myself with all the nice features.

Let's get back to basics. There are 11 tuning steps available. They are 5, 10, 12.5, 15, 20, 25, 30, 50 kHz, and 100 kHz plus 1 MHz for dial select. The tuning step is set via the function and button switches, and then the VFO button is rotated to set the desired frequencies.

The transceiver has a total of 30 mem-

ory channels for each band 144/450. These can be set via the VFO rotary switch and then stored into memory, to be recalled as needed via the **VFO** switch in the **MEM** position.

There are several different "modes" available:

VFO Mode—Used for normal operation over the entire VHF and UHF bands.

Memory Mode—Used for operating the transceiver using memory channel contents. Each band has 30 memories, a total for the two bands of 60.

Clock Mode—Used for setting clock time, power-on time, power off time. (Visible in front-panel LED.)

DTMF Memory Mode—Used for programming DTMF codes. The transceiver comes with standard DTMF codes. Four DTMF memory channels are available, and each memory channel has up to 15 digits of programming capability.

Call Channel Mode—Used for operating the transceiver on a programmed call channel. VHF and UHF bands have their own separate call channels.

As you can see, this radio has lots and lots of features. For example, let's discuss the controls on the top of the radio. First is the antenna terminal, followed by an external power jack (12.5 volts DC). Then comes the external speaker/mike jack (the external unit is an option from ICOM). Next is an external speaker jack, for using a separate speaker in a car, for example.

Across the front top panel is the VHF volume and squelch control. Next to that is the separate UHF volume and squelch control, followed by the VFO dial knob. On the upper side of the transceiver is the **Function** button for enabling the various functions, and just below that is the **Push-To-Talk** switch.

The **Function Display** is an LED panel, with a magnifier across the display. Again, to save time I have shown a drawing of the display from the book (fig. 3). Some of the display needs clarification. Just below each of the band frequency indicators are bars that show relative strengths in receiving and transmitting. There are several **Tone Squelch** indicators that can appear. **T** appears when the subaudible tone en-



This is the ICOM-W2A.

coder it used; **T SQL** appears when the tone squelch is used; **T SQL (*)** appears when the pocket beep function is in use; **(*)** flashes when the pocket beep function is in use and receiving a call. In fact, looking at the various button control functions, just about all these functions are displayed when they are in use.

As to specifications, the power-supply requirements are 6 to 16 volts DC with negative ground. Of course, power output will depend on what level of power-supply voltage is used. On transmit, with a 13.5 volt supply, the draw is 1.3 amp VHF and 1.8 amp at UHF (high power) on low power, 500 ma and 700 ma. On receive, under power save condition it is 20 ma, and with rated audio output, 150 ma. These are single-band ratings on dual band, power saved, 40 ma, and rated audio output 200 ma. The transmitter uses a variable reactance frequency modulator with a maximum deviation of plus/minus 5 kHz. Spurious emissions are rated at less than -60 dB. (I couldn't find any!)

The receiver sensitivity is less than 0.16 uV for 12 dB SINAD, and the squelch sensitivity is less than 0.13 uV. The first IF at VHF is 30.85 and the second is at 455 kHz. At UHF the first IF is at 35.80 MHz and the second is at 455 kHz. Audio power output is 180 mw at 10 percent distortion with an 8 ohm load.

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For your free MFJ-108 12/24 hour clock, buy an MFJ-949D between November 15, 1991 and January 31, 1992. Then return your *original receipt* with your request for a free MFJ-108 clock and \$5 shipping and handling to: **Free MFJ Clock Offer**, MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762. **Limit: One per customer.** Must be postmarked by February 28, 1992.

650 MHz Dummy Load

MFJ-264

\$59⁹⁵

1 year guarantee
Made in USA



DC-650 MHz 50 ohm dummy load handles 1.5 KW SWR below 1.3 to 650 MHz and below 1.1 at 30 MHz. 100 watts continuously, 1.5 KW for 10 seconds.

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MFJ . . . making quality affordable

Add \$5 each shipping/handling; © 1991 MFJ

MFJ-948 Deluxe 300 Watt Tuner

MFJ-948

\$129⁹⁵



If you don't need a dummy load but want all the other features of the MFJ-949D choose the new MFJ-948 for only \$129.95.

The MFJ-948 features a **peak reading lighted** meter with a built-in lamp switch, a one year unconditional guarantee and is made in the USA.

Remember, with MFJ you're getting proven performance and reliability from the most trusted name in antenna tuners.

Continuing Service

MFJ Customer Service Technicians will help you keep your MFJ tuner performing flawlessly -- no matter how long you own it. Just call our *toll-free* help line 800-647-TECH(8324) -- no other tuner manufacturer gives you toll-free help.

No Matter What™ Guarantee

You get MFJ's famous *one year No Matter What™ unconditional* guarantee. That means we will repair or replace your MFJ-949D (at our option) *no matter what* for a full year.

Others may give you a limited warranty on defects in material and workmanship.

Cross-Needle SWR/Wattmeter covers 1.8-60 MHz

MFJ-815B

\$69⁹⁵



Cross-needle SWR/Wattmeter lets you read peak/average, forward/reflected power and SWR. 200/2000 watts forward and 50/500 watts reflected power ranges. Covers 1.8-60 MHz. Has meter zero adjustment. 7 1/4 x 4 1/2 x 3 1/2 inch aluminum cabinet. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, \$12.95. One year unconditional guarantee. Made in USA.

■ Front panel



KEY	FUNCTION	WHILE PUSHING [F]
V MAIN 	Selects the VHF band as the MAIN band. (p. 3)	Activates the transceiver for the VHF band only. (p. 18)
U MAIN 	Selects the UHF band as the MAIN band. (p. 3)	Activates the transceiver for the UHF band only. (p. 18)
MONI 	Opens the squelch and the optional tone squelch of the main band. (p. 4)	Opens the squelch and optional tone squelch of the sub band.
T/P.B/T SOL 	Turns ON the following optional functions* in this sequence: subaudible tone encoder → pocket beep → tone squelch → non-tone operation. (pgs. 20, 46)	Selects the following in this sequence: —duplex → +duplex → simplex. (Pgs. 19, 20)
DTMF 	Emits the programmed DTMF memory code. (p. 33)	Enters DTMF MEMORY mode to program the DTMF memory. (p. 33)
PGR/C SOL 	Turns ON the following optional functions in this sequence: Pager function → code squelch → non-selective call operation. (pgs. 41 - 44)	Used for programming the code memory for pager and code squelch. (p. 42)
Δ/SCAN 	Changes the frequency. (p. 15)	Starts the programmed scan or memory skip scan. (pgs 27, 28)
▽/SCAN 	Starts the full scan or memory scan when pushed and held. (pgs. 27, 28)	
PRIO 	Starts the priority function. (p. 32)	No secondary function.
POWER 	Turns power ON and OFF when pushed for 1 sec. (p. 2)	The same function as at left.

*Built-in to the U.S.A. version

Fig. 1—The front panel and its push buttons. This and fig. 2 describe the many and various button functions.

KEY	FUNCTION	WHILE PUSHING [F]	AFTER PUSHING [ENT]
V/M MW 	Selects VFO or MEMORY mode. (p. 24)	Writes the VFO contents into the memory channel or call channel when pushed and held. (pgs. 23, 25)	Inputs digits for frequency setting. (p. 16)
	Used only for numeral input.	No secondary function.	
LIGHT 	Turns ON the display lighting for 5 sec. (p. 34)	Turns ON the display lighting continuously. (p. 34)	
CALL M-V 	Calls up the call channel. (p. 23)	Transfers the contents in the selected memory or call channel into the VFO. (p. 26)	
TSD SEL 	Selects the tuning step. Use the switch together with the main dial. (p. 17)	Selects the dial select step from among 100 kHz, 1 MHz or memory channel changing. (p. 17)	
P.L. 	Used only for numeral input.	Turns the PTT lock function ON and OFF. (p. 18)	
SKIP/MASK 	Sets the selected memory channel as a skip channel. (p. 31)	Hides and displays the selected memory channel. Memory channel 1 cannot be hidden. (p. 26)	
SET 	Used only for numeral input.	Enters SET mode. (p. 22)	
H/LOW 	Selects high or low output power. (p. 4)	Selects low output power in 3 levels. Use this function together with the main dial. (p. 18)	
CLR/BEEP 	Clears the input digit before entry. Exits the SET and CLOCK modes. (pgs. 16, 22)	Turns the beep function ON and OFF. (p. 34)	
CLOCK/AO 	Enters CLOCK mode. (p. 35)	Turns the auto off function ON and OFF. (p. 35)	
ENT/LOCK 	Sets the keyboard for numeral use. (p. 16)	Turns the lock function ON and OFF. (p. 15)	

Fig. 2—The remaining description of the push-button functions.

BEST OF MFJ

MFJ, Bencher and Curtis team up to bring you America's most popular keyer in a compact package for smooth easy CW



MFJ-422B

\$134⁹⁵

The best of all CW world's -- a deluxe MFJ Keyer using a Curtis 8044ABM chip in a compact package that fits right on the Bencher iambic paddle!

This MFJ Keyer is small in size but big in features. You get iambic keying, adjustable weight and tone and front panel volume and speed controls (8-50 WPM), dot-dash memories, speaker, sidetone and push button selection of automatic or semi-automatic/ tune modes. It's also totally RF proof and has ultra-reliable solid state outputs that key both tube and solid state rigs. Use 9 volt battery or 110 VAC with MFJ-1305, \$12.95.

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

The Bencher paddle has adjustable gold plated silver contacts, lucite paddles, chrome plated brass and a heavy steel base with non-skid feet.

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

Deluxe 300 W Tuner



MFJ-949D
\$149⁹⁵

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

Antenna Bridge

MFJ-204B
\$79⁹⁵

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

No other equipment needed -- take it to your antenna site. Determine if your antenna is too long or too short, measure its resonate frequency and antenna resistance to 500 ohms. It's the easiest, most convenient way to determine antenna performance. Built-in resistance bridge, null meter, tunable oscillator-driver (1.8-30 MHz). Use 9 V battery or 110 VAC with AC adapter, \$12.95.

Super Active Antenna

"World Radio TV Handbook" says MFJ-1024 is a "first rate easy-to-operate active antenna ... quiet ... excellent dynamic range ... good gain ... very low noise ... broad frequency coverage ... excellent choice."

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

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

MFJ-1024
\$129⁹⁵

VHF SWR/Wattmeter

MFJ-812B
\$29⁹⁵

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

MFJ Coax Antenna Switches



\$34⁹⁵ MFJ-1701

\$21⁹⁵ MFJ-1702B

\$59⁹⁵ MFJ-1704

Select any of several antennas from your operating desk with these MFJ Coax Switches. They feature mounting holes and automatic grounding of unused terminals. They come with MFJ's one year unconditional guarantee.

MFJ-1701, \$34.95. 6 pos. 2 KW PEP, 1 KW CW. 1.8-30 MHz. 10x3x1 1/2 in.

MFJ-1702B, \$21.95. 2 positions plus new Center Ground. 2.5 KW PEP, 1 KW CW. Insertion loss below .2 dB. 50 dB isolation at 450 MHz. 50 ohm. 3x2x2 in.

MFJ-1704, \$59.95. 4 position cavity switch with lightning/surge protection device. Center ground. 2.5 KW PEP, 1 KW CW. Low SWR. Isolation better than 50 dB at 500 MHz. Negligible loss. 50 ohm. 6 1/4 x 4 1/4 x 1 1/4 in.

"Dry" Dummy Loads for HF/VHF/UHF

MFJ-260B
\$28⁹⁵

MFJ-264
\$59⁹⁵

MFJ-264N
\$69⁹⁵

MFJ has a full line of dummy loads to suit your needs. Use a dummy load for tuning to reduce needless (and illegal) QRM and save your finals.

MFJ-260B, \$28.95. VHF/HF. Air cooled, non-inductive 50 ohm resistor. SO-239 connector. Handles 300 Watts. Run full load for 30 seconds, derating curve to 5 minutes. SWR less than 1.3:1 to 30 MHz, 1.5:1 to 150 MHz. 2 1/2 x 2 1/2 x 7 in.

MFJ-264, \$59.95. Versatile UHF/VHF/HF 1.5 KW load. Low SWR to 650 MHz. Run 100 watts for 10 minutes, 1500 watts for 10 seconds. SWR is 1.1:1 to 30 MHz, below 1.3:1 to 650 MHz. 3x3x7 inches.

MFJ-264N: "N" connector.

HF or VHF SWR Analyzer™

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

MFJ-207
\$99⁹⁵

MFJ-208
\$89⁹⁵

MFJ Speaker Mics

MFJ's compact Speaker/Mics let you carry your HT on your belt and never have to remove it to monitor calls or talk. You get a wide range speaker and first-rate electret mic element for superb audio on transmit and receive. Earphone jack, lapel clip, PTT. MFJ-284 fits ICOM, Yaesu, Alinco. MFJ-286 fits Kenwood.

MINIATURE SPEAKER MICS: 2" x 1 1/4" x 1/4". MFJ-285 and MFJ-285L (with "L" connector) fit Icom, Yaesu or Alinco; MFJ-287 or MFJ-287L fit Kenwood; MFJ-283: Split jack Alinco. All features of compact models. One year guarantee.

MFJ-283, 284, 285, 285L, 286, 287 or 287L
\$24⁹⁵ each

MFJ-1278 Multi-Mode Data Controller

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

MFJ-1278T, \$359.95. MFJ-1278 with 2400 modem built in.

12/24 Hour LCD Clocks



\$19⁹⁵ MFJ-108B **\$9⁹⁵** MFJ-107B

Huge 5/8 inch bold LCD digits let you see the time from anywhere in your shack. Choose from the dual clock that has separate UTC/local time display or the single 24 hour ham clock.

Mounted in a brushed aluminum frame. Easy to set. The world's most popular ham clocks for accurate logs. MFJ-108B 4 1/2 x 1 x 2; MFJ-107B 2 1/4 x 1 x 2 in.

Cross-Needle SWR Meter

MFJ-815B
\$69⁹⁵

MFJ Cross-Needle SWR/Wattmeter has a new peak reading function! It shows you SWR, forward and reflected power in 2000/500 and 200/50 watt ranges. Covers 1.8-30 MHz.

Mechanical zero adjusts for movement. SO-239 connectors. Lamp uses 12 VDC or 110 VAC with MFJ-1312, \$12.95.

Deluxe Code Practice Oscillator

MFJ-557
\$24⁹⁵

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base so it stays put on your table. Portable because it runs on a 9-volt battery (not included) or an AC adapter (\$12.95) that plugs into a jack on the side.

Earphone jack for private practice, Tone and Volume controls for a wide range of sound. Speaker. Key has adjustable contacts and can be hooked to your transmitter. Sturdy. 8 1/2 x 2 1/4 x 3 3/4 in.

MFJ Multiple DC Outlet

MFJ-1112
\$29⁹⁵

New MFJ DC Power Outlet saves you space and money. Hook it to your 12 VDC power supply and get 6 DC outlets for connecting your accessories. RF bypassing keeps RF out of power supply from DC line outlet. 13 1/2 x 2 3/4 x 2 1/2 in.

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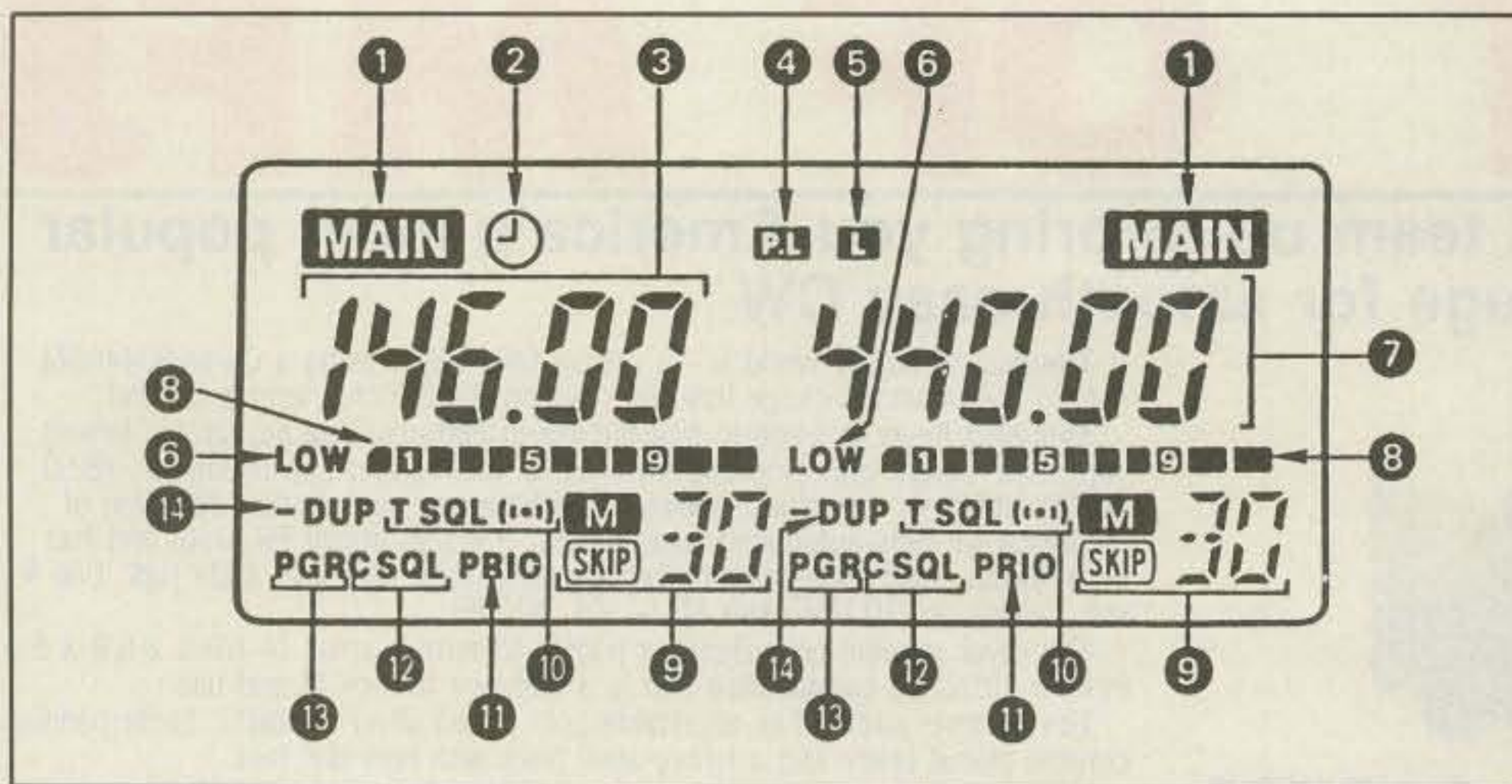


Fig. 3—The **Function** display. This display actually has a magnifier built over it. If I had any complaints about the unit, it would be that even with the magnifier, it is difficult but not impossible for a "senior citizen" to read.

so that the transceiver will shut off at a preset time. Naturally, this can be a real battery saver if you are forgetful—and most of us are. By the same token, there is a **Power On Timer** that can be preset to turn the rig on at a preset time—a very useful feature if you keep schedules—and many of us do. Of course, if we are going to have the above modes available, the natural question would be, is there a time-

of-day clock present? There is, and the time of day is displayed on the panel LED. There are several **Scan** modes available. These include the following:
Full Scan—Scans all frequencies over the selected band.
Memory Scan—Scans all memory channels in sequence.
Programmed Scan—Repeatedly scans between preselected channels.

Memory Skip Scan—Repeatedly scans memory channels. Memory channels programmed as the skip channels, however, are skipped while scanning.

Scan Resume Condition—Two resume conditions are available: pause scan and timer scan.

One of the first things I check with any FM handheld is intermodulation distortion under actual operating conditions. I always remember how good a receiver could be when there was no intermodulation and how bad they were with it. Silver City doesn't have serious intermodulation problems, but both El Paso and Phoenix have real problems. In any case, I operated the receiver extensively in both locations and can give the receiver a completely clean bill of health. The audio reports on transmission were outstanding, and everyone who had a chance to play with the transceiver fell in love with it.

Here in the west we have a great deal of dual-band 146/450 MHz operation. Silver City has dual machines, as do some of the remote base setups. This kind of radio is really a necessity. Normally I get turned off by too many "bells and whistles," but the ICOM IC-W2A has what I would call very useful bells and whistles.

The ICOM IC-W2A lists for \$629.00 and is manufactured by ICOM America, Inc., 2380 116th Avenue NE, Bellevue, WA 98004.

TOUCH-TONE DECODER/DISPLAY & ASCII CONVERTER BOARD

Model **TDD-8** decodes and displays all 16 DTMF digits and provides an ASCII serial output. Digits are displayed on eight LED's. 32 character memory can be scrolled. It will accept almost any audio source. Serial output can be connected to your computer. IBM compatible software included for displaying, storing and/or printing time, date and number for automatic logging. **Ideal for automatically logging your auto-patch traffic!**

TDD-8 DTMF DECODER/DISPLAY/ASCII \$99
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9913/PIN	N Male Pin for 9913, 9086, 8214	
	Fits UG-21 D/U & UG-21 B/UN's	1.50
UG-21D/9913	N Male for RG-8 with 9913 Pin	3.95
UG-21B/9913	N Male for RG-8 with 9913 Pin	5.75
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 Add a **Recorded Natural Voice** to your system or equipment. Voice vocabularies or multiple phrases up to 1 minute in a Natural Voice is saved in Non-Volatile E-Prom memory. (If power is removed the recordings will not be lost). We'll record your message(s) in a male or female voice - or - you can record the library by using the optional SDS-1000 development board on an IBM or compatible computer.

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CIRCLE 67 ON READER SERVICE CARD

MFJ gives you *all 9* digital modes and keeps on bringing you state-of-the-art advances

Now with **FULL COLOR SSTV** . . . the latest MFJ breakthrough!

MFJ-1278

\$279⁹⁵



No old stale technology at MFJ!

Using the latest advances, MFJ brings you 9 exciting digital modes and keeps on bringing you state of the art advances like *color* SSTV. You get tons of features others just don't have.

Only MFJ gives you *all 9* modes

Count 'em -- you get 9 fun modes -- Packet, AMTOR, RTTY, ASCII, CW, FAX, SSTV, Navtex and Contest Memory Keyer.

You can't get all 9 modes in *any* competitive multi-mode. Nobody gives you modes MFJ-1278 doesn't have.

NEW! New Full Color SSTV!

Enjoy the latest MFJ-1278 breakthrough -- full color SSTV display with an appropriate terminal program like MFJ-1289!

The best modem you can get

Tests in *Packet Radio Magazine* prove the modem used in the MFJ-1278 copies HF packet more accurately than all other modems tested.

MFJ-1278 is the *only* multi-mode with a *true* DCD circuit. This dramatically reduces sensitivity to noise and dramatically increases completed QSOs.

Exclusive Built in Printer Port

The MFJ-1278 has a printer port that lets you plug in your Epson or IBM compatible printer. You don't have to buy a silly \$40 cable just to plug in your printer.

20 LED Tuning Indicator

MFJ's unequaled tuning indicator makes it really easy to work HF packet. Just tune your radio to center a single LED and you're precisely tuned in to within 10 Hz -- and you use it the same for all modes.

New Easy Mail™ Personal Mailbox

You get MFJ's new Easy Mail™ Personal

Radio specific TNC cables

New pre-wired cables instantly connect your MFJ multi-mode or MFJ TNC to almost any radio for only . . . \$14.95 each!

Now you'll get on the air even faster when you choose an MFJ-1278 or MFJ-1278T Multi-mode or an MFJ-1270B, MFJ-1274, MFJ-1270BT or MFJ-1274T packet radio controller.

These new MFJ cables are pre-wired for most 8 pin rigs and HTs. You won't have to wait to get your cable wired because MFJ solves that little problem for only . . . \$14.95!

Choose the custom cable for your radio from the models listed below. Take it home with your MFJ Multi-mode or TNC and your MFJ MultiCom™ package with computer cable for IBM compatible, Commodore 64/128 or Macintosh (described at right). *What else do you have to do? Just plug it all in and you're hooked up and on the air fast . . . Enjoy!*

MFJ TNC to Radio Cables: **\$14⁹⁵** each

MFJ-5024, Icom, Yaesu HTs, Alinco DJ-560

MFJ-5026, Kenwood HTs

MFJ-5080, Yaesu 8 pin rigs

MFJ-5084, Icom 8 pin rigs

MFJ-5086, Kenwood and Alinco 8 pin rigs



Mailbox with soft-partitioned memory so you and your ham buddies can leave messages for each other 24 hours a day.

Multi-Gray Level FAX/SSTV Modem

You'll see tomorrow's news today when you copy outstanding FAX news photos with crisp clear details. MFJ-1278 is the *only* multi-mode with a built-in multi-gray level modem. It lets you transmit and/or receive multi-gray level pictures with an appropriate terminal program.

NEW! MFJ's new Automatic Signal Analysis™ gives you exclusive HF packet identification!

MFJ's new ASA automatically identifies HF packet, RTTY, ASCII and AMTOR signals. A

and MSYS compatibility, fast throughput anti-collision technology, independent transmit level for each radio port, random code generator, lithium battery backup, RS-232 and TTL serial ports, socketed ICs, tune up command, peripheral I/O port, automatic serial numbering, programmable message memories, dual radio ports (each HF or VHF), CW paddle jack, audio amplifier and speaker jack so you can monitor CW sidetone, transmit and receive audio and packet connect bell, *new* fully intergrated instruction manual with *Fast Start*™ booklet and more. 9½ x 9½ x 1½ inches.

No Matter What™ Guarantee

You get MFJ's one year No Matter What™ Guarantee.

That means we will repair or replace your MFJ multi-mode (at our option) *no matter what* happens to it for a year.

Others give you a 90 day *limited* warranty. What do you do *after* 90 days? Or *before* 90 days if they say, "Sorry, your *limited* warranty does not cover *that* problem?" Why take chances when MFJ gives you *No Matter What* protection for a full year?

Get nine new ways of having fun

Don't settle for old stale technology.

Choose the multi-mode that gives you the latest advances and all 9 modes. Get yours today!

NEW! MFJ 9600 Baud Modem

MFJ-9600 G3RUH compatible 9600 baud modem. Specially designed for the MFJ-1278 and other MFJ TNCs. Plugs right in to MFJ-1278 for very easy installation. Screws, cable and LED included. Not all radios compatible with 9600 baud.



New MFJ-1278T Turbo with fast 2400 baud modem

MFJ-1278T **\$359⁹⁵**

The new MFJ-1278T Turbo gives you *fast* 2400 baud packet -- *twice* the baud rate of any competitive multi-mode. By communicating faster you'll reduce chances for error, lessen congestion and more efficiently utilize our ham frequencies. You'll also get 1200/300 baud for compatibility with older TNCs.

2400 modem available separately, MFJ-2400, \$69.95. **New!** G3RUH compatible 9600 Baud modem, MFJ-9600, \$109.95.

One FREE Upgrade!

When you buy your MFJ-1278 *today*, you don't have to miss new modes and features that come out *tomorrow*. Why? Because your 1278 comes with a coupon good for one *free* eeprom upgrade exchange that'll add new features.

Plus More . . .

Plus you get . . . 32K RAM, *free* AC power supply, Host mode, Kiss interface for TCP/IP

MFJ-1289 MultiCom™ . . . exciting MFJ-1278 software

High resolution AP news photo received on 20.738 MHz using MFJ MultiCom and MFJ-1278 with multi-gray modem.



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"Antenna Arrays" From AV Technology

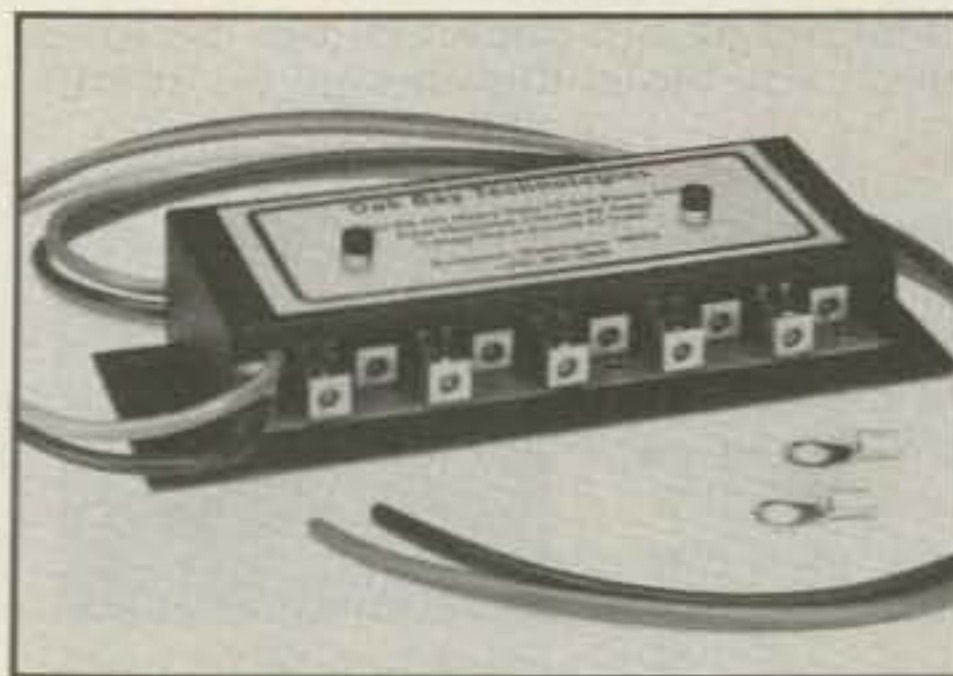
Antenna Arrays software computes up to 16 dipole elements (larger arrays are available as an additional option upon request). Toggle to display from vertical to horizontal, and then the user can try rotating the polarization of the combinations from horizontal to vertical. The radiation patterns can then be viewed in both the horizontal and vertical planes. The software is priced at \$59.95 (specify 5 1/4 or 3 1/2 inch disk). It requires IBM PC compatible, EGA monitor, MS.DOS 3.0, and at least 512K RAM.

For more information, contact AV Technology, P.O. Box 97, West Newton, MA 02165 (617-965-3866), or circle number 109 on the reader service card.

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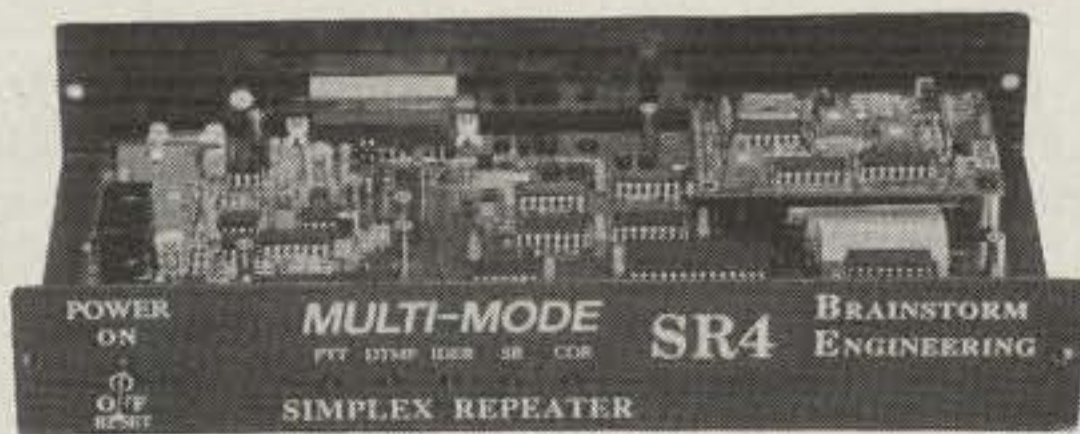
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CIRCLE 70 ON READER SERVICE CARD

CQ REVIEWS:

M2 Enterprises Antennas And The 2M12 Two Meter Yagi

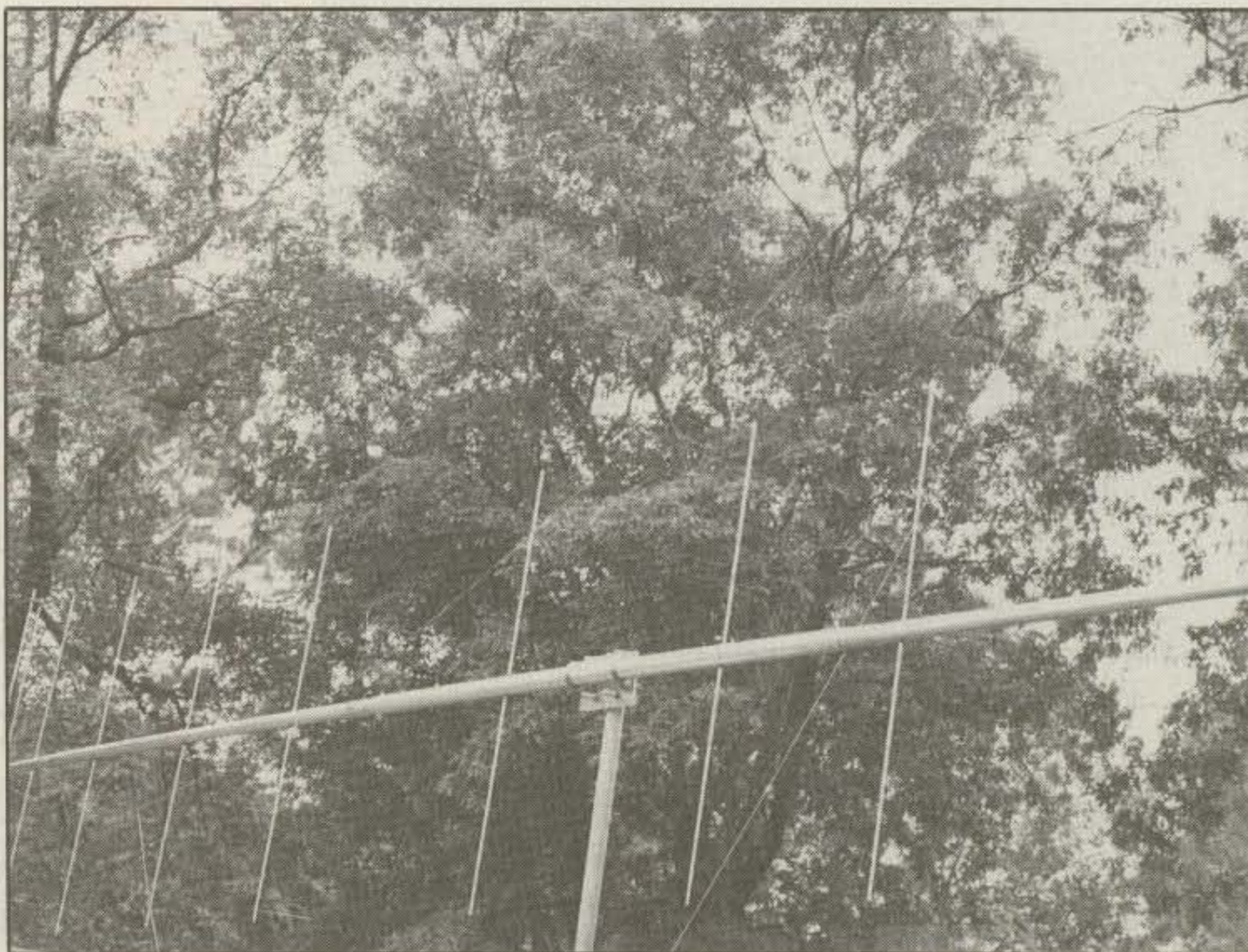
BY DAVE INGRAM*, K4TWJ

A relatively new antenna company known as M2 Enterprises has been advertising in *CQ*, and the general specs on their line of products are quite impressive. Naturally I was delighted to check out one of their antennas and share my opinions with readers. While the main subject of this review is M2 Enterprises' 2M12 two meter 12-element Yagi, many of its features (such as computer-optimized design and high-quality construction) are common to the full M2 line. Our following discussion is thus useful for understanding the overall M2 philosophy and recognizing their name when you are ready for a big-league HF, VHF, or UHF beam or stacked array.

Although M2 is a new name in antennas, its "kingpin" and product designer, Mike Staal, K6MYC, has been well known among big guns and serious DXers for many years. Mike's creative genius resulted in some of today's best beams for both HF and VHF, and he really puts his expertise into action with the M2 line. Check out their advertisements in *CQ*, and you will see what I mean. M2 manufactures over a dozen types of super-gain VHF and UHF beams that can be used individually or stacked in large numbers for serious moonbounce work or tropo DXing. They also make a half-dozen long-boom, band-blasting monoband beams for 20 through 10 meters, plus a big log periodic for 10 through 30 meters.

All of the M2 beams are made with top-grade aluminum tubing, use stainless steel hardware for long life, and have weather-proof driven-element feedpoint housings. They are also optimized for best gain and bandwidth. Now let's focus on one specific M2 type: the 12-element 2 meter Yagi.

The accompanying photo shows the M2 2M12 unpacked in my yard and ready for assembly. The elements were measured and laid out in order of assembly as the instructions directed. One plastic insulator is pushed onto each element.



The M2 Enterprises 2M12 antenna features 13 dB gain, 19½ foot boom, and excellent construction.

insulator will be added after each element is installed through the boom, and then stainless "keepers" lock each into place. The 19½ foot boom is in five sections that slip into each other and bolt together. Assembly is straightforward and foolproof. One point I found quite appealing was the boom could be assembled or disassembled without removing any elements. That's right: Boom sections mated in between rather than at element mounting points. Clever!

The next photo was taken only 30 minutes later (a small investment for a *big* 2 meter signal indeed!). After installing the elements and preassembled driven-element assembly, I bolted in the balun, added the boom-to-mast plate, and the 2M12 was ready for testing. A commercial "N" type connector is used at the feedpoint, so another 5 minutes was spent in my closet digging for the N-to-PL259 cable adapter

I previously used with my KWM-380 HF transceivers. M2 has the right idea, however, and my use of an adapter is not encouraged. Consider it like putting four bald tires on a new Cadillac. Use a single and unbroken length of top-quality coax (like RG-213 or better) with an N connector at the antenna, plug to fit your rig on the other end, and avoid losing any of the 2M12's 13 dB gain.

I was super-anxious to start using the 2M12 at this time, so I bolted it to a long mast, raised it as high as possible, and strapped the mast to my back deck. Standing back/below and looking while trying to get the whole antenna in a viewable photo was mind-boggling. The boom on this critter is longer than the one on my HF tribander!

SWR measurements followed, and they were a pleasant surprise. Although I used a metal mast between elements (yuk!) and

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9086	.64	1.7	3.1
RG-213/U	.9	2.3	5.2
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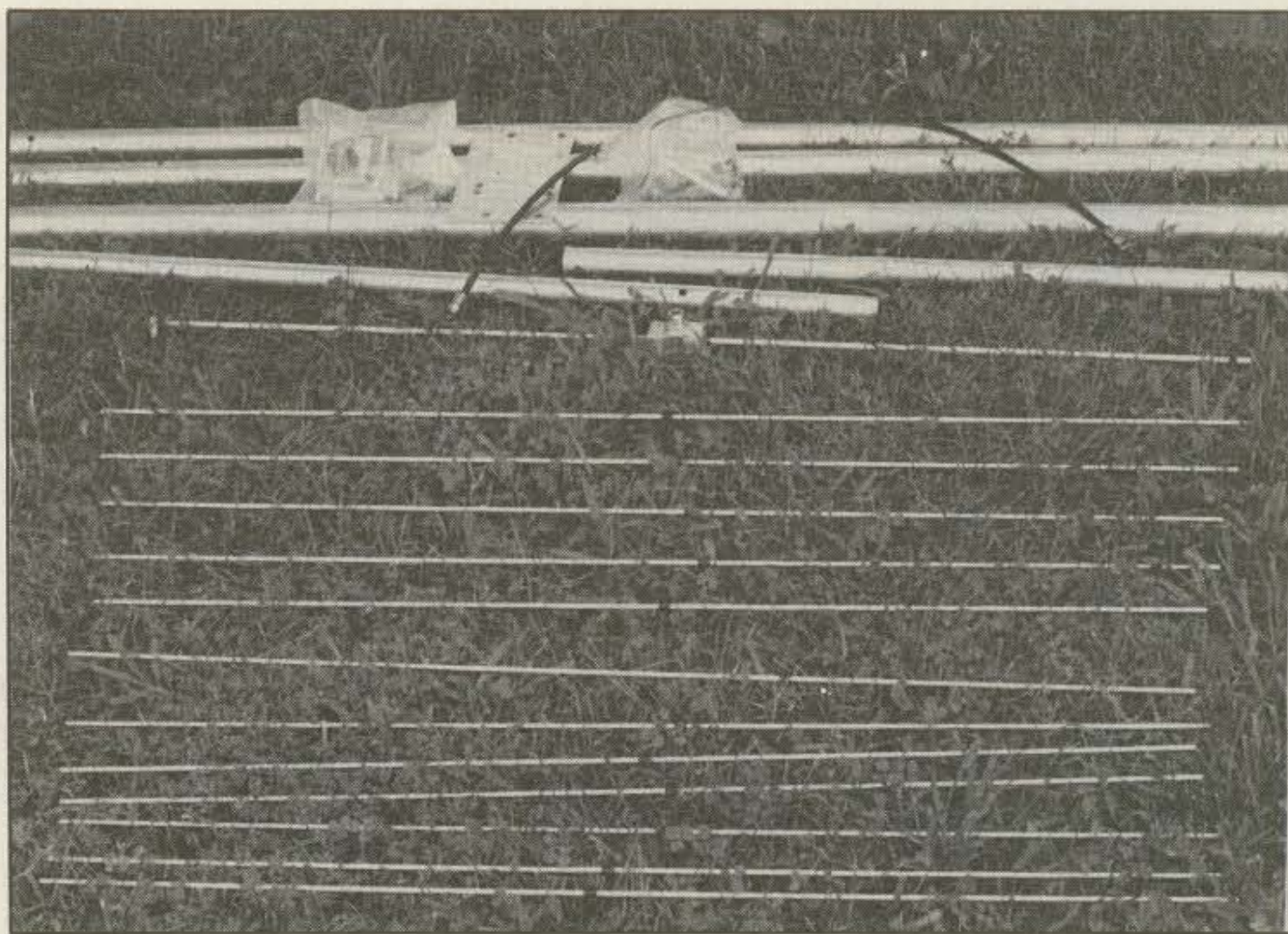
M-F: 9AM-5PM
SAT.: 9AM-1PM

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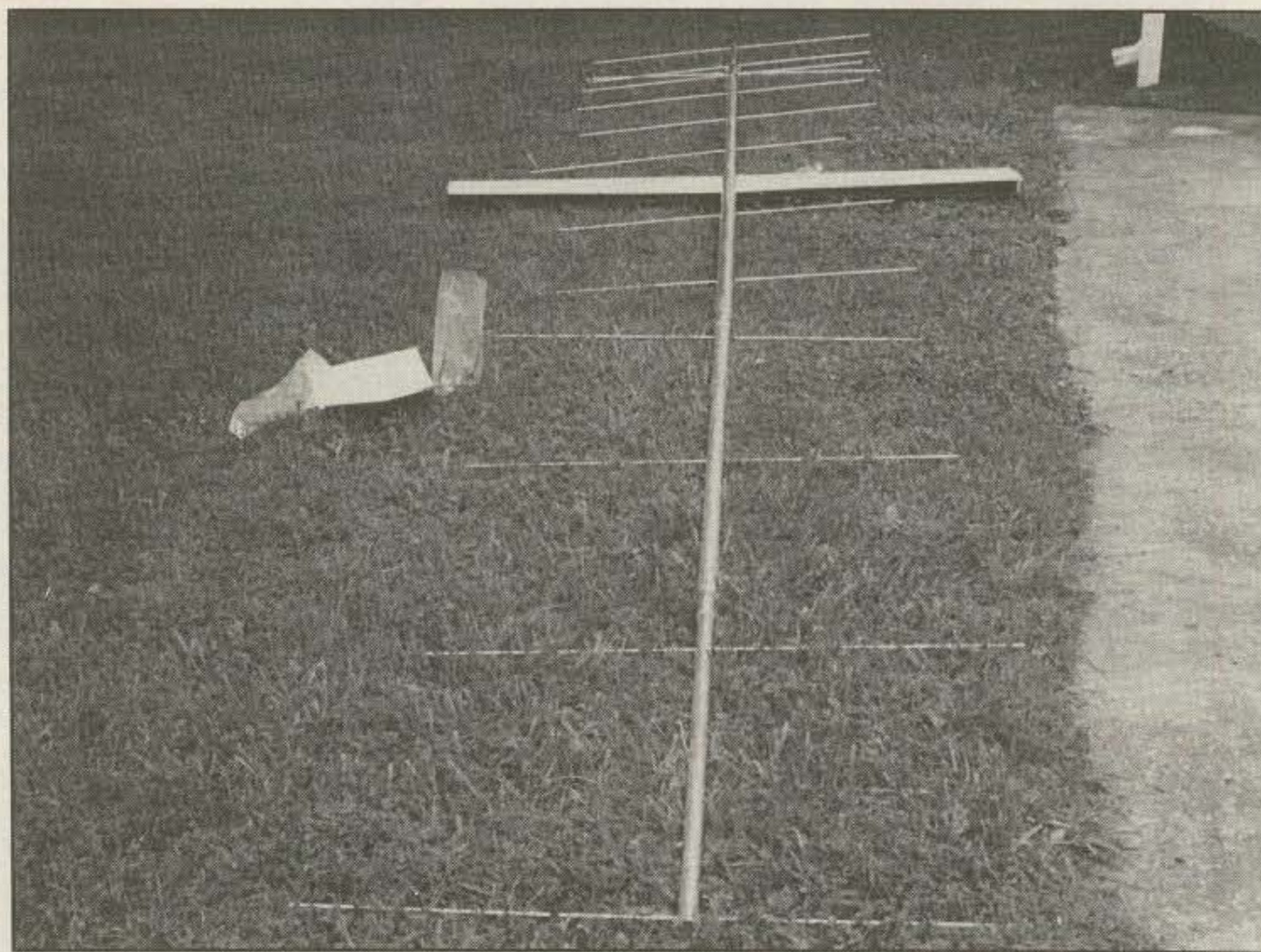
other antennas were nearby (what do you expect with a 20 foot boom and an all-band QTH!), the measurements were great. The SWR was 1.1 to 1 from 144 to 147 MHz, increasing to only 1.4 to 1 from 147.4 to 148 MHz. A quick field-strength-meter check also showed the beam has a sharp and very strong front pattern with very low side/rear radiation. In fact, it was almost like measuring a parabolic dish. M2 helps amateurs stack/phase one or two dozen of these antennas for moonbounce! Talk about big-time DXing!

So how does the 2M12 work? Like a champ, to put it mildly! Right off the bat I started hearing and working through distant repeaters I never knew existed. Listening on 146.52 during "drive times" sounded like 20 meters (well, almost). Using a big antenna makes a significant difference. SSB DXing was also great with the 2M12, and boy will it be terrific for mountaintopping. Just unbolt the boom sections, slip it and a mast into the trunk, and head for the hills! This thing should put some real excitement in VHF contesting!

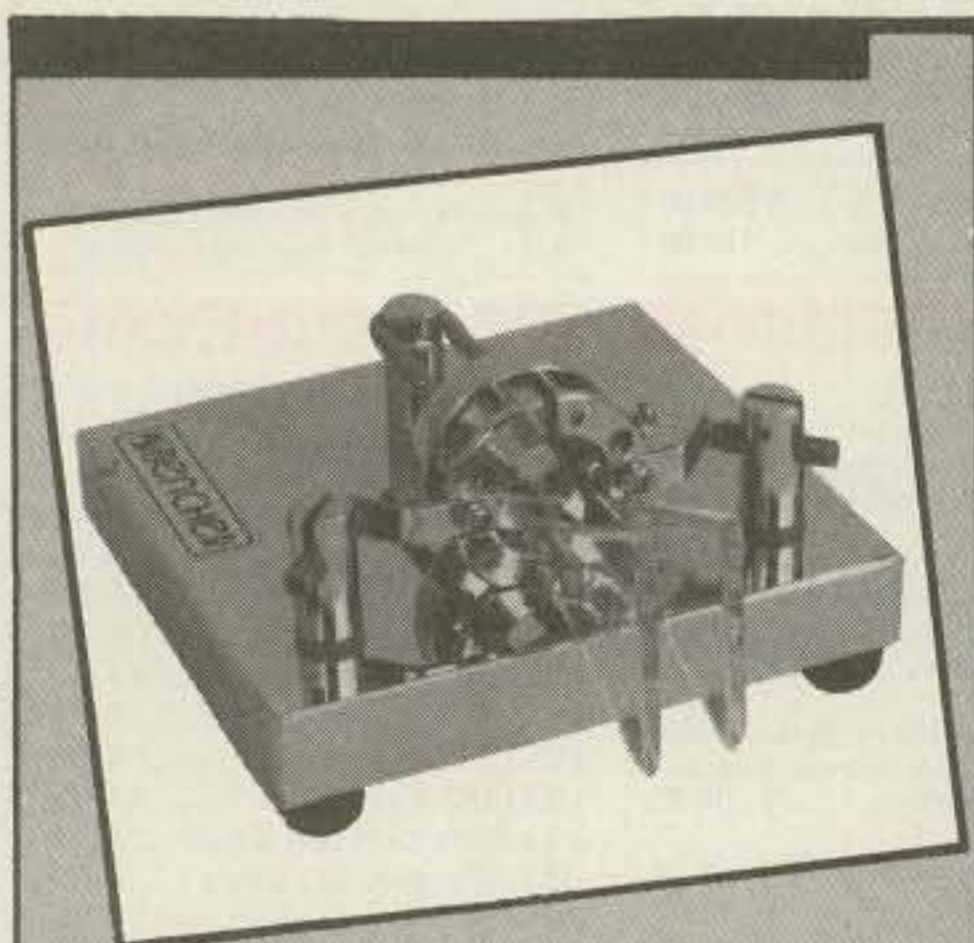
The 2M12 also does an outstanding job for OSCAR satellite work, but accurate azimuth and elevation tracking is vital. This brings up an important point. High-gain Yagis such as M2's 2M12 have a narrow beamwidth or "front lobe," so they must be aimed/rotated directly toward targeted areas for best results. Nothing new there; just a fact worth remembering. The more



The 2M12 unboxed and ready for initial assembly. The only tools needed are a tape measure, screwdriver, and pliers.



Thirty minutes later, the assembled 2M12 ready for 2 meter action. Not only does this antenna work great, it adds 6 dB of amateur glamor to the QTH!



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elements/longer the boom, the more RF energy is concentrated into a narrow forward "beam" or radiation pattern.

M2 antennas are top quality all the way, and their manuals remind you that they are only a phone call away to guide you through proper installation. Such personal guidance may not be necessary with one

2 meter antenna, true, but it is vital when you are setting up large stacked-and-phased arrays. If you are looking for a sharp HF, VHF, or UHF antenna, check out M2 Enterprises, 7560 N. Del Mar Avenue, Fresno, California 93711 (209-432-8873). I am sure you will like the results. (And by the way, the 2M12 is priced at \$129.00.)

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Length: 17' 8" Connector: UHF

2 CA-2x4FX

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146 4.5dB 7/8 wave
446 7.2dB 5/8 wave x 3
Max Power: 200 watts
Length: 5' 11" Connector: UHF

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Gain & Wave:
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Max Power: 120 watts
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446MHz 7.0dB 5/8 wave x 3
Max Power: 120 watts
Length: 4' 6"
Connector: UHF

5 CPR-5400

Gain & Wave:
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446MHz 6.0dB 5/8 wave x 2
Max Power: 120 watts
Length: 3' 2"
Connector: UHF

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Length: 4' 10" Connector: UHF

7 CA-2x4SR

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Length: 3' 4" Connector: UHF

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8 B-20

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9 B-10

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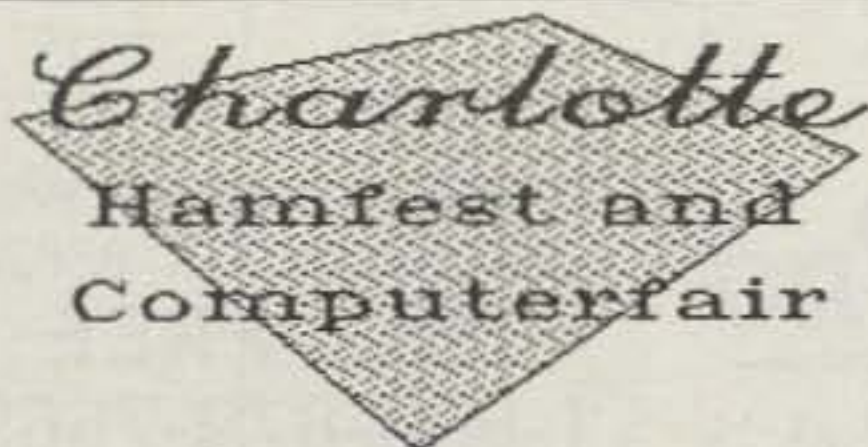
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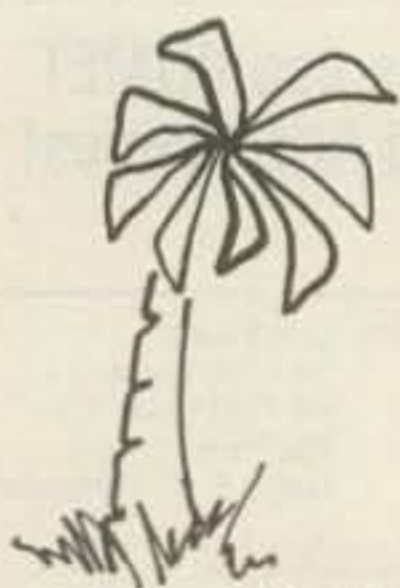
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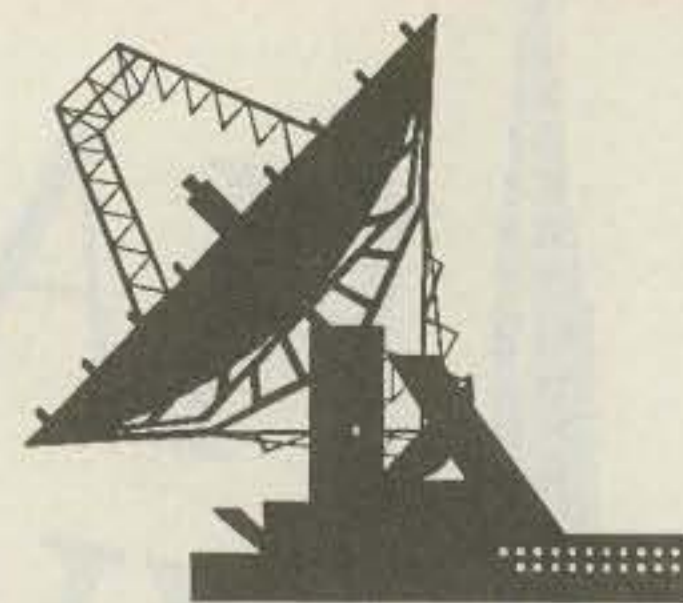
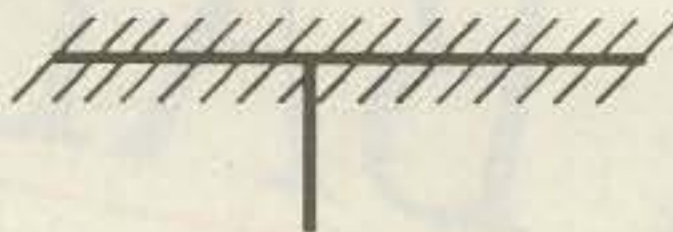
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- C. GIVE ME A BREAK!!!
- D. ALL OF THE ABOVE

Answer: D (But some people are telling you they're the same).

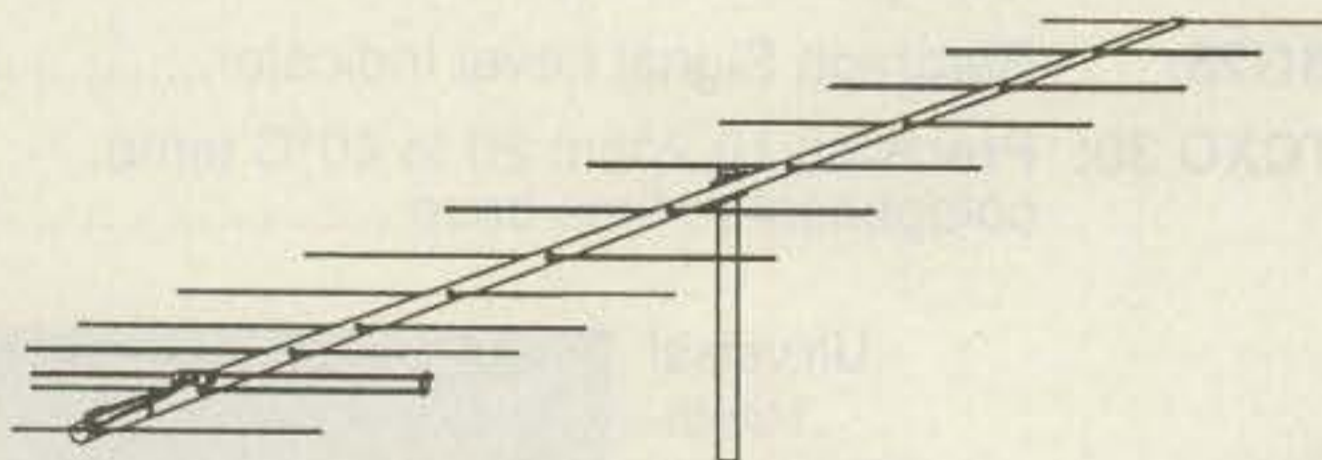
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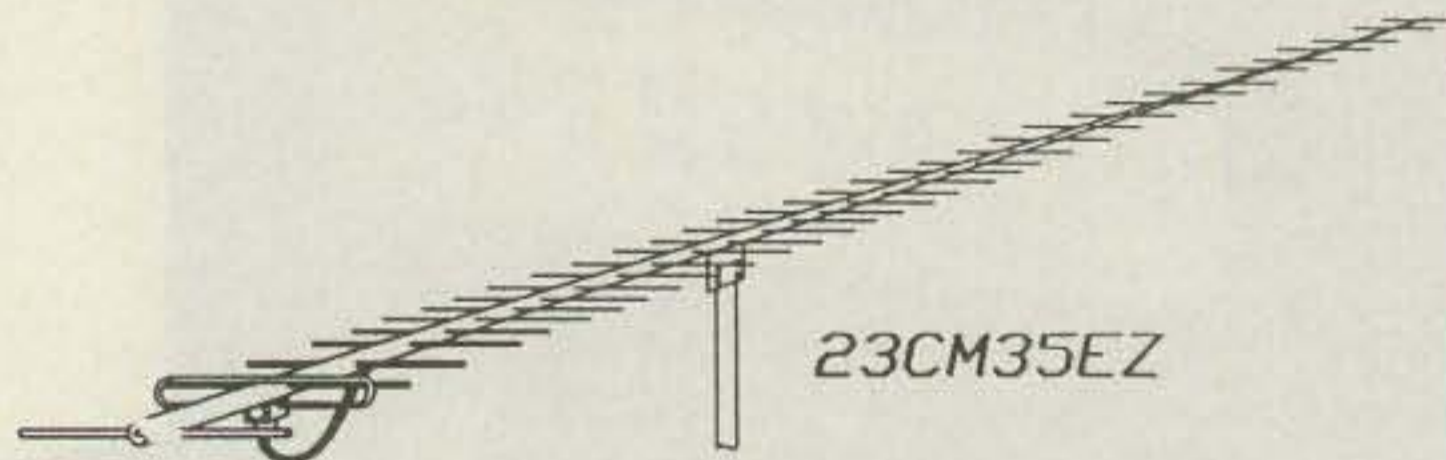
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ICOM		
IC-781 HF Base Station XCVR		CALL
IC-765 Gen. Cov. Xcvr/PS/Tuner		CALL
IC-751A Gen. Cov. Xcvr		CALL
IC-735 Gen. Cov. Xcvr		CALL
IC-726 .1-30MHz/50-54MHz		CALL
IC-725 Gen. Cov. Xcvr		CALL
IC-R71A .1-30MHz Rcvr		CALL
R1 100KHz-1300MHz Handheld Rcvr		CALL
R72 30KHz-30MHz Rcvr		CALL
R-7000 25MHz-2GHz Rcvr		CALL
R-9000 .1-2000 MHz Rcvr		CALL
IC-2410 VHF/UHF 45W/35W		CALL
IC-3220H VHF/UHF 45W/35W		CALL
IC-229H 50W FM		CALL
IC-901 Fiber Optic		CALL
IC-W2A 2M/440 Handheld Xcvr		CALL
IC-24AT 2M/440 Handheld Xcvr		CALL
IC-2SAT 2.5W 2M Handheld Xcvr		CALL
IC-2GAT 7W 2M Handheld Xcvr		CALL
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TS-850SAT Xcvr w/Receiver, Tuner		CALL
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TM-641A 2M/220MHz, FM Xcvr		CALL
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TM-731A Delux 2M/440MHz		CALL
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TH-26AT 2.5w, 2MHT w/TTP		CALL
TH-27A 2.5 W, 2M, HT		CALL
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1274 Packet controller		143.95
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284 Spkr/Mic-Icom/Yaesu		24.95
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535 Argonaut II ORP Xcvr		1249.95
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FT-757GX-II Gen. Cov. Xcvr		CALL
FT-747GX HF Xcvr		CALL
FT-736R Xcvr 144-148, 430-450		CALL
FT-290R/II 2M All Mode 25W		CALL
FT-5200 2M/440 50/35W		CALL
FT-2400H 2M 50W		CALL
FT-415 Delux 2M, HT		CALL
FT-712RH/C8 440MHz 35W FM		CALL
FT-26/25 2M 2W		CALL
FT-470 2M/70CM 2W		CALL
FT-411E 2M 2.5W		CALL
FT-811 440MHz 2W		CALL

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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for January is:

Clyde Kane, KA0NVT
USA-CA All Counties #683
All SSB, 12-12-90

"I was born in Lander, Wyoming and finished my sophomore year in high school before moving to Dubois, Wyoming. I was valedictorian of my graduating class there, receiving an Honors Scholarship to attend the University of Wyoming.

"My working career consisted of the wholesale and retail in-store supermarket bakery business. I was Director of Bakery Services for the largest supermarket chain in the world. I was involved in this business for more than 30 years. I am now involved with my wife in her home cleaning business. (She is the boss; I am the helper. Hi! Hi!) I hold a private pilots license, single engine, land and sea ratings, and have logged more than 2500 hours in the air.

"I hold a first-aid instructor rating from the American National Red Cross, and received the highest Red Cross award. On one occasion in 1959 a lady lost her balance while disembarking from an airplane and fell into the whirling propeller. Fortunately, I was able to stem the loss of blood by applying pressure to a neck artery until she reached the hospital. She lived to tell her friends all about the experience.

"As recently as November 1990, while Arlene and I were working in a condominium, we heard the cries of a woman in distress. She had fallen and broken her wrist. We found her door locked with a dead bolt and chain; being a semi-invalid, she was unable to open it. There was no building manager available, so I broke down the door. We found the lady lying on the floor with a compound fracture. Arlene immediately called the paramedics. The lady recovered completely.

"I received my Novice license on April 23, 1982 with the call KA0NYU. Two weeks later the FCC notified me that that call had been issued to a Nebraska ham and I was given my present call, KA0NVT. I upgraded to Technician class on July 24, 1984, General class on July 16, 1988, and Advanced class on June 19, 1990.

"I was very interested in DXing and have worked over 150 countries. I was also interested in other awards. My collection includes the ARRL 5-Band WAS NR2164, 8-20-87; WAS Oscar 10 #143; WAC Oscar



Clyde Kane, KA0NVT, USA-CA All Counties #683, at his operating position in Minnesota.

10; ARRL 6 Meters WAS 816; ARRL 6 Meters VUCC 87; and ARRL 10 Meters WAS #833.

"Some of my more interesting contacts over the years have included KH6IJ, Katsushi Nose, Oscar 10, 12-26-85; KH6BZF, 40 meter CW; WB0LRY, Joe Flaska, one of the engineers who helped build the Oscar 10 Satellite; K5YY, Sun, Oscar 10, 10-16-85; and last but not least, ZL2ACP, Vic, 15 meters CW, 10-31-86. I guess of all the QSL cards among some 8000 contacts, one of my most precious is the one from DP0SL. For those who may not know, DP0SL was the station operated by three West German hams aboard the Challenger space craft. They were Doctor Reinhard, DD6CF; Doctor Ernst Messerschmid, DG2KM; and Doctor Wubbo Ockels, PE1LFO.

"I have also enjoyed various building projects along the way. One of my most interesting was a 6 meter amplifier which I built under the supervision of W0HEV, Hank. It had one 4CX-250 tube in it and put out 250 watts. I built a screen supply on a separate chassis that had three 20B tubes and put out 325 volts. The power supply that I built for the amplifier put out 2000 volts for the plate voltage, 50 volts bias, 6 volt filaments on the tube, and 300 milliamps plate current.

"I have built five link-type antenna tuners, winding some of my own coils (they worked!). I also enjoyed my own 2 meter repeater project, putting it on the air January 5, 1987. I sold it three years later. Also, for a fun thing I have a collection of tubes—860, 833A, GL845, VT127A, 807—set up and wired to transformers to furnish the correct filament voltages so they light up.

"Of all my good experiences in amateur radio, a few stand out as especially precious—for example, giving K9KKX his last county for his USA-CA All Counties Award; and being notified by Arnie, K9DCJ, of my qualifying for USA-CA All Counties #683.

USA-CA Special Honor Roll

Ronald P. Smith, VE1GU
 USA-CA All Counties #728
 Mixed, 9-3-91

Darrel R. Craig, W6TMD
 USA-CA All Counties #729
 Mixed, 9-16-91

Robert B. Damon, N6PLQ
 USA-CA All Counties #730
 All Mobile, 9-21-91

"I would like to give thanks to all the amateurs who helped me get my USA-CA number, with a special thank you to those who helped me get needed re-works at the end: KF5HY, Ed; WB9YZE, Fred; W0UM, Cecil; WT4S, Bill; W5VBH, Don; WD0EAM, Ken; KJ4EJ, Willis; and N8HAM, Jim. Also, a special thank you to W5ILR, Ed, for giving me the very last contact for county #3076, Hood, Texas.

"There is much more, but I'll say 73 and 88 for now with thanks to Arlene, my wife, KB0GQU, and our son Josh, KB0GQS, for all their help and support—Clyde, KA0NVT/M."

USA-CA Honor Roll

3000		1000	
W6TMD	755	AA2AV	1195
N6PLQ	756	ONL-4000	1196
		W6TMD	1197
		N6PLQ	1198
2500		500	
W6TMD	834	YB5QZ	2540
N6PLQ	835	AA2AV	2541
		OK1-1198	2542
2000		W6TMD	2543
W6TMD	912	N6PLQ	2544
N6PLQ	913		
1500			
AA2AV	1001		
W6TMD	1002		
N6PLQ	1003		

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 \$1.25. 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.

333 South Lincoln Ave., Mundelein, IL 60060

NEW MULTIBAND ANTENNAS FROM DIAMOND


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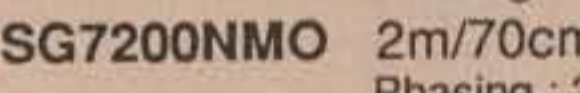



Good Design Product selected by Ministry of International Trade and Industry (Japan)


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- 

SG7500NMO 2m/70cm Dual Band Antenna. **NEW** NMO
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ . Rating : 150W. Length : 40.6". Connector : NMO.
- 

SG7200NMO 2m/70cm Dual Band Antenna. **NEW** NMO
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ . Rating : 150W. Length : 37.8". Connector : NMO.
- 

SG7500 2m/70cm Dual Band Antenna.
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ . Rating : 150W. Length : 41.7". Connector : UHF.
- 

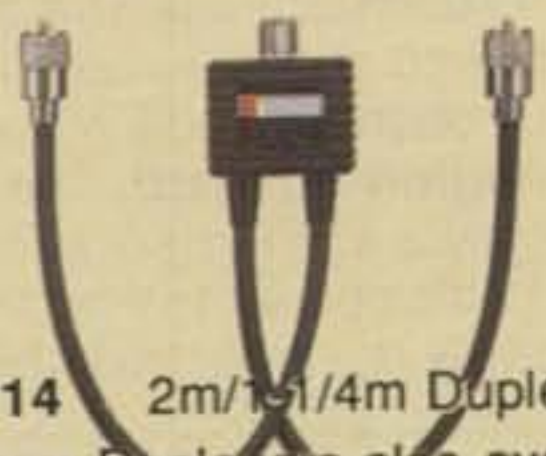
NR2000NA 2m/70cm/23cm Tri-Band Antenna. **NEW**
Phasing : 2m $1/2\lambda$, 70cm 2-5/8 λ , 23cm 5-5/8 λ . Rating : 100W (2m & 70cm), 50W (23cm). Length : 39.0". Connector : N.
- 

CR214S 2m/1-1/4m Dual Band Antenna. **NEW**
Phasing : 2m $1/2\lambda$, 1-1/4m 5/8 λ . Rating : 120W. Length : 37.0". Connector : NMO.
- 

NR770HNMO 2m/70cm Dual Band Antenna. **NEW**
Phasing : 2m $1/2\lambda$, 70cm 2-5/8. Rating : 200W. Length : 38.2". Connector : NMO.



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Awards Issued

Ronald P. Smith, VE1GU, filed his application along with his final collection of confirmed contacts and received USA-CA All Counties #728, Mixed, dated 9-3-91.

Darrel R. Craig, W6TMD, submitted his completely filled and certified Record Book qualifying for USA-CA All Counties #729, USA-CA 3000 #755, USA-CA 2500 #834, USA-CA 2000 #912, USA-CA 1500 #1002, USA-CA 1000 #1197, and USA-CA 500 #2543, Mixed, dated 9-16-91.

Robert B. Damon, N6PLQ, also made a clean sweep of it by claiming USA-CA All Counties #730, USA-CA 3000 #756, USA-CA 2500 #835, USA-CA 2000 #913, USA-CA 1500 #1003, USA-CA 1000 #1198, and USA-CA 500 #2544, All Mobile, dated 9-21-91.

Paul A. Scipione, AA2AV, filed his good application for USA-CA 1500 #1001, USA-CA 1000 #1195, and USA-CA 500 #2541, Mixed, dated 9-6-91.

Egbert Hertsen, ONL4000, filed his good application and upgraded his record to include USA-CA 1000 #1196, Mixed, dated 9-14-91.

USA-CA 500 certificates went to:

Anton Iriawan, YB5QZ, USA-CA 500 #2540, Mixed, 9-4-91.

Paul A. Scipione, AA2AV, USA-CA 500 #2541, Mixed, 9-6-91.

Robert Haszprunar, OK1-1198, USA-CA 500 #2542, Mixed, 9-9-91.

Darrel R. Craig, W6TMD, USA-CA 500 #2543, Mixed, 9-16-91.

Robert B. Damon, N6PLQ, USA-CA 500 #2544, All Mobile, 9-21-91.

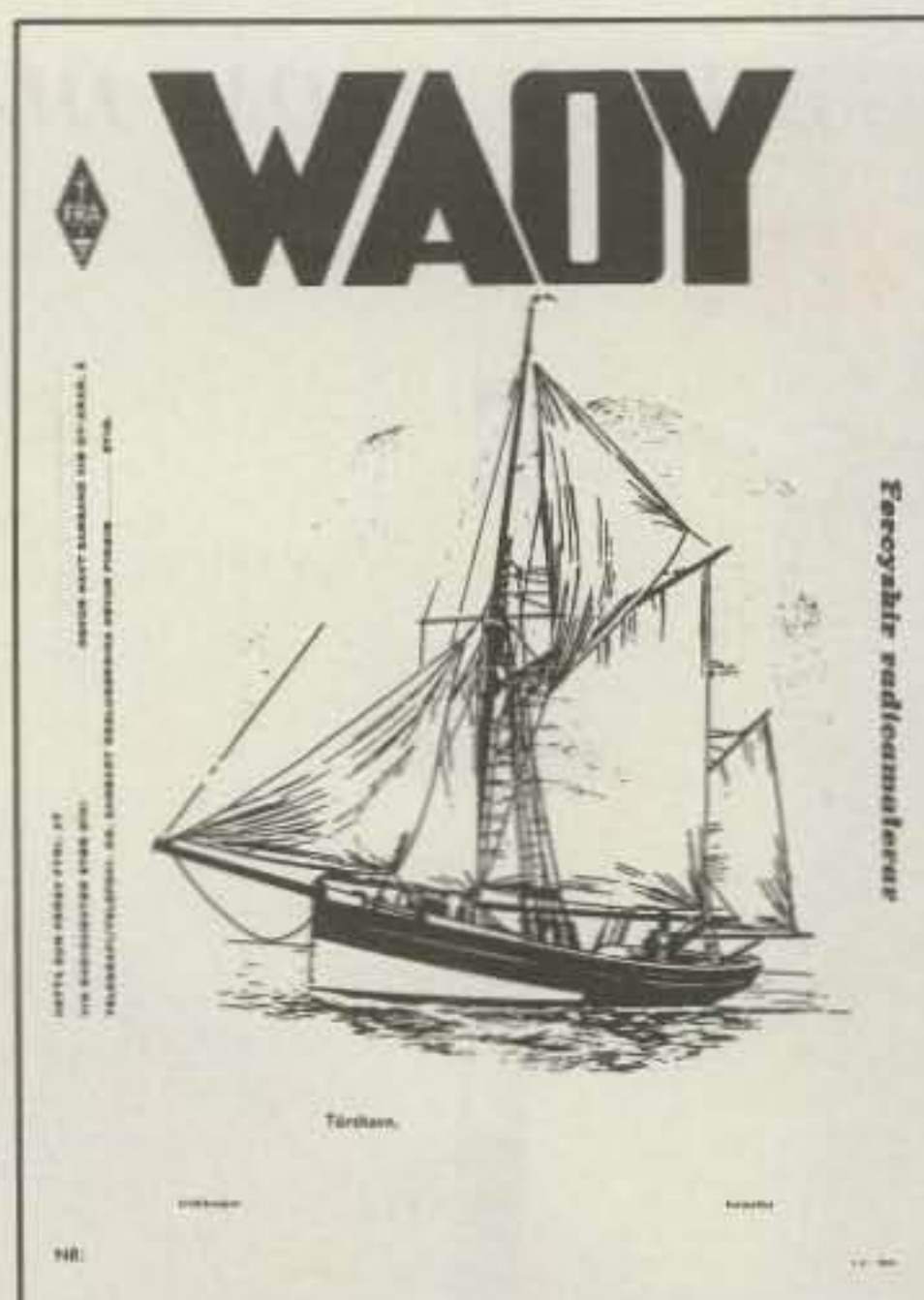
Awards Available

WAOY Awards. Since 1965 a WAOY (Worked All Faroe Islands) Award has been offered by FRA, The Faroese Radioamateur Society, for all radio amateurs, either for CW or phone contacts on any of the five old HF bands. Since conditions have changed a great deal since 1965, the FRA Board of Directors has decided to amend the rules for the WAOY award and at the same time expand them to cover VHF/UHF and introduce an SWL award. The revised rules follow.

Thirty MHz and higher: WAOY VHF/UHF awards are issued in 4 classes: 50 MHz requires 5 points; 144 MHz requires 3 points; 432 MHz requires 2 points; and OSCAR requires 5 points. For all classes, contacts in different modes are valid.

Each contact with an OY station—i.e., a station with a permanent OY call operating from the Faroe Islands—is valid. Contacts with temporary OY stations, such as OY/Own Call or OY stations operating outside the Faroe Islands, such as OZ/OY— or OY—/MM, are not valid for the awards. Contacts via repeaters are not valid.

Scoring: One point for each different OY



Worked All Faroe Islands Award offered by the Faroe Radioamateur Society.

station worked. Contacts with club stations OY6FRA, OY6NRA, or OY6JAM count double. Only contacts made on or after 1 January 1980 are valid for these awards.

SWL: WAOY for SWL is issued in the same classes as WAOY for the HF bands and WAOY VHF/UHF on the basis of OY stations heard. Otherwise the rules are the same.

Only contacts heard on or after 1 January 1990 count for these awards.

Applications: Applications for all WAOY awards should be sent, together with a GCR list (no QSL cards) and 15 IRCs or \$10 US, to FRA Awards Manager, Arne Juul Arnskov, OY1A, P.O. Box 343, FR-100 Torshavn, Faroe Islands.

HF Bands: WAOY is issued for contacts between amateurs on CW or SSB or mixed modes.

Contacts on all HF bands are valid for the awards.

WAOY I—requires 35 points for European stations and 25 points for non-Europeans.

WAOY II—requires 25 points for European stations and 15 points for non-Europeans.

WAOY III—requires 15 points for European stations and 10 points for non-Europeans.

Each contact with an OY station—i.e., a station with a permanent OY call operating from the Faroe Islands—is valid. Contacts with temporary OY stations such as OY/Own Call or with OY stations operating outside the Faroe Islands such as OZ/OY— or OY—/MM are not valid for the awards.

Scoring: One point per band for each OY station worked. Contacts with club stations OY6FRA, OY6NRA, or OY6JAM count double.

These amended rules are used for all contacts made on or after 1 January 1990.

Contacts between 11.4.1965–31.12.1989 score according to older rules—i.e., only 3.5, 7, 14, 21, 28 MHz and stations outside Europe get 2 points on 7–14 MHz. Otherwise the amended rules above are applicable.

ZC4 Award. The ZC4 Award, The Sovereign Base of Cyprus, is available from Awards Manager ZC4BS, Stephen B. Bowden, ZC4 Bureau, JSB, BFPO 53. The award is open to both TX operators and SWLs for contacts with ZC4 stations after 1980.

Enclose only a list of QSOs with your application together with a signed declaration that the credits necessary for this award and the licensing conditions of your country have been adhered to. Do not forward your QSL cards, as they are not needed to confirm this award. The award comes in three classes with various band and mode endorsements. Point requirements for the classes are:

Class 1—Europe and Asia, 15 points; Americas, Oceania, and Africa, 10 points.

Class 2—Europe and Asia, 10 points; Americas, Oceania, and Africa, 5 points.

Class 3—Europe and Asia, 5 points; Americas, Oceania, and Africa, 3 points.



ZC4 Award, Sovereign Base of Cyprus, available from the ZC4 Bureau.

Each contact with a ZC4 station counts one point; the same station may be worked on different bands for additional points. Contacts with the two club stations, ZC4ESB and ZC4EPI, count double points, as do any special event callsigns (ZX4JAM or similar, having three letters after the prefix).

Contacts on 50 MHz or on 7 MHz and below count two points. Therefore, a contact with ZC4ESB and 3.5 MHz, for example, would count four points.

The cost of this award is 10 IRCs or \$3.00 U.S. Additional information can be obtained by contacting the awards manager at the above address. This is the first ZC4 award and should issue a fair challenge to TX operator and SWL alike.

IARU Region II Award. The Bolivian Radio Club gives a Diploma of IARU Region II to Ham Radio operators who prove with QSLs two-way contacts from their coun-

try, on or after 1 March 1991, with: Antigua & Barbuda V2, Argentina LU, Aruba P4, Bahamas C6, Barbados 8P, Belize C3, Bermuda VP9, Bolivia CP, Brazil PY, British Virgin Islands VP2V, Canada VE, Cayman Islands ZF, Chile CE, Colombia HK, Costa Rica TI, Cuba CO, Dominica J7, Dominican Republic HI, Ecuador HC, El Salvador YS, Grenada J3, Guatemala TG, Guyana 8R, Haiti HH, Honduras HR, Jamaica 6Y, Mexico XE, Montserrat VP2M, Netherlands Antilles PJ, Nicaragua YN, Panama HP, Paraguay ZP, Peru OA, Surinam PZ, Trinidad & Tobago 9Y, USA K, Uruguay CX, and Venezuela YV.

All authorized callsigns, frequencies, and modes are valid. There are special endorsements for 18 MHz, 24 MHz, and 30 MHz (RTTY). Mobile stations do not count.



IARU Region II Award, by the Bolivian Radio Club, for working countries in Region II.

The award is issued in three classes: Class I—all countries; Class II—34 countries; Class III—30 countries.

The fee for the award is 10 IRCs. Endorsement to a higher class is 2 IRCs. Send log certificate through a radio club member of IARU to Radio Club Cochabamba, P.O. Box 1900, Cochabamba, Bolivia.

Barcelona Olympic Games Award. On the occasion of the Olympic Games "Barcelona 92" and as a celebration of this event, "Olimpiada Cultural Barcelona-92" and Radio Club BAIX Penedes have organized an award for radio amateurs under the following rules.

Diploma—There are no geographic boundaries. All licensed radio amateurs in the world are invited to participate.

Objective—To obtain the highest number of links between EA3-EC3 radio stations. Each link will be confirmed by a QSL "Olimpiada Cultural Barcelona 92" and will be valued at 1 point.

Mode—All modes are permitted.
Band—All HF bands are permitted.
Duration—Time limits are from September 1990 until the last day of the Olympic Games, 9 August 1992.

Specific—Only one link with each radio station, mode, and band will be allowed, and there must be an interval of 20 minutes.

Areas—To be entitled to a diploma, these scores are needed: Spain, Balearic,

Portugal, and Andorra 70 points; Europe, Africa, Canary, and Azores Islands 50 points; Asia and Americas (North and South) 30 points; Australia 10 points.

Call—The call will be "CQ CQ CQ Barcelona 92."

Lists—Participants need only send the numbered label of the QSL cards, including their call with the serial number. Logs will only be accepted if they are fully certified by the association or corresponding radio club. The postal address to which labels and lists are to be sent is Radio Club Baix

Penedes, Box 250-43700, El Vendrell, (Tarragona) Spain.

Remittance—Diplomas will be sent free of charge.

Any violation of these rules in any way, any unsportsmanlike conduct, or any failure to follow amateur radio rules and legislations can cause disqualification. Judgments by Olimpiada Cultural Barcelona 92, COOB 92, or Radio Club Baix Penedes will be final and unappealable.

Best wishes for a Happy New Year!
73, Dorothy, WB9RCY

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32-19 19-el. 2M beam
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The Gallatin, Tennessee Hamfest will take place on Saturday, January 25, from 7 AM to 5 PM at the National Guard Armory, on Highway 25 East, Gallatin, Tennessee. A Packet Forum will take place from 10:30 to noon, with an "Introduction to Packet Handbook" free at the forum. VE exams; talk-in on 147.30 and 443.300. RV parking. Dealer setup Friday from noon to 5 PM. For more information call Hamfest Chairman Bill Ferrell, N4SSB, 615-452-3962 after 5 PM.

Amateur radio digital communication techniques have taken on a different look from what they were only a few years ago. However, there is one digital mode that has continued to be at the forefront of the hobby for more than a decade now.

In 1981 there was a small AMTOR group that was making progress with this new form of forward error correcting (FEC) data transfer. Today this same mode is flourishing as one of the most dependable high-frequency (HF) traffic-handling mediums we have.

True, packet to a large extent is being used to pass traffic on the low bands, such as 40 and 20 meters, but the ever-increasing problem of congestion has become a hindrance that creates excessive retries. This same overcrowding on the packet frequencies has spread into the other digital frequencies and has created even more interference to the other digital modes. Because of this kind of interference, RTTY, AMTOR, and even CW are beginning to look good as alternative means for passing traffic on HF.

Any time you wish to argue this point, set your TNC to 300 bauds and tune to the packet portion of 20 meters, between 14.101 and 14.111 MHz. This is only for openers!

As you learn about other frequencies on HF that are set aside for packet use, you will understand why I am concerned about the future of our HF packet system.

The Alternative

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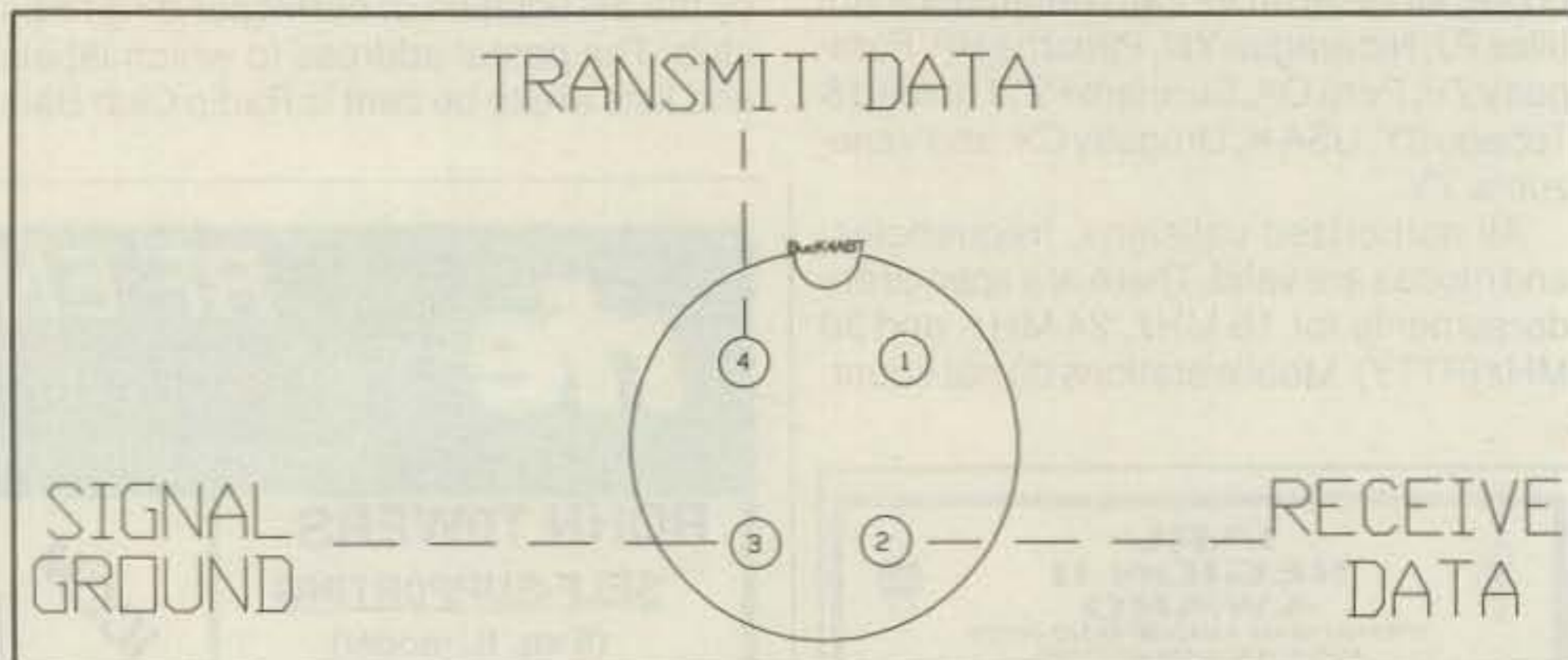


Fig. 1—The TRS-80 Color Computer(s) I, II, and III implement RS232 serial comports. The data I/O is controlled by using "software handshaking."

itself as the best method to pass NTS and other kinds of traffic is AMTOR. AMTOR is beginning to gleam not only as a domestic means of forwarding, but as an international traffic-handling system.

The AMTOR digital communications mode is supported by the HAL PCI-3000 PC-AMTOR System. Bill Henry of HAL Communications was one of the early supporters of this digital mode. He must have had a window on the future of HF digital communications when he began promoting this mode in the U.S. after the European community had begun having great success with it.

The HAL PCI-3000 AMTOR system is a card that plugs into the PC or compatible. In addition to the AMTOR mode, the HAL PCI-3000 supports the use of RTTY and CW. The HAL PCI-3000 is APLink compatible, and when used in conjunction with the HAL SPT-2 "Spectra-Tune," these digital signals become easy to tune in.

APLink

APLink is a system that enables the transfer of messages from the high-frequency AMTOR international network into the packet radio network. In many cases, the transfer is made from AMTOR at HF into the VHF packet BBS network.

Although the HAL PCI-3000 is considered the thoroughbred for this purpose, there are several "all mode" and "multi-mode" digital controllers that also support the AMTOR mode. Unlike the HAL PCI-3000, which fits inside the PC or compatible, these devices are external to the computer or terminal, and attach to the com-

puter or terminal, serial communications port.

These controllers are the popular AEA PK-232, the Kantronics KAM, and the MFJ-1278/T. They not only support AMTOR and RTTY, but they also support FAX/WeFAX, Navtec, CW, and both VHF and HF 1200 and 300 baud packet.

Looking Ahead

The time to be concerned about the future of the digital modes is now. In the months ahead the WARC convention will be making decisions that may change our band plans as we may have known them. Notice that I use the phrase "may have known."

It has been over a year since the "Digital Committee" was formed by the League, yet to date no frequency coordination and operating procedures have been made with regard to the HF digital operations. Still the problem continues to worsen as more and more packet operators move into the HF spectrum. To the Digital Committee I want to say that I only hope some common ground will be found to negate the erosion that is taking place within our digital modes.

Agreeing To Disagree

As much as we would like to see fewer regulations, here is a place where the enactment of some form of regulation may be needed to keep the various digital modes apart. The passage of such a package might, at first glance, seem fruitless. However, we have few options from which to choose.

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To continue in the current environment, without separating the digital operating modes of packet, RTTY, AMTOR, and CW, could very well create adversity—if it hasn't already begun. I suggest that a hard line be drawn to see that AMTOR has spectrum for AMTOR, RTTY has frequencies set aside for amateur radio teletype, and packet has frequencies designated for its operation.

Just as voice and single sideband have spectrum allocated for their use, the same edict should prevail for each of the digital modes. To attempt otherwise could become an exercise in futility. The bottom line will demonstrate that each mode should have "exclusive" spectrum.

Supporting Evidence

Oh, no. I'm not about to begin defining frequencies, nor am I attempting to do the job of the Digital Committee. All I'm doing is reflecting on some feelings from many readers who have written to me with their concerns about the future of digital amateur radio communications. A preponderance of the following evidence supports the case for AMTOR as a means of passing international traffic on the HF bands.

The Last Voice From Kuwait!

At a recent meeting of the Middle Tennes-

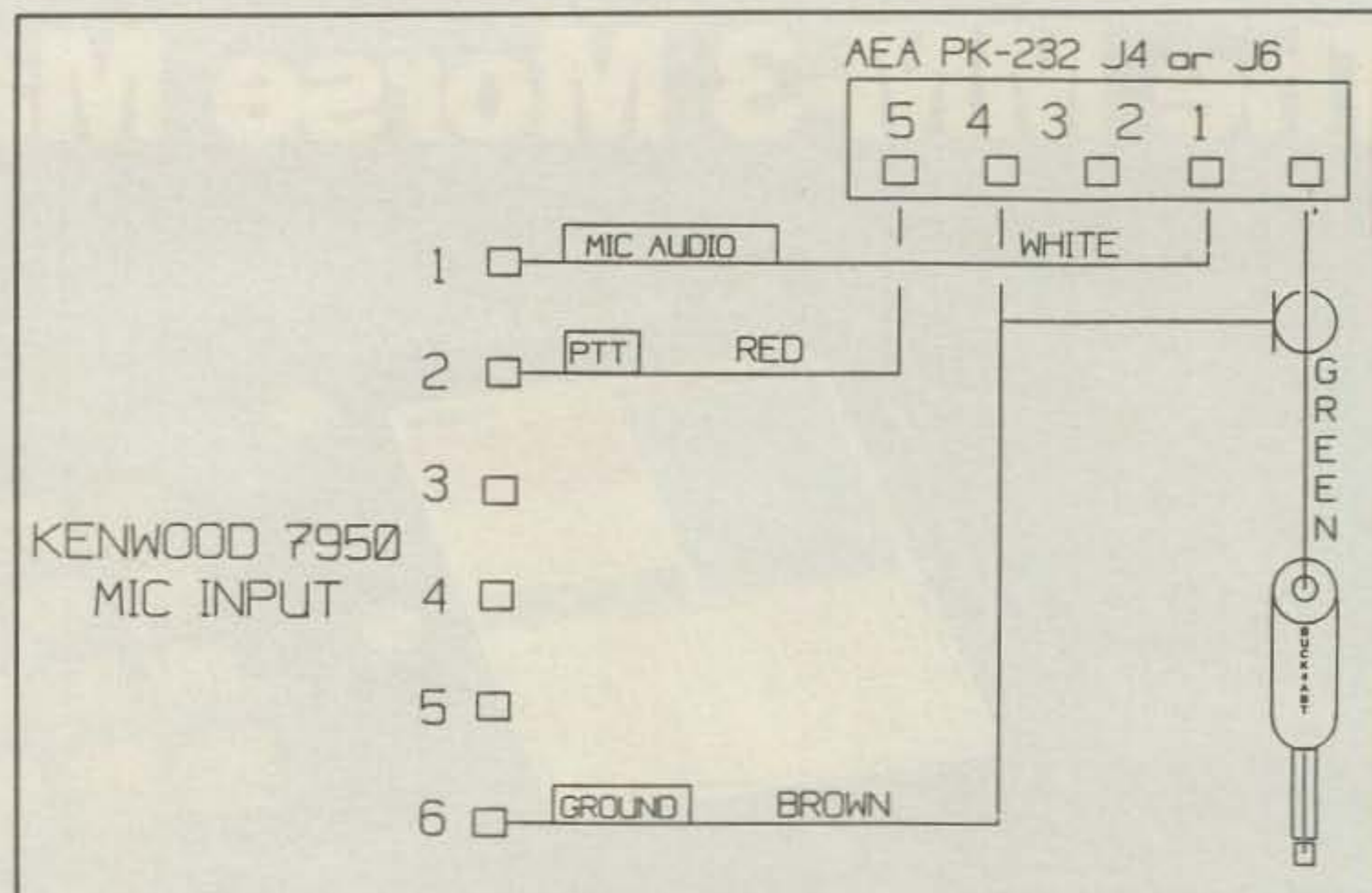


Fig. 2—AEA PK-232 MBX Multi-Mode Data Controller to Kenwood 7950. Note: The AEA PK-232 port can be either J4 or J6. Switching is controlled by the front-panel RADIO 1/ RADIO 2 switch.

see Packet Association (MTPA) the president, Steve Waterman, K4CJX, handed me a video tape and asked that I review it. Steve operates one of Nashville, Tennessee's APLink stations, which receive international messages via AMTOR. In turn, his

system then distributes the traffic to area VHF packet network systems through the WA4TTZ clearing house.

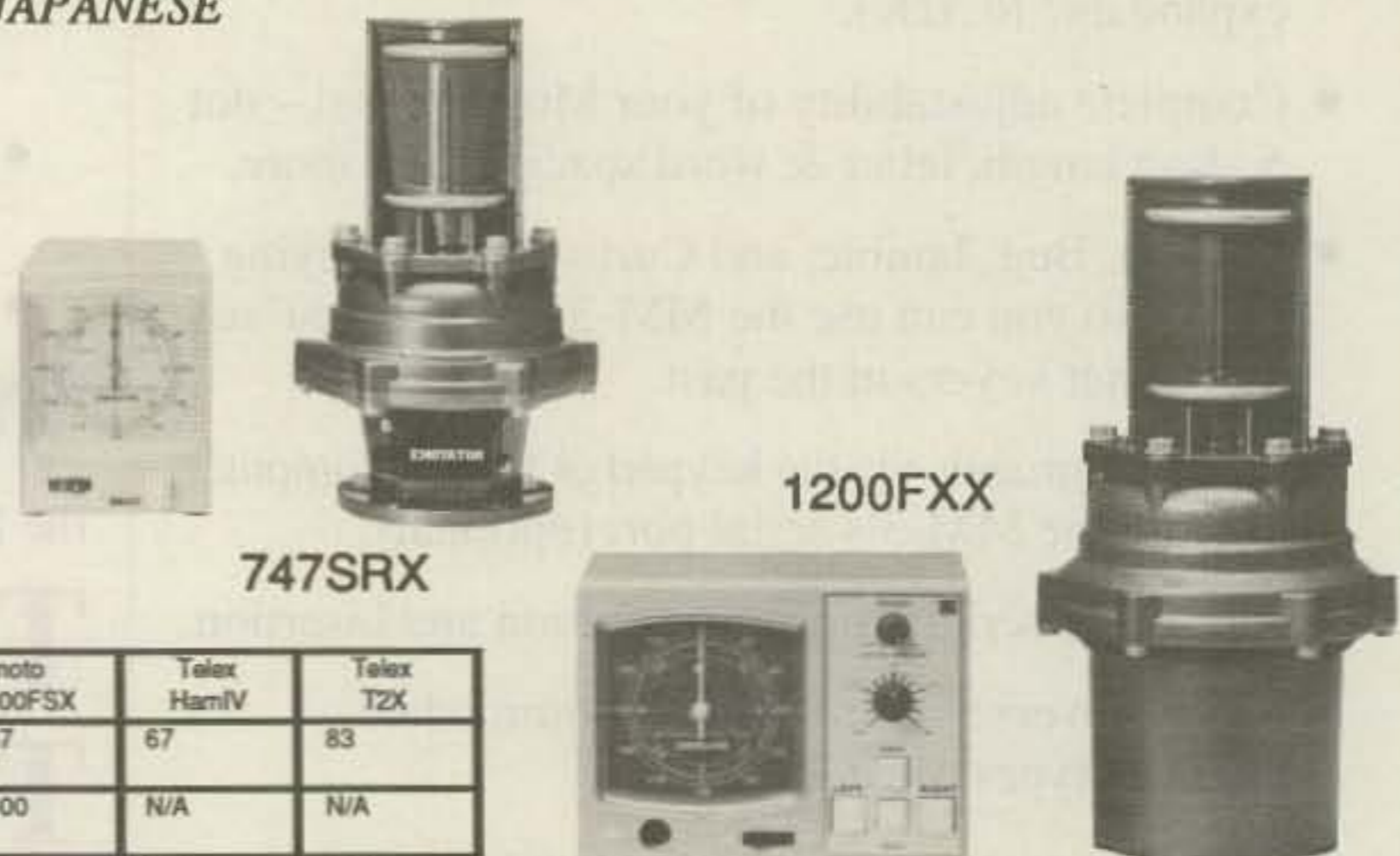
This is not an ordinary packet "clearing house," but a sophisticated software-driven packet network distribution center.

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Gd? KgM Ant Inertia	100	400	700	1000	1800	3000	N/A	N/A
Brk/Static Torque Ft#	215	502	717	1290	1792	2150	417	750
Wind Load In Tower Ft#	11	22	27	27	33	36	15	20
Mast mount	5	9	12	12	15	16	7.5	10
Rotating speed 360°	55	35	65	40	77	80	60	60
Power 120V 60Hz	70VA	70VA	70VA	90VA	120VA	150VA	26V AC	26V AC
Mast Dia.	1.2-2.4 in	1.5-2.4 in	1.5-2.4 in	1.5-2.4 in	2.4-3.1 in	3.5-5.5 in	2 in	2 in
Vertical max load #	660	1100	880	1760	1760	2200	400	800
Rotor wt/#	7.5	9	11	11	13	39.5	14	18

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(More on this system in a later article.)

The video tape that Steve loaned me is well written, composed, and documented. It was produced at WANE-TV in Fort Wayne, Indiana, with inserts by distinguished personalities from CBS, CNN, and other media. There are appearances by President George Bush as he addresses the country regarding the war in the Gulf.

Frank Moore, WA1URA (WANE-TV), is one of the driving forces behind this documentary, which is called "The Last Voice From Kuwait!" Frank is a valiant supporter of the AMTOR to packet (APLink) system. He has been instrumental as one of the international gateways to the world from the domestic AMTOR network. He operates one of many AMTOR stations that received and distributed intelligence traffic to the State Department during operation Desert Storm.

The video must be seen to really feel the full impact of how vital the role of amateur radio was during this tragedy in the Persian Gulf. As you watch, you soon begin to see an even greater story unfold as we are given a first-hand look at a real hero. You see and hear the heroics that were exhibited by the honorable and brave Abdul Jabbar Marafie, 9K2DZ.

Outside the U.S. there are others who are mentioned in the video, and rightly so. There are some who must remain anonymous for reasons that become obvious as you view the video. Mentioned in the video are VK2AGE, PA0QRS, and OD5DG. There are still other stations that were critical to the movement of traffic out of the Desert Storm region.

Scott Ward, N5DST, aboard the U.S.S. *Kennedy* intercepted and relayed to the war effort information about 12 to 24 hours before the State Department collected it from Frank. Other courageous communications are supported by a live cast of operators whose numbers go beyond the space available in this column.

At this end of the APLink system there were many HF and VHF packet stations involved in the distribution of health and welfare messages as they were being received from these international stations.

Many readers of this column are already aware of how fruitful this effort was, because some of you were the recipients of traffic that was routed via this network. It is important for me to state that all operations were conducted within the normal amateur bands.

The video is about 30 minutes in length, but it tells a story that lasts a lifetime. I cannot provide copies of the video, and I do not have facilities for the duplication of the tape. If your club or organization has an opportunity to obtain a copy of this video, then by all means see it!

I cannot tell you how powerful and compelling this video is and how great an image it builds for the future of amateur radio. The people and places that are seen in this

video are real, and no dramatization is employed. It is real, and more than that, it portrays a real purpose that we amateurs have in today's world. Whether it is disaster or dictatorial conflict that threatens our health, welfare, or basic freedoms, we are committed to a common cause.

Thanks, Abdul, Frank, and the many

other amateurs who participated in this effort. In some way your actions may have helped to shorten a conflict that could have been prolonged, had your heroic performance not been present.

73 de Buck4ABT
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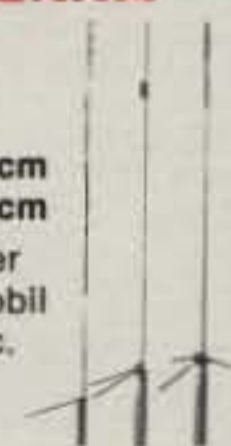
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

ARRL Novice Roundup Contest

The American Radio Relay League (ARRL) sponsors the Novice Roundup (NR) Contest each year. This is a nine day contest which sandwiches a full week in between two weekends. This is a pleasant low-pressure contest for Novices and Technicians who may otherwise have little (or no) interest in contesting. One can participate just a few minutes, or as long as 30 hours (maximum) in the NR.

Name. The name "Novice Roundup" was established many years before Technician licensees were granted code operating privileges in the so-called Novice bands. The name remains appropriate because operation remains confined to the frequency segments (sub-bands) available to Novice class licensees, on a shared basis with all other classes of American amateur radio licensees. Technicians have full operating privileges above 50 MHz, but their NR activities are limited to frequencies shared with Novices.

Objective. The objective is for Novices and Technicians to contact as many amateurs as possible. One's contest score is multiplied by the total number of ARRL/CRRL sections and foreign (DX) countries contacted.

Participants. This contest is primarily for American Novice and Technician class licensees, but General, Advanced, Extra, and foreign (DX) operators are also invited to operate in it. Novices and Technicians can work all amateurs (Novice, Technician, General, Advanced, Extra, and DX), but General, Advanced, Extra, and DX amateurs are only allowed to work Novices and Technicians in the contest. This is a good rule, because it guarantees that at least one Novice or Technician is involved in each NR contact. This contest is open to all Novice and Technician operators in the 50 states, plus those who are in U.S. possessions and territories.

Rules. A basic condition of entry for NR contest participants is that they abide by the ARRL NR rules, decisions of the ARRL awards committee, and the regulations of the FCC. Failure to abide by these requirements is reason for disqualification. It is common to have other amateurs ask you what "NR" is, or what the NR rules are,



Here is eight-year-old Robert Kosakowski, KA3WTG, of Natrone Heights, Pennsylvania. He recently passed the 20 wpm Extra Class code test. He has worked 247 countries. In addition to amateur radio, he enjoys baseball, bicycling, soccer, and swimming. Robert is a third-grade student. He is a member of the Western Pennsylvania DX Assn. His father is John, KC3TM.

during the first few days of this contest. It is unreasonable of them to expect you to lose operating time providing such information; it is suitable to simply direct these operators to the January issues of *CQ* or *QST* for NR details. Know the NR contest rules and abide by them. Read this article carefully a couple of times before getting on the air in the contest.

Benefits

I advise you to operate in the NR even if you have a poor station and/or low code proficiency. It will be nice if you get a certificate for working at least 200 NR contacts, and you will have just cause to be extremely proud if you are the top scorer in your ARRL section or division, or one of the top ten scorers in the country. However, you do not need to achieve these lofty accomplishments to benefit from NR activity. This contest provides a great opportunity to contact amateurs in many counties, states, and countries. You can probably work more contacts during one day of the NR contest than you normally work in a month. These contacts can help you qualify for

hundreds of operating awards. Novice contacts remain valid after one upgrades, even if the callsign is changed.

NR operation will let you judge your operating skills and station performance against those of other operators. NR participation can also help you increase code receiving and sending proficiencies to help you prepare to pass license upgrade tests. You can benefit in many ways by operating in contests.

Competition and Awards

This contest provides a unique opportunity for Novices and Technicians to compete on the air against other Novices and Technicians in their own ARRL sections, plus against those who operate from other ARRL sections. Novices just compete against Novices, and Technicians only compete against Technicians; Novices and Technicians do not compete against each other in this contest.

The ARRL issues a nice certificate to each Novice and Technician who participates in the contest. These certificates are endorsed appropriately for the top scoring Novices and Technicians in each ARRL section and division.

General, Advanced, Extra, and foreign (DX) amateurs are invited to take part in the NR contest, but they are not eligible for NR certificates. These operators provide contacts, cards, and code practice for Novices and Technicians.

No certificates are awarded to DX Novices who operate in the NR. However, American Novices greatly appreciate opportunities to contact DX amateurs, and I hope many DX amateurs will be on the Novice bands during this contest. Novices and Technicians are likely to be happy with a few DX contacts.

Dates and Times

The NR contest starts at 0001 UTC on the 25th of January, and it ends at 2359 UTC on the 2nd of February. Simply stated, it starts Friday evening (January 25th) local time, and it ends early Sunday evening (February 2nd). If you are not familiar with Coordinated Universal Time (UTC), you can listen to WWV (Fort Collins, Colorado) on 5 or 10 megaHertz to hear the plain lan-

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guage statement of time (UTC) every five minutes. Simply note the time difference (in hours) between UTC and your local time. The NR starts one minute past 4, 5, 6, and 7 PM PST, MST, CST, and EST, respectively. Similarly, the NR ends one minute before 4, 5, 6, and 7 Pacific, Mountain, Central, and Eastern Standard Times, respectively.

The NR contest length is 215 hours and 58 minutes. Novices and Technicians are allowed to work a maximum of 30 hours in the NR. The NR log must show each time one goes on and off the air during the contest, and the minimum allowable time off the air is 15 minutes. Listening time on the air counts as contest operating time, and it must be shown as time on the air. I advise you to be completely honest in all contest matters; it helps you to accurately gauge your improvement in subsequent contests.

Frequencies, Modes, and Output Powers

The 80 meter Novice subband is 3675–3725 kHz. Only code (A1A) may be used. All classes of U.S.A. amateurs are limited to 200 watts maximum output power in this subband.

The 40 meter Novice subband is 7100–7150 kHz. Only code (A1A) may be used. All classes of U.S.A. amateurs are limited to 200 watts maximum output power in this subband.

The 15 meter Novice subband is 21.1–21.2 MHz. Only code (A1A) may be used. All classes of U.S.A. amateurs are limited to 200 watts maximum output power in this subband.

The 10 meter Novice subband is 28.1–28.5 MHz. Code (A1A) is allowed throughout this subband, but it is commonly used just in the 28.1–28.3 MHz segment, where RTTY (radioteletype) and packet radio are also allowed. The suggested simplex packet radio frequencies on this subband are 28102.3 and 28104.3 kHz. Voice contacts are restricted to the 28.3–28.5 MHz segment of this subband. Only Novices and Technicians are limited to 200 watts maximum output power in the 28.1–28.5 MHz Novice subband; all other classes of U.S.A. amateurs may operate at up to 1500 watts PEP (peak envelope power) maximum output power on this Novice subband.

The 1.25 meter Novice subband is 222.10–223.91 MHz. Novices and Technicians may operate all modes available to all other classes of U.S.A. amateurs on this band. However, Novices (only) are limited to 25 watts maximum output power on this subband. The national simplex packet radio frequency is 223.40 MHz and the national simplex voice calling frequency is 223.50 MHz. It is standard practice to make the initial contact on a calling frequency and to shift up or down one chan-

nel to complete the contact. However, if the calling frequency is not busy, it is okay to complete the contact on the calling frequency.

The 23 centimeter Novice subband is 1270–1295 MHz. Novices and Technicians may use all modes that are authorized for use by all other classes of U.S.A. amateurs on this subband. However, Novices (only) are limited to 5 watts maximum output power on this subband. The national simplex calling frequency is 1294.5 MHz.

Categories

Most entries are by single operator stations wherein the individual Novice or Technician transmits, receives, and logs all contest contacts without assistance.

Multi-operator entries will be accepted. The assistance may be operating and/or logging help during the NR.

Operating

All NR contacts must be made in the Novice subbands. A Novice or Technician operator must be involved in each NR QSO (contact). General, Advanced, Extra class, and DX amateurs should not contact each other while they are participating in the NR contest. Crossband contacts are not allowed, such as receiving on 10 meters and transmitting on 15 meters. Crossmode contacts are no longer allowed, such as listening to a DX voice station on 15 meters and transmitting to her/him using code (A1A). NR contacts are not allowed on any repeater frequency. Packet radio digipeater contacts do not count in the NR.

The same station may be contacted two times during the NR. One contact must be digital (A1A code, radioteletype, or packetradio) and the other contact with the same station must be voice (SSB or FM). Any subsequent digital or voice contact with the same station is invalid, regardless of the subband that is used.

It is beneficial to use at least two bands to have a reasonable chance to contact amateurs in many countries and ARRL/CRRL sections. The 15 and 10 meter bands provide the best opportunities to contact amateurs in other countries (DX), plus amateurs in the Canadian (CRRL) provinces and distant parts of our own country. Use 10 and 15 during the daylight hours. Switch to 40 and 80 at night when 10 and 15 close down. This type of operation provides the best possibilities of working desired states, provinces, and countries. When operating on the high frequency (3–30 MHz) Novice subbands, it is advisable to start at the low end, and to shift up through the band as contacts are made. Most NR contest activity will be evenings of weekdays, plus night and day of weekends. If you can do so, schedule your

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				0	CO/COLO IA KS/KANS MN/MINN MO ND/N DAK NE/NEB SD/S DAK MAR/NFLD PQ/QUE ON/ONT MB/MAN SK/SASK AB/ALTA BC NWT/YUK	Colorado Iowa Kansas Minnesota Missouri North Dakota Nebraska South Dakota Maritimes/Newfoundland Quebec Ontario Manitoba Saskatchewan Alberta British Columbia Northwest Territory/Yukon
				VE1 VE2 VE3 VE4 VE5 VE6 VE7 VE8/VY1		

Table 1—ARRL sections. The NR contest exchange is limited to a signal report and ARRL section (see text).

operating time to be on the air during periods of maximum activity.

Identification. Novices add /N and Technicians add /T to their callsigns during this contest to indicate their eligibility to all amateurs participating in the NR. As examples, a Novice with a callsign such as KB6RXU uses KB6RXU/N, and a Technician with a callsign such as WA6FNM uses WA6FNM/T during the contest. Out-of-area operation is also indicated in callsigns to minimize confusion. As an example, if a Technician with an apparent California callsign, such as WA6FNM, is operating in the NR from Louisiana, he would identify as WA6FNM/5T to indicate that he is operating from the ARRL Louisiana (LA) section instead of the Los Angeles (LAX) section.

General, Advanced, and Extra class licensees are not required to indicate class of license as part of the callsign used in the NR. However, many of us use /G, /A, or /E to make it very clear to other General, Advanced, Extra, and DX amateurs that we are not valid NR contacts for them; we are only valid NR contacts for Novices and Technicians. This additional identification is particularly useful in cases in which Gen-

eral, Advanced, and Extra class amateurs have retained callsigns that could indicate they are Novices or Technicians.

Exchange. The on-the-air NR contest exchange is limited to a signal report (RST for code or RS for voice) and one's ARRL section. The ARRL sections are listed herein for your information. This information must be exchanged both ways for the contact to count. The ARRL sections are listed in Table 1.

Where more than one identifier is shown, the preferred (shorter) identifier is listed first. You must know your ARRL section to participate in the NR. Fortunately, most ARRL sections are entire states or provinces.

Since the objective is to work as many amateurs as possible, in as many countries and ARRL/CRRL sections as you can contact in the NR contest, it is helpful to maintain a check sheet that shows at a glance which countries and sections you have already worked during the contest. It is simple to start with a list showing all the ARRL/CRRL sections grouped by callsign areas, and just cross out each section as you work it. Maintain a second list show-

ing the callsign of the first amateur contacted in each country worked during the NR.

Each time a new section or country is worked, it must be indicated (in sequence) in the NR log. Simply start with number one and continue up as you earn multipliers, including countries other than Canada and the United States.

Typical Contacts. As is true in all contests, NR contacts should be as brief as possible. A typical good NR code contact between KB6RXU and W6JEP in the first few days of this contest could be as follows:

CQ NR CQ NR CQ NR CQ NR CQ NR DE
KB6RXU/N
CQ NR CQ NR CQ NR CQ NR DE KB6RXU/N
KB6RXU/N
CQ NR CQ NR CQ NR DE KB6RXU/N KB6RXU/N
KB6RXU/N K

KB6RXU KB6RXU DE W6JEP W6JEP NR K
W6JEP DE KB6RXU BT 579 LA 579 LA BK
BK R 589 LA 589 LA DE W6JEP BK
BK R 73 CQ NR CQ NR CQ NR DE KB6RXU/N
KB6RXU/N NR K

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and evaluate it very carefully with regard to the comments in the rest of this paragraph. In the initial call, KB6RXU included the /N each time with his callsign to indicate contest eligibility to all other amateurs. Notice also that the number of CQ NR transmissions decreased from five to three and station identification increased from one to three during the calling sequence, and the NR contest activity was again indicated prior to the invitation to transmit (K) at the end of the third CQ NR sequence. When W6JEP answered the call, she just identified both stations twice, left off the /N, and indicated contest participation by sending NR before the invitation to transmit. Once the two-way contact has been established, there is no need to continue using /N or /T.

The KB6RXU reply to W6JEP is very brief; the callsigns are just sent one time each, and only at the beginning of the reply. The RST report and ARRL section are sent twice to minimize possible requests for repeats. Neither the term *RST* nor the word *section* precedes the report and League section, since it is obvious what both are, and the break sign (BK) is used to eliminate unnecessary identifications. During contest activity, a series of short transmissions is not likely to extend past 10 minutes, and the identification shown in the sample exchange suffices. Note that the W6JEP response is short; the R advises

that the KB6RXU contest data has been received. W6JEP then sends the report (RST) and her section twice, identifies with just her callsign to give KB6RXU assurance that he is copying the correct signal, and sends the break sign to invite KB6RXU to respond.

When KB6RXU answers, he sends R to indicate the contest data has been received. He may send best regards (73), and he then sends a short contest call in case another station is waiting for a contest contact. When the short call is sent, the /N is again added to indicate contest eligibility to all amateurs. This indicated brief exchange is further abbreviated after the first few days the contest has been in progress, but the sample exchange is suitable at the start of each year's NR.

After the first few days of NR activity, shorten the call to a single 3 by 3 or 2 by 2 (CQ NR CQ NR DE KB6RXU/N KB6RXU/N NR K, as an example) and listen carefully (above and below your transmitting frequency) for answers before repeating this call. The rest of the previous explanation holds true when using this preferred shorter calling procedure.

A typical NR voice contact could be as follows:

CQ Novice Roundup (2 or 3 times) this is WA6FNM Technician Whiskey Alfa Six Foxtrot November Mike Over WA6FNM this is KB6SOH Novice Kilo Baker Six

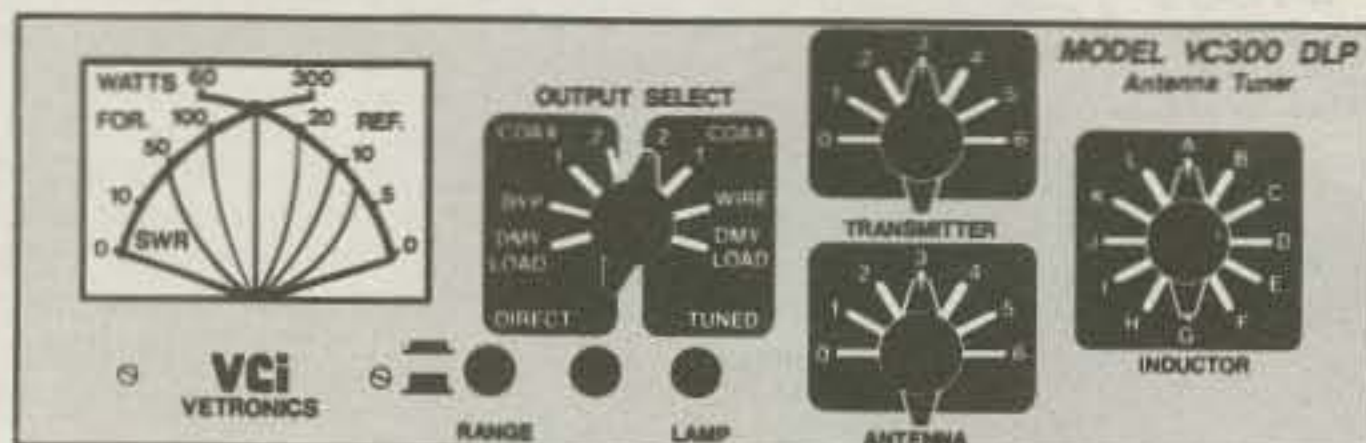
Sierra Oscar Hotel Over
KB6SOH from WA6FNM 5 by 9 in Los Angeles
Section Over
WA6FNM from KB6SOH 5 by 9 in Los Angeles
Section Over
Thank you KB6SOH This is WA6FNM
Technician Whiskey Alfa Six Foxtrot
November Mike calling CQ Novice
Roundup Over

The voice procedure is basically the same as for a code contact. Again, the calling sequence is abbreviated after the contest has been running a few days.

Brevity. Do not routinely exchange normal contact information during contest contacts. In other words, do not send your name, location (QTH), rig, antenna, weather (WX), or mailing address information as parts of contest contacts. Keep each contact brief. Do not send faster than you can receive accurately; let the other fellow slow down to a speed you can copy. If the other operator sends too fast, tell her/him to send more slowly (QRS).

If you contact a county, state, or country you need to have confirmed, simply request a QSL when you send your card. I send a card to each amateur contacted for the first time, which is not a common practice among most amateurs. However, most amateurs send a QSL in response to each card received. If all amateurs just responded to cards received, none would be exchanged. Nevertheless, if received

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wards initiate completion of the QSL exchange, that is okay; the person who wants the other amateur's card is simply the one who begins the exchange.

Required Log Entries. Your NR log must show the time each contest contact started. It is preferable to use Universal Time Coordinated (UTC) when logging radio contacts, since it eliminates possible time zone confusion. Most experienced amateurs only use UTC. UTC is still called Greenwich Mean Time (GMT), Greenwich Civil Time (GCT), Zebra time, or Zulu (Z) time by many amateurs, and they are all meant to indicate the same time. However, UTC has been the correct term since 1 January 1974 and it should be used. The other amateur's callsign (N/ and T indicators not required) and ARRL/CRRL section (or country) must be logged for each contact. Received and sent signal (RST/RS) reports must both appear in the NR log. Your station callsign, frequency, and dates of contest operation are also required.

It is best to maintain separate logs and check sheets for voice and digital contacts.

Scoring

Contact Points. One point is earned for each station contacted by voice while on the air in the NR, whether or not contacted amateurs are participating in the contest, as long as the report and ARRL/CRRL section (or country) are obtained. Each digital (A1A code, RTTY, or packet radio) contact counts for two points.

Code Proficiency Points. If you have an ARRL code proficiency certificate, your stated receiving speed (words per minute) is added to the point total for the stations you contacted. If you do not hold an ARRL code proficiency certificate, or if you want to increase the rate shown on your certificate, you can submit your January or February W1AW or W6OWP qualifying copy with your NR material to claim these extra points.

Multipliers. The total number of points derived from your contest contacts and your ARRL (not FCC) certified code proficiency rate are multiplied by the number of foreign countries and ARRL/CRRL sections you contacted during your NR contest operation. Remember that Alaska, Canadian Provinces, Hawaii, and the West Indies (Guantanamo Bay, Puerto Rico, and Virgin Islands) are ARRL sections, and they do not count as countries in this contest.

Forms

It is advisable to request one set of NR contest forms from the ARRL, preferably before the contest starts. If you send a self-addressed and stamped business (#10) envelope to the ARRL with your request for a set of NR material, they will

send two log sheets, two dupe (duplication avoidance) sheets, and one NR contest summary sheet. You are welcome to duplicate League material to meet your needs. The ARRL mailing address is 225 Main Street, Newington, Connecticut 06111.

NR logs do not have to be mailed to the ARRL until 30 days after the contest ends, so you have time to request logs from ARRL, fill them in, and mail them. If you transcribe NR contest entries from your original log, be sure to repeat all contact information on the forms to be turned in. If you make more than 200 contacts, you must include a sequential listing of callsigns worked, using the Callbook sequence system. Callsigns are arranged by number (one through zero/ten), then by suffix, and last by prefix.

Submitted Material. The contest material submitted to the ARRL is not returned, so do not send your only (original) log sheets. It is a simple matter for most of us to duplicate material before mailing it to the ARRL. Take your time and try to submit correct material that is easy to read. Checking contest entries is a tough job, but you can make it easier for League checkers by turning in good material. The League appreciates receiving check logs from General, Advanced, Extra, and DX operators who take part in the NR.

Incomplete and/or late logs are just used as check logs. They are not eligible towards NR awards or QST listing.

Closing Comments

NR contest activity has always been slow at the start, and it is common to have other

operators request an explanation of contest rules. As previously stated, I advise you to direct them to the NR coverage in this column or in other magazines, which is simpler and better than trying to give all this information to each amateur who requests it. NR activity continues to build as the days pass and more amateurs become aware of it. By the last few days of the contest, activity is excellent. If you get this issue before the contest starts, please mention the Novice Roundup to every amateur you contact to let them prepare for this excellent contest.

I hope to contact you on one of the Novice bands. I work about 1000 Novice band contacts every year, and I have participated in each Novice Roundup. When the NR contests were held in the 1952 through mid-1970 era, the Novice license was just valid one year; it could not be renewed, and it was not available to anyone who had previously held any class of amateur radio operator license. In that time frame, no Novice could compete in more than one NR as a Novice, and newer Novices seldom participated at all. Novice licenses are now valid a maximum of ten years and they can be renewed, which means that many Novices have acquired experience in previous NR contests, and improved scores should result. Similarly, a change allows Technicians to use the Novice code bands. Enjoy this contest by putting your station in top condition and reserving adequate good operating time during the NR.

We appreciate the cooperation of the NR Contest Manager, Billy Lunt, KR1R. He informed us of no changes in this year's NR contest.

73, Bill, W6DDB



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Starts: 0000 GMT Saturday

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

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

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

IV. Type of Competition:

1. Single Operator (Single band and All Band)

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

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

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

2. Multi-Operator (All band operation only)

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

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

V. Exchange: RS(T) report plus a pro-

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

VI. Points:

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

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

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

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

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

could sign /W8, /N8, /K8, etc., or any other prefix authorized for use in the US 8th district. Portable designators without numbers will be assigned a zero (0) after the second letter of the designator to form the prefix. Example: N8BJQ/PA would become PA0. All calls without numbers will be assigned a zero (0) after the first two letters to form the prefix. Example: XEFTJW would count as XE0, RAEM would count as RA0, etc. Maritime mobile, mobile, /A, /E, /J, /P, or interim license class identifiers do not count as prefixes.

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

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

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

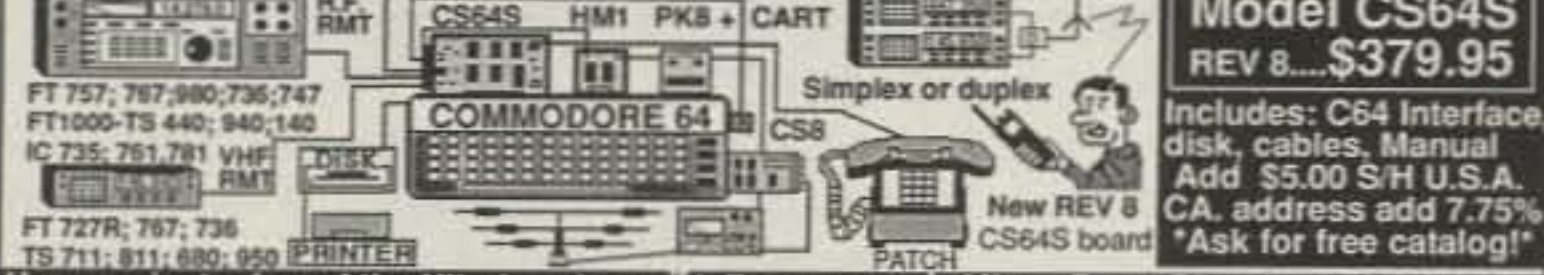
3. A station may be worked once on each band for QSO point credit. However, **prefix credit can be taken only once** regardless of the number of different bands on which the same station and/or prefix has been worked during the entire contest.

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

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X. Low Power Section (Single Operator Only): Output power must not exceed 100 watts. **You must state the actual output power used for all claimed contacts on the summary sheet.**

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

1. In every participating country.

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

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

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

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

XII. Trophies, Plaques and Donors:
SSB

Single Operator, All Band

WORLD - Stanley Cohen, WD8QDQ
U.S.A. - Atilano de Oms, PY5EG
CARIB./C.A. - Auturo Gigante, Jr., HI8GB
EUROPE - Jim Hoffman, N5FA
*JAPAN - The DX Family Foundation
SO. AMERICA - Ron Moorefield, W8ILC
OCEANIA - Phillip Fraizer, K6ZM
Memorial
AFRICA - Peter Sprengel, PY5CC
ARABIAN GULF - Don Greenbaum,
WB2DND
WORLD QRPp - Dayton A.R.A.
USA QRPp - Doug Zwiebel, KR2Q

Single Operator, Single Band

WORLD - John N. Reichert, N4RV
WORLD 7 MHz - William D. Johnson,
KV0Q
EUROPE - Myron E. Crofoot, WB4VQO
U.S.A. 3.7 MHz - Lance Johnson Engi-
neering
U.S.A. 21 MHz - Bernie Welch, W8IMZ
Memorial
U.S.A. 28 MHz - Novice/Tech. only - Jon
Engelhardt, KA0ZFX

Multi-Operator, Single Xmtr.

WORLD - Mike Badolato, W5MYA

Multi-Operator, Multi-Xmtr.

WORLD - Prince Georges Zulu Radio Club
NORTH AMERICA - James Dixon, NL7HI
(Burt Curwen, KL7IRT Memorial)
U.S.A. - Glenn Tracey, KC3EK

Contest Expedition

WORLD - Kansas City DX Club
•••

CW

Single Operator, All Band

WORLD - Terry Baxter, N6CW

U.S.A. - Steve Bolia, N8BJQ

*JAPAN - The DX Family Foundation

OCEANIA - Tom Morton, KT6V

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

Single Operator, Single Band

WORLD - Pedro Piza, Jr., NP4A
(Pedro Piza, Sr., KP4ES Memorial)
WORLD 7 MHz - William D. Johnson,
KV0Q
WORLD 3.5 MHz - Lance Johnson Eng.
U.S.A. - Kansas City DX Club
U.S.A. 28 MHz - Walt Smith, K1DWQ
(Bernie Welch, W8IMZ Memorial)
U.S.A. 21 MHz - Wayne Carroll, W4MPY
U.S.A. 14 MHz - Gene Walsh, N2AA
U.S.A. 7 MHz - Dennis Younker, NE6I

Multi-Operator, Single Xmtr.

WORLD - Ron Blake, N4KE
U.S.A. - Austin Regal, N4WW

Multi-Operator, Multi-Xmtr.

WORLD - Roger Burt, N4ZC

Contest Expedition

WORLD - Ed Roller, K4IA
•••

Combined SSB/CW

EUROPE - SINGLE OPERATOR, ALL
BAND - Les Nouvelles DX Group

Club (SSB & CW)

WORLD - CQ Magazine

**Donor is responsible for this trophy.*

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

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

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

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

3. Logs must be checked for duplicate contacts, correct points, and prefix multipliers. Duplicate contacts must be clearly shown. Computerized logs must be checked for typing accuracy. Original

logs may be requested if further cross-checking is required.

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

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

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

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

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

7. Contest logs may be submitted on disk. Logs submitted on disk must contain all required information (Time, Band, Call, RST & NR Sent, RST & NR Rcvd, Multiplier, and QSO Points). Files must be in ASCII format and in chronological order for single operator and multi-single entrants. Multi-multi entrants should submit logs chronologically by band. Other file formats (.bin, .res, .dbf, .wks) are acceptable. A sorted multiplier file is also required. Only MS-DOS compatible disks will be accepted (either 5¼ or 3½ inch). A written summary sheet must accompany the disk, showing all required scoring information, the category of competition, off times, and the normal signed declaration, as well as your name, address, and a phone or FAX number where you can be reached. The original log may be requested for cross-checking.

XIV. Disqualification: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest, unsportsmanlike conduct, taking credit for excessive duplicate contacts, unverifiable QSO's or multipliers will be deemed sufficient cause for disqualification. (Incorrectly logged calls will be counted as unverifiable contacts.) Actions and decisions of the CQ WPX Contest Committee are official and final.

XV. Deadline: All entries must be post-marked no later than **May 10, 1992** for the SSB section and **July 10, 1992** for the CW section. **Indicate SSB or CW on the envelope.** Extensions may be granted if requested.

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

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

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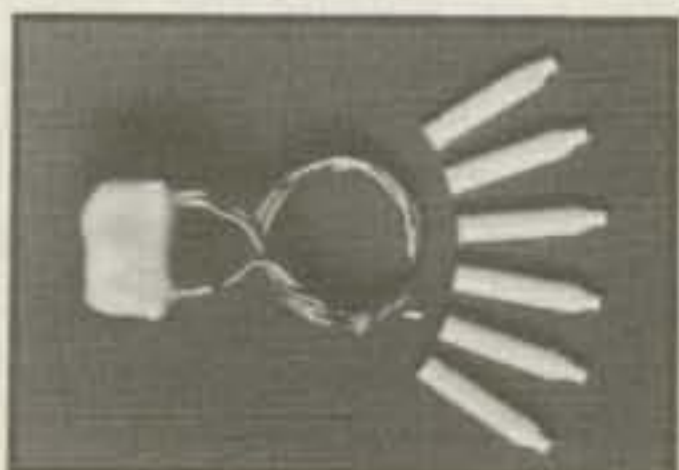
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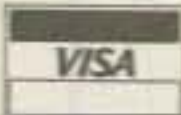
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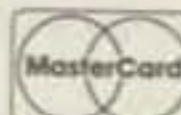
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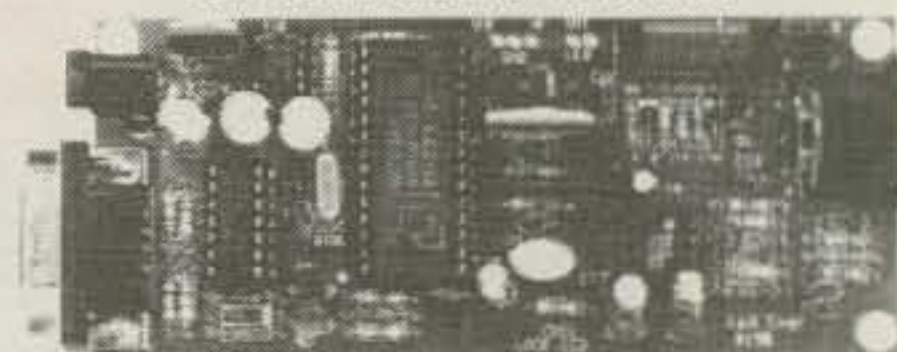
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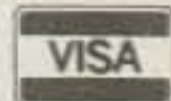
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1992 Deadlines

Award Nominations: March 1

License Exams: March 23

Appointments will be mailed by April 13

Advance Registration and Banquet:

USA - April 3 Canada - March 27

Flea Market Space:

Spaces will be allocated by the Hamvention committee from all orders received prior to February 1. Express Mail *NOT* necessary! Notification of space assignment will be mailed by March 15, 1992.

Checks will not be deposited until after the selection process is complete.

Information

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or, Box 964, Dayton, OH 45401-0964

Lodging Information: (513) 223-2612

(No Reservations By Phone)

Flea Market Information: (513) 767-1107

Lodging

Please write to **Lodging, Dayton Hamvention, Chamber Plaza, 5th & Main Streets, Dayton, OH 45402-2400** or refer to our 1991 Hamvention program for a listing of hotel/motels located in the Dayton area.

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maximum of 3 spaces per person (non-transferable). Tickets (valid all 3 days) will be sold **IN ADVANCE ONLY**. No spaces sold at gate. Vendors **MUST** order registration ticket when ordering flea market spaces.

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HAMVENTION is sponsored by the Dayton Amateur Radio Association Inc.

Advance Registration Form

Dayton Hamvention 1992

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ALL ABOUT THE WORLD ABOVE HF

Excellent 6 Meter Conditions

I have rewritten this part of the column three times. Every day of this week I have started and stopped this column only to start it again. Why? Because *6 meters was hot! Hot! Hot!*

I begin this month by borrowing a line from Hugh Cassidy, WA6AUD, by saying, "The faithful waited . . . and were rewarded!" The month of October commenced with good reports of Hawaii working the East Coast and Taiwan, and other parts of the world being entertained with very good regional propagation. However, the end of October and the beginning of November made these reports pale by comparison. What follows is only a very limited account of some of the activity.

From the southeast part of the U.S., Ted Goldthorpe, WA4VCC, reported that he worked ZL1ANJ and ZL4AAA on October 20. Then on October 23 he worked 9J2HN, 7Q7CM, 7Q7RM, V51KC, and ZS9A. On October 26 he was one of over 400 U.S. stations to work G4SMC/8R1, who was at that time using only a vertical and a brick. On October 27 Ted reported four continents—North America, South America, Africa, and Europe—workable in the southeast simultaneously. He reported that V51KC, V51E, ZB0X, ZB0T, CN8ST, and a CT1, as well as a smattering of South American stations were all workable around 1400Z. Finally, on October 28 Ted worked A22BW for his eighth new one for the week. Among the other stations heard on the band in the southeast during that week were CO2, HC, HH, LU, PJ9, PY, PY0, PZ, TI, YV, and 9Y.

During the same time in southern California Terry, N6CW, reported similar conditions. On Saturday evening, October 26 he reported hearing ZL1ANJ for several hours, including for three hours following sunset. He also reported hearing and/or working many stations in Asia and the South Pacific. On Sunday, October 27 he reported being able to work five continents, lacking only Europe. That day he, as well as 16 other southern California stations, worked 7Q7RM. All together Terry worked seven new countries during the two weeks (ZS9A, 6Y5IC, 7Q7RM, V73AT, PJ7/W1XT, V51KC), topping it off with G4SMC/8R1 on the 29th.

From Guyana, Paul, G4CCZ, and others operating G4SMC/8R1 set out to work HF

during their stay in the country. They took 6 meter equipment to check out the possibilities for propagation on that band. They had only hoped to operate 6 meters "if the band opened." And boy, did it! When I spoke with them on the 29th they reported working over 1300 stations in 35 countries. Regrettably, as of this writing, they had not worked into Europe.

In a phone conversation I had with Shel, NI6E, he later updated this figure to 37 countries and 49 states, lacking only Alaska for a complete WAS on 6 meters. They plan a return trip in April, beginning around the 20th. Shel also advised me that they may show up from China prior to their next stop in Guyana.

From Hawaii Shel reported working a number of stations in the Caribbean, including KP2, CO2, and HI8 as new ones. Additionally, Al, KH6IAA, reported working 14 Caribbean stations, including one new country, on the 29th. Al said that conditions were the best to the Caribbean he has ever heard.

From Costa Rica, on October 29 Eric Roy, TI2NA, worked over 300 stations throughout the U.S. and Canada. On that day he reported that he worked into the Dakotas for the first time in ten years! Last, on November 2 he worked into Europe (G's and F's), the Azores, a ZL2, ZK1XC, and many South American stations.

From the northeast Rich, K1JRW, reported that by mid-October things started popping for him. For the month he worked several South American stations, 9L1US, V50AC (who came back to his CQ), V51KC, V51E, 7Q7RM (a new one), A22BW (another new one), and VK4BRG (yet another new one). On Tuesday Rich worked FK8EB. He also reported hearing the 3D2FJ beacon for over an hour.

From the northwest during the last two weeks of October Shep, W7HAH, reported working V73AT, ZL's, LU's, CO2KK, XE3EB, TI2NA, and HC2GE/1, who was running 1 watt! Shep said that many of these QSOs were on backscatter. (Shep also reports that he made 53 contacts on 2 meters and 16 contacts on 70 cm during the first weekend of the EME contest.)

From the southwest (Texas) Pete, WA5JCI, reported the following partial log excerpts: September 3, VK4BRG and FK30FU; September 21, LU1UK; September 22, PT7CB; September 27, LU9AEA and KH6IAA; October 1, VE3EB, ZL1UFJ, and ZL3NE; October 2, NI6E/KH6; October 7, LU8EEM; October 10, PZ1EL and

9Y4VU; October 20, ZL1ANJ, ZL2CD, V73AT (for country number 76), KH6IAA, and KH6VP; October 22, HC2GE/1; October 23, 9J2HN (for country number 77) and LU7VB; October 24, LU2BQU; October 25, PZ1AP, HC5K, and PY0FF (for country number 78); October 26, YV4AB, G4SMC/8R1, and 7Q7RM (for country number 79); October 27, PY0FF and PJ7/W1XP (for country number 80); and October 29, PJ4/WA3LRO.

More from the southwest (Oklahoma): Connie, K5CM, Pam, N5KW, and their daughter, Melissa, KB5PLX, reported the following from their logs. On October 1 Melissa worked ZL4AAA, for her very first 6 meter contact. On October 2 at least one of them worked KH6IAA, NI6E, and VK4APG. On October 8 Pam worked LU2DEK. On October 10 at least one of them worked PZ1EL and 9Y4VU. On October 11 the whole family worked VK4FNQ and Connie worked VK4JH. On October 20 at least part of the family worked CO2KK and ZL3NE. On October 23 all three of them worked 9J2HN for a new one for all three. Also some of the family worked 7Q7CM and 7Q7RM. On October 25 Pam worked HC5K, HC2DE/1 (again he was running only 1 watt), PY0FF, and V51E. On October 26 some member of the family worked G4SMC/8R1 and PT7NK. On October 27 all three of them worked PJ7/W1XP and some of them worked V51KC, PZ1AP, and a smattering of ZL2's. On October 29 all three worked PJ4/WA3LRO, and Melissa worked PJ9EE. Pam just received DXCC No. 26 and Melissa is up to 15 countries on 6 and as of this writing had yet to work a stateside station.

From Australia Ron, VK4BRG, ended up in many 6 meter enthusiasts' logbooks during those hot two weeks, several of the logbooks for the first time. VK4BRG in turn reported working CT, RI, MA, and NJ as new states. NI6E reported that Ron also had worked Ontario and New York.

From Bonaire, following the PJ1B HF operation (for the CQ WW DX Contest) Walt, WA3LRO, activated PJ4/WA3LRO from the QTH of PJ9EE. Walt reported working a number of North American stations on Tuesday, October 29 (he was 20 over 9 at your editor's QTH for most of the day) and some stations on Wednesday, October 30. QSLs for this short operation go to K2SB. Chet, PJ9EE, also showed up for awhile working some of the guys. He reports that the PJ4B beacon at 50.015 should be back on the air by the time you

P.O. Box 73, Oklahoma City, OK 73101

are reading this column. He has a new QSL manager, YB3CN, from which many are reporting a good, short turn-around time.

Additionally, W1XP, working high-speed CW, activated PJ7/W1XP from Sint Maartin to give out a new one for a number of guys in North America. Then on November 2 W6JKV reactivated Sint Maartin, signing PJ7/W6JKV. When last heard he was doing a brisk business.

From New Caledonia the prodigal mobile Henri, FK8EB, worked Bob, VE1YX, among many others in North America and the Pacific during this exciting time.

From Chile on November 2 Kevin Szot, KB6SL/CE3, operating XQ3SIX, was working North America by districts, with good reports from everywhere in the country. His QSL route for both calls is to NI6V.

From Nova Scotia Bob Billings, VE1YX, gave this sampling of his log: On October 29 he worked G4SMC/8R1, P43AS, XE1GE, PJ4/WA3LRO, PJ9EE, FK8EB, AA6TT, HC5K, PT7OO, W7CI, and heard the 3D2FJ beacon for 30-40 minutes. On October 30 he worked PZ1AP, FY3FV, HC5K, V51E, T12HL, ZS6LN. Finally, on November 3 Bob worked A22BW for a new country.

From Botswana Lothar, A22BW, running 60 watts into an 8-element 30 foot long Yagi, showed up in many DXers logs as a new one during those hot two weeks.

From Oklahoma City Larry Hazelwood worked ZL4AAA on October 1 for a new one. Then later in the month he worked 9J2HN, 7Q7CM, PY0FF, PJ7/W1XP, and PZ1EL all for new ones.

Finally, your editor reports working LU2EIO on October 28. On October 29 the following stations were logged: PJ4/WA3LRO, G4SMC/8R1, PJ7/W1XP, PJ9EE, KH6IAA, and HC5K. Then on November 2 contacts were made with PJ7/W6JKV, PY5CC, HI8A, PY2IAX, PY2WG, PY5ZBU, and XQ3SIX.

As I am writing this column, 28.885 continues to bristle with reports. Truly some of the best conditions ever reported have occurred during those two weeks. I hope that next month I can report the same or better conditions for 6 meters.

More 6 Meter News

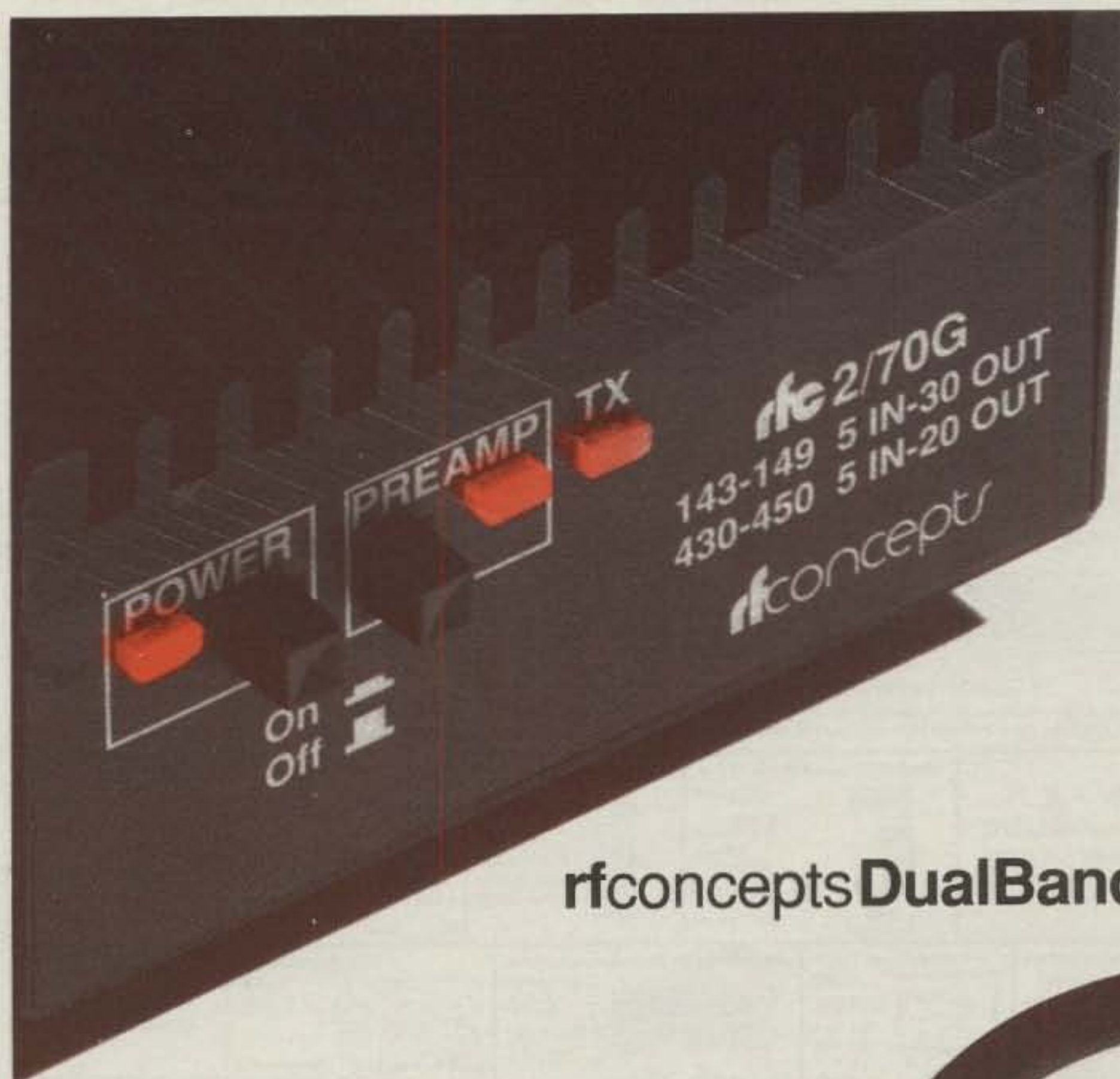
You might have noticed the improved signal from Andy, YS1AG, on 6 meters. Thanks to the generosity of Chip Angle, N6CA, and Jack Henry, N6XQ, Andy has a better equipped station from which to operate. Chip donated a new 6-element Cushcraft beam and Jack loaned Andy an ICOM 551D for six months. Andy previously showed up on 6 meters with a 3 watt transceiver. Andy is in the process of building an amplifier for the transceiver and is also assisting another YS station in getting on 6 meters. Hopefully, in the near future many of you will have worked El Salvador.

Your response to the survey question re-

garding the 6 meter DX window has been strong and adamant. Since the survey has until the 20th of this month to run, I do not want to comment much on that question because of my concern about biasing the survey, thereby invalidating it. However, I will say that the question was consistently the one answered among all the surveys received. Some of you made strong statements supporting your opinion. On-the-air comments to me have also been very strong. Next month I will discuss the results of that particular question. The rest of the survey will take a bit longer because of the time it will take to tabulate the results on the other questions.

If you have not filled out your survey, please do so as soon as you can before the 20th of this month. For those of you who have, thank you very much for taking the time to express your opinions to me on the several subjects covered by the survey.

My home state DX club, the Oklahoma DX Association, reports that a team, including 6 meter and 432 EME enthusiast Charlie Calhoun, W0RRY, will activate Palau for a period of 15 days bracketing the ARRL CW DX Contest. Six meters and 432 EME operations are planned, with 1 KW on both bands. As the licensing of operations from KC6 rests with the local authorities, the call signs to be used are still pending as of this



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writing. QSLs for this operation will go to OKDXA, P.O. Box 88, Wellston, OK 73088.

The publishing of "The 50 MHz DX Bulletin" has been taken over by Victor Frank, K6FV, and boy, does it look nice. Shel had problems with printing and the cost of paper in Hawaii, so now he sends the editorial content to Victor on a floppy and Victor then runs off the master on his laser printer. The subscription information remains the same (\$20/year to: P.O. Box 1222, Keauu, HI 96749).

More on Safety

Last month I felt I covered most areas of concern in shack safety. I mentioned lightning strikes and the necessity of grounding the push-up mast and the tower. I feel that

I may not have stressed lightning protection enough. For us in the midwest and southwest lightning strikes seem to occur more frequently than in other parts of the country. Lightning strikes can occur any time of the year anywhere.

A graphic example of what can occur when lightning strikes happened last fall to Pat Stein, N8BRA. Pat had a run in with lightning that was quite spectacular. Around five in the morning a bolt of lightning hit his service drop from the power pole outside his house. The energy traveled down the service drop into the service panel inside the house. Pat reported that circuit breakers flew out of the service panel across the room. He said that it appeared that fireballs went everywhere around him and his family within the house.

The effect to the outside air was instant ionization. Pat has a tall tower that is well guyed and grounded. Normally, that type of installation provides a bit of a zone of protection. However, when the air was ionized from the lightning strike, the inevitable happened.

The second strike occurred about a minute and a half later. This bolt hit the tower. It damaged all his antennas on the tower, including causing the Cushcraft 3219 beam antenna to explode. (They later found pieces of the elements over 500 feet from the tower.) The bolt continued to travel down the tower, including down the guy wires, the antenna rotator cable, and the hardline, and on into the house. The hardline was ripped open like a banana peel and the cable was blown off the rotator control box inside the shack.

In the aftermath of the two strikes they found that almost every light bulb had blown out of its socket. Every appliance except the electric stove, the washing machine, and the toaster was damaged to some degree. Pat said that about half of the mother board in one of the televisions was charred beyond recognition, that every piece of amateur radio equipment was damaged, that the pump in the water well located some distance from the house was damaged, and that much of the interior electrical wiring was destroyed. He found that there was a 6 inch trench dug in the ground surrounding the tower where the dirt was blown away, and that dirt was exploded away from the concrete blocks holding the earth anchors. He stated that a neighbor who saw the second strike thought that the whole house had gone up in flames when the area around the house lit up due to the ionization. When he dug up his hardline he found that it had arced damage on it where it had arced to the underground air-conditioning ducting several feet from the hardline and that it had arced to the house wiring in the attic.

Pat feels very fortunate that the house did not go up in flames. He attributes that good fortune (if there can be any in this disaster) to the type of insulation he used in the walls and attic. He stated that it had a very high flash point and provided a measure of protection from the red-hot wiring when the wiring was receiving the extra energy from the bolts. Pat said that although it represented some terrifying moments for his family, incredibly two of his children slept through the entire affair.

During the same time frame that Pat was having his run in with Mother Nature, two other VHF enthusiasts were having their own encounters. Hal Perry, KC4YO, in Tennessee and Al Ward, WB5LUA, in Texas both experienced strikes that were not nearly as dramatic. However, in both cases they suffered some damage to their amateur radio equipment and other appliances in their homes.

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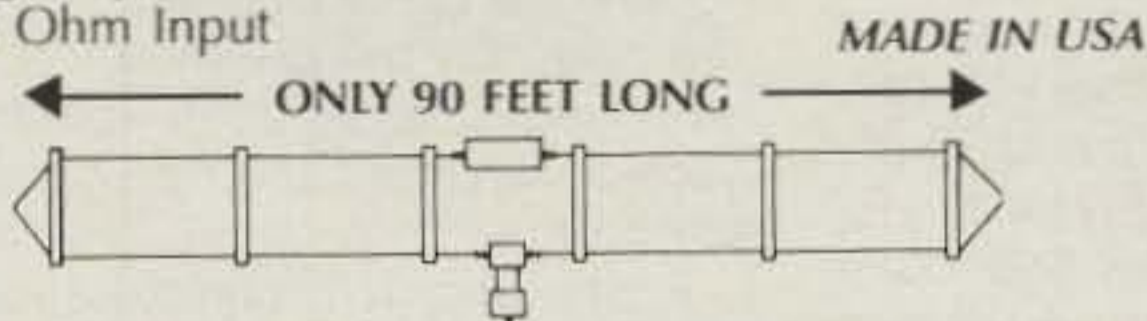
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tect yourself from the nearby hits, you cannot afford yourself 100% protection. Be aware of what lightning can do and respect it. I am sure that Pat, Hal, and Al all have a new appreciation of the power of lightning.

Microwave Update '91

Last October 17 through 19 the North Texas Microwave Society hosted the 1991 Microwave Update. A total of 24 presentations were made to an audience of nearly 100 microwave enthusiasts. Seminars ranged from designing equipment (including amplifiers, low-noise preamps, transverters, and antennas, to name a few) to contesting, to radio astronomy, to the AM-SAT Phase III-D project (that plans a 40 watt 10 GHz transmitter and is set to launch in 1996), to beacons, to EME operations on microwave. Some of the topics discussed will be featured in future "VHF Plus" columns.

The banquet speaker was Paul Rinaldo, W4RI, who is one of the amateur radio operator members of the U.S. WARC 92 work group. Paul spoke of the concerns that the ARRL and subsequently the amateur radio operator should have concerning the WARC 92 conference to be held later this year. He stated that there appears to be some threat to the amateur radio 40 meter band (a realignment that would result in the possible movement down to 6.9 MHz for the lower end of the band) and some threat to the 2.3 GHz band from satellite operations. He reminded the audience that the U.S. has only one vote and that it is up to the U.S. delegation to present a convincing argument in order to persuade delegates from other countries to vote similarly.

He stated that we as VHF/microwave enthusiasts should be concerned with what we are developing today in the way of projects and equipment used on our higher frequencies and how these projects will affect the use of the spectrum available to amateur radio 15 years into the future. He encouraged the conference participants by complimenting them for their active participation in microwave experimentation. He indicated that they were pioneers who pave the way for commercial interest to develop equipment that will be used by a wider group of amateur radio operators. He cited the experiments of TAPR, the Tucson Amateur Radio Packet Corporation, as an example of amateur radio operators developing equipment that eventually inspired commercial interest in packet communications. He drew a parallel between that development and what he had witnessed at the Update, indicating that the work being done by the experimenters at the conference would also lead to commercial interest in developing equipment for use by a wider range of amateur radio operators.



Ron Hammel, KC6WLC, gives out contacts from rare DM07 during the September VHF QSO Party. The snow-covered, 14,254 foot White Mountain provides the backdrop for view of the beautiful California mountain scenery. (Photo courtesy KC6WLC)

He concluded by encouraging the participants to continue their experimental work, since he is able to use their work as examples of how the amateur radio frequencies in the microwave spectrum are essential to the amateur radio service.

Special acknowledgements go to Al Ward, WB5LUA, and Kent Britain, WA5VJB, for their very hard work in putting together the conference. Al was responsible for contacting all of the speakers and securing the facilities, and Kent was responsible for the tours and much of the logistics of the conference. The North Texas Microwave Society should also be complimented for accepting the responsibility for being the host for the conference. Proceedings are still available for \$12.00 (plus \$3.00 shipping) from the ARRL. This year's Proceedings has nearly 350 pages of excellent information pertaining to building equipment and operating on microwave frequencies.

Four-Wheel-Drive Rover

One of the nice side benefits of being a Rover during a contest is the potential for some tremendous views of the surrounding areas. During the September VHF QSO party Ron Hammel, KC6WLC, and Gordon Keck (call unknown) towed his jeep to Pig Pine, California to begin his two grid square roving activity. Gordon then drove the jeep, starting out in DM17 and eventually driving to an altitude of 12,900 feet in DM07, to complete his roving. As you can see by the photo, the snow-covered, 14,254 foot White Mountain is in his view in the background while he is giving out rare DM07 grid contacts on 2 meters sideband and 223.5 FM simplex. Ron reports that they went through the Bristlecone Forest on the way up and that the last 20 miles was above the tree line. Some of the things I

miss from California are those beautiful mountains and the forests. Wonderful country, Ron.

Current Contests

The ARRL January VHF Sweepstakes is scheduled for January 18-20. Check the Contest Calendar column or the ARRL for the rules, and send an SASE with two units of first-class postage to the ARRL for log and summary sheets.

As many of you are also found to operate 160 meters, I will mention that the CQ 160 Meter CW Contest is January 24-26. Again, see the Contest Calendar column for the rules. Send your logs to the Contest Director, Donald McClenon, N4IN, 3075 Florida Avenue, Melbourne, FL 32904. And don't forget to return to VHF when the contest is over, hi.

And Finally

For those of you who like to chase meteors, the *Quads* (or *Quadrantids*, their official name) take place over January 3-4, with the peak day being January 3. Look for north-south propagation from these, but don't be surprised about propagation from any path.

Please be sure to complete your survey and get it into the mail by January 20th. I hope to have the results ready for the March or April column. If you have late-breaking news, please call me at 405-528-6625. Yes, I do have an answering machine and no, I do not have a FAX machine yet. Thanks to all of you who contribute to this, your column. It is a success because you continue to make it a success. Until next month . . .

73, Joe, N6CL

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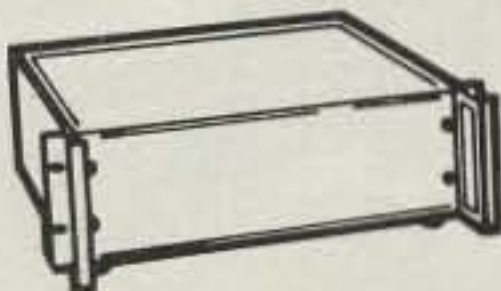
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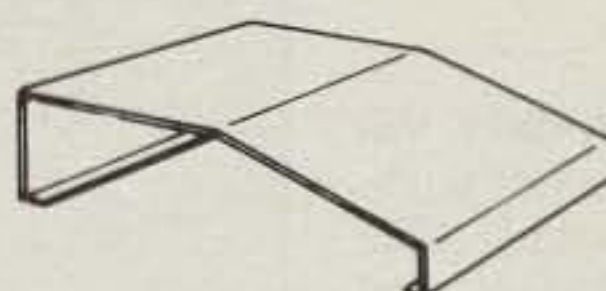
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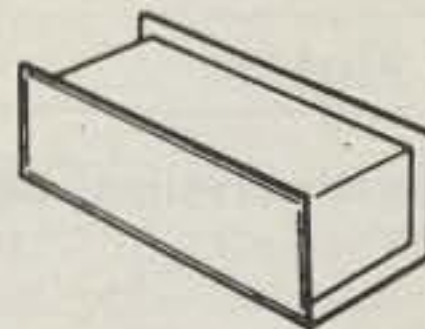
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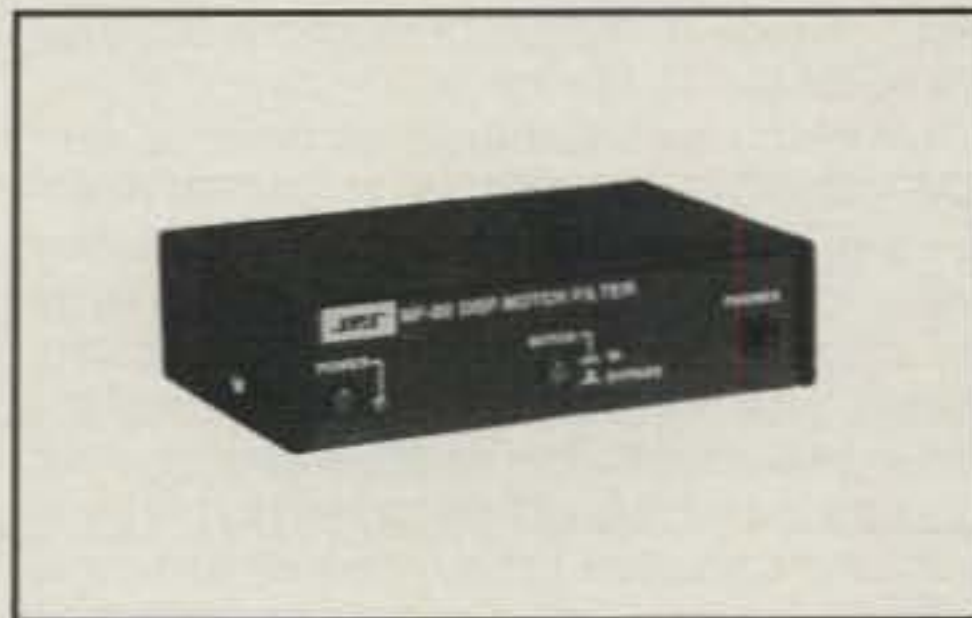
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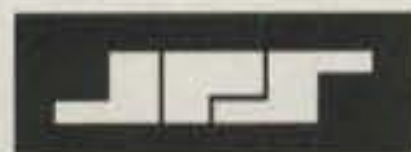
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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Antenna Notes—Part III

In last month's *CQ* we again featured a variety of antennas and accessories topics, covering new antenna and software products as well as updates to old ones. This month we're on the same track. Let's begin.

Antenna Notes

GAP Antenna Observations de AA0CY. We mentioned the popular GAP Challenger multi-band vertical antennas in the December 1989 and April 1991 columns. We've not yet worked with one, but Robert A. Wanderer, AA0CY, has. His observations reflect some of the practical problems antenna erection presents.

"The first installation was in a rented house, so the suggested concrete base couldn't be used. My friend and I simply knocked the base mast into the ground with a sledgehammer and a piece of hardwood to protect the aluminum. The antenna was guyed for safety's sake. Installation took about 90 minutes from the time we first opened the box to when we tied off the guys The antenna really requires at least two people to put it up. . . . While bringing it up from horizontal to vertical, the antenna bowed quite a bit and we were fearful it would bend in half just above the gap, but it didn't. Once vertical (and guyed), it didn't sway too badly even in this area's notorious wind gusts.

"Initially it didn't work as advertised. SWR was flat, but 3:1. A call to the factory set things straight. [They] insisted that the capacitor at the top of the antenna had come loose; I was equally adamant that it had been installed tightly and care was taken not to loosen it when the mast was slipped over it. Guess what? The cap fell off right after we lowered the antenna!

"A more careful installation yielded the SWR performance claimed of the antenna: less than 1.5:1 on 10 through 40 and the resonant part of 80 (3.7 MHz), and under 4:1 (and easily tuned out) at the band edges of 80. With a tuner it would accept power on 160 and 18 meters, but no contacts were made; 30 wasn't tried, but the factory says the antenna doesn't like 10 MHz. As you know, SWR is only one aspect of antenna measurements; the real question is, does it work?"

Robert cited several examples of the antenna's excellent DX performance. He also mentioned that he relocated the antenna to a new house last February, where he was able to pour a concrete base, but still guyed the antenna.

Robert also is wary of roof-mounting, where some unsurmountable problems may arise that are difficult to cope with: "I've spoken to two hams who roof mounted their GAPs and had many problems trying to lower the SWR. Despite claims that the antenna can be roof-mounted,



You're looking at the "guts" of the respected W1FC Collins Design Phased Vertical Switching Network, the outdoor phasing network box at the top and the indoor lobe direction control box below it. The system is designed to handle two- or four-element phased vertical antenna arrays on 40, 80, or 160 meters. Instant switching provides immediate DX signal direction determination. Appropriate phasing lines are required in addition to the hardware. (Photo courtesy Davis RF)

the manufacturer really does not recommend it. . . . Perhaps the antenna needs that proximity to the ground to work correctly or there's a dramatic change in feedpoint impedance because it's no longer 16 feet up."

We discussed Robert's comments with GAP's George Henf, KK4CW, at the 1991 Atlanta HamFestival. George confirmed that they really don't recommend roof mounting, not so much because of the effects Robert suggested, but because of the unpredictable nature of the groundplane under the antenna and the even more unpredictable effects caused by the proximity of the antenna to house wiring and other in-house objects. George confirmed that their bottom-line suggestion to those who call for support on a poorly-performing roof-mounted vertical is to simply place it on the ground; most of the problems then go away.

GAP also unveiled a new vertical at the HamFestival—the Voyager DX-IV, designed for 160, 80, 40, and 20 meters. The new antenna uses the same patented GAP "center launch technology" found in the Challenger DX-VI. This technology effectively emulates a centerfed dipole fed vertically. The new antenna—which uses no traps, coils, baluns, resistors, or tuners—is 45 feet tall and has an 80 inch capacity hat at the

top. The Voyager also is supplied with a hinged base and two sets of guy clamps for mounting. The antenna requires three 57 foot radials to establish a base counterpoise. The antenna has a claimed 90 kHz bandwidth with SWR less than 2:1 on 160 meters. Price is \$389.

For more details, contact GAP Antenna Products, Inc., 6010 Bldg. B, N. Old Dixie Highway, Vero Beach, FL 32967.

Performance Electronics Quads. Jim Marsh, KE4CV, sent us information on his line of "Hot Quads" for the 144, 222, and 432 MHz bands. Jim is a quad aficionado, having begun designing and building quads for sale at hamfests in 1975.

To review briefly, there are several reasons why quads are so popular, despite occasional mechanical problems that sometimes are associated with them. For one thing, quads usually have much broader bandwidths than do conventional Yagis, they have greater signal capture area when compared with most other antennas, polarization is quickly and easily changed, they're nearly immune to rain static and corona discharge, and they require smaller space than do conventional beams for the same frequency bands. Also, quads can be designed to be directly fed with coax without the use of matching devices.

Jim currently offers six different fiberglass quads that range in size from 6 to 13 elements; all directly match 50 ohm coax. The antennas are furnished complete and include a 48 inch mast and a 60 inch preassembled coax cable assembly. Prices range from \$74.95 to \$94.95, depending on model; a two-year full replacement warranty is provided. Two- and four-antenna phasing harnesses and stacking kits also are available.

For more information, contact Performance Electronics, P.O. Box 310, Conestee, SC 29636.

W1FC Collins Design Phased Vertical Switching Network. Verticals and multi-element vertical phased arrays often are used by low-band "big guns" for DXing on the 40, 80, and 160 meter bands. In the November 1984 column we covered the speciality verticals and phasing equipment offered by Dana Atchley, W1CF, Fred Collins, W1FC, and Steve Davis, K1PEK, through ColAtchCo, Inc. These phased verticals, which typically consist of quarterwave high elements spaced one-quarter wavelength, are popular for their low angle of radiation, which can provide excellent results on long-haul transmission and reception on the lower HF bands.

Steve, K1PEK, has reintroduced the heart of the system, the W1FC Collins Design Phased Vertical Switching Network designed to assure proper current and phase distribution to each vertical. In addition to instant switching of either two- or four-element arrays, the system also provides in excess of a 25 dB F/B (front-to-back) ratio and 6 to 8 dB forward gain. The broadband switching network is rated conservatively at more than 1.5 KW RF power; units are available

317 Poplar Drive, Millbrook, AL 36054

for 160, 80, or 40 meters. The units include a steel outdoor phasing network box and an indoor lobe direction control box; not included are the tuned phasing harnesses, three-conductor control wire, and low-power dummy load, which are available separately.

The switching networks are priced at \$355 and are available from Davis RF Company, P.O. Box 230, Carlisle, MA 01741. Their antenna parts catalog provides an excellent discussion of the merits, design, and construction of vertical phased arrays.

Slack Enterprises Insulators. In May 1990 we noted several wire antenna systems offered by Slack Enterprises. Slack offers prefabricated single-band HF dipoles for all HF bands from 160 through 10 meters, including the WARC bands, that currently range in price from \$27.95 (10 meters) to \$89.95 (160 meters).

Recently, John W. Slack, WA2BGB, sent me a sample of his line of heavy-duty antenna insulators. These high-quality insulators come in 1/2, 3/4, and 1 inch diameter models and are priced at \$2.95, \$3.95, and \$5.95, respectively. Larger diameter insulators are available on special order. John also offers a heavy-duty center insulator with coax connector for \$15.95.

For more information, contact Slack Enterprises, 101 Royal Park Drive, Apt. 2H, Oakland Park, FL 33309.

Ameritron T/R Switch. Ameritron has announced a new electronic T/R switch for linear amplifiers, the QSK-5. Said to operate ultra-fast, offer switching over six times faster than using vacuum relays, and overcome various noise and speed problems, the QSK-5 works with any linear amplifier. The switch is rated at 2500 watts PEP and 2000 watts CW in normal amateur service when SWR is below 1.5:1; it handles 750 watts on continuous carrier modes. An optional cooling fan which allows sustained operation at 1500 watts in any mode is available.

For more details, contact Ameritron, 921 Louisville Rd., Starkville, MS 39759.

Hy-Gain Yagi Redesign. Information from Hy-Gain indicates that they have updated two of their HF Yagis to base their design on the sophisticated "method of moment" computer modeling.

The two affected models are the 205BA-S and the 155BA-S, which were so changed. The antennas were renamed to be the 205CA and 155CA, respectively, and now boast improved F/B ratios. The 205CA is priced at \$762; it has a setting for the 17 meter WARC band and a new adjustable beta match. The 155CA, at \$430, has an optional setting for 12 meters and has standard settings for CW, midband, and phone operation.

For more information or a catalog, contact Telex Communications, 9600 Aldrich Ave. S., Minneapolis, MN 55420.

Universal Communications Catalog. The new, 92-page Universal Radio communications catalog is now available. It covers a broad spectrum of equipment for the amateur, shortwave listener, and scanner enthusiast. A good selection of antennas, headphones, books, and accessories is offered, making the catalog an excellent hamshack "resource document" as well.

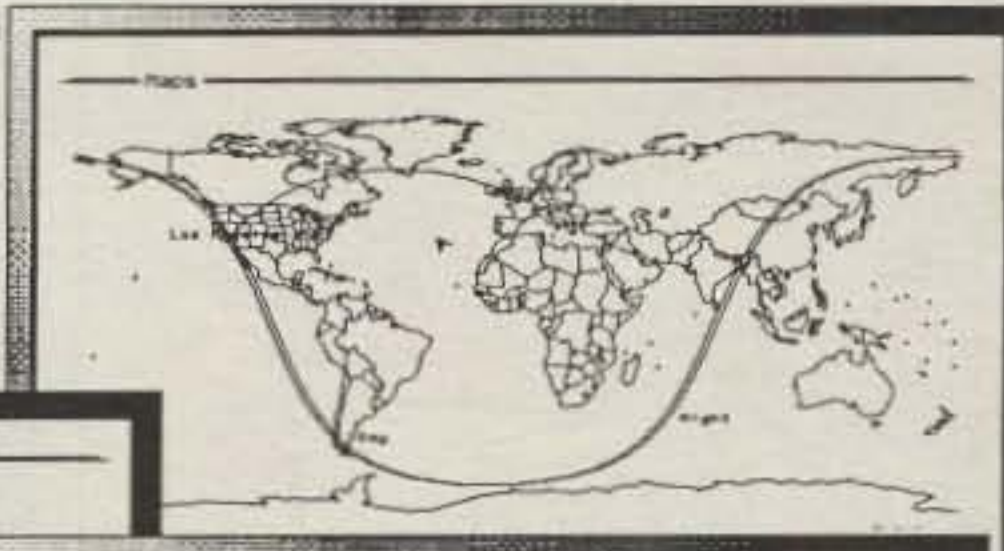
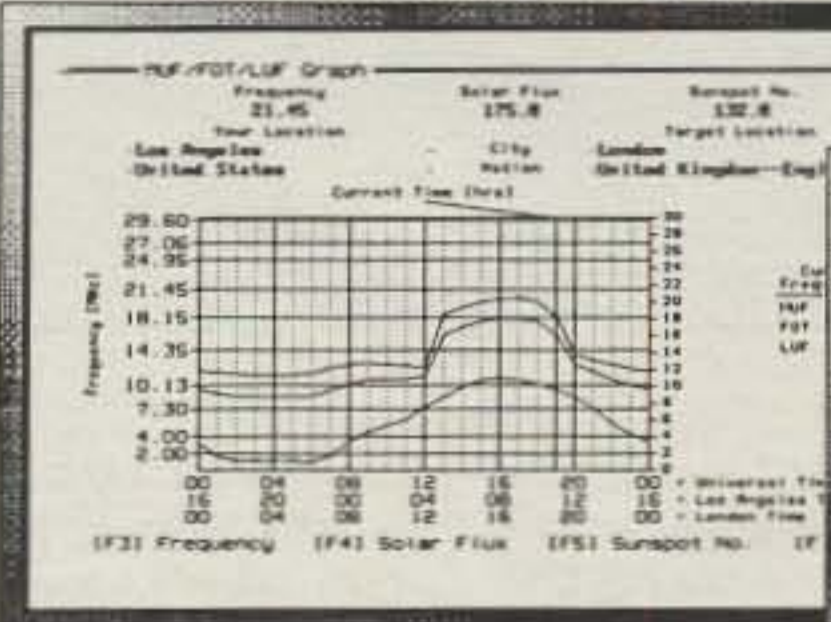
The catalog is available free on request by fourth-class mail, or for \$1.00 by first-class mail. Write to Universal Radio, 1280 Aida Drive, Reynoldsburg, OH 43068.

SI Antennas Catalog. We've described Spectrum International's antenna offerings several times previously, so we won't go into detail

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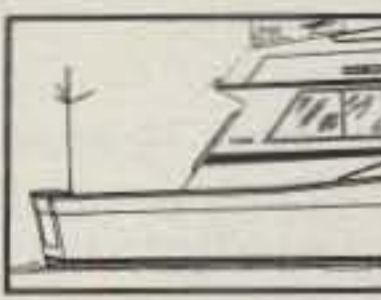


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CATALOG 6

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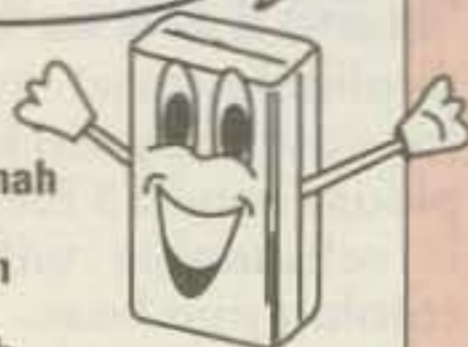


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Shown here is the new Ameritron QSK-5 electronic T/R switch. Said to be ultra-fast and switching over six times faster than when using vacuum relays, the QSK-5 works with any linear amplifier. It is rated at 2500 watts PEP and 2000 watts CW in normal amateur service when the SWR is below 1.5:1. (Photo courtesy Ameritron)



Next month we will describe the Gene Hansen SUPERTENNA. It's been around for many years and is going head-to-head with other serious HF mobile antennas. The antenna claims high efficiency but does not require the operator to switch a resonator or change a whip to shift bands. As can be seen in the photo, the antenna has a large, high center loading coil. It is available from the Gene Hansen Company, 1000 Hansen Road, Corrales, NM 87048-0419.

this time. However, we note that their catalog has grown in size and a number of products have been added since we last perused it. The catalog is now 22 pages of VHF/UHF loop Yagis, Jaybeams, weather satellite receiving systems and antennas, VHF and UHF receive converters, HF crystal filters, VHF and UHF filters, GaAs FET preamps, harnesses and stacking kits, combiners, transverters, and other accessories.

For a free copy contact Spectrum International, Inc., P.O. Box 1084, Concord, MA 01742.

Pasternack Enterprises Coax Products Catalog. We last described the Pasternack coaxial wares in February 1988. We now see the catalog has grown, and now claims that more than 2000 different coaxial products are stocked

by the 20-year-old company. The latest catalog, which has an excellent table of contents and index (hint to other catalog writers!), presents a wide variety of adapters, amplifiers, attenuators, coax and coax assemblies, connectors, switches, patch cords, power dividers, terminations, tools, twinax, and other coax-related goodies.

For a catalog contact Pasternack Enterprises, Coaxial Products Division, P.O. Box 16759, Irvine, CA 92713.

Software Notes

Log View for Windows. Paul Keezer, NX1P, sent us a nice letter detailing his devotion to the writing of logging programs since 1979. His software-writing involvement is interesting.

In late 1988 Paul decided to harness his considerable experience to create a logging program that would work with Microsoft's Windows™. Since then he has been using, modifying, and enhancing what he's dubbed Log View, which integrates powerful logging, award chasing, contesting, and QSLing capabilities. During development he's not lost a logged QSO for any reason—a notable achievement, since one of the biggest complaints about computer loggers is that of lost QSO data. Presently his database is over 7000 contacts, large enough to verify the integrity of the database tools. Writes Paul:

"In the fall of 1990 I decided to write a user's reference manual so that I might make this program available to other individuals interested in Windows based logging. Since that time I have tested both the program and the documentation at several other friends' shacks and have made the program easier to work with for the first-time user. I have also converted the program to Windows 3, to take advantage of the superior user interface and speed. . . . I intend to continue enhancing and expanding Log View's capabilities for my personal use and make these improvements available at a reasonable price to others who are interested in this style of operator interface."

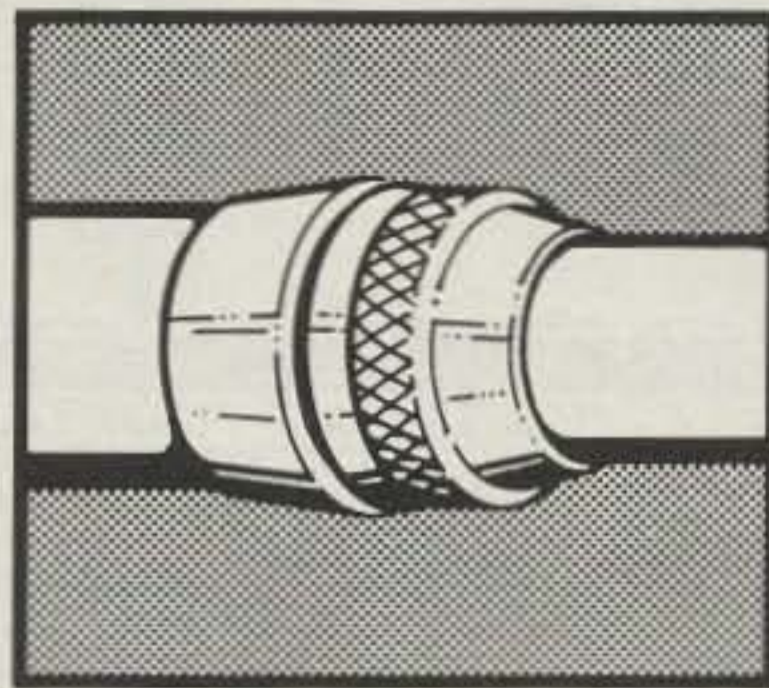
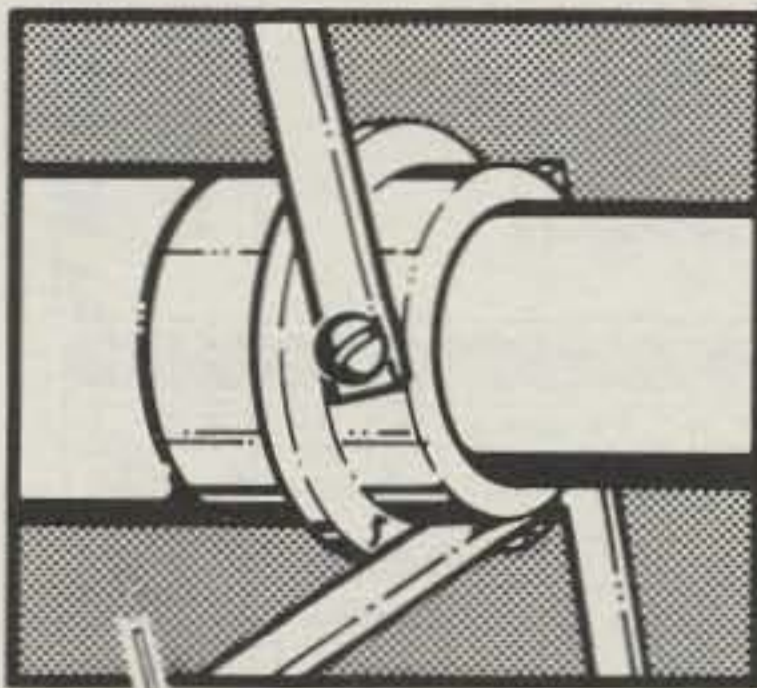
Log View boasts features such as 50 multiple interactive windows, unlimited contact entries up to available disk space, tracking of up to 1000 different user-definable awards, several predefined award and contest files, user configurable QSO reports and QSL formats, sophisticated sorting criteria, automatic bearing and distance indicators, contest mode dupe checking, and much more than we can detail here. I must confess to not yet being a fan of GUIs (graphical user interfaces) such as Windows, so I'm unable to properly put Log View through its paces. However, I'm impressed with Paul's commitment to the development of such a program, certainly one of the first amateur software packages to take advantage of the Windows interface.

To make things more interesting, Paul has installed a BBS (at 508-649-4360) where announcements, database files, configuration script files, hints, and problem reporting are available. The Log View BBS may also be used by any interested operator who wants more information on Log View capabilities or who wants to purchase the program. Registered users can download program updates through the BBS.

The price for Log View is \$85 plus shipping and handling; updates on disk are available for \$15 anytime within one year of last purchase. Contact Paul at the PDK Company, 46 Oak St.,

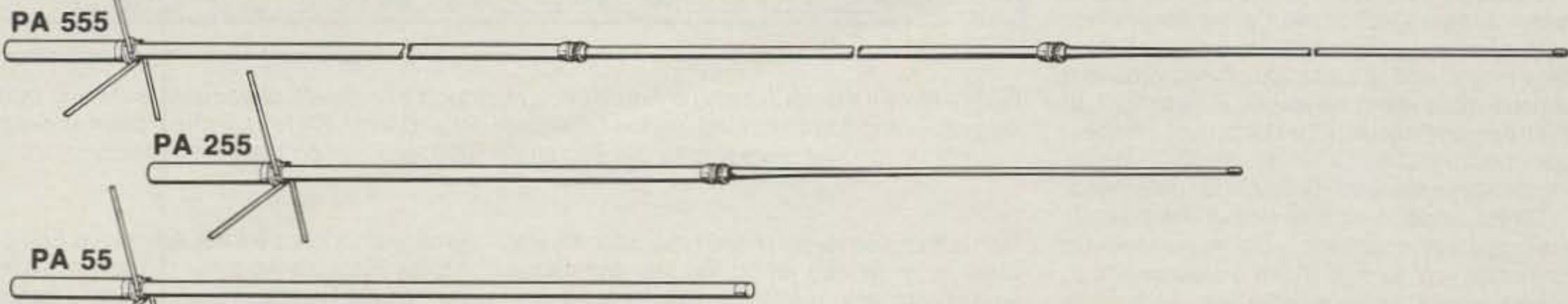
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PA 255	2m/70cm	6.0dB	8.0dB	200	98.4	UHF	112	2m:2-5/8λ, 70cm:4-5/8λ
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Dunstable, MA 01827. Fig. 1 shows the Log View Main Menu.

Paul also has available a demo Log View disk that is fully functional but handles a limited number of QSOs. Included on the demo disk is Pack View, a simple Windows based packet terminal that provides a customized interface to DX clusters and has a DDE (dynamic data exchange) support of Log View.

PC Super Keyer. Wally Blackburn, N8MWU, sent us his PC Super Keyer, a full-featured memory keyer package for the IBM PC and compatibles. It's an excellent product.

The program sports many of the features that are available in "contest" or "keypad" keyers, but at a lower price and without the confusing controls and keypad entries. Several sophisticated and useful message and file output capabilities are provided. These include "message within a message," slower/faster sending for parts of a message, practically unlimited message length, and an automatically incremented serial number within messages. A message can even call itself, resulting in a loop, useful for beacon operation. You can send any ASCII file using the same features available for messages.

Direct output can come from the paddles or keyboard interchangeably, so no switching is necessary. You can make adjustments to speed, weight, serial number, etc., with a few keystrokes. Two preset speeds (slow and fast) are available with a single keystroke, and the keyer can send at speeds from 4 to 600 WPM. Additional features include a local/UTC clock display bar, conversion of paddle input to characters displayed on-screen, speed adjustment using the PC's Up/Down keys, and a built-in test routine that adjusts the program's internal timing to ensure correct timing on your computer.

The PC Super Keyer requires a simple hardware interface, MS-DOS 3.1 or greater, 256K RAM, and a parallel port on the PC. It is priced at \$24.95 including interface plans and a complete manual, or \$39.95 including the interface parts kit. A demo is \$2.00. Contact CW Enthusiasts, 1346 Erickson, Columbus, OH 43227.

QQL Update. We mentioned QQL, the "Quick" QSL Label program by Bill Mullin, AA4M/6, in the May 1990 and April 1991 columns. To briefly recall, the program is designed to do just one thing: to print labels for QSL cards, and to do so fast. Bill sent us his latest version, 3.4, several months ago, so I suspect that he has by now issued several further enhancements. In any case, QQL is a "software survivor," a mature program that is well-scrubbed of nasty program bugs. V3.4 is equipped with lots of new "bells and whistles" that Bill has added in his quest to make QQL the "Rolls Royce" of QSL label-generation programs.

While I can't really say whether or not Bill has reached his admirable goal, this one is worth looking at. It's shareware and is available on many amateur-oriented bulletin boards (BBSes); registration is a modest \$15.95. For more information, contact Bill Mullin, AA4M/6, 3042 Larkin Place, San Diego, CA 92123-3026.

DXLOG Update. DXLOG has been around for three years or more, and its *de facto* survival in the software jungle alone is reason so sit up and take notice. The folks at PAYL software, Drew Smith, K3PA, and Susan Smith, K3YL, periodically have sent us program updates that signify ever more operating improvements. The most recent version I have at this writing is V1.82.

This version is quite elegant, doing more than ever before. It includes features such as automatic determination of country, zone, and ob-

GMT	Date	Time	Call	Name	DXCC	PRFX
05/19/91	13:45	VC8SWR	santo		HR	Honduras
05/19/91	14:04	VF8CHA	murni		HS	Thailand
05/19/91	20:54	7Z1IS	Ibrahi		HU	Vatican City
05/19/91	20:57	UU2TTC	ehak		HZ	Saudi Arabia
05/28/91	00:17	TA8C	Erol		I	Italy
05/22/91	01:23	ET2A			IS	Sardinia
05/25/91	23:49	5U7NU			IT	Sicily
05/27/91	19:21	4J1FS			J2	Djibouti

Fig. 1— Here's the main menu of Log View, a Microsoft Windows™ based amateur radio logging program—the first of its kind that we have seen. Paul Keezer, NX1P, says he's been working on logging programs for himself since 1979, and on Log View since 1988.

last; automated statistics and reports for several awards; numerous report formats; automatic award application printouts; QSL label generation; QSO import from other logging and contesting programs; and considerably more. DXLOG is also compatible with PAYL's new ClusterLog PacketCluster system, which should be available by the time this appears.

DXLOG is priced at \$44.95; a functioning demonstrator is \$5.00, creditable toward purchase. For more information, contact PAYL Software, P.O. Box 926, Levittown, PA 19058-0926. Fig. 2 shows the DXLOG Main Menu.

GGTE Morse Tutor Note. In last July's col-

umn we announced the Advanced Edition of Morse Tutor, although we did not have a working copy in hand and so did not do a hands-on review. Several months later we received a letter from GGTE president Warren I. Hoffnung, KF6VV, who told us that he was receiving orders for the software that referenced our column, but was surprised since he had no record that we were using the Advanced Edition. Warren mentioned in his letter that as of late July, he'd sold over 9000 copies of Morse Tutor and Morse Tutor-Advanced Edition and had received registration cards from users in 29 countries.

Warren kindly enclosed a copy of V1.01,

```

DXLOG Main Menu

C QuickCheck
E Edit QSOs
Q QSL Functions
D DXCC Functions
Z Zone Functions
O Oblast Functions
U Utilities
X Exit DXLOG

Add or modify QSO information in the database.
  
```

Fig. 2— Here's the eight-option main menu of DXLOG, billed as "the complete DX tracking system for the IBM PC." Now available in version 1.82 or higher, the software provides fast, automated real-time logging with duping. The new version is compatible with PAYL Software's new ClusterLog PacketCluster system.

which we've now had the opportunity to check out, and find that its performance is everything claimed. The Advanced Edition (\$29.95 plus \$2.00 shipping) is a very comprehensive package that should appeal to students from beginner to Extra class alike. It's available on 3.5 or 5.25 inch diskettes.

For more information, contact GGTE, P.O. Box 3405, Newport Beach, CA 92659.

Instant Recall. Have you "gone CRZ," or Can't Remember Zip? Are loose ends bogging you down? Well, as we enter middle age we have become a great believer in PIMs, or "Personal Information Managers." These are software packages that essentially are freeform databases that help you organize and manage your daily affairs, however unorganized they may be. We've covered several PIMs in the past, all of which take different approaches to handling unstructured information.

A relatively new software package for the IBM PC and compatibles is Instant Recall. It's a general-purpose memory-resident pop-up whose main claim to fame is that it can globally tie together notes, projects, tasks, meetings, schedules, names, and phone numbers. The program is said to be the only one that offers memory-resident integrated views (in which you can see the various notes, tasks, schedules, and names all together in one place) and multiple search modes (in which you can search by text, topic, date, person, or any category of your choosing). Thus, the package forms one cohesive system so that every item related to a person, project, task, topic, or date appears on a single screen if you so desire.

The package offers several other convenient features, which includes pop-up audible alarms, advance alerts, overdue warning notices, automatic schedule conflict checking, follow-up dates, a phone dialer, a clipboard for exchanging text with other programs, and even password protection. You can have up to 30 pages of notes per item if you like.

This slick program has a clean, intuitive user interface and good context-sensitive help that makes it easy to learn and use; it also has full mouse support and works with Microsoft Windows. The program runs in only 28K of RAM and can be set up to use expanded memory if your PC is so equipped, to enable pop-up over most software without interrupting your workflow. The program is highly recommended by *PC Magazine* and *InfoWorld*. (See Fig. 3.)

Instant Recall is priced at \$99.95 from Chronologic Corporation, 5151 N. Oracle, Suite 210, Tucson, AZ 85704.

Books We Like

Don C. Wallace, W6AM, Amateur Radio's Pioneer. More than a year ago I became aware of the book that Jan D. Perkins, N6AW, who serves as a member of the CQ WW DX Contest Committee, was preparing. Its purpose was to document the life and honor the memory of the late Don Wallace, W6AM, who was a mentor and "Elmer" of sorts to Jan. The result, a 304-page collector's item prepared with the cooperation and support of the Wallace family, was well worth the wait.

Most readers have heard of Don, but for those who haven't, he stood tall as "a ham's ham," one who spent an incredible 75 years as an amateur. Born in 1898, Don first went on the air in 1911. In 1919 he served as the naval radio operator for President Woodrow Wilson aboard the

The screenshot shows the Instant Recall software interface. At the top, it displays 'Database - MAIN', 'Notes', and the date/time 'Tue Jul 16 10:09'. Below this is a menu bar with 'Alt', 'Views', 'Access', 'Functions', 'Help', and 'Quit'. A 'Views' menu is open, listing various views: Standard (S), Follow-Up (F), Time On List (T), Notes (/N), Tasks (/T), Schedule (/S), People (/P), Quick Timer (/Q), Global (/G), Files (/F), and Overview (/O). The main window shows a list of entries with columns for 'No.', 'Category', and 'Text'. The 'Text' column contains various entries like 'Press Z (for Zoom) to view text after user's click on text instead.', 'Codes in Numerical Order', 'Codes by State/Province & City', 's and Zip Code Request', 'es by State', 'Time Zones for Cities around the World', 'Conversion Tables: Weights & Measures (Metric, American & UK)', and 'Fahrenheit and Centigrade Temperatures'. At the bottom, it says 'View: Standard'.

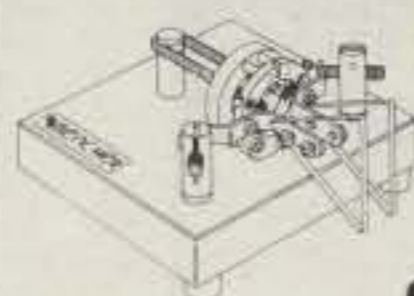
Fig. 3— Shown here is an illustrative screen presentation from Instant Recall™, a full-featured Personal Information Manager (PIM) from Chronologic Corporation. The program instantly presents information in several different formats, including an integrated view that pulls together different types of information (notes, tasks, schedule, people, etc.) into one place. Entries may be assigned to categories, individuals, or groups.

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USS George Washington at the Versailles Peace Conference. Don won the Hoover Cup for the best home-built amateur radio station in the country in 1923 and achieved WAS in the same year, becoming a WAC charter member in 1926. He was an inductee into both the CQ DX Hall of Fame and the Quarter Century Wireless Association Hall of Fame. Since at least 1957 he also was at or near the top of the ARRL DX Century Club (DXCC) Honor Roll.

Don indeed knew the meaning of the word "antenna." In 1945 he acquired 120 acres atop the Palos Verdes Peninsula, where he installed 16 impressive rhombic antennas in Rolling Hills to make what at the time was the largest and most powerful amateur station in the world. His antenna farm in part consisted of 61 telephone poles, ninety 25 foot feeder poles, 108 relays, 17 miles of antenna wire, and 52 miles of feedline. (Jan, incidentally, helped to remove the antennas after Don became a Silent Key on May 25, 1985; this daunting task is covered in Jan's article, "The W6AM Rhombic Antenna Farm Dismantled," which appeared in the December 1988 QST.)

Jan's book finally rolled off the printing presses last June. He told me that it was his first experience at book publishing, and thus it was a real learning experience. For example, in the early stages of typesetting, he made the decision to increase the page size to 8½" x 11" to accommodate certain rare and unusual photos (there are about 200 photos in the book). Adding some two dozen color photos to the book alone added an additional six weeks to the publishing schedule. The hardcover final product is a fine

tribute to Don's memory and is printed on high-quality stock. Other than a few typos and some duplication of photos, the finished product is none the worse for the learning experience.

The Wallace book is available for \$29.95 and \$3.00 shipping and handling in the USA, from Wallace & Wallace, 11823 E. Slauson Ave., Suite 38, Santa Fe Springs, CA 90670.

Where Do We Go Next? Are you an armchair DXpeditioner at heart? Noted DXer Wayne Gingerich, W6EUF (who incidentally is mentioned in N6AW's Don Wallace book), kindly sent me an autographed copy of DXer Martti J. Laine, OH2BH's book of DXploits, *Where Do We Go Next?* The book was prepared in response to demand for a presentation in book form of the author's spectacular DXing accomplishments over the past quarter century. Now Martti is an author, and he tells his fascinating story well.

The 306-page book, which is richly illustrated to include several color photos, tells what it's like to be a well-known, globetrotting DXer through moments of triumph and toil. At heart, the book is an amateur radio based travelogue that effectively invites the reader to take armchair trips on DXpeditions to rare and exclusive places such as Annobon Island, the Western Sahara, southern Sudan, Market Reef, Revillagigedo, and Malyj Vysotskij (M-V) Island, among other exotica. While there are chapters devoted to the author's philosophy of DXing, the book also tells how many obscure but important DX countries were born. Several chapters are contributed by Martti's DXpedition associates.

Note that this book will be available from CQ at their Hicksville address. The book sells for

\$22.95 plus \$4.00 shipping and handling (see the ad for the book in this issue).

Keys, Keys, Keys! At this spring's Birminghamfest, fellow CQ colleague Dave Ingram, K4TWJ, passed me a copy of one of his newest books, *Keys, Keys, Keys!* along with one of his homebrew, clothespin-based "Wild Woody WARC Keys." What fun!

As Dave puts it, the new book constitutes "a visual celebration of amateur radio's favorite accessory," namely the communications, or telegraph, key. Reflecting Dave's love of radio collectibles and classics, the book contains a wealth of information on semiautomatic keys ("bugs"), handkeys, telegraph sounders, custom fingerpieces, electronic paddles, and even miniature "spy keys." Dave's very readable 96-pager makes for good, nostalgia-style reading. Published by CQCommunications, it's available for \$9.95 plus shipping from CQ's Bookstore.

REFLECTIONS Book Corrections. Several months ago we conducted a short review of Walt Maxwell, W2DU's authoritative work *REFLECTIONS—Transmission Lines and Antennas*. Walt's book has been a good seller, but he's 'fessed up to missing a few errors during the final proofreading of the first printing. While the errors have been corrected for the book's second printing, those who have early copies of the book may wish to make some pen-and-ink changes. The corrections were printed in a letter from Walt published in the Technical Correspondence column of QST, in the August 1991 issue, p. 42.

Short Bursts

On Ordering Stuff. When we mention a product in the column—an antenna, a software package, or whatever—we really don't expect you to immediately whip out your checkbook and send away for the product, sight unseen. Bear in mind that in some cases we have the product in hand and have actually put it through its paces; in other cases, we're simply collecting and passing on information. Obviously, we can't personally check out every product we hear about. Thus, we expect you to begin your investigation where we leave off, sending away to the manufacturer, distributor, or dealer for technical literature yourself. Only after you have some basis of comparison should you plunk down your cash.

Another reason for having product literature in hand is to confirm current pricing, shipping, and handling charges (especially for overseas orders), not to mention applicable sales and use taxes. We generally don't mention sales and use taxes since their applicability is very sticky in some states and there's no certain way for us to tell whether or not you need to remit the tax. Obviously, if you live in the same state as the person or firm selling something, you should enclose the tax, if your state has one.

Wrapping It Up

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

Overheard: If you don't at first succeed at something, the only really safe thing to do is to destroy all of the evidence that says you tried in the first place!

73, Karl, W8FX

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

Telephone Interference Redux

Telephone interference seems to repeat itself like a bad pizza. From my incoming mail, I suspect it is a greater problem among amateurs than is generally realized.

At this stage of the game it looks as if telephone interference can be reduced or eliminated in many cases simply by adding a line filter directly at the telephone. However, if the phone itself has extra bells and whistles (memory, call-back, automatic dialing, or other features that incorporate extra diodes or ICs), a line filter often won't do the job. (My friend Tiff, W6GNX, has a phone that creates interference, even when it is physically disconnected from the line! His solution to the problem was to throw the phone in the ash can.) In many cases it is easier and less of a bother to replace the instrument than it is to clean it up! Brave souls who wish to tackle the problem head-on will find useful information in the *Interference Handbook* or the *ARRL Handbook*.

As far as line filtering is concerned, the results you get depend upon the individual telephone and the type of filter used. Some phones are less prone to radio interference than others. It's a crap-shoot.

Assuming you have a phone that is not a problem in itself, the right line filter will do a good job in knocking out interference. Some filter types provide greater attenuation than others. Fig. 1 tells the story. A simple filter made up of two windings on a small toroid follows the generalized attenuation curve A. Of the various filters of this type tested, they all show good attenuation to broadcast-band signals and to amateur signals on the 160 and 80 meter bands. Because of the distributed capacitance inherent in the filter assembly, the attenuation of the two-winding toroid filter decreases above its self-resonant frequency, which usually falls between 2 and 5 MHz, depending upon the winding technique used. These filters do a good job on 160 and 80 meters and are effective up to 20 meters, if the interference is not too severe. On 15, 10, and 6 meters attenuation is not particularly good, and other types of filters provide better attenuation.

48 Campbell Lane, Menlo Park, CA 94025

The Pi-section Filter

Home-made pi-section filters (such as I described in my columns of April, June, and October 1991) do a better job of filtering, as shown by curve B. If, as W6FR, W6GNX, and I have found out after numerous tests, the filter does not have at least 40 dB attenuation at your operating frequency, it won't do the job in "tough" cases.

Most pi-section filters using miniature toroids work, but just barely meet the 40 dB "spec" in the 20 to 30 MHz range. Again, the high-frequency drop in filter attenuation seems to be caused by the distributed capacitance across the input and output terminals and the self-resonance of the filter itself.

A Good Telephone

Line Filter for 7-50 MHz. How about a filter specially designed for the higher frequencies? It was decided to try a filter incorporating rather small inductance and capacitor values in order to reduce stray capacitances and boost high-frequency performance. Fig. 2 is the response of such a filter. Taking 40 dB attenuation as a minimum desired goal, this filter design

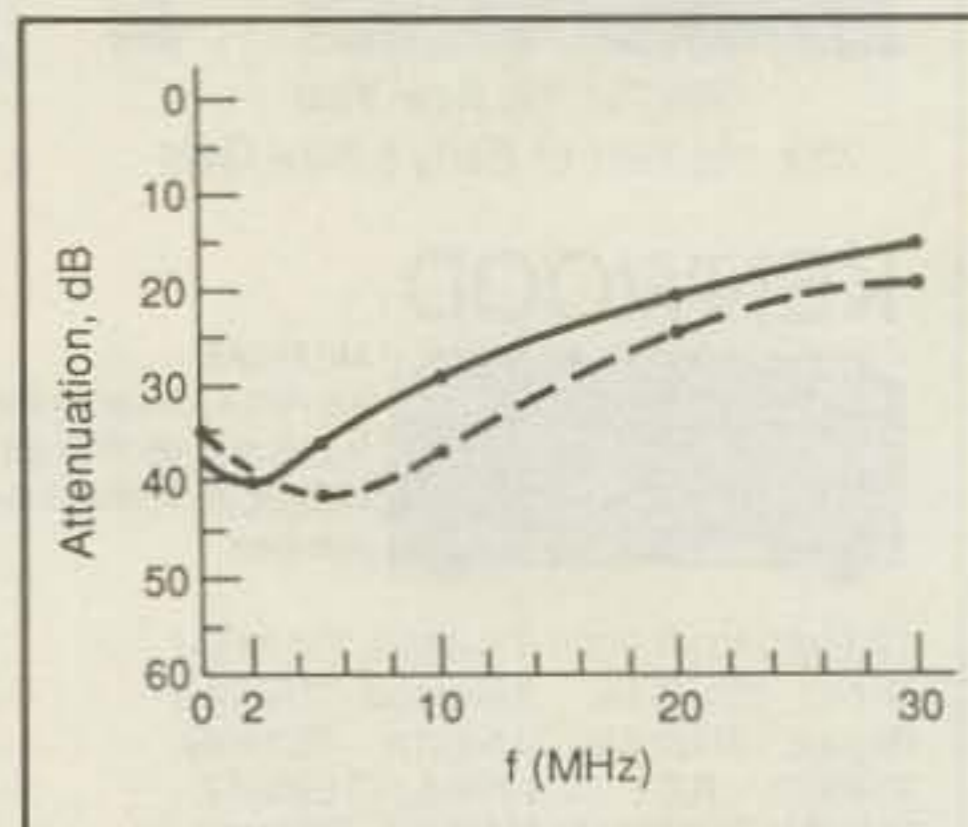


Fig. 1- Two representative dual-winding toroid filters for telephone service. Suppression is satisfactory for 160 and 80 meter bands.

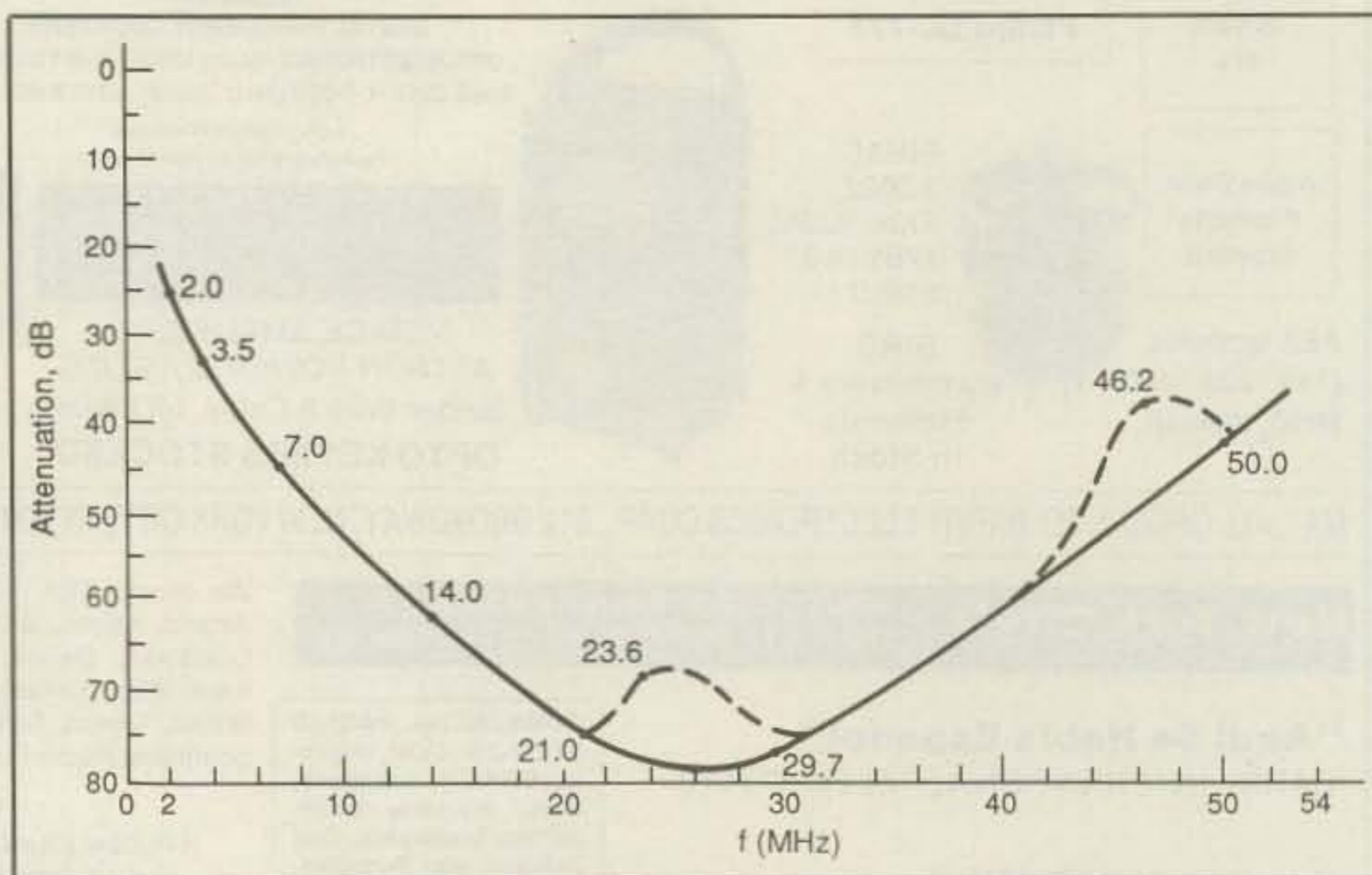


Fig. 2- Response of HF telephone filter "bumps" in curve are caused by unnecessary lead length of capacitors.

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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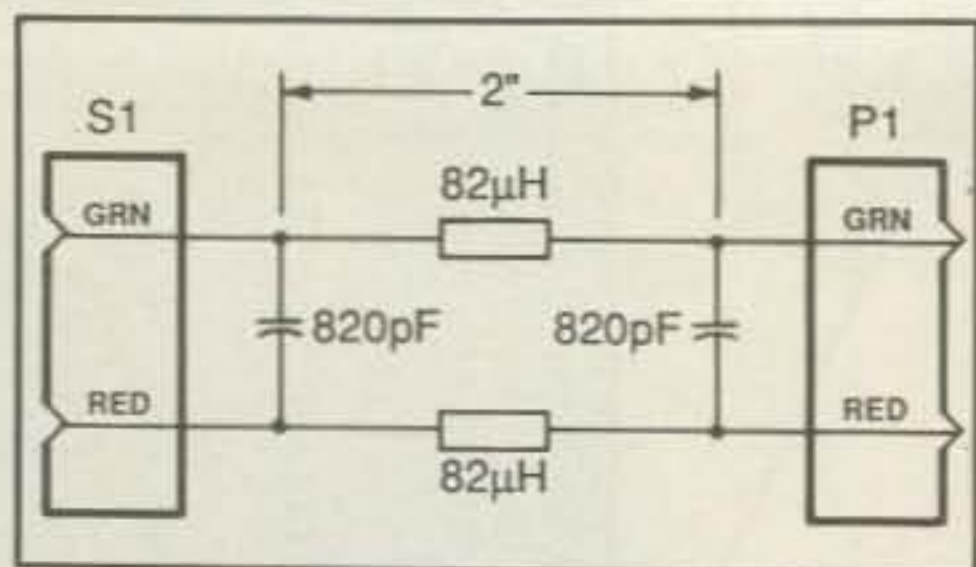


Fig. 3— Filter is built in plastic box. Plugs are standard modular socket-plugs. Polarity should be observed (red-to-red and green-to-green). Observe spacing between capacitors.

23.6 and 46.2 MHz. These are due to the fact that each capacitor was made up of two units in parallel and the interconnecting leads were too long. Substituting single capacitors for the 720 pF values and cleaning up lead length reduced the humps, so the final filter followed the dashed line in the graph.)

The last version of this filter is shown in fig. 3. It uses two 820 pF small, epoxy-coated mica or ceramic capacitors. The voltage rating should be at least 250 volts. You can substitute 720 pF capacitors with little change in filter response.

The inductors are solenoid type, about 1 inch long and ¼ inch in diameter. The molded version is J.W. Miller 9340-40 and the unmolded version is J.W. Miller 4630 (or equivalents).

The filter should be made up in a plastic box with phone-type input and output connectors on each end so the unit can be clipped right into the phone line at the instrument.

Lightning Protection

The best way to keep your station from being damaged by lightning is to make sure the lightning never gets to it! One way to accomplish this is to disconnect the coax line from the equipment and remove it from the station. This is not always easy to do, but it is mandatory when a lightning storm is headed your way!

Even if the storm is a distance away, your station equipment can be damaged

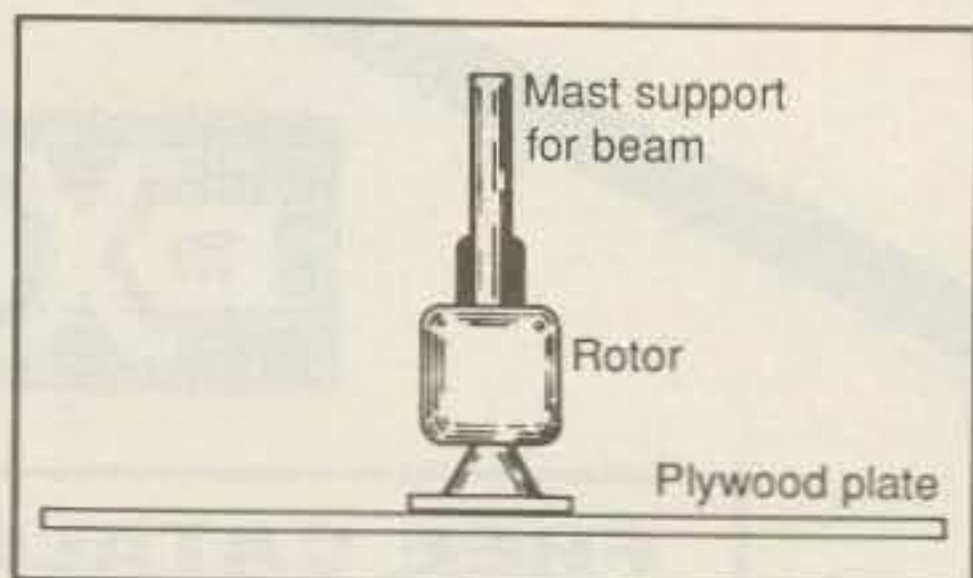


Fig. 4— Rotary beam is mounted on stub mast. Rotor is bolted to plywood plate held in position by cement block weights placed on corners.

by voltages induced by a near strike. In this case you must make sure the lightning currents induced by the strike are dissipated outdoors and not in your shack. This requires a good ground system at the base of your tower. The tower, ground rods, and radials (if you have any) should all be strapped together with a heavy, low-impedance conductor (a 2 inch wide, thick copper strap, for example).

Multiple ground rods should be used at the base of the tower to get good electrical contact to the earth. Some amateurs in bad lightning areas use four or six ground rods. The ground rods must get down to moist soil. In some places, this is difficult.

Lightning is lazy. It takes the lowest impedance path to ground. To encourage lightning to use the ground rods and not your coax line, wind the coax into a choke coil at the base of your tower. Lightning has plenty of energy at 10 MHz or even 100 MHz. The inductor will offer increased impedance to the higher lightning frequencies. As a starter, I'd suggest 10 turns of coax, about a foot in diameter, space-wound on a wood or phenolic form.

Many broadcast stations use this technique for lightning protection. Not a bad idea to try it at your station! (This material is based upon "What To Do Once You're Hit," by John Shepler in the October 9, 1991 issue of *Radio World*, an Industrial Marketing Advisory Services, Inc. publication.)

The Parapet Beam

Many amateurs live in homes or apartments with a flat roof. In most cases the roof is composed of wood with a heavy coating of building paper and tar to make it waterproof. More often than not the roof is encircled by a low, parapet wall running around the outer circumference of the building. This wall can be from 1 to 3 feet high and offers good camouflage for a hidden rotary 6 or 10 meter beam antenna.

You can take advantage of the roof and parapet walls by mounting a beam on a short stub mast and rotor. The rotor is fastened to a large plywood plate resting on the roof (fig. 4).

The object is to elevate the beam as high above the roof as possible without it being viewed from the street. The higher the parapet wall, the higher you can place the beam.

The best situation is one where there are no electrical wires or pipes in the roof. In large apartments the roof often covers a large crawl space in which wires, conduit, and pipes are run. This is a bad scene, as the conductors in the crawl area are closely coupled to your antenna. In this case a vertical antenna with ground plane wires is suggested. This will vastly reduce coupling between antenna and various crawl-space conductors and metal pipes.

If there is no crawl space, and wires or other conductors are not present in the roof, the area is well-suited for a rotary Yag antenna. The only problem is to prevent the coax cable and rotary control cables from coupling to the antenna.

Survey your location and determine the direction in which you *do not* plan to do much operating. That's the direction to lead the wires away from your antenna base. To help matters, you can slide ferrite beads on both the control cable and the coax to "cool off" the conductors. I'd suggest putting about ten beads directly at the rotor and coax at the point they drop down to roof level and another ten beads at the locations that the conductors clear the radius of the antenna. You may have to experiment to eliminate RF in the shack. Make a note of how the SWR varies on the feedline as you rotate the antenna. Try to eliminate fluctuations in SWR by adjusting dress and bead placement. It may take a little work, but once you are finished, you'll have a beam antenna where none has gone before!

Waterproofing Coax Connectors

"Doc" Murphy, KØGRM, lives in North Dakota, which is well-known for "variable" weather! He works for the North Dakota Department of Transport and has had plenty of experience water- and weather-proofing coax connectors of all sizes. He says the big problem in connectors is the voids when the connector is assembled. Normally the voids are filled with air, but in wet weather water tends to fill the voids. The answer to this is to pack the connector with good-quality silicone grease—not a dab around the center pin, but enough so that it oozes out as the joint is tightened. You thus eliminate places for the water to collect.

"Doc" says the best outside protection for a coax joint is beeswax! Just work it over the connection and down the coax until the joint is completely covered. After a while it looks terrible, he says, because of the accumulation of dust and grime on the beeswax surface. However, underneath all is bright, shiny, and dry!

(This idea sounds practical but messy. How about some kind of overwrap on the beeswax to keep it clean?—ed.)

More on Kahoolawe Island

Last month I mentioned Kahoolawe Island, Hawaii as being a possible new DX country. As of this writing the island is under Navy control, as is Midway Island. After writing the column my memory started to work, and I searched my old data file for a letter written to me on the subject by Frederick Smallwood, WA4JVL, Captain,

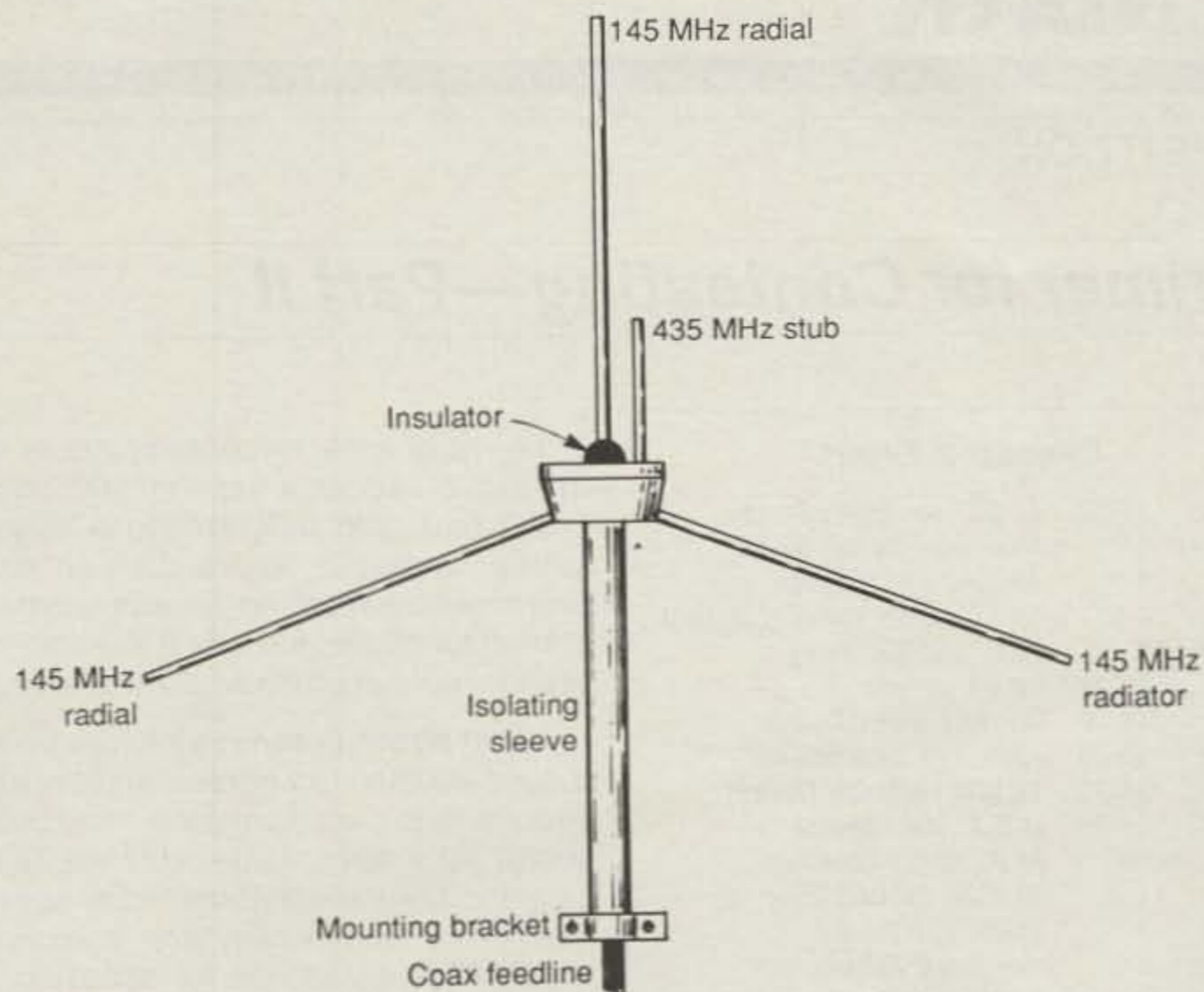


Fig. 5- DL4KCJ dual-band ground-plane antenna for 145 and 435 MHz.

USN. The letter was written in 1988, but the information may be good today. With regard to Kahoolawe, Captain Smallwood suggested the following address with regard to visiting the island: Commander Third Fleet, Pearl Harbor, HI 96860, Attention: Code 01K (Kahoolawe Liaison Officer). So there it is. Go to it, and good luck!

A Ground-Plane Antenna For 145/435 MHz

Here's a clever idea for a two-band ground plane. It originated with DL4KCJ and is reported in the October 1991 issue of *Radio Communication* (p. 39), the journal of the Radio Society of Great Britain (see fig. 5). This is a regular 2 meter ground-plane antenna with an extra 435 MHz quarter-wave rod "planted" on the ground-plane base. On 2 meters the extra rod is inconsequential. However, in conjunction with the lower third of the 2 meter antenna it becomes a quarter-wave transformer, matching the feedpoint to the upper two-thirds of the radiator, which is a half-wave at 435 MHz. A 1/4-wave sleeve for 145 MHz blocks RF on the outside of the coax and doubles as the mounting tube.

No dimensions are given in the article, but normal 145 MHz dimensions apply to the main antenna. The 435 MHz stub may be made of 1/4 inch tubing cut to a quarter wavelength at the higher frequency. Spacing between the two elements is about 3/4 inch and may be adjusted for best SWR on the feedline at 435 MHz.

The Dead Band Quiz And Other Things

I try to catch my readers off-base on these little quizzes, but it is a tough job! To bring things up to date, W9GIB correctly identified Ben Bernie's theme song (September quiz), and 4Z9EAC, KC4EOD, KC7UO, and WF8H identified the quote from "Hunt for Red October," also in the September quiz.

K9BO points out that the F9HJ version of the W8JK beam (October) doesn't work on the second harmonic as the original version does (right!).

Finally, many thanks to Tony, W2UDA; John, VE7AAL; Joe, NR5H; Harry, W7IV; and George, W4TTJ, who sent me personal notes.

REWARD! I am looking for a manual on a Hickock 1605M volt-ohmmeter. I'll send an autographed copy of my *Beam Antenna Handbook* to the heads-up reader who can locate the manual (complete with schematic and calibration data). Anybody out there hear me?

This Month's Quiz

The "girls" were called Dorothy (G-EQA) and Lillian (G-EHF). The movie starts out in Cairo, Egypt. Patrick O'Malley and Eve Tozer embark with "Dorothy" and "Lillian" on a great adventure looking for Eve's father. Where is he? Who are the "girls"? Do you know the name of the movie? If you do, who says, "The ox is slow, but the earth is patient? (Ha! Gotcha on that one!)"

73, Bill, W6SAI

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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	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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NEWS/VIEWS OF ON-THE-AIR COMPETITION

A Beginner's Primer for Contesting—Part II

If there has been one consistent theme in this year's CQ Contest Survey, it is the lack of youth and new blood in contesting. Actually, most will agree that this problem exists for the hobby as a whole. While reading the Canadian Amateur Radio Federation monthly this past week, I discovered that the average age of a Canadian amateur is 55 years old! Although I don't know the U.S. numbers, they are probably not dramatically different.

This month I am continuing a two-part column focusing on the fundamentals of contesting. Whether you are new to contesting or a consistent winner, I think information such as this is useful in bringing newcomers into the fold. For the beginner, there may be a few tips that are new and informative. The experienced contesteer can share this article and other information like it at club meetings and other gatherings. The possibilities are endless. If you have any other ideas how we can use this column in this fashion, I'd love to hear from you.

Are contests only for big stations?

Although contest operating can be intimidating, the answer is absolutely not! The key to contesting is establishing a goal for yourself. As I've said many times, there are only a few winners out of the thousands who participate in any given contest. Your goals can range from beating last year's score to improving your code speed. If contests were only for big stations, there wouldn't be contests; there just aren't enough big stations to go around.

What kind of radio/options should I be using? After reading through a distributor catalog I received in the mail recently, I was quickly subjected to information overload. For a relatively small market, there sure are a large number of products that we can purchase. Although I'm not going to endorse a specific radio manufacturer, there are some basics you should strive for in the "right radio." These include:

- Solid-state tune-up
- Digital displays
- Computer interface (RS-232)
- Selectable filtering options
- Reputation
- RIT/XIT

2 Baldwin Street, Windham, NH 03087

Calendar of Events

Dec.	21-22	JT-80 Anniversary Contest
Jan.	1	ARRL Straight Key Night
Jan.	4-5	ARRL RTTY Roundup
Jan.	4-5	Michigan QRP Club CW Contest
Jan.	5	Zero Land QSO Party
Jan.	18-19	HA DX Contest
Jan.	18-19	WPEACE Award Contest
Jan.	18-20	ARRL VHF Sweepstakes
Jan.	24-26	CQ WW 160M CW Contest
Jan.	25-26	U.B.A. SSB Contest
Jan. 25-	Feb. 2	ARRL Novice Roundup
Feb.	1-2	YL ISSB CW QSO Party
Feb.	1-2	Maine QSO Party
Feb.	1-2	Vermont QSO Party
Feb.	2	North American CW Sprint
Feb.	2-3	Classic Radio Exchange
Feb.	8-9	QCWA CW QSO Party
Feb.	8-9	Dutch PACC Contest
Feb.	8-9	YLRL YL/OM SSB QSO Party
Feb.	8-10	New Hampshire QSO Party
Feb.	9	North American SSB Sprint
Feb.	15-16	ARRL DX CW Contest
Feb.	21-23	CQ WW 160M SSB Contest
Feb.	22-23	YLRL YL/OM CW QSO Party
Feb.	22-23	U.B.A. CW Contest
Feb.	29	Utah 160 Meter Challenge
Mar.	7-8	ARRL DX SSB Contest
Feb.	7-8	YL ISSB SSB QSO Party
Mar.	1-2	Wisconsin QSO Party
Mar.	7-8	QCWA SSB QSO Party
Mar.	13-15	Japan Int'l DX CW Contest
Mar.	15-16	Bermuda Contest

- Dual VFOs
- Selectable attenuation

The advantages of the above are worthy of a column in and of themselves. Like most consumer purchases, it is easy to get caught up in the feature/function war. Don't lose sight of the fact that there is nothing better than good, old-fashioned word of mouth, especially if you can get it from an experienced contest operator.

A second consideration in equipment has arisen in recent years, and that is the computer. While operating from K1EA's station, I sometimes find myself looking for the radio in the maze of 386s, 486s, TNCs, keyboards, displays, cables, and other "amateur" support equipment. The guidelines for computers in amateur radio should parallel the same requirements for any home system. In today's world a 286 system is barely adequate, while a 386 (or 386SX) is the model of choice. Nowadays a contest station without a computer is only slightly less inept than one without antennas!

The final area to contemplate is the myriad of accessories (mostly homebrew) that help differentiate a contest station. Consider issues such as audio and antenna switching, remote access to station functions, etc. We'll look into this area in more depth in a future column.

What about antennas? Antennas are a good addition to a contest station, and I recommend that everyone should use them! All kidding aside, antenna selection decisions are determined by several factors such as money, time, and/or real estate. The guidelines for choosing antennas should be no different for a contest station than any other amateur setup. After all, whether you are interested in contesting, DXing, or casual ragchewing, the usual goal is to have the best signal possible.

For years contesters have led the field in antenna innovation. Although most amateurs have limited resources to play in the mega-station field, a simple setup with a 60 foot tower, tribander for 10/15/20, 2-element "shortie" 40, and a few strategically placed dipoles can do amazing things. Another alternative is to focus on a single band and place all your efforts in that direction.

Don't forget that there are remarkable accomplishments that can be gained with wire antennas. For example, Andy Blank, N2NT, has done extremely well from his modest station with "wire-only" antennas (however, don't get fooled by some of his winning efforts from NF2L). A pass through the *ARRL Antenna Handbook* (and other publications) will not only educate you, but will provide low-cost alternatives to the newcomer.

How do I choose my operating category? Choosing an operating category begins by reading the rules and understanding your options. I am an advocate of multi-operator entries for the "novice" contesteer. If you are fortunate enough to latch onto an experienced contesteer, so much the better.

In recent years the growth of packet radio (and resultant single operator assisted categories) has led me to believe that operating with packet spotting assistance is probably the most fun for a new contesteer from a small station. You have the combined advantage of making lots of interesting QSOs while honing your natural skills. It makes your entre into con-

Contest Club

Yankee Clipper Contest Club
 Frankford Radio Club
 Texas DX Society
 Potomac Valley Radio Club
 Northern California Contest Club
 Mad River Contest Club

Geography

New England
 Philadelphia
 Houston
 Maryland/Virginia
 Northern California
 Ohio

Contact(s)

K1XM, KC1F
 K3WW, N2EA
 N5DC
 WA8MAZ, K3ZO
 W6TSQ
 K8MR

Table I—A few of the U.S.-based contest clubs and key contacts.

testing significantly less lonely. Simply put, it is a lot of fun!

How can I maximize my score from a small station? Most of the strategic skill in contest operating can be fundamentally based on common sense. Unfortunately, not everyone has the opportunity to operate from a contest "superstation." The vast majority of competitors use tribanders and dipoles. The question is "Can I have fun with that kind of setup and how can I make the most of it?"

For most people contesting is a sport that allows us to operate and "see what we can do." The issue of maximizing your score begins with an honest assessment of your station's strengths and weaknesses. If you are using a dipole on 40 meters, it is going to be difficult to compete in the world of large beams at the low end of the band. However, running up and down the band and working people can be very productive. Second, selection of operating times is key. If you have limited operating time, try to choose a schedule that matches the times when conditions are optimum for peak rates (e.g., 15/10 meters in the morning for Europe).

The advent of computers has tremendously assisted our ability to track progress during a contest. It may seem obvious, but always be sure to work the easy stuff! I remember a CQ WW where I forgot to work a Zone 3 (California) on 40 meters.

Operating from smaller stations actually forces you to be a better operator. It requires that you be more clever in signing your callsign in pile-ups (brute force just doesn't work). A strategic callsign placement during a lull in a pile often pays off! More important, the small station can still be very effective during the peak times of activity. My advice is to use your VFO liberally. And when you feel there is opportunity to run stations, stay high in the band and avoid the "big guns."

Where can I get more information about contests? Depending on your geographic location, there are a number of active contest clubs around the world that are interested in gaining new members. I, for example, belong to the Yankee Clipper Contest Club, which is located in the northeast part of the U.S. Although not an inclusive list, refer to Table I for a list of U.S. contest clubs. The ARRL con-

test branch can help you with additional information.

The National Contest Journal is an excellent reading resource that is exclusively focused on contesting. Not only are there interesting articles and features, but it can be useful to help identify specific contesters who would be more than willing to answer questions and provide direction to the new operator. And of course, always feel free to contact me directly at my home address.

The Battle of the Geographies

There are East Coast weekends and then there are East Coast WEEKENDS! The 1991 CQ WW SSB Contest was not only an East Coast weekend, but clearly it was a northeast event. Mike Wetzel, W9RE, was kind enough to send me a copy of the rate sheet from his SSB effort. As if there is any debate to the claim above, take a look at Table II to see how a few thousand miles can define a totally different contest. Amazingly, wasn't it just last year

Hour	K1AR		W9RE	
	Day 1	Day 2	Day 1	Day 2
00	62	34	53	47
01	47	25	55	21
02	41	25	27	16
03	42	24	32	12
04	37	18	34	16
05	44	20	27	17
06	31	3	32	14
07	68	0	58	17
08	117	0	35	24
09	77	23	76	13
10	92	72	39	20
11	105	185	27	60
12	97	141	48	52
13	96	33	75	33
14	85	53	59	27
15	75	71	46	24
16	40	80	47	14
17	62	50	43	13
18	87	40	47	47
19	119	60	34	17
20	88	64	21	14
21	46	56	20	11
22	41	40	66	11
23	20	29	91	25

Table II—1991 CQ WW DX SSB Contest rate analysis, the Northeast versus the Midwest.

that Texas was the place to be for single ops?

Errata

Please note that there is a new address for all RSGB contest entries. In the future send your log entries to the RSGB HF Contest Committee, c/o S. Knowles, G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, England. Please make a note of this change for recently announced RSGB events in CQ.

Also note that in the results of the 1990 CQ WW DX CW Contest (October 1991 issue) on page 28 under Italy, IK2AIH was the incorrect call. The entrant was IK2AIT.

Closing Comments

You can look forward to the results of this year's contest survey "Inside the Mind of a Contester" in next month's column. The stack of responses is impressive, and I appreciate the time you took to participate.

Remember, the deadline for the April issue is February 1st.

73, John, K1AR

U.B.A. SWL Competition

January 1 to December 31, 1992

The U.B.A. (Belgium Amateur Radio Union) is again sponsoring this year-long competition for the benefit of SWLs.

There are five categories: Phone, CW, RTTY (AMTOR, ASCII, packet), and SSTV (FAX) for single operators. And all modes for clubs and multi-operators.

Use all 6 bands, 1.8–28 MHz.

Each station heard counts 1 point on each band. Each country heard is a multiplier (counted once only). Final score is total of different stations heard on all bands times the country multiplier.

To enter the competition you must report your progress to the Contest Manager on April 1 and September 1. Your final log must be submitted no later than January 20, 1993. There will be certificates and trophies to the winners in each category and area.

The U.B.A. suggests that you use their special log forms. Your requests for log forms and more detailed information should be directed to the Contest Manager. Include 3 IRCs if in Europe; 4 IRCs for all other areas (\$2 US).

Contest Manager: Marc Domen, (ONL 6945), Post Bus 188, B-2600 Berchem 1, Belgium.

Michigan QRP CW Contest

1200Z Sat. to 2359Z Sun., Jan. 4–5

This is the 12th annual CW contest

sponsored by the Michigan QRP Club. The contest is open to all amateurs and all are eligible for awards.

Classes: (A) Less than 250 milliwatts. (B) 1 milliwatt to 250 milliwatts. (C) 1 watt to 5 watts. (D) Over 5 watts.

The same station can be worked on each band for QSO and multiplier credit.

Exchange: RST; state, province, or country; and Club membership number. Non-members send power output.

Scoring: Contacts with members 5 points. Non-members 1 point. Bonus of 1.25 if power used is 100% battery, and 1.5 for natural power.

Final Score: Total QSO points \times states, provinces, and countries worked per band \times power bonus if applicable.

Frequencies: 1810, 3560, 7030, 7040, 14060, 21060, 28060, 50060. Novice—3710, 7110, 21110, 28110 kHz.

Awards: Certificates to top scorers in each state, province, and country.

Use a separate log for each band and include a summary sheet showing the scoring, operating class, and equipment used, plus the usual signed declaration.

Logs must be received no later than Feb. 7th by L.T. Switzer, N8CQA, 654 Georgia, Marysville, MI 48040. Include a large SASE for a copy of the results or for sample forms.

ARRL RTTY Roundup

1800Z Sat. to 2400Z Sun., Jan. 4-5

This is the fourth annual all-digital contest sponsored by the ARRL. Any station may work any other station worldwide. You may operate more than one digital mode, but QSOs and multipliers are counted once only regardless of modes used.

Operation is limited to 24 hours out of the 30-hour contest period. Two rest periods must be taken in two separate blocks of time and clearly marked in the log.

Modes: Baudot, RTTY, ASCII, AMTOR, and packet.

Bands: 3.5-30 MHz on those frequencies recommended for digital operation (no 10, 18, or 24 MHz).

Categories: Single operator, multi-band, (1) less than 150 watts output, (2) 150 watts or more. And multi-operator, single transmitter, all band.

Exchange: Signal report and QTH. State for the U.S., province for Canada. DX will send a serial QSO number.

Scoring: One point per QSO. A station may be worked once per band for QSO credit.

Multiplier: Each US state (48), each VE province (12), and each DXCC country, counted only once, not once per band. (KH6 and KL7 are countries; VO1/VO2 counts as one VE province).

Entries with 200 or more contacts must submit a duplicate QSO check sheet.

Awards: Certificates to the top-single operator, both low and high power, and multi-operator scorers in each ARRL/CRRL section, and each DXCC country. Novice/Tech entrant with at least 50 QSOs will also receive a certificate.

Detailed information appeared in the November issue of *QST*. Contest forms are available from the ARRL for an SASE and two units of first-class mail and are recommended.

Postmark your entry by February 5th and send it to: ARRL RTTY Contest, 225 Main Street, Newington, CT 06111.

1992 North American QSO Party

CW: 1800Z Sat. to 0600Z Sun., Jan. 11-12
SSB: 1800Z Sat. to 0600Z Sun., Jan. 18-19

The object of this one is to work as many North American stations (and/or other stations if you are in North America) as possible during the contest period. North American stations are defined by the rules of the CQ WW DX Contests with the addition of KH6.

Classes: Single operator and multi-operator, two transmitters. Multi-operator stations shall keep a separate log for each transmitter and must have at least 10 minutes between band changes. Use of helpers or spotting nets by single operator entries is not permitted. Single operator entrants may only have one transmitted signal at a time. Output power must be limited to 150 watts for eligible entries. Multi-operator stations may operate for the entire 12 hour period. Single operator stations may operate 10 out of 12 hours. Off times must be at least 30 minutes in length and must be clearly marked in the log.

Mode: CW only in CW parties. Phone only in Phone parties.

Bands: 160-10 meters only (no WARC bands). You may work a station once per band. Suggested frequencies are 1815, 3535, 7035, 14035, 21035, and 28.035 (20 kHz up from band edge for Novice) on CW; and 1865, 3850, 7225, 14250, 21300, and 28.600 (28.450 Novice) on phone. Try 10 meters at 1900Z and 2000Z, 15 meters at 1930Z and 2030Z, and 160 meters at 0430Z and 0530Z.

Exchange: Operator name and station location (state, province, or country).

Scoring: Multiply total valid contacts by the sum of the number of multipliers worked on each band. Multipliers are states (including KH6 and KL7), Canadian call areas (VE1-VE8, VO1, VO2, VY1, and VY2) and other North American countries. Do not count USA, Canada, KH6, or KL7 as countries. Non-North American countries do not count as multipliers, but may be worked for QSO credit.

Team Competition: Team competition is limited to a maximum of 5 single operator stations as a single entry unit. **PRECONTEST REQUIREMENT:** To quali-

fy as a team entry, you must give the name, callsign of each operator, and callsign of the station operated should the operator be a guest at a station other than his own (e.g., N4RJ op by KM9P). Teams must be registered with KZ2S.

Penalties: For each unmarked duplicate QSO, you lose that contact plus an additional three contacts; for each QSO for which you are not in the other station's log, you lose that QSO plus an additional one contact; and for each QSO for which the log data is incorrectly copied in any respect, you lose that contact. Entries with score reductions greater than 5% will be disqualified.

Awards: A total of five trophies will be awarded for the high score in each of the following categories: Single operator CW and Phone, Multi-operator CW and Phone, and Single operator combined score. Certificates of merit will be awarded to the highest scoring entrant with at least 200 QSOs from each state, province, and North American country. Send all North American QSO Party entries to John Golomb, KZ2S, 107 Bailey Corner Road, Wall, NJ 07719. Entries must be postmarked not later than 30 days after the party to be eligible for trophies and awards. Logs may be submitted on disk in the form of files generated by K8CC's NA program or MS-DOS ASCII files.

HA DX Contest

2200Z Sat. to 2200Z Sun., Jan. 18-19

Sponsored by the Hungarian Radioamateur Society, this is one of several very popular Eastern European contests. The contest is CW only and stations may be only worked once per band.

Exchange: RST plus serial number (599001). HA stations will also send a two-letter code corresponding to their county. The possible codes are: BA, BE, BP, BN, BO, CS, FE, GY, HA, HE, KO, NO, PE, SA, SO, SZ, TO, VA, VE, ZA.

Scoring: Count 6 points per HA QSO and 3 points for non-HA QSOs on other continents. Final score is total QSO points times sum of HA counties worked per band.

Entries are due 6 weeks after the contest and should be sent to: Hungarian Radioamateur Society, Box 86, Budapest H-1581, Hungary.

ARRL VHF Sweepstakes

1900Z Sat. to 0400Z Mon., Jan 18-20

This is the 45th ARRL January VHF Sweepstakes. ARRL Headquarters recommends that you use the official log forms. It will make your log keeping and the scoring much easier. A large SASE to Newington will get you the necessary forms.

Complete rules will be found in the De-

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BC855XLT-B Bearcat 50 channel 12 band scanner	\$199.95
BC560XLT-B Bearcat 16 channel 10 band scanner ..	\$94.95
BP205-B Ni-Cad battery pack for BC200/100XLT	\$39.95
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ember issue of *QST*. They are a bit complicated, so look them over carefully.

CQ WW DX 160 M Contest

CW: Jan. 24-26 SSB: Feb. 21-23
2200Z Friday to 1600Z Sunday

Complete rules were published in the November issue. The following is a brief rundown.

Exchange: RS(T) and QTH. State for the U.S., areas for Canada, prefix for DX, country abbreviation for those with unusual prefixes.

Stations operating in a state different from that indicated by the call are required to sign portable.

Scoring: Contacts with stations in own country 2 points, other countries in same continent 5 points, and with other continents 10 points.

Multiplier: Each U.S. state (48), Canadian area (13), and DX country. (ARRL and WAE country lists and WAC boundaries are the standards.)

Awards: Certificates to the top-scoring stations in each U.S. state, Canadian area, and DX country. And an assortment of 11 plaques for U.S. and world winners.

Penalties: Three contacts will be deleted for each duplicate that has not been removed.

Disqualification: Taking credit for excessive duplicate contacts, and the usual assortment of rules violations and unsportsmanlike conduct.

Mailing deadline for logs is February 28th for CW entries and March 31st for the SSB section.

They can be sent directly to the 160 Contest Director, Donald McClenon, N4IN, 3075 Florida Avenue, Melbourne, FL 32904. They can also be sent to CQ 160 Meter Contest, 76 North Broadway, Hicksville, NY 11801. Be sure to indicate CW or SSB on the envelope.

U.B.A. CW/SSB Contest

Phone: 1300Z Sat. to 1300Z Sun.
Jan. 25-26
CW: 1300Z Sat. to 1300Z Sun.
Feb. 22-23

This one is sponsored by the Belgium Amateur Radio Union (U.B.A.) and is any station working any other worldwide. Numerous operating awards are available and contest QSOs may be credited towards these awards.

Classes: 5 categories exist—Single Operator, All Band/Single Band, Multi-Operator/Single Transmitter, QRP 10 watts, and SWL.

Frequencies: CW—3500-3560, 7000-7035, 14000-14060, 21000-21060, 28000-28060 kHz. SSB—3600-3650, 3700-3800, 7040-7100, 14125-14300, 21200-21400, 28500-28800 kHz.

Exchange: RS(T) and consecutive se-

rial number. Belgian stations also give their province abbreviation.

Multipliers: All Belgian Provinces, prefixes: ON4-9, DA1-2, and European countries.

Scoring: QSOs with ON, DA1-2 count 10 points. European QSOs count 3 points. All others are 1 point. Final score is total QSO points times total multipliers.

Awards: There are several awards available, including trophies and certificates to the high scorers in each operating class.

Send your final results no later than 30 days after each contest mode to: UBAHF Contest Committee, Galicia Jan, ON6JG, Oude Gendarmeriestraat 62, B-3100 Heist Op Den Berg, Belgium.

ARRL Novice Roundup

0001Z Sat. Jan. 25 to 2359Z Sun. Feb. 2

It's a nine-day long contest, but only 30 hours of actual operating time is permitted for scoring.

Novice/Tech will work each other and higher class licensees who, of course, are limited to contacting Novice/Tech only. All bands and modes open to Novice/Tech can be used.

Exchange: Signal report and ARRL section (country for DX stations).

Scoring: One point for phone QSOs, two points for CW, including RTTY and packet.

Multiplier: Each ARRL section plus each DXCC country. There is also a bonus for stations holding a code proficiency certificate.

Final Score: Add your code bonus to your QSO points total and multiply that total by your multiplier.

Awards: Certificates to every Novice/Tech who submits a valid entry. Higher class licensees are not eligible for awards.

The use of official forms is not only highly recommended, but is a *must*. A large SASE to ARRL Novice Roundup will get you a contest package with all the necessary forms. The January issue of *QST* had a detailed announcement with suggestions and operating details not covered here.

Postmark your entry no later than March 2nd to: ARRL Novice Roundup, 225 Main Street, Newington, CT 06111.

Maine QSO Party

1800Z Sat. to 0400Z Sun., Feb. 1-2
1200Z to 0000Z Sun., Feb. 2

This is the annual Maine event sponsored by the Portland Amateur Wireless Association and open to all amateurs on SSB and CW.

Classes: Single operator, QRP (less than 5 watts) or QRO (100 watts maximum).

Exchange: Signal report and county (Maine stations), state, province, or country for others.

Scoring: Multipliers are Maine counties and any Maine club station that so identifies (e.g., W1KVI). Credit 2 points per CW QSO and 1 point for SSB contacts.

Send your entries to: Maine QSO Party c/o P.A.W.A., Box 1605, Portland, ME 04104 on or before March 31st.

Vermont QSO Party

0000Z Sat. to 2400Z Sun., Feb. 1-2

The Vermont QSO Party is sponsored by the Central Vermont Amateur Radio Club and offers a great opportunity to snag this rare state. Stations may be worked on CW, phone, RTTY, packet, or AMTOR, up to five times on each band.

Exchange: RS(T) and QTH. County for VT stations (2-letter designators); state, province, or country for others.

Scoring: One point for phone QSOs; 2 points for other modes. VT stations multiply by number of states, provinces, countries. Others multiply by number of VT counties worked. Work W1BD, the club station, and receive an additional multiplier award.

Frequencies: (suggested) Phone—lower 25 kHz of the 80-15 meter General bands plus 28.3-28.5 MHz; CW—40 kHz up from the bottom edge of the 80-15 meter bands plus the Novice bands. Other modes in usual area of operation.

Logs must be received by March 1, 1992. Send logs to: Bob DeForge, K1HKI, RR #1, Box 271, Brookfield, VT 05036. Send him an SASE for results and/or log and scoring sheets.

YL ISSB QSO Party

CW: Feb. 1-2 SSB: Mar. 7-8
0001Z Saturday to 2359Z Sunday

The party is open to all, but the emphasis is on membership participation. Rules and logging format are much too lengthy and complicated to list here. I strongly suggest you send a large SASE to KØETA for more details.

Categories: Single operator, DX-US Partners, and YL-OM Teams.

Exchange: Call, RS(T), QTH (state, province, territory, district or country), name, ISSB number, YL-OM teammate, DX-US partner.

Points: One point for non-member contacts, 3 points for member contacts on the same continent, and 6 points if in a different continent.

Multiplier: Only contacts with member stations count as a multiplier. In addition, credit one multiplier for working both DX-W/K partners, each YL/OM team, US state, VE province, DXCC country, and each VK, ZL call area. Use multiplier of 2 for low power (less than 250 W).

Frequencies: The General portions of the CW and phone bands, 10 through 80 meters. Avoid 14332 used by ISSB Net. Check 40 and 80 hourly.

Awards: Category and QTH area winners.

Logs: Should be set up as outlined in the exchange and should indicate at least two 6-hour rest periods. A summary sheet showing the scoring and other essential information would be helpful.

Mailing for all entries is April 30th, and they go to: Fred Kujawa, KØETA, RR 4 Box 213-6, Stockton, MO 65785.

New Hampshire QSO Party

1900Z Sat. to 0700Z Sun., Feb. 8-9
1400Z Sun. to 0200Z Mon., Feb. 9-10

This year's party is again sponsored by the NH Amateur Radio Association. It is New Hampshire stations working all others. As with most QSO Parties, the same station may be worked once on each band mode.

Exchange: RS(T) and QTH. County for

NH stations; state, province, or country for others.

Scoring: All stations credit 1 point/SSB QSO and 2 points digital QSO (RTTY, CW, Packet). NH stations multiply QSO points by number of NH counties, states, provinces, and DXCC countries. Others simply use counties. Twenty (20) bonus points/QSO may be added to your final score for working NHARA members: WB1CAG, NY1Z, W1GUA, W1WQM, WB1FFZ, WW1G, K1MNS, NØCUH, K1RD, WB1ASL, WK1P, N1LT, K1BKE, and W1OC.

Final Score: Final score is calculated by multiplying QSO points times total multiplier and adding bonus points.

Frequencies: CW—1810, 3535, 7035, 14035, 21035, 28035; SSB—1875, 3935, 7235, 14280, 21380, 28380, 50115, 144205.

Logs must be received by March 31st, 1992. Be sure to include an SASE for final results. Send logs and comments to: Mount Moriah Repeater Society, c/o Bud Valcourt, NY1Z, 19 Teague Drive, Salem, NH 03079.

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NEWS OF COMMUNICATION AROUND THE WORLD

Bangladesh: IARU Scores Again!

Hard on the heels of its astounding success in introducing amateur radio to Albania ZA, the International Amateur Radio Union (IARU) has scored another success: Bangladesh S2. On August 28, 1991 the Bangladesh Wireless and Frequency Allocation Board unanimously decided to reintroduce amateur radio to the country. The first two amateur licenses were issued to two Bangladesh citizens: Saif Shahid, S21A, and Nizam Chowdhury, S21B, President and General Secretary of the Bangladesh Amateur Radio League, respectively. More licenses would be issued in the near future.

This announcement caps a 12-year effort to officially establish amateur radio in the small Asian country. The Bangladesh Amateur Radio League (BARL) was formed in May 1979 to promote amateur radio, and to represent the interests of amateur radio to the government on an official basis. BARL was registered as such with the Bangladesh government in December 1979. Unfortunately, BARL had little success in its continuing efforts to promote amateur radio for some time.

An important contributing factor leading to this lack of success was the political turmoil in the tiny country, which is about the size of Wisconsin. Since gaining independence from Pakistan in 1971, the country has been under emergency rule or suspended constitution for much of its 20-year existence.

Meanwhile, BARL joined the IARU as its 115th member society in 1982, and also joined the IARU Region 3 Association the same year. Soon thereafter the Wireless and Frequency Allocation Board voted to permit limited amateur radio, restricted to Bangladesh nationals. However, this permission was revoked before any licenses were issued.

A few amateurs were able to obtain special permission for demonstration stations and limited operation. These amateurs included Eric, SM0AGD, in 1977 and S21GM in November 1981. For a period of many years these were the only amateur operations from Bangladesh that were accepted for DXCC credit. Then a Japanese team under the direction of JA1UT staged a major operation in March 1990 as S21U

(QSL JA1UT). The Japanese team operated from the office of the National Broadcasting Authority and made 1100 contacts in two days under the close supervision of the Bangladesh government. Immediately following this SSB-only operation, Vince Thompson, K5VT, came on the air from Bangladesh as S20VT, making about 2000 contacts on CW (QSL K5VT).

These limited operations did little to satisfy the demand for Bangladesh. The country has been in the Top 50 Most Wanted countries for more than 10 years. More recently, it has moved into the Top Ten, finishing fourth in the 1991 Survey. With all three countries above it on the air in 1991, or scheduled for 1992, Bangladesh stood to be at or near the top of the Most Wanted countries survey in 1992.

Fortunately for DXers around the world, a combination of weather and IARU assistance led to the historic announcement of last August. Soon after a democratic government was elected to power in the country, a devastating storm hit the over-populated lowlands of southern Bangladesh. The resulting waves and widespread flooding killed more than 100,000 people and cut off most communications within and to the country. The BARL immediately offered its assistance in setting up emergency communications links. The proposal was accepted, but before the paperwork could garner all appropriate signatures from the different government agencies involved, the communications emergency had ended. However, the incident helped bolster the cause of amateur radio in Bangladesh.

Meanwhile, David Rankin, 9V1RH, had been making regular visits to Bangladesh, meeting with telecommunications officials and explaining the value of amateur radio. (Dave is the Chairman of the Directors of IARU Region 3.) Dave made yet another visit to Bangladesh last summer, and the announcement of the reintroduction of amateur radio followed soon thereafter. Saif Shahid credited the IARU, and Dave Rankin in particular, for this success: "I am convinced that if it were not for the personal involvement of David Rankin, Bangladesh would still be closed to radio amateurs," Saif S21A said at the IARU Region 3 meeting in Indonesia in October. (Thanks to the "ARRL Letter.")

This remarkable success, coming after



JA1UT (left) discusses yet another Asian DXpedition with a relative of San Sen, of Kampuchea. JA1UT led the S21U operation that put Bangladesh on the air for the first time in years.



Rudi, DK7PE, lugged more than 130 pounds of gear to Mozambique to operate CW as C9RAA last September. Note the propagation plots, sunrise/sunset graphs and chart of short band openings above the rig. Rudi delighted many DXers with low-band contacts.



Alim Mamedov, RF6FO, from Georgia makes good use of his home-brew rig and two-element quad, as this photo of his QSL cards, trophies, and contest certificates shows. His address is 1 Azi Aslanova Str., Kiziladgilo 383136, Marneuli, Georgia, USSR.

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Europe: K1CVF, N7JB

Award of Excellence Plaque Holders: 18YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2**, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, VE7WJ, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VE3FXR, N4MM.

Award of Excellence Plaque Holders with 160 Meter Endorsement: FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, HI8LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, K9QRF, NN4Q, W4UW, NX0I, G4BUE, LU3YL/W4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to: "CQ WPX Awards," 880, CR13, Clovis, NM 88101-9511 USA.

The WAZ Program

Single Band WAZ

10 Meter SSB

407 DU1KT 408 I2UYT

15 Meter SSB

398 AB1U 400 K9EL
399 I2UYT

20 Meter SSB

860 AA6MP 862 K9EL
861 K7TED

40 Meter SSB

73 DU1KT

10 Meter CW

120 K9EL

15 Meter CW

216 K4IQJ

20 Meter CW

406 TI4SU 408 K4IQJ
407 EA7AZA

Phone

605 CP1FF

All Band WAZ

SSB

3823	K6IPV	3833	N4SLR
3824	PT7BSH	3834	WA8LOW
3825	IK2ABJ	3835	JA3BSL
3826	KD5ZD	3836	W8/DL2SCA
3827	EA1EVE	3837	PY3EM
3828	G3UKH	3838	DL9MFH
3829	AB4UF	3839	KB7IVU
3830	K7PB	3840	F6AFA
3831	N4UCK	3841	G0JEE
3832	N6PTI	3842	KF4SA

CW/Phone

7085	SM3CZS (CW)	7095	SM7AVZ (CW)
7086	K7UOT (CW)	7096	W9XT
7087	DL4FN (CW)	7097	NB7Q
7088	N3AHA	7098	DF8KR
7089	WA5DTK	7099	KD4ZO
7090	HA5BWW	7100	N1CPC
7091	WA8LOW	7101	HL5AP (CW)
7092	KF6TC	7102	T10RC
7093	N4SLR	7103	WU8A (CW)
7094	OH3NLH (CW)		

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

12 years of effort, joins the IARU success in Albania earlier last year, meaning that the IARU has helped establish amateur radio on an official, continuing fashion in two of the Top Five Most Wanted countries within a few months!

As this column is being prepared, Eric Biorck, WZ6C, is eagerly awaiting written confirmation of his verbal permission to operate as S21NQ. Eric has been very helpful to the BARL, including lining up support of BARL from outside Bangladesh, and in teaching amateur radio classes in the country. The International DX Association (INDEXA) has provided a complete amateur station to Saif, and S21A should be active on the bands by the time you read this.

The IARU

The International Amateur Radio Union is an organization that has done much for DXers and the DX community. While the spectacular successes of getting two of the Top Five Most Wanted on the air within months of each other generates headlines, much of the work of the IARU is quiet, persistent, behind-the-scenes effort on behalf of amateur radio. The IARU is an organization of member societies, not individual amateurs. National societies representing

radio amateurs in more than 100 countries constitute the "members" of the organization. The American Radio Relay League is but one member. (An important one, as the ARRL houses the international headquarters of the IARU.)

The IARU helps individual member societies work with their respective governments on behalf of amateur radio. For example, once Bangladesh decided to reintroduce amateur radio, telecommunications officials didn't know how much to charge for amateur licenses, or whether to permit foreigners to hold licenses. A few international telephone calls resulted in a FAX to Bangladesh detailing license costs in dozens of countries, and recommending that licenses be issued to foreigners as well as to Bangladesh nationals. A potential delay of months or years in issuing licenses was eliminated, thanks to the quick work of IARU headquarters.

Another IARU success was the establishment of three new amateur bands at the 1979 World Administrative Radio Conference (WARC). The so-called WARC bands at 30, 17, and 12 meters have been very popular among DXers, and will be especially useful as sunspot numbers decline.

Individual amateurs can assist the good work of the IARU in a couple of ways. The

most important way is to support one's national amateur radio society. Each member society pays dues to the IARU and to the regional association. (The IARU has three regional organizations: Region 1 is Europe and Africa; Region 2 is North and South America; and Region 3 includes Asia and Oceania.) Any amateur can also send contributions directly to the IARU, or to the regional association, c/o one's own national society. At times, national societies make direct requests to their members for contributions for IARU work. For example, the ARRL solicited funds for IARU prepara-

5 Band WAZ

As of Sept. 30, 1991, 333 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

K9RHY
KS1L

The top contenders for 5 Band WAZ are:

N4WW, 199	VE7DX, 199
SP9PT, 199	W0PGI, 199
K6YRA, 199	W2YY, 199
PY7ZZ, 199	W9WAQ, 199
DL9WW, 199	K6EID, 199
K0CS, 199	I8IGS, 198
KB0G, 199	VE7AHA, 198
UA4RZ, 199	SM6AHS, 198
AA4KT, 199	K1ST, 198
K7UR, 199	W1JR, 198
K9EL, 199	4X4DK, 198
NA0Y, 199	

750 Stations have attained the 150 zone level as of September 30, 1991.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

tion for the next World Administrative Radio Conference in Spain in March.

Another way in which DXers can assist the work of the IARU is to encourage the national associations in smaller countries to join the IARU, the regional association, and to be active in IARU affairs. For example, when DXers go on a contest DXpedition to a Caribbean island, they can take some time to meet with the officers of the local radio club and promote the cause of the IARU. Contact IARU/ARRL headquarters in Newington for details.

The next big test of the IARU is the 1992 WARC. There will be considerable pressure on amateur allocations in both the HF and the UHF ranges. The 40 meter allocation is under particular attack by international broadcast interests, for example. Any assistance amateurs can provide to help the IARU represent the best interests of amateur radio at WARC 92 would obviously be appreciated by DXers everywhere. And who knows? Maybe the IARU will help establish amateur radio in a country that you need!

DX Century Club News

The DXCC desk has resumed accepting DJ6SI/SY QSL cards for DXCC credit for Mt. Athos. Baldur operated from the Greek

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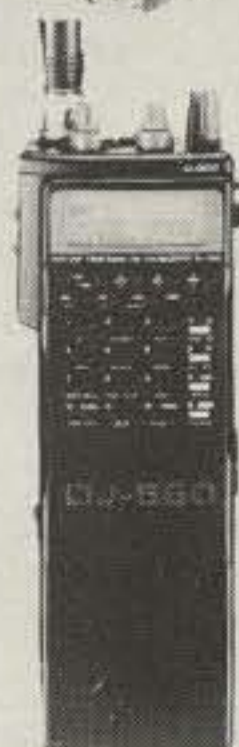
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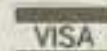
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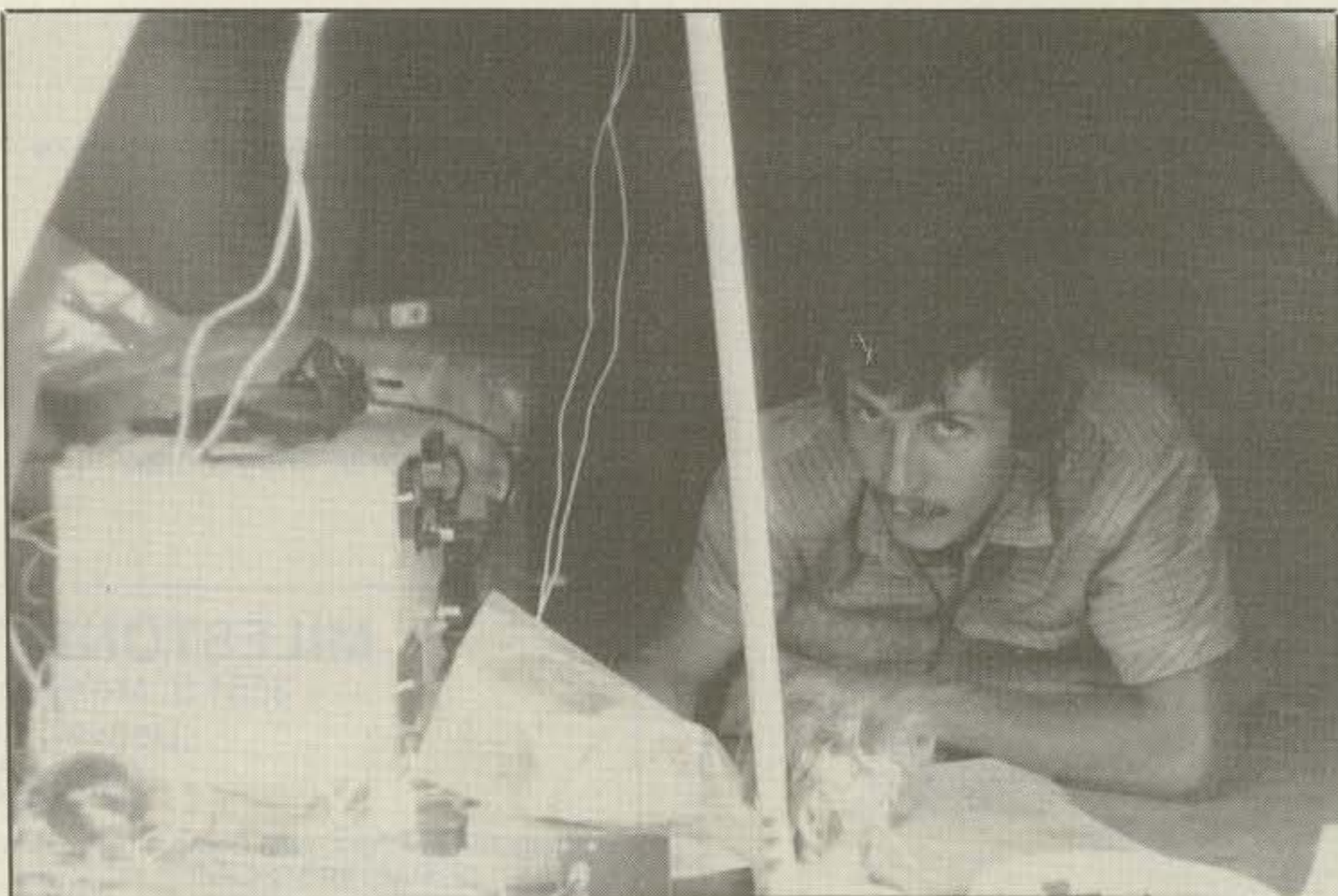
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CIRCLE 40 ON READER SERVICE CARD



Andy Zhukov, UA6BGB, operated RJ8R/ from 4100 meters high in the mountains of Tadzhik last August. He and fellow operators Oleg Zhokov, UZ6AZF, and Alan Latyshev, UA6HPR, made 13,000 contacts in 161 DXCC countries on the trip. QSL to Box 1, Ust-Labinsk 352300 USSR.

peninsula in May of last year. Anyone whose DJ6SI/SY cards were rejected for DXCC credit may resubmit them at any time. Those DXers who previously received DXCC credit for this operation do not need to resubmit the cards; their Mt. Athos credit was never removed from their record.

Also, the DXCC desk immediately accepted the **ZA1A** cards for credit for Albania. The cards began going out in the mail in late October, thanks to the help of many volunteers from the Northern California DX Foundation. As of late October the DXCC desk had not made a determination of the DXCC status of the Hungarian Albanian operations, including ZA1QA, ZA1HA, ZA0RS, and others. These operations received their amateur radio licenses through the Youth Sports and Culture ministry of Albania, which claims authority over amateur licensing. The Hungarians' paperwork appears to be in order, and these operations will probably be accepted for DXCC credit soon.

On the negative side, the DX Advisory Committee (DXAC) voted unanimously against adding Jarvis Island KH5J to the DXCC list as a separate country from Palmyra KH5. A petition for separate country status from Pete Grillo, AH3C, Martti Laine, OH2BH, and Wayne Mills, N7NG, was based on the concept of "exclusive economic zones" around the Pacific islands. The DXAC rejected this concept as not in accordance with the DXCC country criteria. Contacts with **AH3C/KH5J** are accepted for DXCC credit for Palmyra KH5.

In a related topic, the Awards Committee has unanimously accepted the DXAC recommendation for "editorial changes" to DXCC Country Criteria Point 3, separation by another DXCC country. The recent rewrite of the DXCC rules included a controversial Point 3. A strict interpretation of the rule as approved would make hundreds of islands between the US and Canada separate DXCC countries. Tad Cook, KT7H, even submitted a petition for separate country status for a couple of islands off the coast of Washington state, based on this literal interpretation. His petition was turned down unanimously, and the DXAC accelerated its efforts to reword the rules to fit the meaning they originally discussed. In September the Awards Committee unanimously accepted the DXAC-recommended "editorial changes" in Point 3. The rule now reads:

Point 3, Separation by Another DXCC Country.

(a) Where a Point 1 DXCC country, composed of one or more continental land areas or of continental land areas and one or more islands, is totally separated by an intervening DXCC country into two land areas that are at least 75 miles apart, two DXCC countries result. This distance is measured along the great circle between the two closest points of the two areas divided. The measured distance may include inland lakes and seas which are part of the intervening DXCC country. The test for total separation into two areas requires that a great circle cannot be drawn from any point on the continental land area and/or islands of one area to any point on the continental land area and/or islands of the other area without intersecting any land of the intervening DXCC country.

QSL Information

3A2LF to F6FNU
 3B8CF/3B7 to 3B8CF
 3C0CW to EA3CUU
 3C1EA to EA4CJA
 3D2CA to I4ALU
 3D2HA to JI1NJC
 3D2RW to ZL1AMO
 3D2ST to JI1NJC
 3D2WE to LA6VM
 3D2XV to VK2BCH
 3D2YI to JI1NJC
 3D2YN to JI1NJC
 3X0HNU to F6FNU
 3X1AU to ON6BV
 4J4JAT to DL1VJ
 4J4JJ to UG6JJ
 4K1A to UZ1PWA
 4K1ADQ to UA1ADQ
 4K2BCA to RA3YA
 4K2MAL to UA4RC
 4K2DIL to UA9MA
 4L7PEO to UL7PEO
 4N7M to YU7KMN
 4S7CF to 9V1JY
 4S7NMR to K2ZBY
 4U46UN to W8CZN
 4X4NJ to WA4WTG
 4X6UO to WB3CQN
 5B4ADA to YU4YA
 5H30H/A to OH2DQ
 5H3RA to JA3PAU
 5N0CEP to N6QLQ
 5N31ETP to N6QLQ
 5V7DP to KA1DE
 5V7JG to F6AJA
 5W1JW to ON4QM
 5W1YA to W6YA
 5Z4DU to KE4DA
 6W1QB to DK3NP
 7P8/ZS6AIS to ZS6AIS
 7P8EN to ZS4TX
 7P8FE to OH3GZ
 7Q7BW to N5MHZ
 7Q7JH to K7UP
 7Z1AB to WJ2W
 8R1/G4AAL to G4AAL

9H3OZ to DL1SBR
 9H8F to HA4ZC
 9J2SZ to SP8DIP
 9K2JH to KE4JG
 9K2ZZ to W8CNL
 9L1US to WA8JOC
 9L3BM to VE3KKU
 9M2AX to JA6FBO
 9M600 to N200
 9X5HG to DJ3FW
 9X5NH to DJ6EA
 A22BW to DK3KD
 A25AA to A22AA
 A35CA to I4ALU
 A35EA to ZL1AMO
 A35IJ to JA3OIN
 A35XJ to KE6XJ
 BV2BV to WU6X
 BV2DA to DL7FT
 BV2FB to AA6BB
 BY4AA to DJ7BV
 C30DVA to FE1MAR
 C39ED to F1LIN
 C9RAA to DK7PE
 C9RZZ to SM7DZZ
 CE9GEW to CE8LKO
 CM8DD to CO8RCB
 CO6CG to HK5LEX
 CO6DD to CM6RCI
 CQ4DX to CT4DX
 CR8UW to CT4UW
 CT8B to CT1CWT
 CU2DX to KB5RA
 CY8SAB to VE1CBK
 EA5FX to EA5FMJ
 ED3IB to EA4KK
 ED5ICE to EA5AR
 EJ2VLP to DK7UY
 EJ7FRL to EI2BB
 EK250RA to UA9OBA
 EM3W to UA3AYR
 EN50PQ to UA1ZX
 EO50PQ to RA1OA
 EX8V to UF6FFF
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 FY5EW to F6BFH
 FY5FA to F6GNG
 FY5FO to F6BYZ
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 HG20JP to HA0HG
 HL9TK to KK4TK
 HP2CWB to N4YWY
 HR1LW to JA1LW
 HR2BDC to AA5ET
 HS0ZAA to KM1R
 HV3SJ to I0DUD
 HZ1AB to K8PYD
 IT8A/B to IK8HVH
 J28FO to F6FNU
 J37A to N6CW
 J40HS to DJ8MT
 J79MD to N4CRU
 JW0CX to LA0CX
 KG4DD to N5FTR
 KK6NE/T4 to K6ELX
 KP5/KP2A to WA2NHA
 LX9DX to LX1EA
 LY1BY to LY2WW
 OD5SK to KB5RA
 OD5ZN to LZ1BB
 OH08BF to OH2BBF
 ON9CFE to K4TDT
 OX3KR to OZ3PZ
 P29DK to N4EOF
 PJ2MI to K2PEQ
 PJ4/WG3I to G4FRE
 PJ5/N4XO to N4XO

PY0FF to W9VA
 R3MRW to RA9SB
 RC2AR/UA2 to DL5EG
 RF6FP to UF6DZ
 RJ1J to UJ8JMM
 RJ4X to UJ8JMM
 R040A to SP9HWN
 RX3TT to UZ3AXH
 RY7B to RB5RB
 S21NQ to W4FRU
 S79HQ to IK2BHX
 S79KMB to KN2N
 S79MX/D to HB9MX
 SN0WYD to SP9GDB
 SN9PP to SP9VFO
 SO3IF to DJ0IF
 SO5YJW to KB2JYW
 SP0LOK to SP1AEN
 ST0DX to WA2NHA
 SU1HV to IS0LYN
 SV/W7SW to W7SW
 SV0DV/9 to WB4TDB
 SV2ASP/A to SV2UA
 T20WW to NW3W
 TA3PB to DL5YCC
 TF3EJ to TF3IRA
 TI2/N9IUO to WA9BXC
 TJ1FN to I2RRI
 TJ1GG to I2EOW
 TL8CP to F6ESG
 TL8DJ to DA1UA
 TR8GL to F6IXI
 TR8JH to W3HCW
 TT8SA to F6FNU
 TU2QW to F2CW
 TV6FE to F6AUS
 TX1XX to FF1NZH
 TZ6VV to N0BLD
 U100CC to RT4UF
 UD850GF to UD6GF
 UF7FWW to UF6FFF
 UH8EA to W5BWA
 UI8DX to UA4FFF
 UI8ZAA to K9FD
 UI9ACQ to KA6V
 UL0A to UL7ACI

UL7JC to K8BTH
 UM8MBA to UA4FFF
 UR5M to Y22QE
 US8R to UB1RR
 UX5HQ to UB4WZA
 UY8U to RB5UU
 V44KJ to WB2TSL
 V51JM to NK2T
 V63DJ to KA3DBN
 V63WP to WB6STU
 VE7FEI to KC8PG
 VK8SD to K1SE
 VP25EQ to KC8JE
 VP2EE to KA3DBN
 VP2EXX to KC8JE
 VP2M/AA5AU to AA5AU
 VP2MLD to KC4DWI
 VP2MR to N5DXD
 VP2VI to AB1U
 VP5VEP to JA1ELY
 VP8CFM to GM4KLO
 VP8CGK to VK4MZ
 VP8GAV to GM0LVI
 VP9OT to K1FFI
 VP9WS to WB2YQH
 VS6CT to KA6V
 VU2TE to K9JJR
 XV3UU to RA3AUU
 XV9MA to UA9MA
 Y88POL to Y32WN
 YA2CW to F2CW
 Y80ARN to KC9XN
 YE2T to YB0PR
 YJ0ARW to ZL1AMO
 YQ2T to YO2KAB
 ZA1ZMX to F6EXV
 ZD7CW to N4CID
 ZD8ACJ to G0ACJ
 ZD8WD to G4RWD
 ZD9BV to W4FRU
 ZF2QQ to N4UCK
 ZK1AL to I4ALU
 ZK1CQ to ZL1AMO
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 T40PAN to Box 1, Havana, Cuba
 UD6DCP to Alex, Box 692, Baku
 370129, USSR
 UD850AI to Box 73, Baku,
 370092 USSR
 V44KAO to Nevis Street, Basse-
 tere, St. Kitts
 V51EG to P.O. Box 1214, Swak-
 opmund, Namibia
 VS6WV to P.O. Box 5764, Hong
 Kong
 Z21HS to Ralph, Box 4110, Ha-
 rare, Zimbabwe
 ZA1QA to Box 5, Komoro 4522,
 Hungary
 ZD7DP to Desmond, Box 86, St.
 Helena, South Atlantic Ocean
 ZD7KT to Ken, P.O. Box 68, St.
 Helena Island, South Atlantic
 Ocean
 ZS1ACJ to Box 807, Houghton
 2041, Republic of South Africa

recommendation on this subject to the DXAC in December. The Awards Committee will then review any DXAC recommendation on electronic confirmations.

DXpeditions Seeking Funds

Three major DXpeditions have sent news releases seeking funds to complete their planned trips. Two have been previously mentioned. They are:

The South Sandwich Island DXpedition, now set for a two-week operation beginning March 21. The organizers have received funds and pledges of about \$80,000 of the \$104,200 cost of the trip. They will need to raise the last \$25,000 or so by next month, or risk forfeiting their deposit on the ship. Anyone who can help should send contributions to Gerry Branson, AA6BB, 93787 Dorsey Lane, Junction City, OR 97448. South Sandwich ranked third on the 1991 Most Wanted survey, behind Albania and Burma. This means that after the XY0RR and numerous ZA operations, South Sandwich probably is the Most Wanted DXCC country at this date.

Also, the Vietnam DXpedition, originally set for last year, has been re-scheduled for this month. The team continues to solicit contributions, via the American-Viet-

nam DX team, P.O. Box 875, Rahway, NJ 07065. Vietnam was 68th in the 1991 Most Wanted survey, up from 87th the previous year. It ranks 45th on the East Coast Most Wanted list.

Another operation set for this month is a return to Navassa Island KP1 by members of the same team that activated the uninhabited Caribbean island in 1978. Randy Rowe, N0TG; Murray Adams, WA4DAN; Bob Stewart, KW2P; and Larry McKay, K5MK plan to be /KP1 January 17-23 on all bands. Any donations for this trip may be sent to Randy Rowe at 2120 Reverchon Drive, Arlington, TX 76017. Navassa ranked 53rd on the overall 1991 Most Wanted survey, 25th in Europe, and 12th in Japan.

In other up-coming DX news Bill Horner, VK4CRR, and VK4MWZ plan an Islands On The Air operation from Stradbroke Island (OC-137) January 2-5 under the callsign **VK4VD**. They'll be active on CW and SSB on 10, 15, 17, and 20 meters. QSL direct with return postage (and donations, please) to Bill Horner, 26 Iron Street, Gympie, Queensland 4570, Australia.

CQ Hall of Fame

The CQ Hall of Fame is back in business,

following a lengthy reorganization. Gerry Mathis, W3GM, and Leo Chertok, W3GRF, were recently voted into the Contest Hall of Fame (see K1AR's column for details). The Hall of Fame Committee has established guidelines for future nominations. The nominations for consideration for election in the DX or the Contest Hall of Fame should come from a group or club and should detail the nominee's international, positive, long-lasting effect on DXing or contesting. Nominations should be sent to the Hall of Fame Committee Chairman Bob Cox, K3EST, by February 1 for possible induction at the Visalia or Dayton conventions. Bob's address is 1816 Poplar Lane, Davis, CA 95616.

QSL Notes

Antoine Baldeck, F6FNU, QSL manager for many French-speaking stations, has a new address as of October 1st last year: Agur-1, Rue Abdre Lamande, 64200 Biarritz, France. He is not a member of the REF, and thus does *not* receive cards via the bureau system. Among the stations he now handles are **3X0HNU**, **3X0A**, and **TT8SA**. Include a "tip" in addition to return postage and don't make any errors in your QSL card for best results.

CQ DX Awards Program

SSB

1904	KN4UB	1909	KM4WE
1905	IK0IOL	1910	WF9K
1906	EC1CTH	1911	TI2SD
1907	EA3FGB	1912	W0LSD
1908	EA3EQT		

CW

838	YT7DX	840	N7MC
839	YU7FW		

SSB Endorsements

320	KM2P/323	310	IK0IOL/316
320	OZ3SK/323	310	W0LSD/315
320	DL9OH/323	310	K9BWQ/311
320	VE3MR/323	310	W4BQY/310
320	N4KG/322	300	W7ULC/308
320	W4UW/322	300	WD5P/307
320	OE3WWB/322	300	YV5VB/305
320	VE3MRS/322	300	EA4EQ/304
320	K2ENT/322	300	XE1ZLW/301
320	NJ0C/320	300	K3NEE/300
320	K9QVB/320	275	KA9I/292
320	KR9O/320	275	WF9K/291
320	VK4LC/320	275	HP6AYV/275
310	KA9ABC/318	275	TI2SD/275
310	YT7DX/316	200	KD5ZD/225
310	KZ4V/316	200	EA3FGB/205

CW Endorsements

320	N4KG/322	310	KZ4V/310
320	W6PT/322	310	F3TH/310
320	K9QVB/322	300	N7MC/306
320	W4BQY/321	275	WB5MTV/294
310	K2ENT/317	200	WA8MEM/201
310	K2OWE/316	150	IK0ADY/150

Total number of active countries is 323. A new CQ DX RTTY award is now available. 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.

Bob "Kappy" Kaplan, WA4WTG, handles cards for **FY7AE, K7NJ/4X, TJ1BF, ZF2IB/4X, ZF2GE, ZP5KS, 4Z4DX, ZC4DX, 4Z0DX, 4Z4HF, 4Z4LF, 4X4NJ, 4X4UF, 4X2BYB, 4X6BYB, 4X4FF/5N4, 5Z4RH, 6Y5MC, 8P6AH, 8P6IB, 8P0A, 9M8AP, 4Z5DX, KP4/8P6AH, 9M8MG, 4Z6DX, J6LKO, 9M8PV, 4Z8DX, VK6RQ.** He likes to receive used foreign postage stamps, and will accept accumulations of same, and exchange with other collectors.

Zbigniew Rybka, SP8HR, reports that although the Callbook lists only those Polish amateurs who are members of the PZK, all SP amateurs can receive cards via the PZK bureau. He also says SP0 calls are for special events.

Larry Partington, G4BZP, says all the cards for his **9U5BZP** Burundi operation are out, thanks to his son G0CLP and his wife. Anyone still needing a card may QSL to Larry at 21 East Road, Wymewold, Loughborough, Leicestershire LE12 6ST, England.

The former East German Y1-Y9 bureau has closed down; QSL via the DARC.

The **Diego Garcia VQ9** QSL bureau, now in the hands of Rusty Shaw, VQ9RS, is seeking the identity of previous VQ9 operators to generate a complete list of op-

erators and QSL routes. Contact Rusty at NCS Box 8/154, FPO San Francisco CA 96685 with any information.

Buzz, N5FTR, QSL manager for **A41KJ, P29BT, Z21BA, 9M8FH, 9M8LL, and ZS4PB**, now also handles cards for Doug **KG4DD**. Buzz has access to all of Doug's past logs.

Fred Laun, ex-HS1ABD, says more than 28,000 amateur licenses have been issued in Thailand, most for VHF only. About 100 HS stations have passed the CW test and have access to HF. (A complete list is available from *The DX Magazine* for an SASE.) Finally, Thailand is now issuing reciprocal licenses, the first, **HS0ZAA** to John Vajo, W2ZWW. US DXers QSL **HS0AC and HS0ZAA** to KM1R.

QSL to July **VP9/WA9AEB** Bermuda operation to Thomas Palmisano, WA9AEB, 330 Lakeland Dr., Palos Park, IL 60464.

USSR (and ex-USSR) QSL Notes

Bob Schenck, N2OO, offers mint USSR stamps, 500 kopecks worth for US\$5 and an SASE. Fifty kopecks covers an airmail letter from the USSR. Stamps are assorted values, all mint, in 50-kopeck batches. Send to Box 345, Tuckerton NJ 08087.

QSL **UF6FAL** and **EX1FAL** to M. V. Ignatov, Box 31, Tbilisi Georgia 380002, USSR. QSL **UF7FWR** and **EX0FWR** to the same address.

QSL **RF6Q/UL7LS** via Yuri Funkner, UL7LS, P.O. Box 1, Frunze 459411, Kazakhstan USSR.

QSL **UB4LWA, UB4LWJ, RB4LWA, RB5LW, and RB5LUK/JT** via Kharkov Aviation Institute Radio Club UA4LWA, Box 2821, Kharkov 310085 USSR.

Serge Sadakov, RA1OA, is QSL manager for **RZ1OA/a, UA1OID/a, UA1OBA/a, UZ1OWA/a, UA1PAZ, UZ1PWE, UA1POL/1, 4K3ODX, and EO50PQ**. P.O. Box 48, Arkhangelsk 163040 USSR.

QSL the summer Tadzhikistan DXpeditions by **UZ6AZF, UA6BGB, and UA6HPR** to UJ8S, UJ8J, and UJ8R as follows: UZ6AZF and UA6BGB to Box 1, Ust-Labinsk 352300, USSR, and UA6HPR to Box 999, Stavropol 359044 USSR.

QSL **EO3R, R3R, RA2/RW3RQ, UK1PGO, and 4J3R** to Andy Yatskiv, RA3RQT, Box 30, Michurinsk 393740 USSR.

Stan Torbin, UA9TF, says much of his mail for **UH3E/UA9TF** never reached him. Even now, US\$1 bills are routinely removed from incoming mail. Anyone still needing his card should QSL direct to Box 13, GAJ, 462630 USSR, with IRCs, not US\$1.

SWL Mrs. A. Dimde YLR-48-18 wants to complete QSLing of the following stations before the end of 1991: **EK1KP, EK0AC, RQ2WCY, UA0Y/UZ3AXX, UK2GAB, UQ1GWX, UQ1GXX, UQ0GZZ, YL2RG, and YL200SM**. QSL direct to P. Kaste 18, Riga 226048, Republic of Latvia, Europe,

without callsigns or obvious valuable contents. Note that Box 88 Moscow no longer works for the Baltic republics, and you should *not* put USSR on their addresses.

USSR QSL Services

The following have sent word that they can help with USSR (and ex-USSR) QSL cards:

Victor Loginov, UA2FM, Box 73, Kaliningrad 236000, USSR. Victor offers direct responses for SAE and 1 IRC for 3 QSL, forwarding QSLs to local bureaus for 1 IRC per 10 cards, and addresses of Soviet stations for 1 IRC for 10.

Sushkov Valery, UA3GPA, P.O. Box 3, Lipetsk 398000 USSR, says he will help with any Russian calls, including memorial calls, DXpeditions, and direct cards. SASE, please.

Corrections

QSL **H44VG** to GW3WVG.

QSL **4N4A** to YU4EJC, Radio Club Jajce, Box 16, 70101 Jajce, Yugoslavia.
73, Chod, VP2ML

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January 1992 • CQ • 123

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Amateur Radio Service Shifts Into High Gear

The year is fast coming to a close, and it was a banner year for amateur radio! Beginners are now entering the amateur radio hobby as never before. After a sluggish growth rate averaging less than 5% over the last seven years, we saw nearly a 50% increase in the number of people enrolling in the amateur radio hobby this past year. Let's face it. New entrants are the life blood of our hobby. Without sufficient growth, the hobby declines! Our frequencies are by far our most valuable possession. And they are in constant demand by other radio services. Since the FCC is mandated to promote spectrum use, if we aren't getting maximum use out of them, others certainly will (see Table I).

Keep in mind that the government operates on a fiscal year ending September 30. The figures, for example for Fiscal Year 1991, are actually for October 1, 1990 through September 30, 1991. The Codeless Technician class license was only available to the public for the last half of the 1991 fiscal year. While there was an increase of 46.8% in the number of newcomers to the hobby for the entire fiscal year, the percentage for the last six months was a whopping 83.5% increase. (April-Sept. 1990 = 13,570 beginners; April-Sept. 1991 = 24,898.) The first Codeless Technician ticket was issued on March 12, 1991.

Up until last February there was only one way to enter amateur radio. That was by going the Novice route, which requires learning the Morse code at a speed of 5 words-per-minute. After nearly two years of deliberation, the FCC eliminated the code requirement from the Technician class, thereby establishing another way to join amateur radio. It has been an instant success!

Both Novices and Technicians must pass two examination elements. New Novices must pass a 30-question (Element 2) multiple-choice written test in addition to the code test. Technicians simply substitute Element 3(A)—another 25 question multiple-choice exam—for the code test. All of the questions, multiple choices, and correct answers are widely known and published.

Due to international radio law, the privileges of these classes are somewhat dif-

License Class	F.Y. 1984	F.Y. 1985	F.Y. 1986	F.Y. 1987	F.Y. 1988	F.Y. 1989	F.Y. 1990	F.Y. 1991
Novice	17392	15913	19147	22319	18550	20047	22979	19922
Technician	730	851	1163	1452	2117	2498	2617	17790
Other	678	609	669	567	413	520	538	651
Total	18800	17373	20979	24338	21080	23065	26134	38363
% Increase		-7.6	+20.8	+16.0	-13.4	+9.4	+13.3	+46.8

Table I—First time Amateur Radio Service licensees by initial license class. Note that the number of new Novices pretty much maintained their average of the past seven years, while the number of "No Code Technicians" has mushroomed.

ferent. New Novices may operate their equipment in segments of both HF and VHF amateur spectrum, while the new code-free Technician is authorized all of the amateur bands above 30 MHz. That means 6 meters (50 MHz) and higher. The FCC speculated that the Technician would be more popular than Novice entry, and they were right!

While the number of new Novices is declining a little in number, the Codeless Technician class is skyrocketing! The big attraction of the Technician class is the availability of crystal-clear FM communications in the 2 meter amateur band and computer-to-computer operation using the free radio spectrum rather than the expensive telephone lines. A Codeless Technician need only pass a 5 wpm code test to obtain Novice HF privileges, which includes a segment of the long-range 10 meter shortwave band.

Not only is entry-level amateur radio at an all-time high, but so are the number of licensees upgrading their existing operator license (see Table II)! Once in the hobby, most newcomers want to continue up the ladder! The number of Technicians upgrading does not include Codeless Techs who upgrade to Tech Plus by passing a telegraphy examination. The Commission

does not keep the Tech Plus database, which is maintained by the VECs. "Technicians upgrading" only includes those who upgraded to the General, Advanced, or amateur Extra class.

License Testing In The Amateur Service

In mid-1984 the FCC turned over to the community the responsibility for developing, administering and processing all amateur radio license tests. That was also the last year that the Commission administered any amateur license examinations to anyone, and even then they only conducted exams on a quarterly basis. A completely new amateur radio testing program was created. The FCC established regional Volunteer Examiner Coordinators (VECs) who would act as the administrative liaison between the FCC's Gettysburg, Pennsylvania licensing facility and the Volunteer Examiners (VEs) who would administer the examinations.

Instead of having unknown test questions, the VE would choose a certain number of test questions from each of nine topics. The questions that might be administered in the written examinations for

From Class	F.Y. 1984	F.Y. 1985	F.Y. 1986	F.Y. 1987	F.Y. 1988	F.Y. 1989	F.Y. 1990	F.Y. 1991
Novice	8829	10422	11151	13365	14525	15198	16417	15326
Technician	2504	3833	3861	3687	4780	5017	6092	7448
General	3361	3829	4358	4007	4019	3835	4343	4834
Advanced	1490	2214	2858	2755	3018	2739	2847	3217
Total	16184	20298	22228	23814	26342	26789	29699	30825
% Increase		+25.4	+9.5	+7.1	+10.6	+1.7	+10.9	+3.8

Table II—Amateur Radio Service licensees upgrading their existing licenses. The good news is that not only are newcomers charging into amateur radio, but those who are already licensed are continuing to progress up the amateur radio license ladder.

National Volunteer Examiner, Coordinator, P.O. Box 565101, Dallas, TX 75356-5101

Calendar VEC System 1984	Calendar 1985	Calendar 1986	Calendar 1987	Calendar 1988	Calendar 1989	Calendar 1990	Calendar 1991	
(Technician to Extra Class Examinations)								
Sessions	413	3223	3784	4378	4903	5486	6250	5724*
Persons	8599	41439	42422	49728	53546	57417	64737	74494*
Elements	12633	62589	61921	81042	89788	96092	105763	123767*
Pass Rate	47.5%	58.2%	59.7%	60.6%	61.0%	61.5%	60.8%	66.0%*

Table III—Amateur Radio Service VE/VEC system examination program activity by year. The 1991 figures are through September. All other years are for the entire calendar year.

each of the five amateur radio license classes became known as the Question Pool. There was a Novice, Technician, General, Advanced, and Extra class pool. Each had from 286 to 507 possible questions. These questions are periodically revised by a three-member internal VEC committee called the QPC, for Question Pool Committee. (I am one of the three committee members.)

At first there were about a couple of dozen different VEC organizations, each with many approved (or accredited) VEs. There are now 18 VEC groups remaining, but only two of them (ARRL and W5YI) are large in size. These two VECs account for nearly 80% of all administered amateur radio examinations. Every VEC is required to utilize exactly the same questions and testing scheme. The system has worked very well over the years.

As you might expect, the VE/VEC System (as it has come to be known) has grown into a huge testing system (see Table III). It has been estimated that over 25,000 senior-level volunteer examiners have been accredited by the various VECs to participate in examinations at the Technician and higher class level. There are well over 1000 testing sites nationwide available for those wishing to take amateur radio exams.

This is a far cry from when the FCC administered the amateur exams at their field offices. They had only about 50 examination points, and many amateur examinations were only administered quarterly. It usually meant that an applicant had to take a day off to journey many miles to the nearest FCC examination point. No longer. Most amateur exams are now administered in the evening or on weekends in cities all over the country. Our testing program, the W5YI-VEC, came into being when it appeared that amateur examinations would be very difficult to find after the FCC's final (1984) testing year. We were the first VEC to agree to conduct amateur radio examinations on a national basis.

Be aware that Table III is compiled on a calendar year basis, while Table I and II are September to October government fiscal years. Also the figures are for the (three VE) VEC System examination program and do not include tests given by two VEs under the older Novice testing program. An additional 20,000 beginners are informally examined annually for Novice licenses.

The 1991 figures in Table III are through September only. Notice that far more tests have been administered in the VEC System through September 1991 (three quarters)

than all of calendar year 1990. At this rate more than 100,000 applicants will have been administered 160,000 test elements at 7500 test sessions this year! That represents more than a 50% gain over the prior year. A very big job for the VEC System indeed!

Participating in The VEC System

Novice testing has always been conducted on a volunteer basis by amateurs holding General and higher class licenses. Entry-level testing was completely overhauled in



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1983. Instead of writing to the FCC for a ready-to-administer written Novice test, VEs were permitted to select questions according to a formula from a bank of 200 approved questions. The question-pool system was extended to the Technician and higher classes the following year. At first, the FCC issued each VEC a list of "Examination Designs." That is, they specified which questions were to be asked from each pool.

Later on the FCC allowed VECs to select the questions to be asked. Each VEC simply designed examinations based on selecting an FCC-specified number of questions from each of the nine sub-elements. Written examinations (on paper) were sent to each VE team. Later on VEs were allowed to do the question selection, and

they too could design their own written examinations. VEs and VECs were also permitted to obtain properly constructed written examinations from outside suppliers.

The entire amateur testing program has been in a state of evolution since its onset, and it continues to this day. Even though theoretically the Novice examination falls under a different testing program, every VEC also must conduct Novice tests, since Element 2 is a prerequisite for all higher class amateur licenses.

Some VECs, including the ARRL and W5YI-VECs, also have separate divisions that distribute amateur license preparation material to applicants. This material consists primarily of study manuals for the various license classes and code learning audio cassette tapes. Since all written test

questions for every license class are known and published, it is a relatively simple job to include an explanation of the correct answer. The initial question pools were released to the public without multiple choices, and it was up to the VEC to supply the answer format. The VECs collectively decided in 1986 to all use the same multiple choices to preclude applicants from shopping for easier answer formats. At least one VEC used true/false answers.

Amateur Testing With A PC

During the past five years personal computers—especially IBM and compatible formats—have become a widely owned "consumer appliance." PC fanciers seem to have the same personal characteristics and inclinations as amateur operators. There can be no doubt that manual Morse code is being de-emphasized in amateur radio and is being replaced by machine-read and manipulated code. With the advent of packet radio a computer has become a necessary piece of amateur gear.

We were one of the first VECs to utilize a personal computer in the amateur radio testing function. My assistant, Steve Sternitzke, NS5I, is an accomplished programmer, and we developed software that generates properly constructed amateur radio examinations. The program simply selects the proper amount of questions and their multiple choices from each of the nine sub-elements. The volunteer examiner has the option of testing an applicant right at the PC keyboard or printing out a unique examination. Every written test is different. If the applicant is tested at the PC, the computer ejects a scored answer sheet for submission (along with the Form 610 application) to the VEC.

Another programmer, Joe Speroni, AH0A, wrote "Morse Academy," a code teaching/testing software which was enhanced to our specifications. Morse Academy allows applicants to learn the Morse code from "ground zero" and advance up through the Extra class level. Included are features not found in other CW programs, such as a "stat" function which immediately tells you when you have used all required 43 Morse code characters. A recent enhancement is called "QSO Generator." This sub-routine properly constructs a 5-minute (or as close to 5 minutes as possible) Morse code QSO-type examination that contains all characters. The big advantage of "QSO Generator" is that every Morse code exam is completely different and confidential! It works like this.

QSO generation is accomplished by selecting from lists of many variables for inclusion in up to 60 sentences commonly used in an amateur QSO. Up to 16 sentences are considered optional and are removed by the PC to adjust the sending time to the recommended 5 minutes. The re-



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maining text is analyzed to ensure that all required characters are included. Automatic editing is then performed to add missing characters. If this proves impossible, the QSO test is discarded by the computer and new text is automatically generated. The remaining message has phrases for use with up to 34 different questions. Not only is the QSO text generated, but also the ten questions to be asked and a transcription/answer key for the VE team.

PC Study Software

Our education office distributes a somewhat more complicated study/practice version to the test-taking public. The IBM-compatible test practice software comes in two versions. The "Ham Operator Software" contains seven disks (both 3 1/2 inch and 5 1/4 inch) covering every amateur examination from Novice through Extra class, both telegraphy and written tests. The software contains all current (nearly 2000) questions, multiple choices, and answers. Some of the features include the ability to select colors, take practice examinations, obtain scores by sub-element, and print out practice examinations.

The included Morse Academy code teaching/testing program has "Learning," "Proficiency," and "Endurance" features. Code characters and text are totally random generated and thus cannot be memorized. There are also additional "Receiving Games" and "Teacher" functions. All parameters are user-definable, such as actual sending speed, "Farnsworth" spacing speed, color, tone adjustments, calibration, and weighting. "Weighting" is computer-emphasized characters as determined by the PC. This is based on the student's past history of errors, which is logged. Each feature may be further customized in many ways to suit individual learning needs. The computer tells you when you are ready to pass the test! "Ham Operator Software" costs \$39.95 postpaid and comes with a 200-page licensing handbook.

We also distribute a "No-Code Technician Education Package." This software covers all questions in both the Novice and Technician question pools and has the same features as the "Ham Operator Software." It also contains a 208-page handbook that gives all of the explanations to the (nearly 700) questions that could appear in the No-Code Technician examination (cost \$29.95 postpaid). Both the "Ham Operator Software" and the "No-Code Technician Software" have a current "Part 97 FCC Rulebook" included. VISA and MasterCard orders go (toll free) to: 1-800-669-W5YI (9594).

Testing At The PC

The actual testing functions (examination

and question selection) associated with our examination software cannot be controlled by the VE team. This increases the credibility and integrity of the examination programs and allows them to be used to examine friends and even relatives of VE team members. The examination must be administered (and Form 610 application certified) by VEs who are not relatives, of course.

We even have VE teams who use our testing software in a computer classroom networking environment. Unique examinations may be downloaded by a file server to the applicant's PC. The testing software for administering both the Morse code and written examinations is available to a VE team without cost. We do have all tests available in paper form, however, for those VE teams who do not have an IBM-compatible personal computer available.

We have two different testing programs—one, called "Exam Express," which may be conducted by Advanced class VEs, and another, called the "Automatic Distribution Program," which must be headed up by an Extra class VE. The "Exam Express" program only examines the Novice, Codeless Technician, and Technician Plus levels. The ADP testing program examines all amateur radio classes.

Complete details are available from our VEC office by simply telephoning 817-461-6443. You may also write to us at W5YI-VEC Office, P.O. Box 565101, Dallas, Texas 75356. We share testing fees (actually, expense reimbursement) with our examination teams. At present we have over 10,000 VEs who are organized into nearly 600 testing teams. Complete instructions are contained in our VE manual, which is available without cost.

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W5YI-VEC program is a very simple process. First you must hold either a current Advanced or Amateur Extra class operator license. Send us a copy of your operator license along with the following signed statement:

"I am a currently licensed Advanced (or Extra class) amateur radio operator and wish to participate in the W5YI-VEC volunteer examiner program. I have never had my station or operator license revoked or suspended, nor have I ever been discredited by another VEC. I do not own a significant interest in nor am an employee of any company or entity engaged in the amateur radio equipment or license preparation business. I am familiar with the FCC Rules concerning amateur radio operator testing as indicated in Title 47 CFR, Part 97, Subpart F. I agree to conduct all amateur radio examinations in accordance with these Rules and the policies established by the W5YI-VEC. I understand that failure to comply with these procedures could result in my being separated from the W5YI-VEC examination program. Serious violations of the FCC Rules may result in suspension or revocation of my amateur radio operator and/or station licenses, or both. I am at least 18 years old."

That is all there is to it. We will rush you your accreditation documents by return mail once we receive the above signed statement and a copy of your amateur operator license. There is no cost for accreditation. (Include \$1.00, however, if you wish a certificate suitable for framing.) Let us know if you are interested in heading up a testing team, and we will include a VE manual. Remember that it takes three accredited VEs to conduct a test session at the Technician and higher class levels. VE applications go to W5YI-VEC, P.O. Box 565101, Dallas, Texas 75356. You also may FAX this information to 1-817-548-W5YI (9594).

73, Fred, W5YI

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CIRCLE 83 ON READER SERVICE CARD

THE SCIENCE OF PREDICTING RADIO CONDITIONS

1992 Looks Like Another Good Year!

Although solar activity is expected to decline slowly but steadily during the New Year, 1992 looks like it will be another year of relatively high solar activity and associated good ionospheric propagation conditions on the HF bands.

Table I shows the various phases of solar-cycle intensity corresponding to specific ranges of smoothed sunspot numbers. The data is based on the behavior of the previous 21 solar cycles for which records are available.

Solar Phase	Smoothed Sunspot Number Range
Intense	Greater than 120
Very High	100-120
High	80-100
Moderate	50-80
Low	20-50
Very Low	Less than 20

Table I—Major phases of a solar cycle.

The year 1992 is expected to begin with a smoothed sunspot number of approximately 123, or within the Very High range. By the end of the New Year the sunspot count is expected to drop to approximately 75, well within the Moderate range.

HF Propagation 1992

Compared to the past four years of Intense and Very High solar activity, conditions expected on the HF bands during 1992 may be somewhat reduced, but they are very likely to continue to be very good. Here is what can be expected during 1992 on each amateur band between 6 and 160 meters.

6 meters: Somewhat fewer ionospheric DX openings, but some good ones should still be possible during the equinox months on generally north-south interhemisphere paths. Some good east-west openings should be possible during the winter months, but probably not as frequent as during the past few years of higher solar activity. This will be primarily a daytime DX band.

10 meters: There could be a noticeable decrease in the number and duration of DX openings during 1992, but expect this to

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LAST MINUTE FORECAST

Day-to-Day Conditions Expected for January 1992

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 5, 7-8, 26-27, 29	A	A	B	C
High Normal: 4, 6, 9-10, 28, 30-31	A	B	C	C-D
Low Normal: 1, 3, 11-12, 17-18, 20-21, 23-25	B	C	D	D-E
Below Normal: 2, 13, 16, 19, 22,	C	C-D	D-E	E
Disturbed: 14-15	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.
 3 dB per S-Unit.

HOW TO USE THIS FORECAST

1. Find propagation index associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the propagation index, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a propagation index of 3 will be good-to-fair (B-C) on January 1st; fair-to-poor (C-D) on the 2nd, good-to-fair (B-C) on the 3rd, good (B) on the 4th, excellent (A) on the 5th, etc.

continue to be a great DX band during the equinox and winter months. This will be primarily a daytime DX band.

12 meters: Should behave very much like the 10 meter band, but a somewhat greater number of DX openings are expected. This band will also remain open for DX an hour or two longer than 10 meters.

15 meters: Conditions are expected to remain very much as they have been for the past few years. It is expected to be a great band for worldwide DX during much of the daylight hours, particularly during the equinox and winter months. East-west DX openings are likely to decrease considerably during the summer months, but north-south openings should hold up very well, often extending well into the evening hours.

17 meters: Should behave much like 15 meters, but remain open for DX an hour or two longer.

20 meters: Not much change from previous years expected on this band during

the hours of daylight, with worldwide DX openings possible throughout the year. DX conditions on this band tend to peak for a few hours after local sunrise, and again during the sunset period. Somewhat fewer nighttime DX openings are expected, but generally good DX conditions should be possible during much of this period during the equinox and summer months. Nighttime DX openings during the winter months are expected to be fewer and somewhat more spotty than during the past few years.

30, 40, 80, and 160 meters: These are basically nighttime DX bands, and no significant change is expected during 1992. Good worldwide DX should be possible on 30 and 40 meters between sunset and sunrise, during all seasons, and on 80 and 160 meters during the equinox and winter months.

Sunspot Cycle 22 Progress

Table II is a listing of smoothed sunspot numbers observed to date for Cycle 22, the present solar cycle, and a forecast of activity expected through 1992. Cycle 22 began in September 1986 with a smoothed count of 12. It reached a peak of 159 during July 1989. Cycle 22 is the third most intense solar cycle observed in the nearly 250 years in which records have been kept.

January Conditions

Fifteen meters should be the best DX band during the daytime hours, with 10, 12, and 20 meters not too far behind.

Ten and 12 meters are expected to provide good DX openings from daybreak through the early evening hours on most days during the month. Expect the strongest signals from Europe, Africa, and points east before noon; signals from the southern hemisphere should peak after noon, and from the Pacific and points west in the late afternoon and early evening. Excellent short-skip openings between distances of approximately 1200 and 2300 miles should be possible during most of the daylight period.

The 15 and 17 meter bands should open shortly after sunrise, with signals peaking towards Europe, Africa, and points east before noon. During the afternoon hours peak conditions should swing towards the

south and southwest. Openings towards the northwest and into the Pacific areas should be optimum during the late afternoon and early evening hours. When conditions are High or Above Normal, these bands may remain open well into the hours of darkness for paths towards Central and South America and the Pacific areas. Excellent short-skip openings between distances of approximately 1000 and 2300 miles should be possible from shortly after sunrise through the early evening hours.

During January 20 meters should remain open to some area of the world or another almost around the clock. Signals are expected to peak for about an hour or two after sunrise, and again for about an hour or two before sunset, when openings to many areas of the world should be possible. On many days the band should remain open during the evening hours for paths towards South America and the Pacific areas. Excellent short-skip openings between distances of approximately 800 and 2300 miles should be possible from just after sunrise to as late as midnight. Openings over much shorter distances are likely from mid-morning to mid-afternoon.

Forty meters is expected to be the best band for DX openings during the hours of darkness. Openings to most areas of the world should be possible at some time between sundown and the post-sunrise period. Exceptionally strong signals may often be possible due to a seasonal decline in atmospheric noise or static. Look for openings to Europe, Africa, and points east in the late afternoon, early evening, and until about midnight. After midnight the band should shift towards the west, northwest, and Pacific areas, with DX conditions peaking just before sunrise. Good openings towards the Caribbean and Central and South America should be possible at just about any time between sundown and sunrise. During the daylight hours look for short-skip openings between approximately 100 and 600 miles on both 40 and 30 meters. The skip should lengthen during the late afternoon, and by nightfall conditions should be optimum for openings between 800 and 2300 miles.

Eighty and 30 meters are also nighttime DX bands. Openings towards Europe, Africa, and points east should be possible from sundown to midnight, with openings also possible towards the Caribbean and Central America. After midnight signals should peak towards the southern hemisphere. Openings towards the west, northwest, and the Pacific areas should also be possible after midnight, with these signals peaking around daybreak. Eighty meter short-skip openings between approximately 50 and 250 miles should be possible during the daylight hours. Openings should extend out to between 250 and 1500 miles during the late afternoon and early evening, and by nightfall openings up to and beyond 2300 miles should be possible.

Month	1986	1987	1988	1989	1990	1991	1992
January		18	58	142	151	148	123
February		20	65	145	151	148	118
March		22	71	150	152	147	112
April		24	78	154	149	146	108
May		26	84	157	147	145	104
June		28	94	158	144	143	101
July		31	104	159*	141	141	98
August		35	114	158	141	137	95
September	12	39	121	157	142	133	91
October	13	44	125	157	142	129	87
November	15	47	130	158	142	127	81
December	16	51	138	154	144	125	75

Table II—Progress of sunspot Cycle 22 and predictions for 1992. Predicted values are show in italics. The peak of Cycle 22 is shown with an asterisk.

Expect some relatively good DX openings on 160 meters during the hours of darkness. Openings towards Europe and the east should peak around midnight. The band should shift towards the west and the Pacific areas after midnight, with peak signals likely at daybreak. Openings towards the Caribbean area and into Central

America should be possible during most of the darkness period. During the daylight hours intense solar absorption severely limits openings, but some may be possible up to approximately 150 miles. Short-skip openings up to approximately 1300 miles should be possible on a regular basis during the hours of darkness, and frequently

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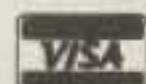
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CIRCLE 92 ON READER SERVICE CARD

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 80 meter openings.

2. The *propagation index* is the number that appears in () after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. 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.

3. 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. On the Short-Skip Chart appropriate *standard time* is used at the *path midpoint*. For example on a circuit between Maine and Florida, the time shown would be EST, on a circuit between N.Y. and Texas, the time at the midpoint would be CST, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones add 2 hours in the PST zone; 4 hours in the MST zone; 3 hours in the CST zone; and 5 hours in the EST zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 P.M. in Los Angeles; 17 or 5 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *standard time* in other areas of the USA subtract 8 hours in the PST zone; 7 hours in the MST zone; 6 hours in the CST zone; and 5 hours in the EST zone. For example, at 20 GMT it is 15 or 3 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave 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.

5. 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.

the skip may lengthen to the maximum short-skip range of 2300 miles.

VHF Ionospheric Openings

Some 6 meter F-2 layer DX openings may still be possible this January during the daylight hours. Openings to Europe and Africa are most likely to occur an hour or two before noon. Look for openings towards the Caribbean area and Central and South America from an hour or two before to about an hour or two after noon. Openings towards the Pacific and points west should be possible during the late afternoon. Openings towards Europe favor east coast locations, while those towards the west and the Pacific areas favor west coast locations. Check for 6 meter DX openings when conditions are expected to be High or Above Normal. Trans-continental and shorter skip openings are likely to occur during the afternoon hours.

January is a poor month for trans-equatorial scatter propagation, but it may be

CQ Short-Skip Propagation Chart January & February 1992 Local Standard Time at Path Mid-Point (24-Hour Time System)

Band (Meters)	Distance From Transmitter (Miles)			
	50-250	250-750	750-1300	1300-2300
10	Nil	Nil	07-08 (0-1) 08-09 (0-2) 09-10 (0-3) 10-12 (0-4) 12-15 (0-3) 15-17 (0-2) 17-18 (0-1)	07-08 (1) 08-09 (2-3) 09-10 (3-4) 10-12 (4) 12-15 (3-4) 15-16 (2-4) 16-17 (2-4) 17-18 (1-2) 18-19 (0-2) 19-20 (0-1)
15	Nil	07-08 (0-1) 08-10 (0-2) 10-15 (0-3) 15-17 (0-2) 17-18 (0-1)	06-07 (0-1) 07-08 (1-3) 08-10 (2-4) 10-15 (3-4) 15-17 (2-4) 17-18 (1-3) 18-19 (0-2) 19-21 (0-1)	06-07 (1) 07-08 (3-2) 08-18 (4) 18-19 (2-3) 19-20 (1-3) 20-21 (1-2) 21-22 (0-1)
20	09-11 (1-2) 11-14 (1-3) 14-15 (1-2) 15-17 (0-1)	06-07 (0-2) 07-09 (0-3) 09-11 (2-4) 11-14 (3-4) 14-15 (2-4) 15-17 (1-4) 17-19 (0-3) 19-20 (0-2) 20-06 (0-1)	06-07 (2-3) 07-08 (3) 08-09 (3-4) 09-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (1-4) 21-23 (1-3) 23-01 (1-2) 01-06 (1)	06-07 (3-2) 07-08 (3) 08-12 (4) 12-14 (4-3) 14-21 (4) 21-23 (3-4) 23-01 (2) 01-04 (1-2) 04-06 (1)
40	07-08 (0-2) 08-09 (1-3) 09-10 (2-4) 10-19 (4) 19-21 (2-3) 21-00 (1-2) 00-07 (0-1)	07-08 (2-3) 08-09 (3) 09-11 (4-3) 11-15 (4-2) 15-19 (4) 19-21 (3-4) 21-00 (2-4) 00-02 (1-3) 02-06 (1-2) 06-07 (1-3)	07-08 (3) 08-09 (3-2) 09-11 (3-1) 11-15 (2-1) 15-17 (4-2) 17-18 (4-3) 18-00 (4) 00-02 (3-4) 02-06 (2-3) 06-07 (3-4)	07-08 (3-1) 08-15 (1-0) 15-17 (2-1) 17-19 (3) 19-02 (4) 02-06 (3-4) 06-07 (4-3)
80	07-08 (2-4) 08-10 (4) 10-15 (4-3) 15-00 (4) 00-04 (3-4) 04-07 (2-3)	07-08 (4-3) 08-09 (4-2) 09-10 (4-1) 10-15 (3-1) 15-16 (4-1) 16-18 (4-2) 18-04 (4) 04-07 (3-4)	07-08 (3-1) 08-09 (2-0) 09-16 (1-0) 16-18 (2-1) 18-20 (4-3) 20-04 (4) 20-06 (4) 06-07 (4-3) 06-07 (3-1)	07-08 (1-0) 08-16 (0) 16-18 (1-0) 18-20 (3-2) 20-04 (4) 04-06 (4-3) 06-07 (3-1)

worth checking 6 meters for such openings between 7 and 10 PM local time. Some meteor-scatter openings on the VHF bands should be possible during the first several days of the New Year when the *Quadrantids* meteor shower is expected to take place. Some VHF auroral-scatter propagation may be possible during the month, particularly when conditions are expected to be Below Normal or Disturbed on the HF bands. Check the Last Minute Forecast appearing in this column for appropriate dates.

Short-Skip Charts

This month's column contains a Short-Skip Chart for use in the continental United States for distances between 50 and 250 miles. Special propagation charts centered on Hawaii and Alaska are also included. The charts are valid through February 1992. See last month's column for detailed DX Propagation Charts for use during January.

73, George, W3ASK

160	09-17 (1-0) 17-19 (3-2) 19-06 (4) 06-08 (3) 08-09 (2-1)	17-18 (2-1) 18-19 (2) 19-21 (4-3) 21-05 (4) 05-06 (3) 06-07 (3-2) 07-08 (3-1) 08-09 (1-0)	17-18 (1-0) 18-19 (2-1) 19-21 (3-2) 21-03 (4-3) 03-05 (4) 05-06 (3-2) 06-07 (2-1) 07-08 (1-0)	18-19 (1-0) 19-21 (2-1) 21-03 (3) 03-05 (4-2) 05-06 (2-1) 06-07 (1-0)
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HAWAII January & February 1992 Openings Given in Hawaiian Standard Time

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	07-08 (1) 08-09 (2) 09-13 (4) 13-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-17 (3) 17-18 (2) 18-19 (1)	12-14 (2) 14-17 (4) 17-21 (3) 21-00 (2) 00-06 (1) 06-08 (3) 08-09 (2) 09-12 (1)	17-18 (1) 18-20 (2) 20-02 (3) 02-03 (2) 03-04 (1) 19-20 (1)* 20-01 (2)* 01-03 (1)*
Central USA	07-08 (1) 08-09 (2) 09-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (4) 09-13 (3) 13-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	08-13 (2) 13-14 (3) 14-20 (4) 20-00 (3) 00-02 (2) 02-05 (1) 05-06 (2) 06-08 (3)	17-18 (1) 18-20 (2) 20-21 (3) 21-01 (4) 01-03 (3) 03-04 (2) 04-06 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-03 (2)* 03-05 (1)*
Western USA	07-08 (1) 08-09 (2) 09-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-12 (3) 12-18 (4) 18-20 (3) 20-21 (2) 21-22 (1)	08-10 (4) 10-15 (3) 15-22 (4) 22-01 (3) 01-04 (2) 04-06 (1) 06-08 (3)	17-18 (1) 18-19 (2) 19-20 (3) 20-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-21 (2)* 21-04 (3)* 04-05 (2)* 05-06 (1)*

ALASKA January & February 1992 Openings Given in GMT

TO:	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern USA	17-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-01 (1)	15-16 (1) 16-17 (2) 17-21 (3) 21-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	12-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-00 (3) 02-03 (2) 03-05 (1)	06-12 (1) 07-11 (1)*
Central USA	17-08 (1) 18-20 (2) 20-00 (3) 00-01 (2) 01-02 (1)	15-16 (1) 16-17 (2) 17-20 (3) 20-23 (4) 23-01 (3) 01-02 (2) 02-03 (1)	12-16 (1) 16-18 (2) 18-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-03 (3) 03-04 (2) 04-06 (1)	06-08 (1) 08-13 (2) 13-14 (1) 07-12 (1)*
Western USA	18-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	16-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-02 (3) 02-03 (2) 03-04 (1)	12-16 (1) 16-18 (2) 18-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1)	04-05 (1) 05-06 (2) 06-14 (3) 14-15 (2) 15-16 (1) 05-10 (1)* 10-14 (2)* 14-15 (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.



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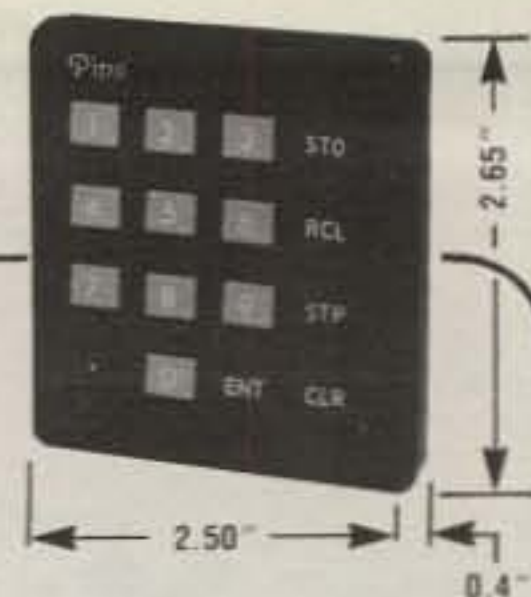
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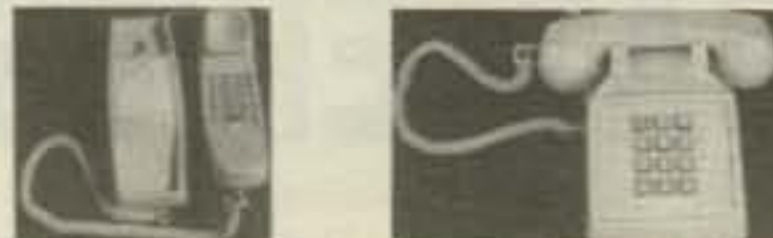
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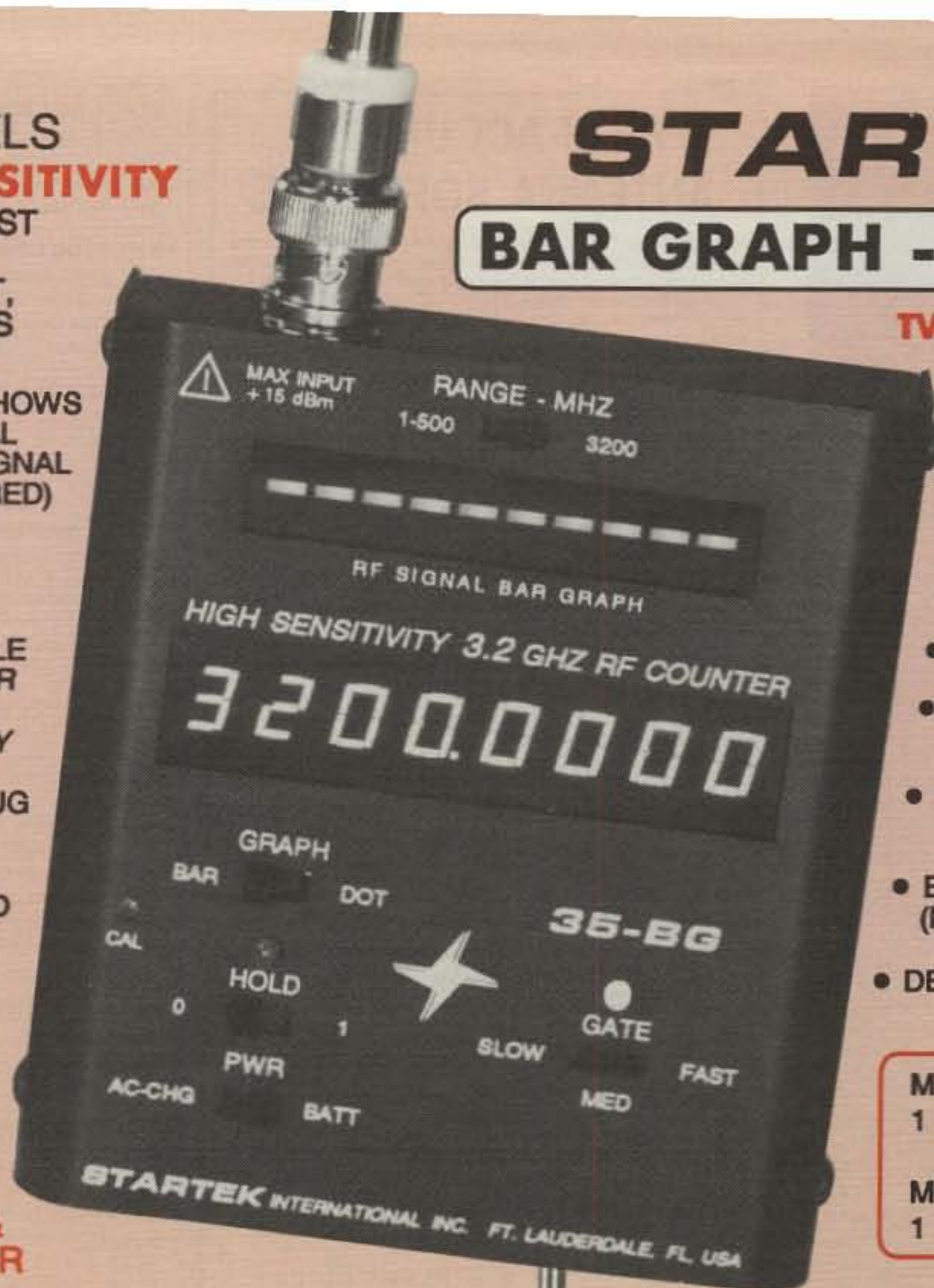
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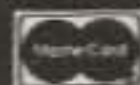
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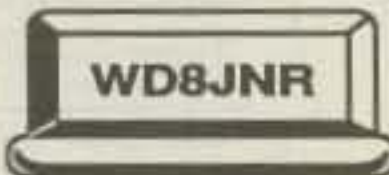
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08/24/91	19:04	177T		ZL9	Ke
08/24/91	23:53	US6VD		ZL9	Au
08/25/91	00:21	581R		ZP	Pa
08/25/91	00:35	ZC4AB	allen	ZS	So
08/26/91	23:57	457WP		ZS3	Na
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DATE/UTC Award Type Mode 160 88 48 3

08/25/91 00:36:35 DXCC [ZC] SSB

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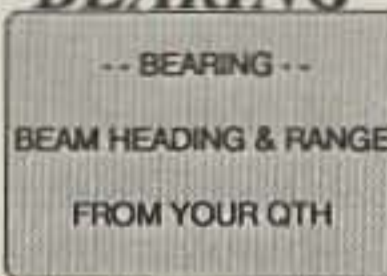
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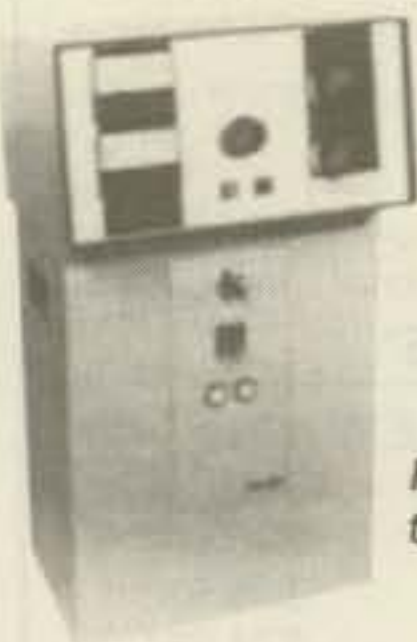
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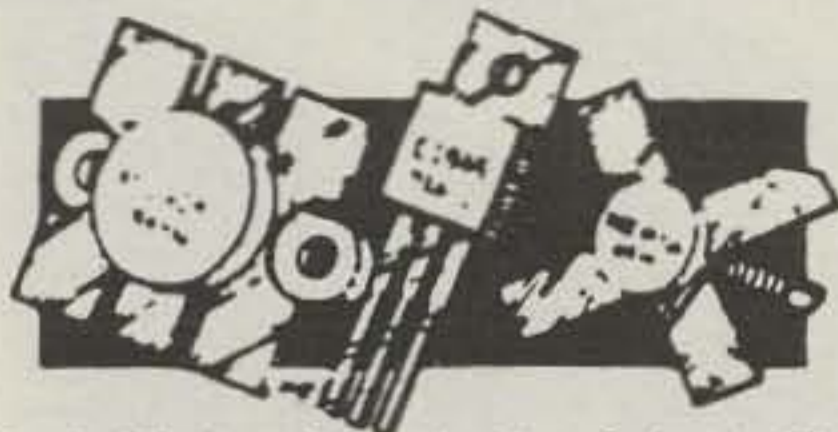
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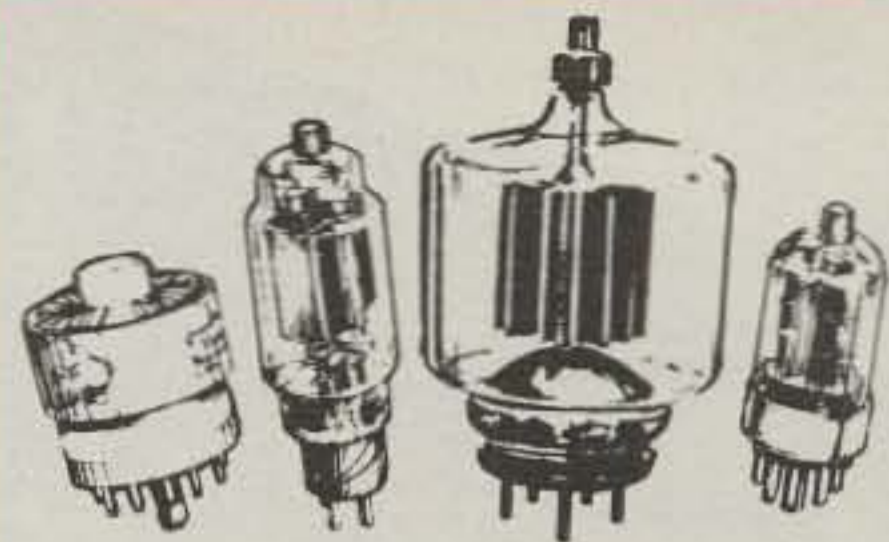
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6CL6	13.75	M20J	26.95
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6JH8	12.95	5894	49.80
6JS6C	18.95	6550A	16.95
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Kantronics D4-10

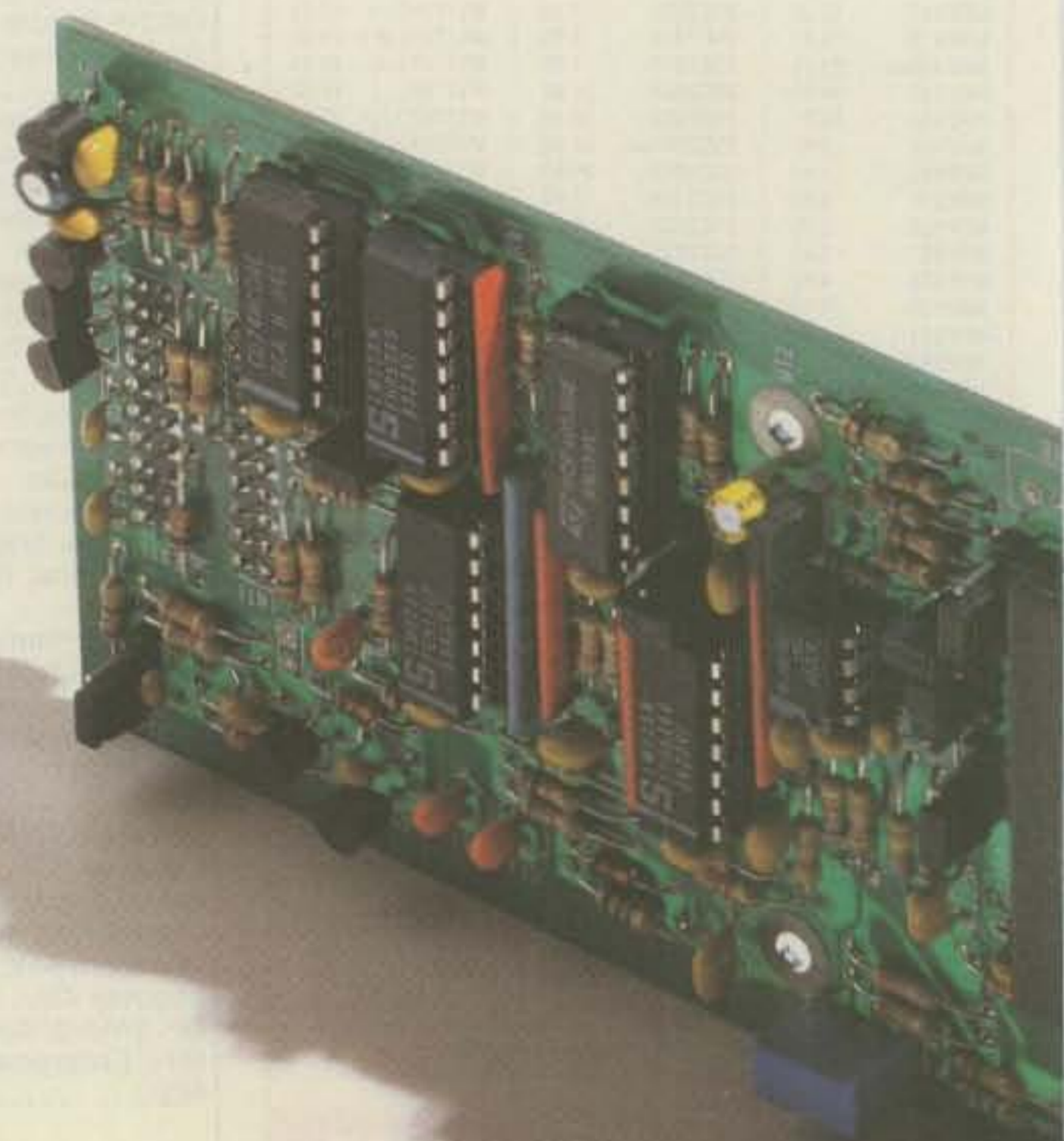
19,200 off the shelf

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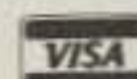


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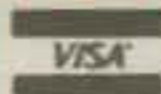
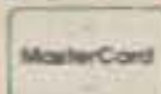
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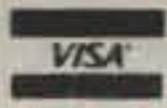
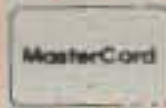
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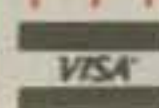
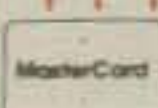
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All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 2SRA75

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