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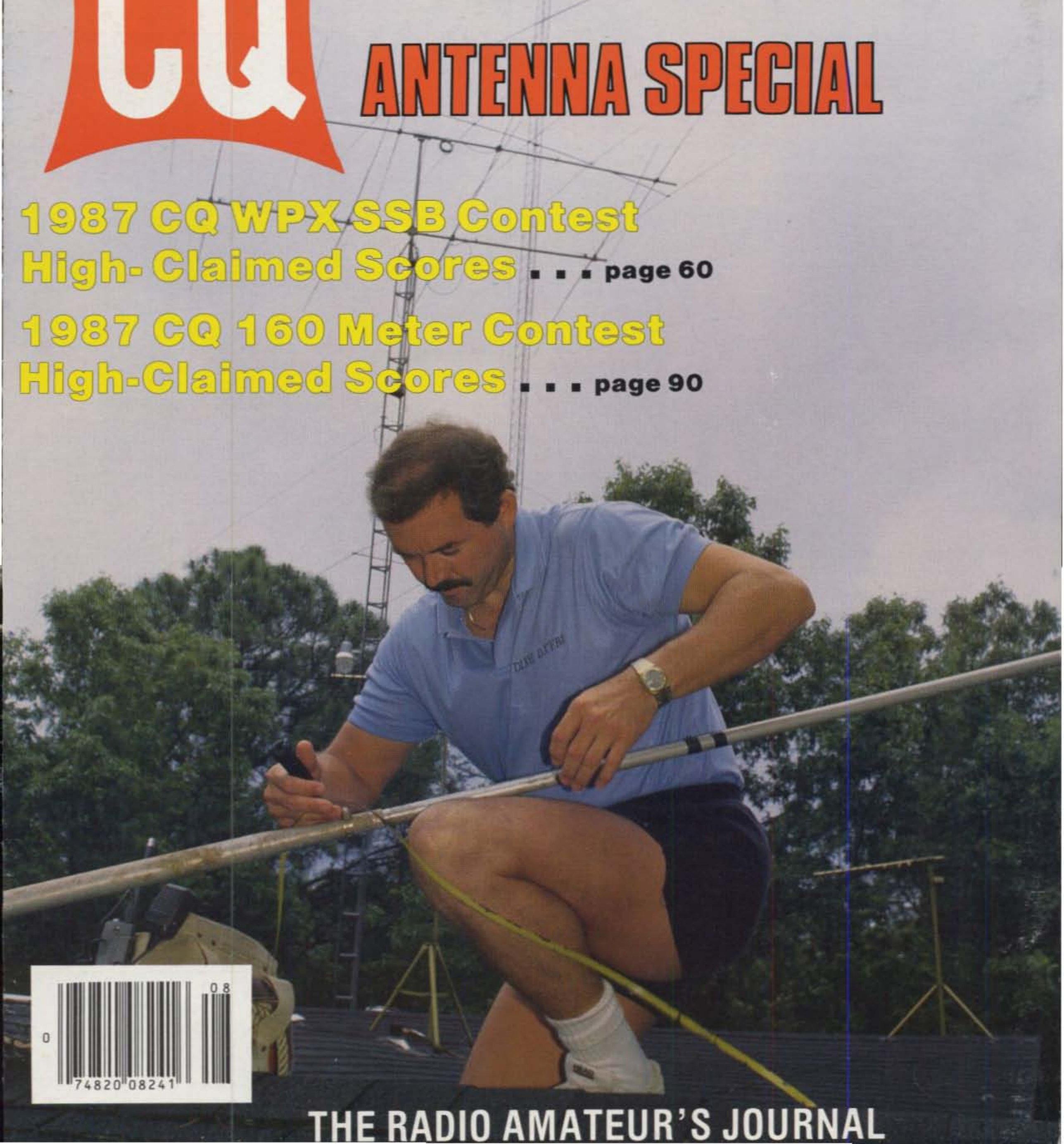

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THE RADIO AMATEUR'S JOURNAL

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#1 Rated HF

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TS-940S

The new TS-940S is a serious radio for the serious operator. Superb interference reduction circuits and high dynamic range receiver combine with superior transmitter design to give you no-nonsense, no compromise performance that gets your signals through! The exclusive multi-function LCD sub display graphically illustrates VBT, SSB slope, and other features.

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- **Graphic display of operating features.** Exclusive multi-function LCD sub-display panel shows CW VBT, SSB slope tuning, as well as frequency, time, and AT- 940 antenna tuner status.
- **Low distortion transmitter.** Kenwood's unique transmitter design delivers top "quality Kenwood" sound.
- **Keyboard entry frequency selection.** Operating frequencies may be directly entered into the TS-940S without using the VFO knob.
- **QRM-fighting features.** Remove "rotten QRM" with the SSB slope tuning, CW VBT, notch filter, AF tune, and CW pitch controls.
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Interface IF-232C/IF-10B

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Complete service manuals are available for all Kenwood transceivers and most accessories.
Specifications and prices are subject to change without notice or obligation.

More TS-940S information is available from authorized Kenwood dealers.

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220 MHz TM-321A Coming Soon!

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TM-221A/321A/421A

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The all-new TM-221A, TM-321A and TM-421A FM transceivers represent the "New Generation" in Amateur radio equipment. The superior Kenwood GaAs FET front end receiver; reliable and clean RF amplifier circuits, and new features all add up to an outstanding value for mobile FM stations! The optional RC-10 handset/control unit is an exciting new accessory that will increase your mobile operating enjoyment!

- **TM-221A provides 45 W, TM-321A, 25 W. The TM-421A is the first 35 W 70 cm mobile!** All three models have adjustable 5 W low power.
- **Selectable frequency steps** for quick and easy QSY.
- **TM-221A receives from 138-173.995 MHz. This includes the weather channels!** Transmit range is 144-148 MHz. Modifiable for MARS and CAP operation. (MARS or CAP permit required.) *(Specifications guaranteed for Amateur band use only.)*
- **TM-321A covers 220-224.995 MHz. The TM-421A covers 438-449.995 MHz.**
- **Built-in front panel selection of 38 CTCSS tones.** TSU-5 programmable decoder optional.
- **Simplified front panel controls**— makes operating a snap!
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- **Kenwood non-volatile operating system.** All functions remain intact even when lithium battery back-up fails. (Lithium cell memory back-up— est. life 5 yrs.)
- **Packet radio compatible!**
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- **Memory scan with memory channel lock-out.**
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- **New amber LCD display.**
- **Microphone test function on low power.**
- **High quality, top-mounted speaker.**
- **Rugged die-cast chassis and heat sink.**

RC-10 Remote Controller

For TM-221A/321A/421A. Optional telephone-style handset remote controller RC-10 is specially designed for mobile convenience and safety. All front panel controls (except DC power and RF output selection) are controllable from the RC-10. One RC-10 can be attached to two transceivers with the optional PG-4G cable. When both transceivers are connected to the RC-10, **cross band, full duplex repeater** operation is possible. (A control operator is needed for repeater operation.)

Optional Accessories:

• **RC-10** Multi-function handset remote controller • **PG-4G** Extra control cable, allows TM-221A/TM-421A full duplex operation • **PS-50/PS-430** DC power supplies • **TSU-5** Programmable CTCSS decoder • **SW-100A** Compact SWR/power/volt meter (1.8-150 MHz) • **SW-100B** Compact SWR/power/volt meter (140-450 MHz) • **SW-200A** SWR/power meter (1.8-150 MHz) • **SW-200B** SWR/power meter (140-450 MHz) • **SWT-1** Compact 2 m antenna tuner (200 W PEP) • **SWT-2** Compact 70 cm antenna tuner (200 W PEP) • **SP-40** Compact mobile speaker • **SP-50B** Mobile speaker • **PG-2N** Extra DC cable • **PG-3B** DC line noise filter • **MC-60A, MC-80, MC-85** Base station mics. • **MC-55** (8-pin) Mobile mic. with gooseneck and time-out timer • **MA-4000** Dual band antenna with duplexer (mount not supplied) • **MB-201** Extra mobile mount

Specifications and prices subject to change without notice or obligation.
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"Digital DX-terity!"

TS-430S

Digital DX-terity—that outstanding attribute built into every Kenwood TS-430S lets you QSY from band to band, frequency to frequency and mode to mode with the speed and ease that will help you earn that dominant DX position from the shack or from the mobile!

- **Covers all Amateur bands**
  160 through 10 meters, as well as the new 30, 17, and 12 meter WARC bands. High dynamic range, general coverage receiver tunes from 150 kHz to 30 MHz. Easily modified for HF MARS operation.
- **Superb interference reduction**
  Eliminate QRM with the IF shift and tuneable notch filter. A noise blanker supresses ignition noise. Squelch, RF attenuator, and RIT are also provided. Optional IF filters may be added for optimum interference reduction.
- **Reliable, all solid state design.**
  Solid state design permits input power of 250 watts PEP on SSB, 200 watts DC on CW, 120 watts on FM (optional), or 60 watts on AM. Final amplifier protection circuits and a cooling fan are built-in.
- **Memory channels.**
  Eight memory channels store frequency, mode and band data. Channel 8 may be programmed for split-frequency operation. A front panel switch allows each memory channel to operate as an independent VFO or as a fixed frequency. A lithium battery backs up stored information.
- **Programmable, multi-function scan.**
- **Speech processor built-in.**
- **Dual digital VFOs.**
- **VOX circuit, plus semi break-in with sidetone.**

Optional accessories:
• PS-430 compact AC power supply • SP-430 external speaker • MB-430 mobile mounting bracket • AT-130 compact antenna tuner covers 80-10 meters, incl. WARC bands • AT-250 automatic antenna tuner covers 160-10 meters, incl. WARC bands • TL-922A 2 kW PEP linear amplifier • FM-430 FM unit • YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters • YK-88SN (1.8 kHz) narrow SSB filter • YK-88A (6 kHz) AM filter • MC-42S UP/DOWN hand mic. • MC-60A/80/85 deluxe desk mics. • SW-2000/200A SWR/power meters • SW-100A SWR/power/ volt meter • PC-1A phone patch • HS-4, HS-5, HS-6, HS-7 headphones

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The Radio Amateur's Journal

ON THE COVER: Here's Steve McElroy, K4JPD, celebrating antenna weather by making a few adjustments. You can see in this shot Steve's 5 element 10 meter beam over a 4 element 15 meter beam plus his 2 element 80 meter Yagi. Photo by Larry Mulvehill, WB2ZPI.

AUGUST 1987 **VOL. 43, NO. 8**

FEATURES

DEPARTMENTS

Zero Bias

AN EDITORIAL

It's antenna time again. From simple wire antennas to the most elaborate multi-element arrays, the concept of antennas fascinates all of us. Some of us are only happy to theorize a perfectly designed antenna supported by page after page of complex formulas proving the last minim of RF reaches an exquisite angle in the ionosphere. Some of us spend thousands of dollars on the latest and best amateur transceivers available, only to "invest" or be willing to spend nine or ten dollars on an antenna system. Both extremes are disappointing in that nothing is that perfect nor that cheap. Most of us are looking for that happy medium, one which we can afford and one which will fit within the confines of our property. Antennas, like much in life, are a compromise.

However, within that compromise is a vast world of possibilities and opportunities for improvement. What you quickly find out is that there is always something better than what you are using at the moment, and what you are using is probably better than what some other folks are using. What it means is that here is an area in which you can still tinker, experiment, and learn, all without having to have hundreds of thousands of dollars worth of exotic test equipment. Let's face it: After a while the average amateur learns that almost anything, including the proverbial "wet noodle," will radiate a signal to some degree or another. What we'd like to strive for is a way of taking that term "some degree or another" and improving our odds of working out on a more consistent and efficient basis. So, with a mixture of time, effort, and, yes, some money, we can do just that.

While it's highly unlikely that we're in a position to design and build a very sophisticated transceiver from scratch, we can build some pretty elaborate antenna systems with relatively simple tools. We can also purchase various antenna components commercially and assemble a system that fits our needs, whether it's something on every single amateur band available or something special for the one or two bands on which we may like to spend time. Antennas are the unique necessity that we can design, work on, or build ourselves. There's a lot of satisfaction in that, and, of course, something to be able to brag about, too.

So while the weather is nice and before the winter contest season starts, think about improving your antenna. It's also a good time to check on any needed repairs from last winter's damage. Perhaps it's time to move up to a beam or a quad or perhaps add a wire antenna or two to see what's happening in another part of the world or on a different band. Perhaps it's also time to relegate the noodles, wet or dry, to some sauce and save them for dinner.

Travels With CQ

Well, it's been a busy month for *CQ*, our travel agent, and the dry cleaners. We have been on the move. We did the Rochester Hamfest in the middle of May. This has been a two-day show for the last few years, but it conflicts with the local LIMARC fleamarket here on Long Island for the second day. The typical Rochester Hamfest weather (rain, what else) held off this year, and it was great weather on Saturday. This year they also included an indoor area for their fleamarket, making it one of the bigger ones around. There was plenty of good stuff at this one, and Arnie and I brought home our share. The commercial exhibitors are well taken care of here, with a luncheon package brought to the booth and cold drinks available periodically during the day. It's a thoughtful touch, and we appreciate it.

We had a chance to fly on Pan-Am's Dehavilland DHC-7 up and back from Rochester. It's one of a commuter series of aircraft that seats about 20 or so people. It's small but has four engines and seems to need about 15 feet of runway for a smooth take-off and landing. We left Rochester Saturday evening in order to be at the LIMARC fleamarket the next day. This is the big outdoor one, and as usual it was packed with "good stuff" and a lot of friends not seen since the last one. You can always tell the dedicated hams at these things by the basement pallor. The typical LIMARC weather (rain or snow) held off, and it was a beautiful day.

The following weekend we had a chance to stay home for a change and get set for a new one on the *CQ* travel schedule. A week later we found out where all the hamfest rain had gone. Evidently it hangs out in Oregon. We went out to Seaside, Oregon for SEA-PAC. Seaside is about a two hour drive from Portland and is a resort area on the coast. On the way you get to see some of the most magnificent scenery imaginable—the forests. You also get to experience what amounts to continual rain. Everyone seems used to it, and it really doesn't stop or slow down anything (and it makes the trees grow). While the crowds are not quite as big as at east-coast events, the enthusiasm and energy spent on this event is just as great as for the big ones. The fleamarket had some terrific bargains, and the folks came with serious intent to buy and sell (and they did). Next year the ARRL National will be in Portland, so I'll come prepared with a raincoat.

The next weekend found us in sunny Dallas. This one inches up each year with more and more people attending. The new facilities as of last year make this event more attractive to Texans in general and to locals in particular. The only hassle in this event is the food concessions, not in the quality, but in the availability. The food is pretty good, but the help is rather poor, creating needless long lines. I've been told that they already have plans for an improved system for next year. Long lines aside, the whole place was wall-to-wall people on Saturday with everyone examining, poking, and knob-twisting the latest in amateur gear. The large fleamarket held tons of "good stuff," and bargains were there to be had.

A few days later Dick and I were on our way to Los Angeles and the open-house party Kenwood had to celebrate their new building. The new facility also consolidates all of Kenwood's divisions (not just amateur) into one building. We had a chance to tour the building, see the company's amateur radio club station, and check out the repair department. It was a whirlwind day, starting out with an early morning flight from New York and ending with a big party in the evening. The next morning we flew home not jet-lagged, but jet-dragged.

We have a few weeks at home (as of this writing) until the Atlanta Hamfest comes up. It's hard to stress the fact that if you're not getting out of the shack to attend some of these shows, you're truly missing some great amateur radio experiences. You're missing the chance to see and fiddle with the absolute latest in amateur gear, to listen and learn from some of the most accomplished amateurs around, and to actually meet some of the folks behind the callsigns. Of course, picking up a bargain or two at the fleamarket can't hurt, or using the fleamarket to part with a treasure or two you've been storing can't hurt either. It all comes under the heading of fun, and it's why most of us got into amateur radio in the first place.

73, Alan, K2EEK

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Your home computer (or even a simple terminal) can be used for radio data communication in six different modes. Any RS-232 compatible computer or terminal can be connected directly to the PK-232, which interfaces with your transceiver. The only program needed is a simple terminal program, like those used with telephone modems, allowing the computer to be used as a data terminal. All signal processing, protocol, and decoding software is in ROM in the PK-232.

The PK-232 also includes a no compromise VHF/HF/CW modem with an eight pole bandpass filter, four pole discriminator, and 5 pole post detection low pass filter. Experienced HF Packeteers are reporting the PK-232 to have the best Packet modem available.

Operation of the PK-232 is a breeze, with twenty-one front panel indicators for constant status and mode indication. The 240 page manual includes a "quick start" section for easy connection and complete documentation including schematics. Two identical back panel radio ports mean either your VHF or HF radio can be selected with a front panel switch. Other back panel connections include external modem disconnect, FSK and Scope Outputs, CW keying jacks, and RS-232 terminal interface.

The RS-232 connector is also used for attaching any Epson graphics compatible parallel printer for printing Weather Fax. Weather maps and satellite photos, like the one in this ad, can be printed in your shack.

Contact your local AEA dealer today for more information about the one unit that gives you six modes for one low price, the PK-232.

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Announcing

• **BVARC 20th Anniversary Award Certificate** - Radio amateurs outside the Beaver Valley ARC, VE7BWI, must contact two members of the BVARC on HF or VHF via satellite in order to acquire their 20th Anniversary Award Certificate (8½" × 11" parchment paper). The time limit to earn a certificate is July 1, 1987 to July 1, 1988. Proof of two BVARC contacts and one dollar ($1.00) to partly cover the costs must be sent to: BVARC, R.W. Briggeman, VE7ETR, Secretary, 3659 Cottonwood Drive, Trail, B.C. Canada V1R 2S4.

• **Twinsburg, Ohio** - The Cuyahoga ARS will operate K8ZFR and member stations from the annual Twins Day Celebration, Aug. 1 from 1700–0100Z and Aug. 2 from 1700–2000Z. Frequencies, ±20 kHz, are phone 3.870, 7.245, 14.245, 21.320, 28.440; CW 3.600, 7.050, 14.050, 21.050; and Novice portions of 15, 40, and 80 meters. For special QSL, send QSL and SASE to CARS Twins Day, P.O. Box 357, Twinsburg, OH 44087.

• **Indianapolis, Indiana** - W9PAX will be operational during the Tenth Pan-American Games being held in Indianapolis, Indiana, Aug. 7–23. The station will be operational from 0001 UTC Aug. 1 to 2359 UTC Aug. 23. W9PAX plans to operate 30 kHz up from the bottom of each band, 1.8 through 28 MHz, for CW. For SSB look around 1.850, 3.850, 7.250, 14.250, 21.350, and 28.550. A colorful QSL card is available for all contacts. Certificates will be given for working W9PAX on three different bands, or working W9PAX once and one station each from any three of the participating Pan-American Nations, or working W9PAX once and three Indiana stations. Send QSL card and SASE to W9PAX, P.O. Box 18495, Indianapolis, IN 46218-0495. For certificate send list of contacts, call, date, and time to the same address.

• **Fishers Island Sound, New York** - For only the fourth time in history, HF amateur radio is going to Flat Hammock Island in Long Island Sound. Tri-City Amateur ARC will mount its fourth annual expedition on Aug. 2 and will operate from about 1300–2000Z. Look for KA1BB in the lower 20 kHz of the General class phone and CW 40, 20, and 15 meter bands and (hopefully) the center of the 40 meter Novice band. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

• **Laona, Wisconsin** - The Hodag Award Chapter will operate W9IAL and NN9Z to commemorate the 50th annual Laona Community Soup Festival on Aug. 2 1300Z to Aug. 3 0100. Suggested frequencies are Phone 7.280, 14.280 and Novice phone 28.350. For certificate send QSL and SASE to W9IAL, 322 N. Stevens St., Rhinelander, WI 54501.

• **Canton, Ohio** - The Canton ARC will operate Special Event station W8AL to celebrate the Pro-Football Hall of Fame Greatest Weekend on Aug. 3–7 from 2200–0200 UTC and on Aug. 8–9 from 1700–2300 UTC. Frequencies will be SSB 7.270, 14.270; CW 7.060, 14.060; RTTY and Novice operation possible also. For an unfolded certificate send your QSL and a 9" × 12" SASE with 2 units of first-class postage. For a QSL or folded certificate, send your QSL and a #10 (business size) SASE to Randy Phelps, KD8JN, 1226 Delverne Ave. SW, Canton, OH 44710.

• **Fleurimont, Quebec, Canada** - To celebrate this city's 50th anniversary, VE2FMA will operate on Aug. 9 from 1400–0200 UTC. Operation will be on 14,155 and 3,765 MHz ± QRM. Certificate will be done on confirmation of your contact. Limit date for expedition is before September 9. Welcome is extended to SWLs. Certificate info via VE2FQX, 1866 Ch. Galvin, Fleurimont, Quebec, Canada J1G 3G1.

• **Akron, Ohio** - The Cuyahoga Falls ARC will operate Special Event station W8VPV at the 50th running of the All-American Soap Box Derby Aug. 10–15. Times: Mon–Fri. 2200–0300Z, Sat. 1100–2000Z. Frequencies: 3860, 7230, 14240, 28420. For certificate send large SASE to W8VPV, P.O. Box 614, Cuyahoga Falls, OH 44222.

(continued on page 54)

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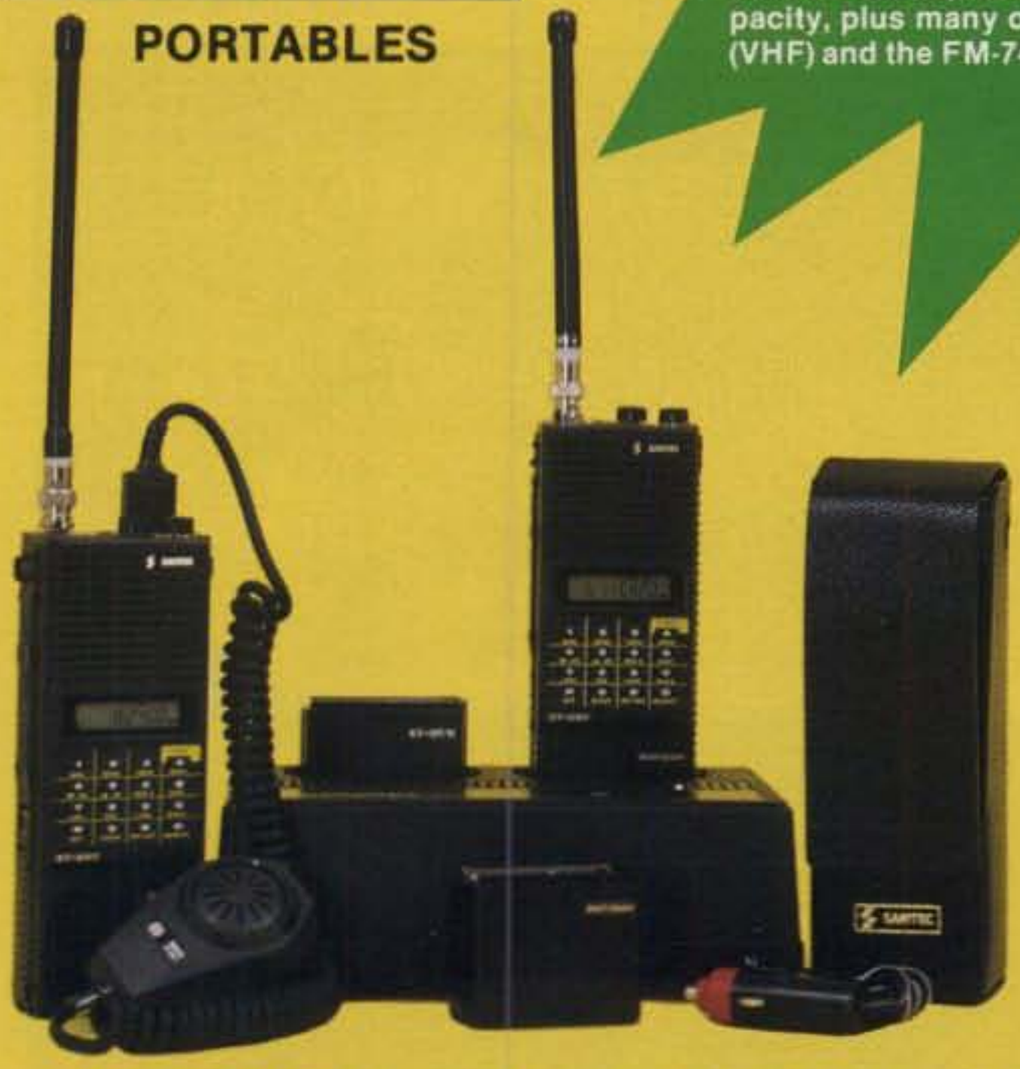

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Our Readers Say:

The Classic Keys

Editor, *CQ*:

This letter is in regard to Dave Ingram's "Return To The Classic Keys" in the June issue of *CQ*. Dave should be complimented on the excellent photos and his selection of different types of keys. I do take exception to the description of the old Morse sounders. There are several discrepancies which would give the wrong impression of Morse code. My amateur career began in 1934, and during my working days I was exposed many times to the Morse sounder which we used for word pictures of baseball games and at times for news. At a BC transmitter where I worked we had a sounder which was linked with New York offices of a major radio network to give us program corrections. Also during my working days I acquired a commercial telegraph ticket.

In order to be as succinct as possible I shall quote just those differences from his text and comment only on those. In the caption under fig. 13 of the W.U. Sounder he said, ". . . Every letter consisted of only dits . . ." This sounder makes a click on the down motion, and the spring-loaded armature returns it to the up position with a clack sound. Thus, a dot would consist of a click-clack. The operator only listened to the space of silence in between these sounds. The Morse code is almost the same as the International code, or continental code we use today except for a few letters like: C which is composed of two dots and a single dot with a space between •• •. The letter R is • ••and O is • • and Y is •• •• and Z is ••• •. There are three lengths of dashes for letters L, T, and zero. The T is a normal dash, the L is a little longer, and numeral 0 is three dashes long. All the numerals are different except 4, which is the same as international. All the punctuation marks are different. These can be found in any issue of the *Callbook* in the front.

Many of us use this code as a tone sans the sounder. We use it on the air the same as the more familiar international code. In fig. 14 this practice set was called a KOB meaning "key on board." These were sold by companies like Montgomery Ward and Sears Roebuck for those who wished to learn the old code. The above will refute his statement: ". . . the all dot Continental Morse (another name for international) was used rather than our radio code. Only the U.S. and Canada used this code. All the other countries used International.

Joe Rice, W4RHZ
Covington, KY

The Importance of Upgrading

Editor, *CQ*:

I just got your subscription notice and it is sure great to hear of our new privileges. It's the finest thing that has happened since I was first licensed in May of 1976.

As to your magazine, it's the finest publication today that I personally have ever read. When I receive mine, I read it from cover to cover and certainly will *never* be without it. Even though I am good until March of 1988, please find enclosed a personal check for another 3 years. I don't wish to miss a single issue.

Even though I am not active on the bands and *do not receive* help from *anyone*, I still will never lose interest. My heart will always be there.

I feel my fellow hams have forgotten what it is like to be a Novice with no help and should take a moment and keep in touch to encourage us to upgrade. They should make this a very important decision. This is how we lose members, and this is a shame.

Well, keep up the good work, and I am looking forward to my next issue.

Ralph E. Myra, Jr., KA1IVL
Litchfield, ME

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Hi/Lo plate voltage switch.
Metering: Full time plate current meter. Multi-meter, selectable for plate voltage, grid current, power out or reflected power.
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Peak power indicator: Ultra quick 10 element LED bar-graph display.
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Frequency coverage: 160, 80, 40, 20 and 15 meter bands plus 18 and 24 MHz standard, 10 meter kit supplied upon proof of authority to transmit.
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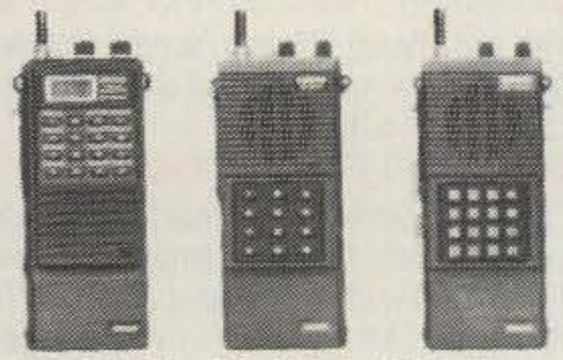

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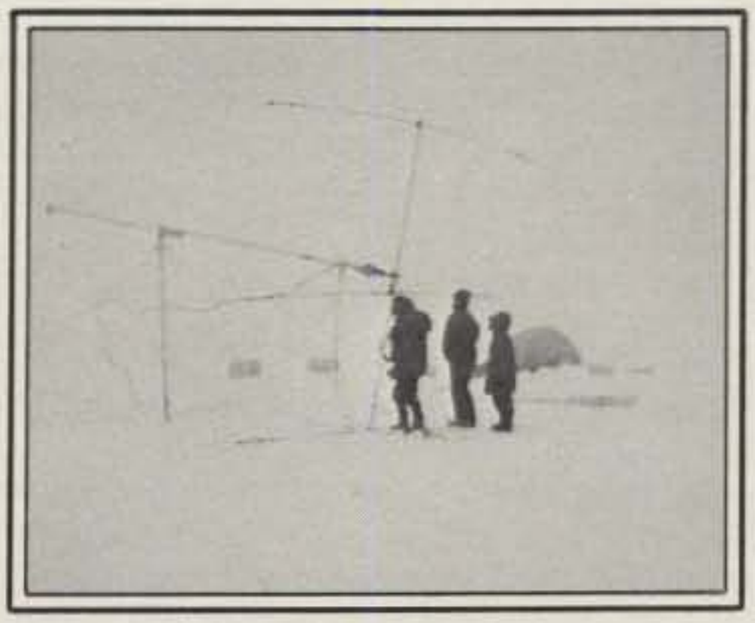
There's still a lot of excitement in amateur radio as the DXpedition to Peter I Island proved earlier this year. LA1EE tells us what it was like for the LA-DX-Group to put this rare spot on the air.

The 1987 DXpedition To Peter I Island 3Y1EE and 3Y2GV

BY EINAR ENDERUD*, LA1EE

Onboard the M/V Aurora. During the twelve-day trip to Peter I, the gear was thoroughly tested. Kaare Pedersen, LA2GV, is shown on the left, and Einar Enderud, LA1EE, is seen on the right.



The VS 33 is ready to go up roughly one day after the landing. Two surveyors from the Norwegian Polar Institute are assisting and inspecting. They seemed quite impressed at the amount of antennas and equipment being installed. The TH3 jr and the Butternut were already up at Kaare's location approximately 100 meters further to the east.

There's a little speck of land—an island, to be exact—that sticks out in the Bellinghausen Sea of Antarctica. This island became very important to amateur radio operators in early 1987 as the Peter I Island DXpedition. Peter I Island belongs to Norway, and in 1986 the Norwegian Polar Institute was in the midst of preparations for an expedition to the island. The institute was also prepared to take amateur radio operators to the island, providing they paid their own way.

The LA-DX-Group started rounding up a team and soliciting funds for this momentous trip. A group of 10 Norwegian DXers provided guarantees for initial funding and got the ball rolling. Jim, VK9NS, approached Kan, JA1BK, and Kan generously came through for the group. A big and very important moment came when we asked the Northern California DX Foundation (NCDXF) for a contribution of $30,000. This money was needed before we could actually make the final decision to go or not go. The additional monies would be needed just to make possible our passage with the Norwegian Polar Institute. The NCDXF answered the call quickly, and thanks to them we were able to start negotiating with the NPI instead of just exchanging ideas and going over "what if" situations. Other groups came through and committed funds quickly in order to make this amateur radio dream come true. Mike, JH1KRC, facilitated a donation from the DX Family Foundation, The European DX Foundation, The Danish DX Group (with the help of OZ1LO), The Heard Island DX

*Gregers Gramsvn 20, N-0382, Oslo 3 Norway

This must be one of the first pictures taken of Peter I Island showing the mountaintop in the clear. The height was estimated by the Norwegians in 1929 to be about 1200 meters and by the Americans in 1960 to be about 1750 meters. This time it was measured by barometric instruments in the helicopter to be 1695 meters high. The helicopter landed on the very top.

Kaare has had some rest and is working full speed ahead on SSB. He had to use the hand mic because of RFI into the headset microphone. Both headsets had this problem, especially on 20 meters. The RFI problems were probably caused by the fact that there was hardly any station ground, since the station was located on top of a glacier, perhaps more than 50 meters high. The ice is probably a good insulator, so the generators and the radio equipment were part of the antenna systems, with RF getting in everywhere.

Association (VK9NS), the LA-DX-Group, and the OH-DX-Boys (OH2BH). All came through with offers of financial help.

At this point timing was critical. We only had a few short weeks to come up with both plans and money. As with any adventure, luck plays an important part, and this DXpedition was no exception. The element of speed was introduced by the government's decision to lease the *M/V Aurora*, which is owned by Monica Kristensens. It seems that at the same time the NPI and we were planning this expedition, Ms Kristensens was planning a private expedition of her own to try and become the first woman to reach the South Pole by skiis.

Ms Kristensens approached the government for financial support. The government, by leasing the *M/V Aurora*, now in a sense could underwrite three separate expeditions for essentially the same money. The NCDXF put up a guaranteed $10,000 for the trip with the proviso that it would pay that amount even if we couldn't get ashore to make any contacts. They would, however, pay the full $30,000 if we did make it ashore and make over the target figure of 15,000 QSOs, a goal set by us. Our contract with NPI had a similar proviso on payment which we felt was extremely fair.

The departure point for this expedition was to be New Zealand. The time initially was set for the end of January 1987. Even as we were signing the contract with NPI, the departure date was being moved up to January 15 and later to January 10. It is easy to understand the urgency we felt in

Einar starting the Honda EB2000X. It worked perfectly and only stopped when it ran out of fuel. We had expected icing problems, since temperatures were varying around the freezing point, but no such problems occurred.

Another shot of 3Y1EE in the shack. The kitchen was on the table to the left of the picture.

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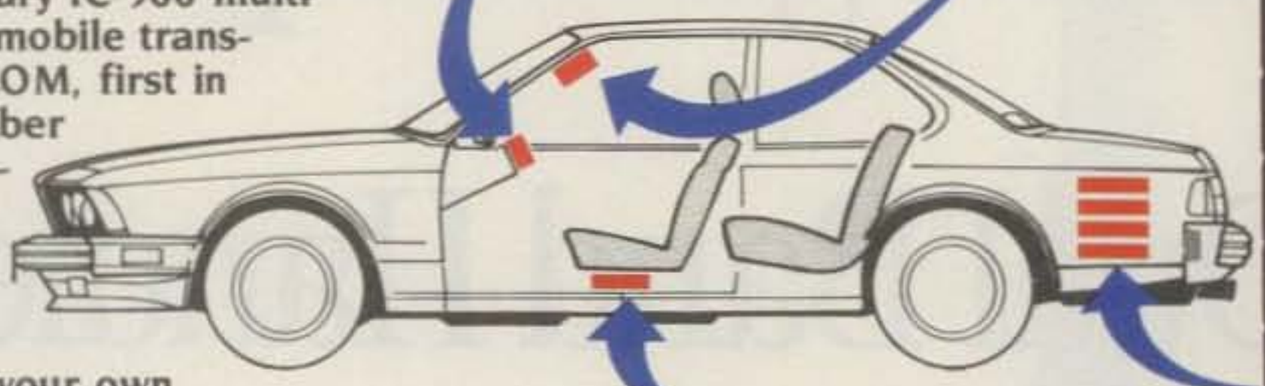

Band Units/Interface Unit B

Interface Unit A

ICOM IC-900 FIBER OPTIC FM MOBILE

ICOM introduces the revolutionary IC-900 multi-band FM mobile transceiver. ICOM, first in utilizing fiber optic technology in amateur radio, enables you to create your own mobile communications system. Six band combinations...10M FM, 6M, 2M, 220MHz, 440MHz, and 1.2GHz. It's the most advanced, versatile, compact, and easy-to-use mobile available.

Features Galore. The IC-900 is an operator's dream...Listen on two bands simultaneously or transmit on one band and receive on a different band when using a second speaker (**true full duplex crossband operation**), 10 memories per band, independent PL tones and offset into each memory, memory and programmable band scan, and all subaudible tones in actual Hz readout.

The IC-900 includes an ultra compact remote controller, an Interface A unit, Interface B unit, SP-8 speaker, HM-14 up/down DTMF mic, **fiber optic** and controller cables.

Remote Controller. Measuring only 2 inches high by 5.7 inches wide by 1 inch deep, the remote controller can be installed on your car's dash or sun visor with the supplied velcro. And, if you want, take the controller with you when you leave your car. The controller features a super large, highly visible LCD.

Interface Unit A is installed in a location near the driver's seat.

Interface Unit B controls the six band units and can be installed in your car's trunk. A **fiber optic** cable runs from Interface A to Interface B, which transports an abundance of information through a 3/16" cable and eliminates RF feedback.

Band Units are "stacked" onto the Interface B Unit via the supplied mounting bracket. Optional band units available are:

Band Unit	Power Output	Frequency
UX-19A	10W/1W	28-30MHz
UX-29A	25W/5W	138-174MHz Rx; 140.1-150MHz Tx
UX-29H	45W/5W	138-174MHz Rx; 140.1-150MHz Tx
UX-39A	25W/5W	216-236MHz Rx; 220-225MHz Tx
UX-49A	25W/5W	440-450MHz
UX-59A	10W/1W	50-54MHz
UX-129A	10W/1W	1240-1300MHz

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Kaare is leaving the sleeping tent after a deserved rest to return to his 20 meter SSB pile-up. This tent was located about midway between the two operating tents.

securing funding and readying equipment for this trip.

The next miracle came thanks to Kan, JA1BK, on behalf of several Japanese companies; to Bob, W6RJ, on behalf of his own company, Ham Radio Outlet; and to ICOM America for providing transceivers, amplifers, antenna tuners, and a most needed generator. I don't know how they managed to get all of this material to Christchurch in time, but they did. Other gear turned up equally as a miracle in perfect timing, antennas, and rotors from K2ON and an LA-1000A amplifier courtesy of INDEXA. INDEXA came through

Call Area	No. of QSOs
1	591
2	928
3	492
4	1820
5	999
6	1526
7	544
8	723
9	854
0	542
Total	9019

Table I– The total breakdown of US QSOs from 3Y1EE and 3Y2GV by US call area.

Kaare is trying to light the primus to melt snow quickly for his soup.

Kaare together with the helicopter pilot, Lee Cranleigh, from Air New-Zealand and the expedition leader Knut Svendsen from the Norwegian Polar Institute.

The IC lines performed perfectly. We did not get any of the problems we had expected when running a complicated transceiver, amplifier, and antenna tuner with lots of sensitive control circuitry from a rough generator main. Both lines worked without any interruptions through the whole operating period. When we slept the power was turned off, and the equipment cooled off to nearly the freezing point. A few seconds after switching on again after many hours we were on the air with everything in order.

at a very critical point in the planning, and we are extremely grateful to that organization and to Murphy Ratteree, W4WMQ. This was a super international effort in the very best tradition of amateur radio.

We left on time and made amateur radio history. The pictures and totals give you some idea of the scope of operation.

This article was written at the end of March, and the final counts haven't been tabulated. We do know that the number of QSOs is between 16,000 and 17,000, and so we far exceeded our goals. The first contact was with K3II on 20 meter CW at 1154Z on January 23, 1987. Actually, it took three attempts at calling CQ to make this contact. I thought that no one could hear us, but it turned out that I was still using LA1EE/MM instead of 3Y1EE—HI. I guess I was very tired after setting up the camp and station and fell into using my regular call.

There were a great number of factors working in favor of the DXpedition—a truly professional ship and helicopter crew, the NPI team, good weather conditions, and incredibly strong signals from the US. In fact, the US signals covered almost everyone else on 15 through 40 meters. Can you imagine 10 to 20 dB over S9 signals on 40 meter CW for hours at a time over that long a distance?

The project group consisted of LA1EE, LA6VM (his XYL and harmonics helped with incoming cards), LA5UF, LA2GV, LA8KM, LA7SI, LA4LN, LA3XI, LA8CJ, and ZL3GQ.

Thank you each and every one who helped with this DXpedition. We appreciated the encouraging comments even in the pileups and shared the general excitement. Everyone seemed to be enjoying this DXpedition. Kaare and I were happy to have had the opportunity of putting Peter I on the air and making the trip, but of course we felt a little sad at not being able to work everyone by the time we were compelled to leave. It was a great experience.

3Y2GV is working full speed listening 14200 to 250. At other times he would listen at fixed frequencies spaced 20 kHz.

Obviously, we still have a lot of "fan mail" to catch up on, and we hope to have caught up on most of it by the time you read this. Please bear with us. The QSL cards were printed, and cards to the US will be sent bulk and distributed stateside by W4WMQ of INDEXA to save postage. The LA-DX-Group was filling out the cards as of the end of March.

We would also like to extend our thanks to Eva, PY2PE, and Peter, ZL3GQ, plus his XYL, Marie, for their company and hospitality. Thanks also to the LA-DX-Group project team and other crew, plus thanks to Kaare's and my employers and colleagues who endured our absence for the sake of amateur radio. CQ

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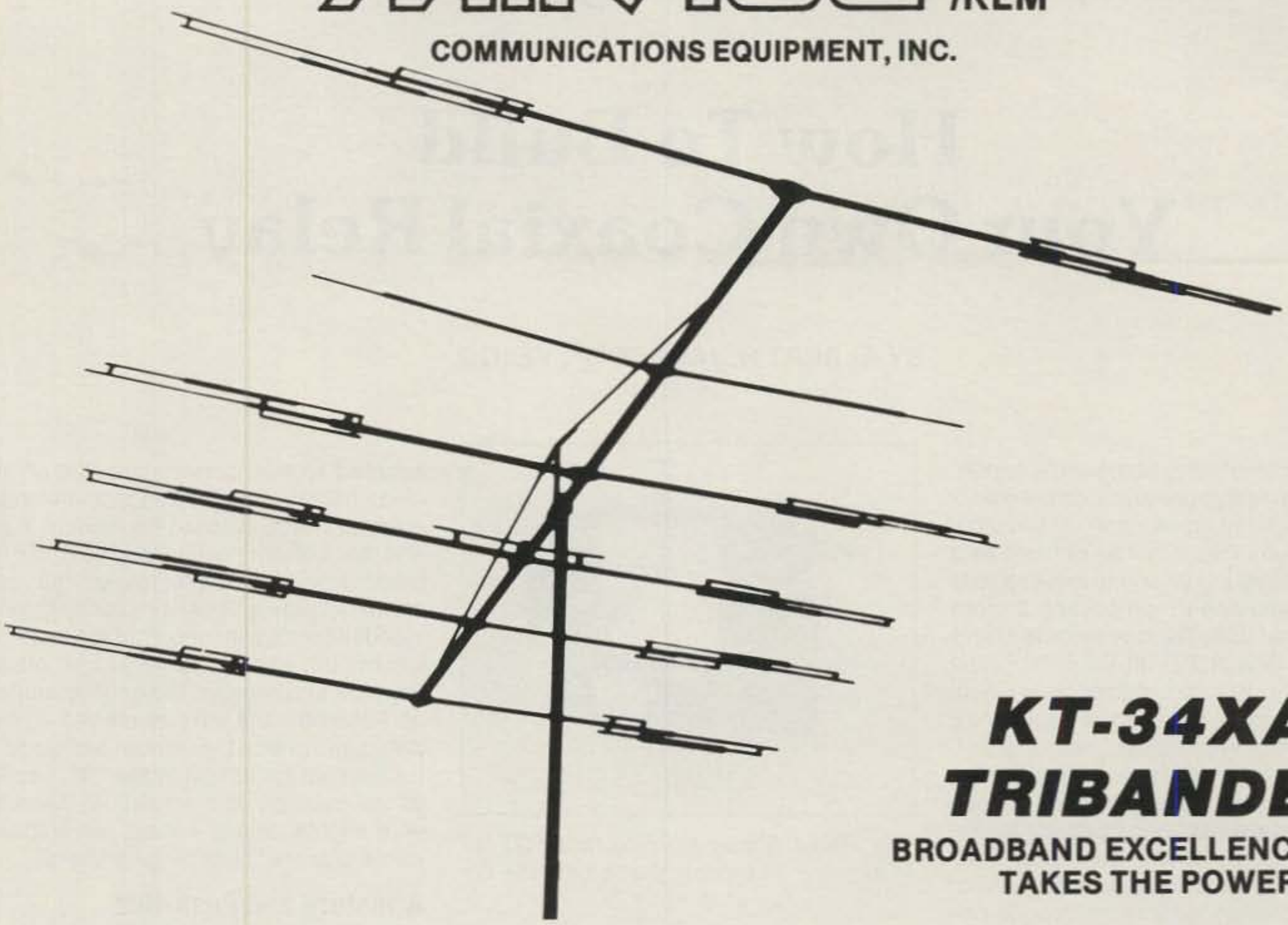

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KLM's KT-34XA TRIBANDER is the 2nd generation of a unique new series of antennas designed to provide superior **broadband** coverage on 20, 15, and 10 meters. The combination of lossless linear loading and hi-Q air capacitors enables the KT-34XA to outperform **all** commercial available tribanders and meet or exceed the performance of a conventional stacked monoband system. The lower weight and windload of a single antenna mean reduced tower and rotator requirements. Thus, overall system costs can be kept to a minimum while enjoying the best of monobander-type performance.

KLM's field proven KT-34A is the heart of the "XA" model. The boom length of the "XA", however, has been doubled, and one tri-resonant and one full size 10 meter element have been added. These changes increase the gain to **11-11.3 dBd** on 10M, **9-9.5 dBd** on 15M, and **8.5-9 dBd** on 20M. Two driven elements are used to make the KT-34XA unusually broadbanded (a concept applied to many KLM antennas). Gain is virtually flat across each band except for 10 meters which has been optimized for the DX'er, 28-29 MHz. The chart shows the remarkable performance qualities of the KT-34XA.

The KT-34XA's design represents the first major advancement in tribander technology in over 20 years! The conventional traps, coils, and capacitors have been discarded in favor of integral linear loading and hi-Q air capacitors, all composed of aluminum tubing. These give the KT-34XA a conservative power handling capability of 4 KW PEP and an unusually high level of operating **efficiency**. Linear loading also makes full ¼-wave elements possible on 15 and 10 meters, and brings 20 meters much closer to the desirable ¼-wave than any conventional tribander.

BANDWIDTHS:	14.0-14.350 MHz 21.0-21.50 MHz 28-29 MHz	**GAIN:**	8.5-9dB 9-9.5dB 11-11.3dB
VSWR:	1.5:1	**BOOM LENGTH:**	32 ft. × 3″ O.D.
FB/FS:	20dB/40dB	**TURN RADIUS:**	21.5 ft.
FEED IMP.:	50 ohms w/balun	**WINDLOAD:**	9 sq. ft.
BALUN:	3-60-4:1 5KW PEP	**WT. (LBS.):**	75 lbs.
ELEMENT LENGTH:	24 ft.	**MAST:**	2″ O.D. (standard)

Mechanically, the KT-34XA has been built to survive the toughest weather conditions. All aluminum, including the boom, is strong 6063-T832 alloy. All electrical hardware is stainless steel. Virtually indestructible "Lexan" insulators, just like those on KLM's 40 meter "Big Sticker," are used for mounting the elements and insulating them from the boom. KLM's 3-60 MHz 4:1 balun is supplied for direct connection to any 50 ohm feedline.

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Once again VE3QQ has come through with a project that's bound to tempt the builder lurking in all of us.

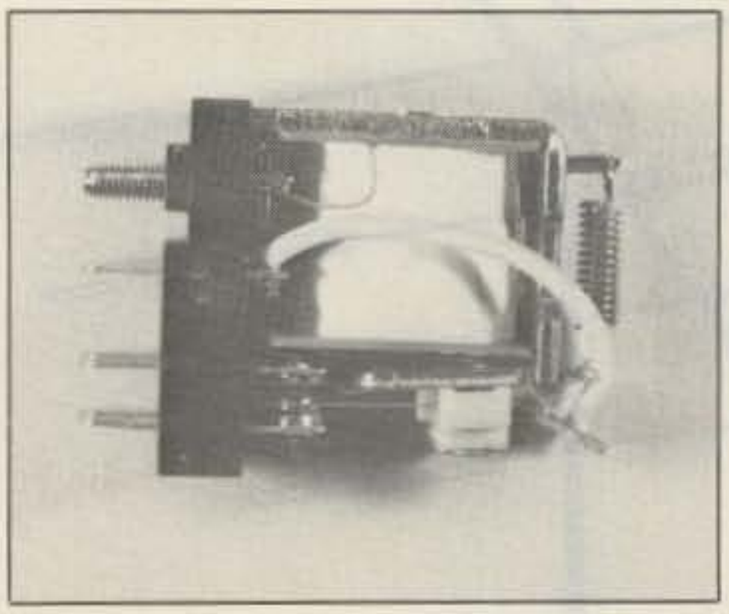
How To Build Your Own Coaxial Relay

BY ALBERT H. JACKSON*, VE3QQ

As an alternative to some of the expensive coaxial relays presently on the market, why not save some cash by developing your own? This is not as difficult as it may seem if you're willing to invest a little time and patience in remodeling a more conventional unit. The one selected here is a Radio Shack 12 volt DC DPDT type (#275-8218), but depending on your ingenuity, the technique can be applied to a number of common relays, including surplus types. Just be certain your choice contains leaf springs and contacts of sufficient number, size, and flexibility for the job at hand. Any double-pole relay electro-magnet should have enough pull for the new version, assuming proper coil voltage, if armature tension and spacing are correctly adjusted.

With any magnet, the shorter the open space the greater the attraction, but no DC relay armature should ever touch the pole piece unless there is a small brass or other nonmagnetic spacer between the two. A gap of at least a few thousandths of an inch must be kept in the iron-to-iron circuit to prevent eventual relay lock-up from residual magnetism. In contrast, AC relays have no residual problem, and good armature/pole contact helps to prevent line-frequency chatter.

In this homebrew model, "plumber's delight" construction replaces the usual 1 inch square machined aluminum bar with a short length of ½ inch copper pipe and standard "T" and coupling fittings. Bent aluminum brackets support the relay coil and the device itself on completion. The external assembly screws present a practical and not unattractive approach, and the copper can be lacquered or plated as you prefer. Except for the 8218's 5 amp 115 volt contacts, the finished product compares well with a larger contact, heavier duty, commercial relay. Both gave identically low SWR indications when checked in 40 and 2 meter feed lines.



The Radio Shack #275-8218 DPDT 12 VDC relay. This forms the basis of the coaxial relay.

Movable Contact Recycling

The photos show two slightly different basic relays purchased under the same Radio Shack part number, but with a minor coil-mounting change either can be adapted to this conversion. Pull off the clear plastic case, disengage the relay armature, and discard its flexible leads and rear coil spring. Drill and push out the blade retaining rivets, make the cuts shown in fig. 1, and lay blade #2 on a wooden block with one contact in a shallow-drilled, same-size hole. File off the top side and remove the contact material. Assemble the various pieces as indicated and check the remounted blade #1 for contact centering in the "T" section of the case on its completion. Bend the wire slightly and/or reheat the soldered joints to correct any misalignment.

Armature and Push-Rod

Extend the relay armature with a small copper strap to accommodate a push-rod actuator for the new center arm as detailed in fig. 2. Use care to keep solder out of the armature hinge holes and push-rod adjusting nut; pre-tinning in the appropriate spots can help.

The push-rod itself is a short length of RG-59U coaxial inner insulation prepared as follows. Remove the cable jacket and

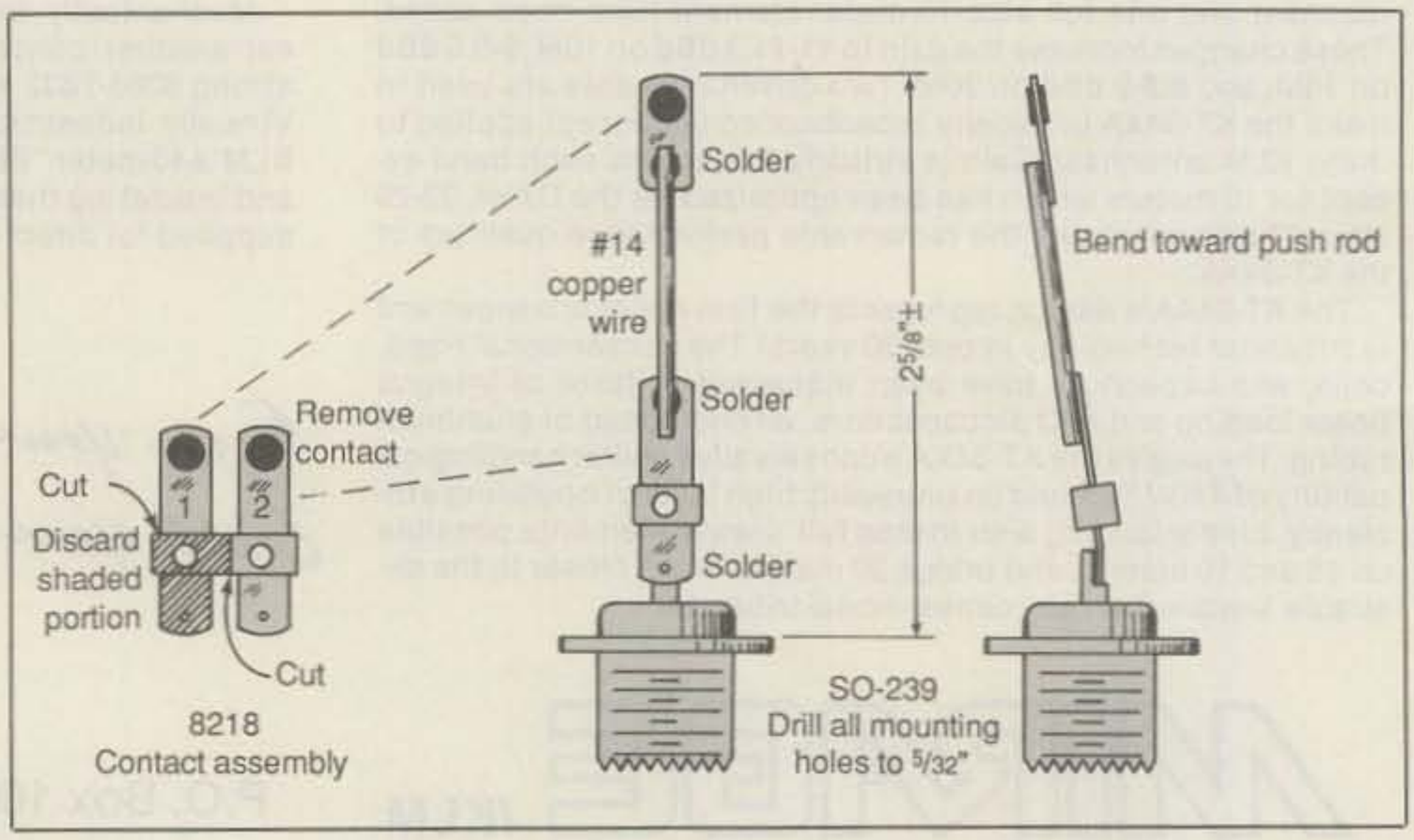


Fig. 1– Details of center-arm construction.

*215 Brock St., Box 994, Stayner, Ontario, Canada L0M 1S0

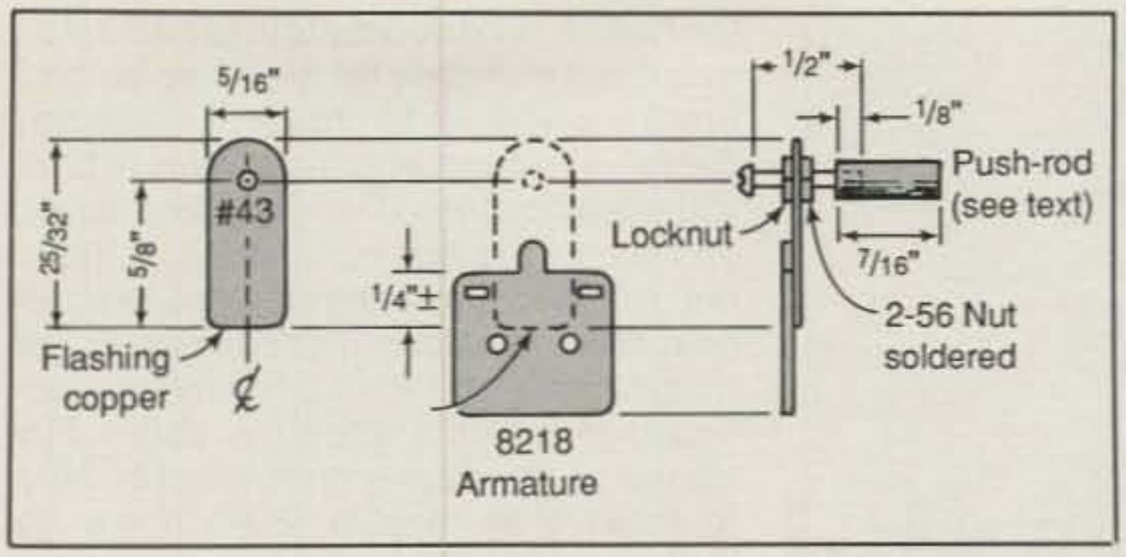


Fig. 2– Plans for armature and push-rod.

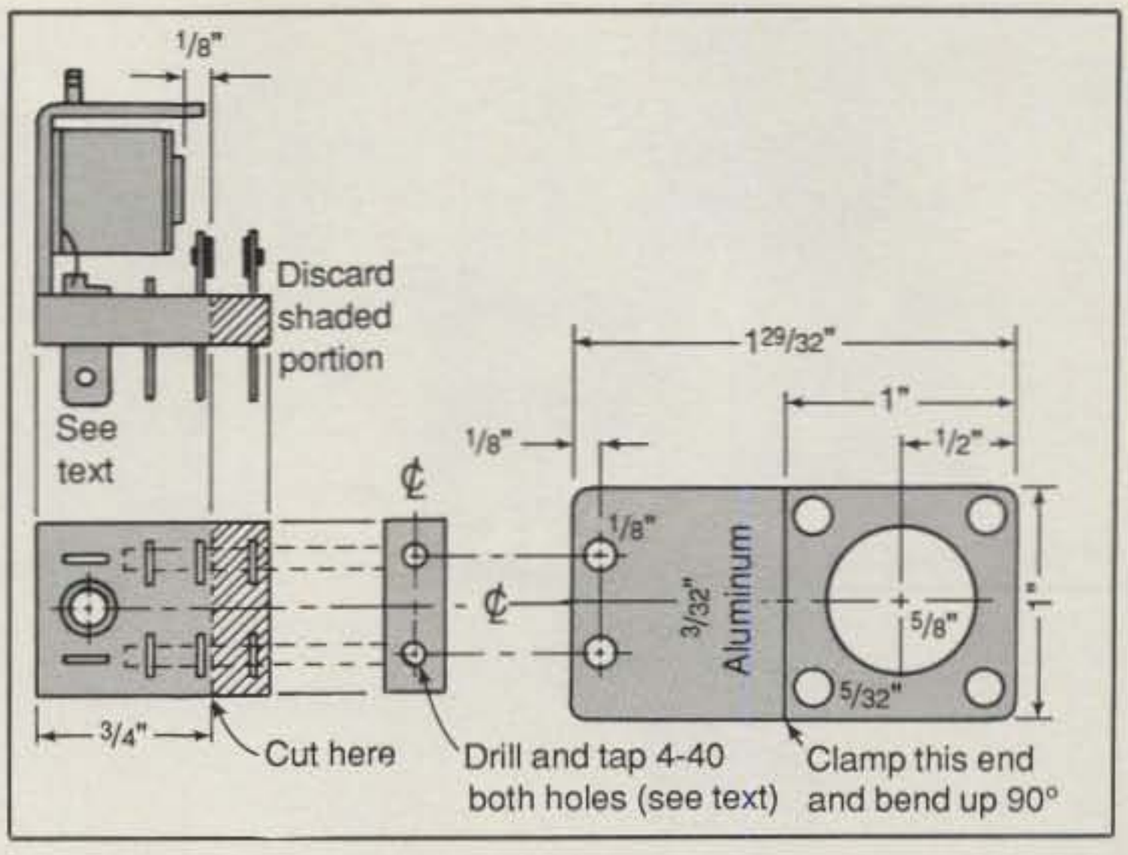


Fig. 3– Relay alterations and relay mounting bracket.

braid and strip a 1 inch section from the center conductor. File one end of this material flat, grip its opposite extremity in a vise, and use a #53 drill to enlarge the wire hole to a ⅛ inch depth. File the tip of a ½ inch round head 2-56 bolt to a partial point, insert it through the locking and fixed nuts of the armature extension, and screw into the plastic to the full depth of the drilled hole. Cut and file the insulation to the dimensions given.

Coil Assembly and Bracket

Referring to fig. 3, cut and square the relay terminal board to the indicated line. Save the contacts from the discard portion by carefully filing the backs and removing them as before. Try not to damage the thin gold plating, since these items later will become the "T" section contacts when soldered to the left and right SO-239 connectors.

On the insulating board, keep the coil terminals intact. The rest can be left in place or trimmed flush with the board on both surfaces, as was done here. Hold on to the extra pair of contacts as spares in case of any of the ones in use are damaged. If your particular relay contact lugs are wide enough, drill and tap the 4-40 mounting holes through the plastic and their centers for added strength as the drawing shows. If the lugs are too narrow for this, drill and tap the board just inside the metal locations.

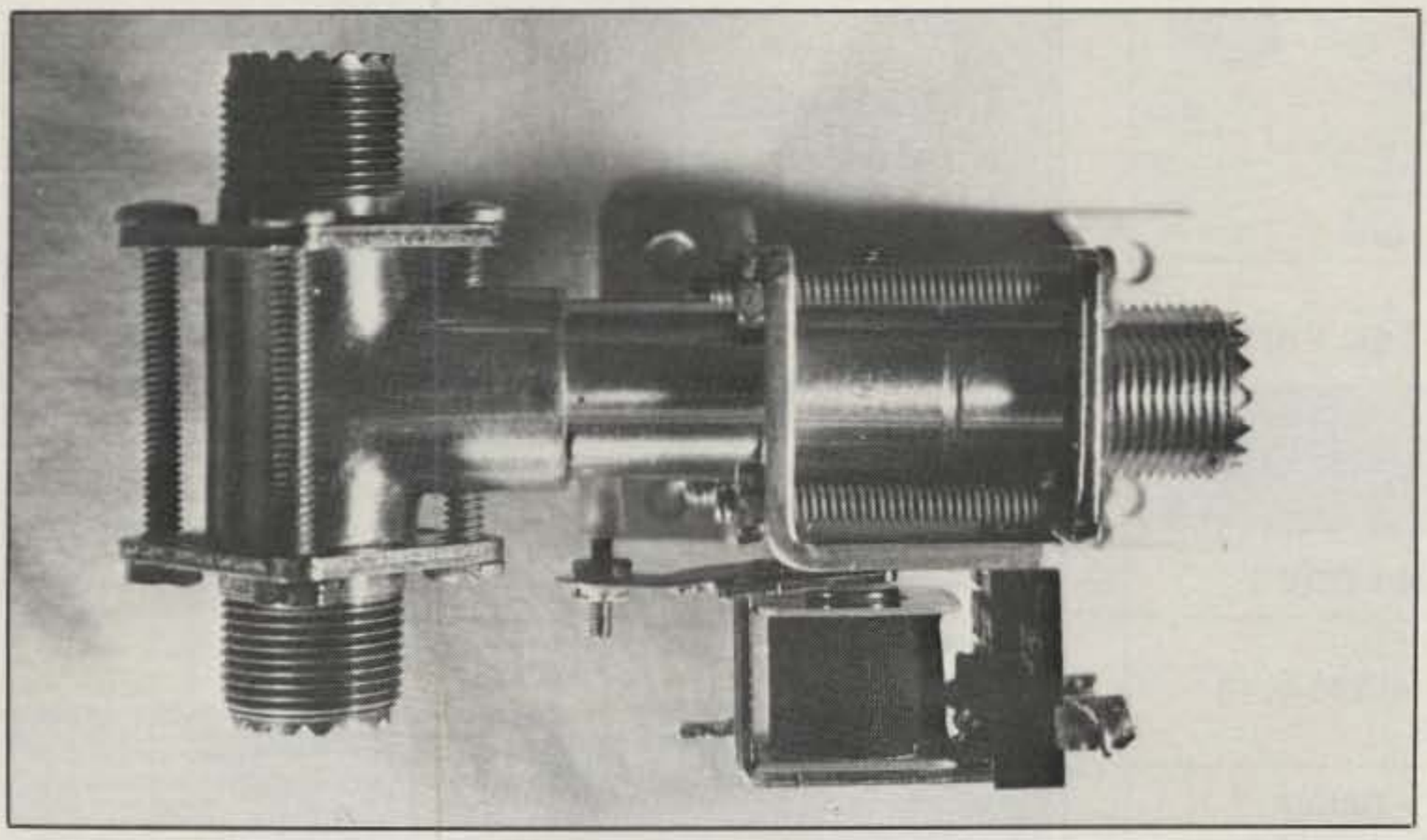
Construct the aluminum bracket next, and drill the coil attachment holes to fit. Make the ⅝ inch hole, clamp a connector in place, and drill (5/32 inch) through the four flange mounting positions.

Outer Case

Fig. 4 shows the case construction. Cut the "T" and pipe to the dimensions given, square up, and ream to de-burr the ends. If your hardware is long enough to include the coil bracket plus the end connector and the two mounting brackets, you won't need to shorten the coupling as I did. Just lengthen the center arm by ⅛ inch and continue as directed.

If long machine screws (up to 1½ inch) are difficult to obtain, you can make your own with a 6-32 thread-cutting die and sections of ⅛ inch welding rod. Thread both ends of each new bolt and use an extra ¼ inch nut to replace the missing head.

Place two long screws in diagonally opposite holes to temporarily attach the SO-239 connectors to the "T." Rotate so that one of the remaining holes appears directly over the center line of the lower part of the fitting on each side and tighten in place. Insert the pipe fully into the "T" and keep it there. Use the point of a 5/32



The finished coaxial relay.

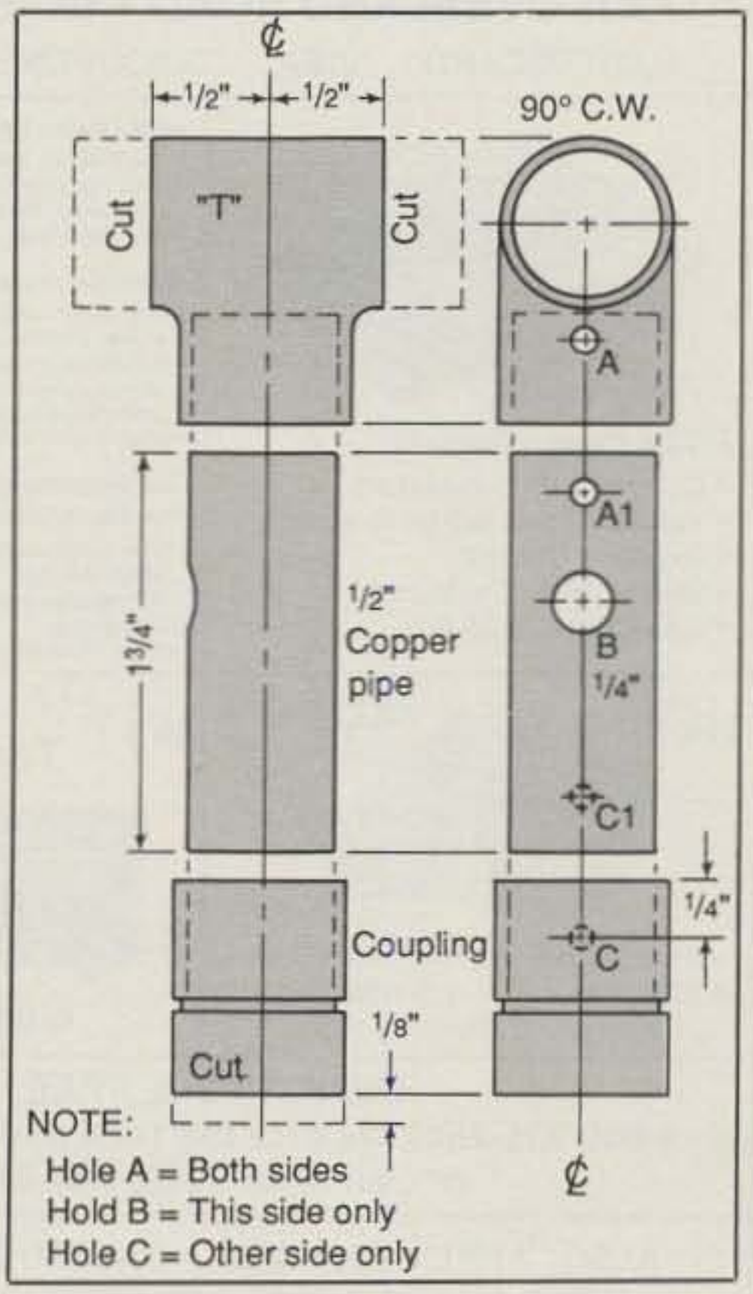
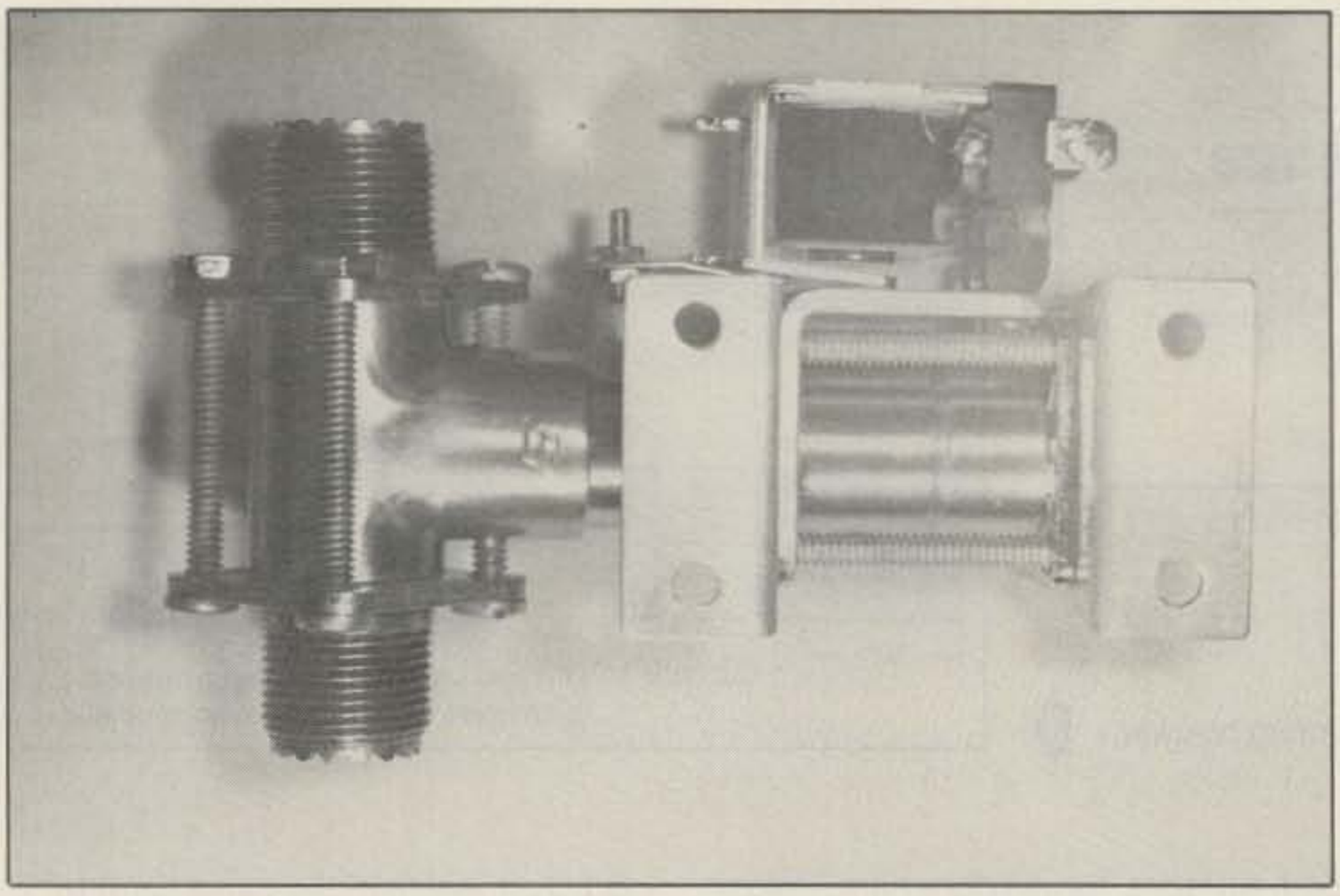


Fig. 4– Details of outer case construction.



The rear view of the coaxial relay showing the mounting brackets. The armature keeper, fig. 6, has not yet been installed.

inch drill through the connector holes to center mark the two lower screw positions A, then drill (#36) and tap for 6-32 screws. Remove the connectors and drill hole B (push-rod clearance) to just touch the bottom of the "T" on the center line of one side.

Seat the coupling on the pipe and drill (#43) and tap hole C for a 4-40 retaining screw on the center line of the *opposite* side. After assembly, the screws should protrude as little as mechanically practicable on the inside of the pipe.

End Connectors and Contacts

Shorten the center pins at the rear of the two "T" end connectors to 13/32 inch measured from their flat mounting flanges. Employ a wooden toothpick to maneuver the salvaged contacts face down, in turn, in the previous wood hole, tin their backs, and solder the end connectors to them. Squaring and centering are important; repeat the operations if necessary to get things right, and then burnish the contacts lightly with a little silver polish. Finish with a dry cloth or tissue and be sure to remove all residue. Even if you go through the gold flashing, the underneath silver is still a good contact material.

Line up the connectors at the ends of the "T" on the outside and check the spacing between contacts. This should be ⅛ inch with the existing armature travel.

Mounting and Assembly

Check the center arm contact for accurate positioning in the "T" section. Do any necessary adjustments, and then proceed to the mounting brackets, fig. 5. Again, clamp the connector in the large hole and drill through the flange for the mounting screws. Slip the relay coil and bracket on the pipe above the coupling, insert the center arm, include the mounting brackets, and assemble as shown in the photos. True up all sections in relation to the "T" and each other, and then tighten the screws.

Try the connectors, one at a time, in the "T" for a last check on alignment and

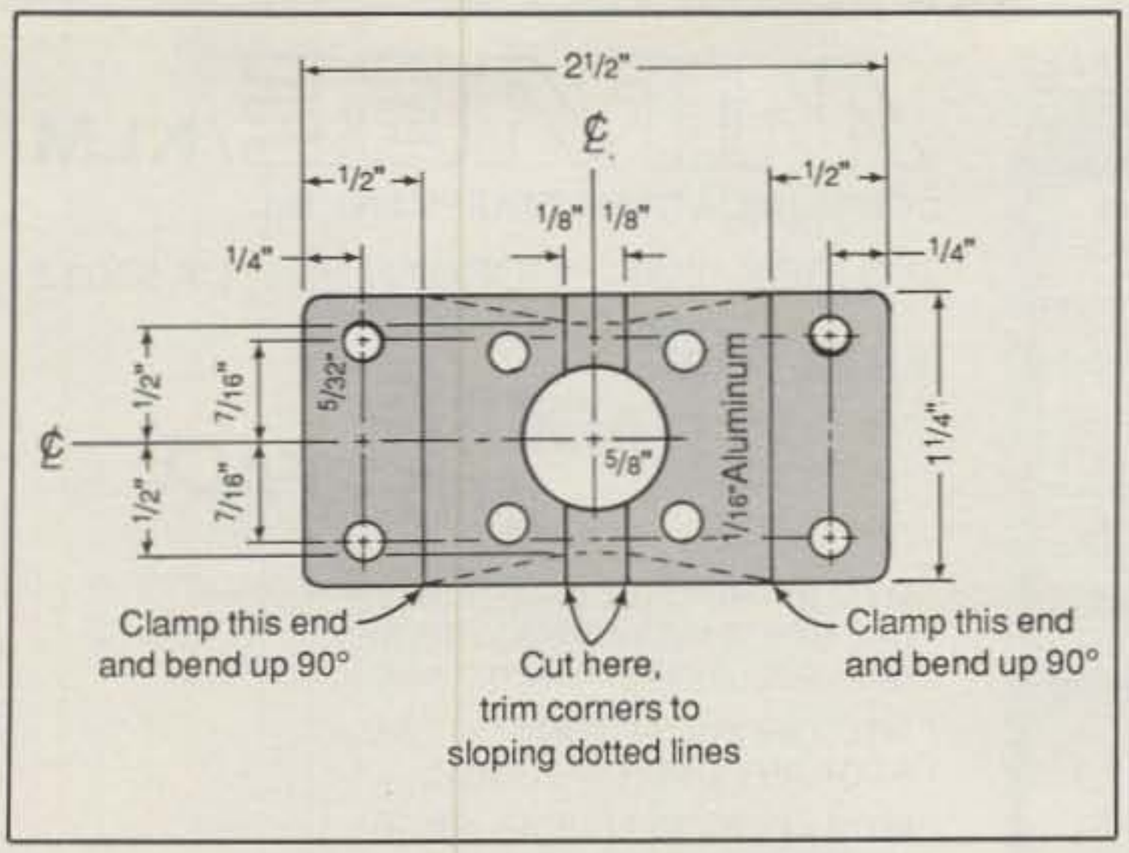
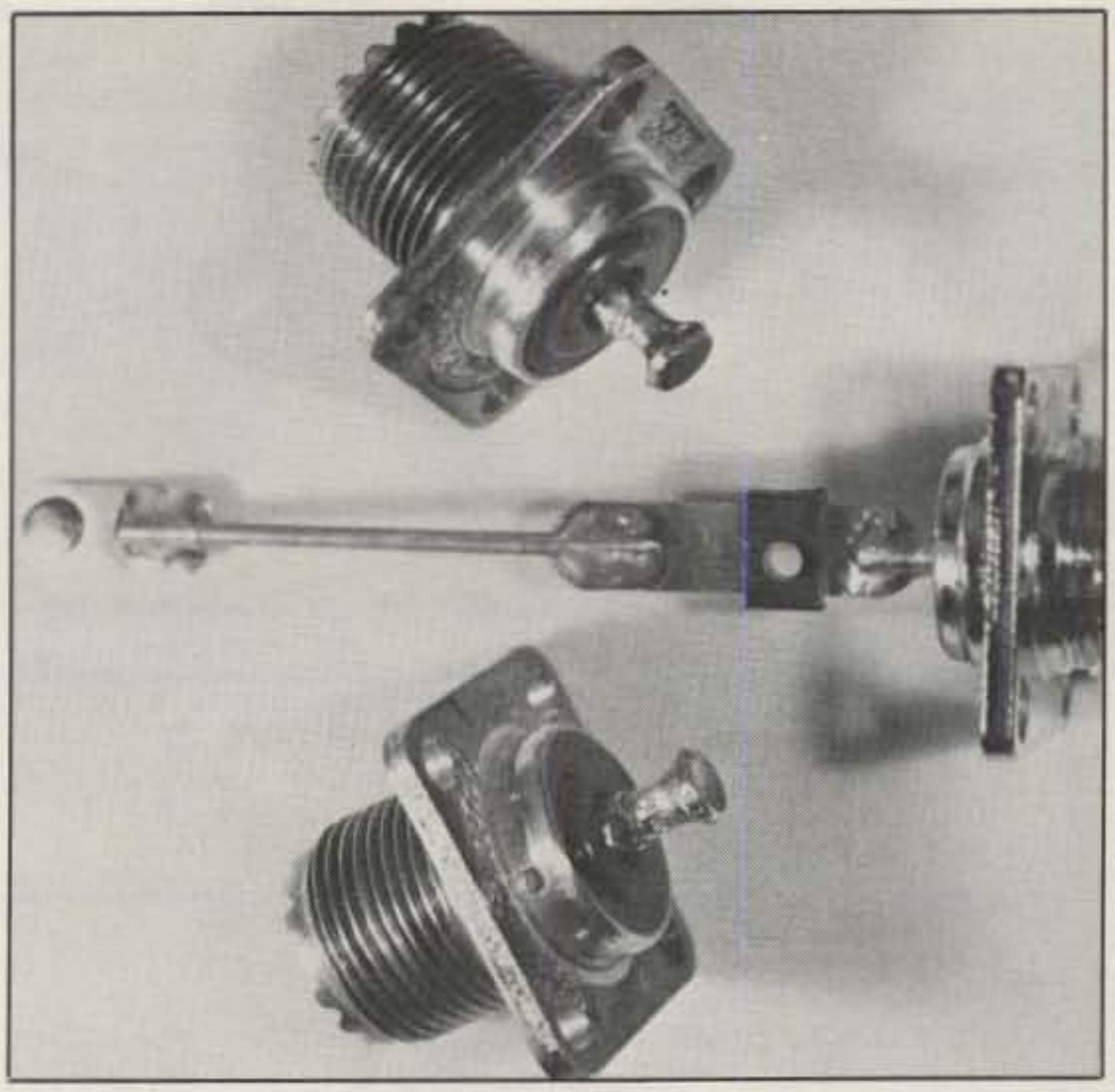


Fig. 5– Design of the mounting brackets.



The completed center-arm with left and right "T" connectors, plus the salvaged contacts in place.

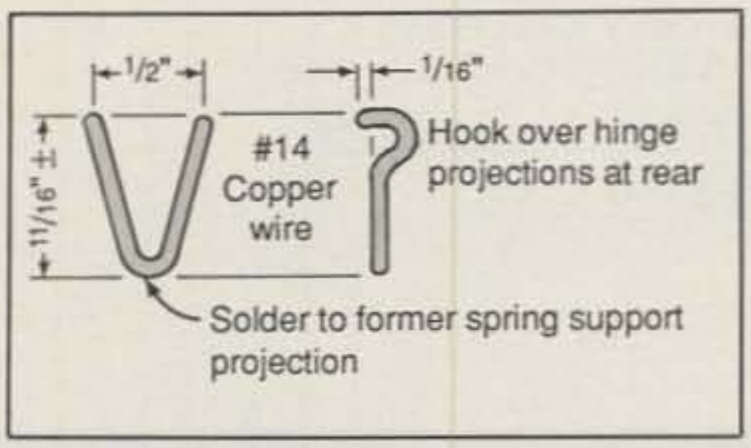


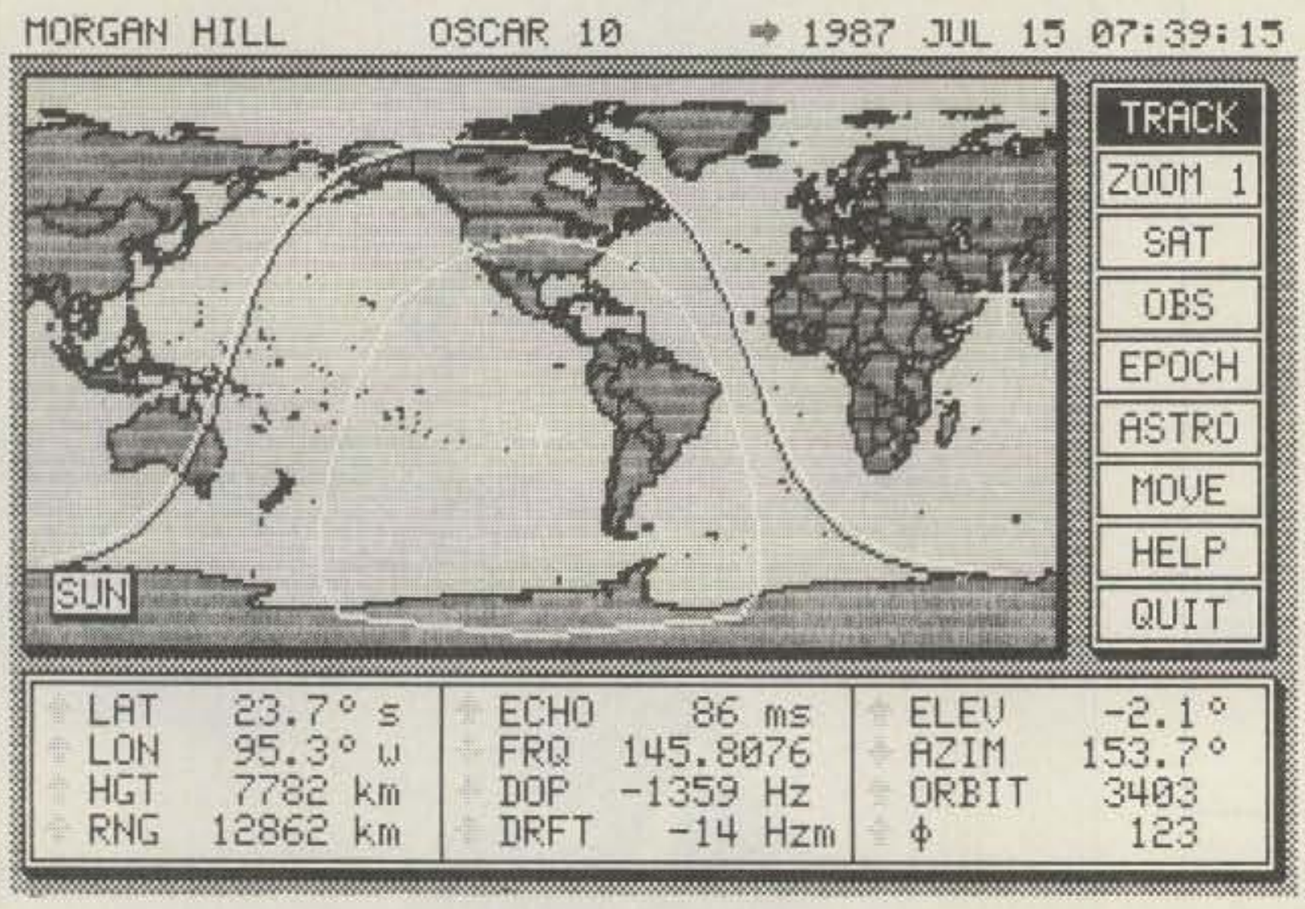
Fig. 6– How to make the armature keeper.

then complete their installation. Screw the push-rod all the way back, push it into hole B, bend the copper strap with pliers to ensure satisfactory hole and center arm positioning, and turn the armature into its normal position between the bracket and coil. Adjust the rod so that the pulled-in armature closes the far contact and a little bit more. The return stroke should leave a tiny space between the push-rod and the center arm. Check this with a finger on the outside after tightening the locknut. The bracket also serves as a backstop for the armature. Verify coil and contact operation with a 12 volt source and ohmmeter, and install the armature retaining keeper of fig. 6.

Conclusion

As always, the final test of any new device is to place it in service. If your regular supply runs much over 12 volts, use a dropping resistor to keep coil temperature down. Your upgraded, now coaxial, relay should give a good account of itself in low and medium-power RF circuits. For high power choose a more rugged, larger contact relay for modification.

My thanks to Miss E. Sheffer for the photography. CQ



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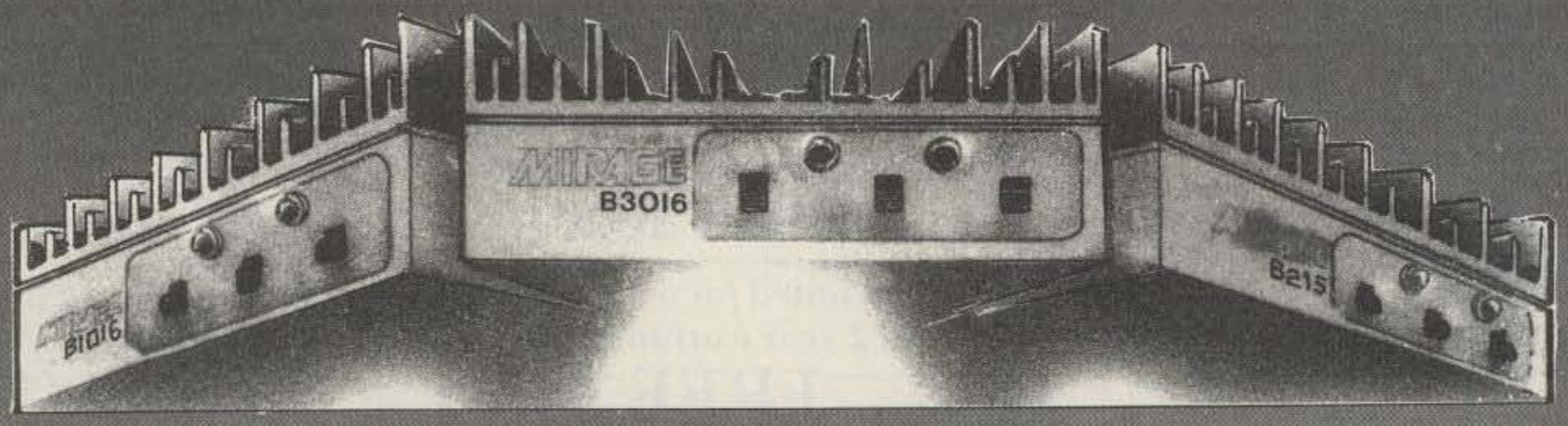

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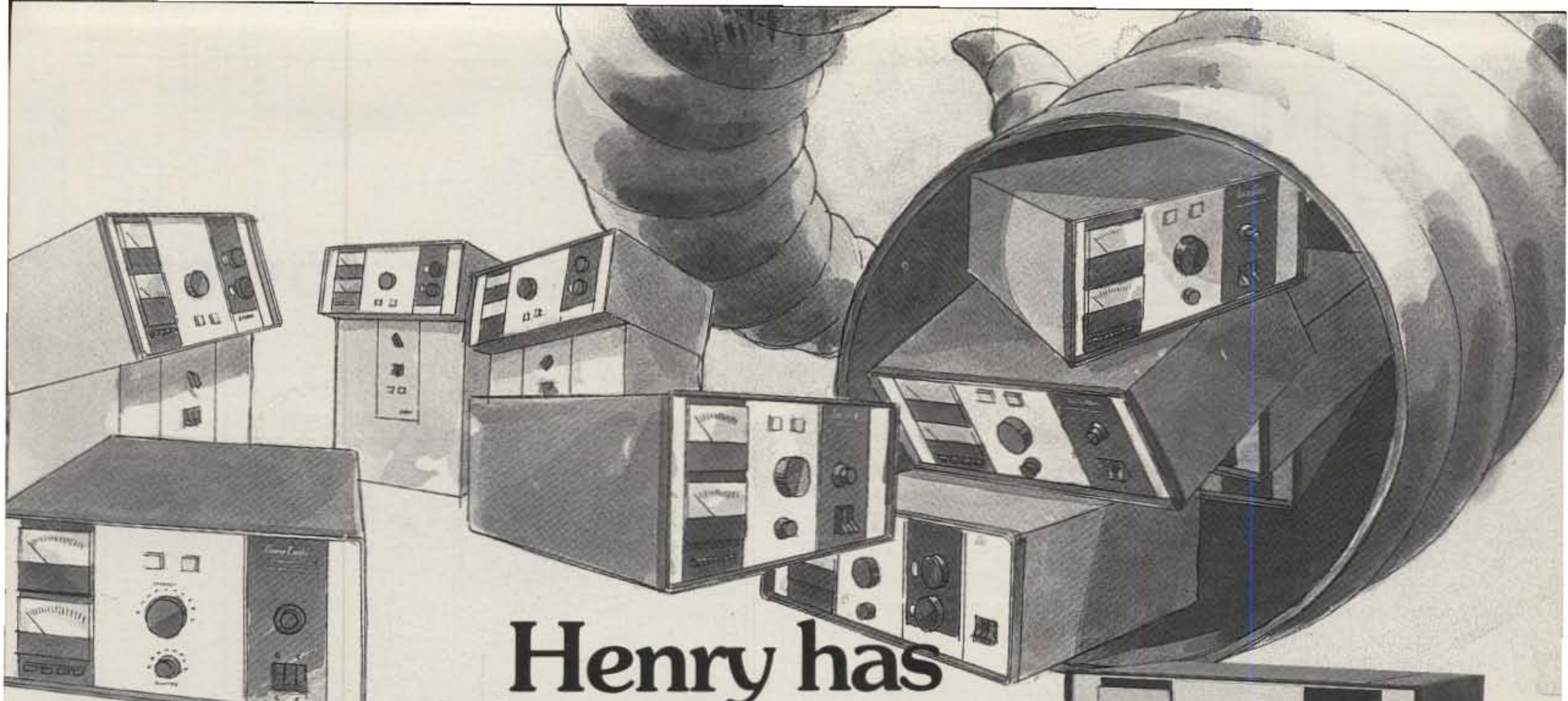

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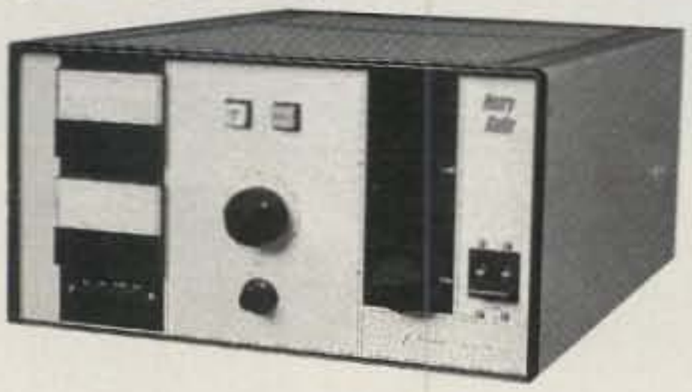

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CQ REVIEWS:

The Alinco ETS-210 Roof Tower

BY STEVE KATZ*, WB2WIK

We all know that one prerequisite for achieving even nominal antenna performance is getting the aluminum up high off the ground, or at least clear of the local obstructions. While many of us have ground-mounted towers, some, for whatever reason, cannot; and even those of us who do have tall towers on our properties will find having a second or third antenna support for auxiliary antenna systems an attractive approach to increased versatility.

Amateurs have used rooftops and chimneys as antenna supports forever. The average residential roof is surely capable of supporting enormous weight and is often high enough to clear its surroundings, but how to mount amateur antennas so they are secure and serviceable? Chimneys are a lousy choice; they are never intended as antenna supports, and the brickwork is usually just a thin facade to cover a ceramic pipe which has barely the strength to support itself.

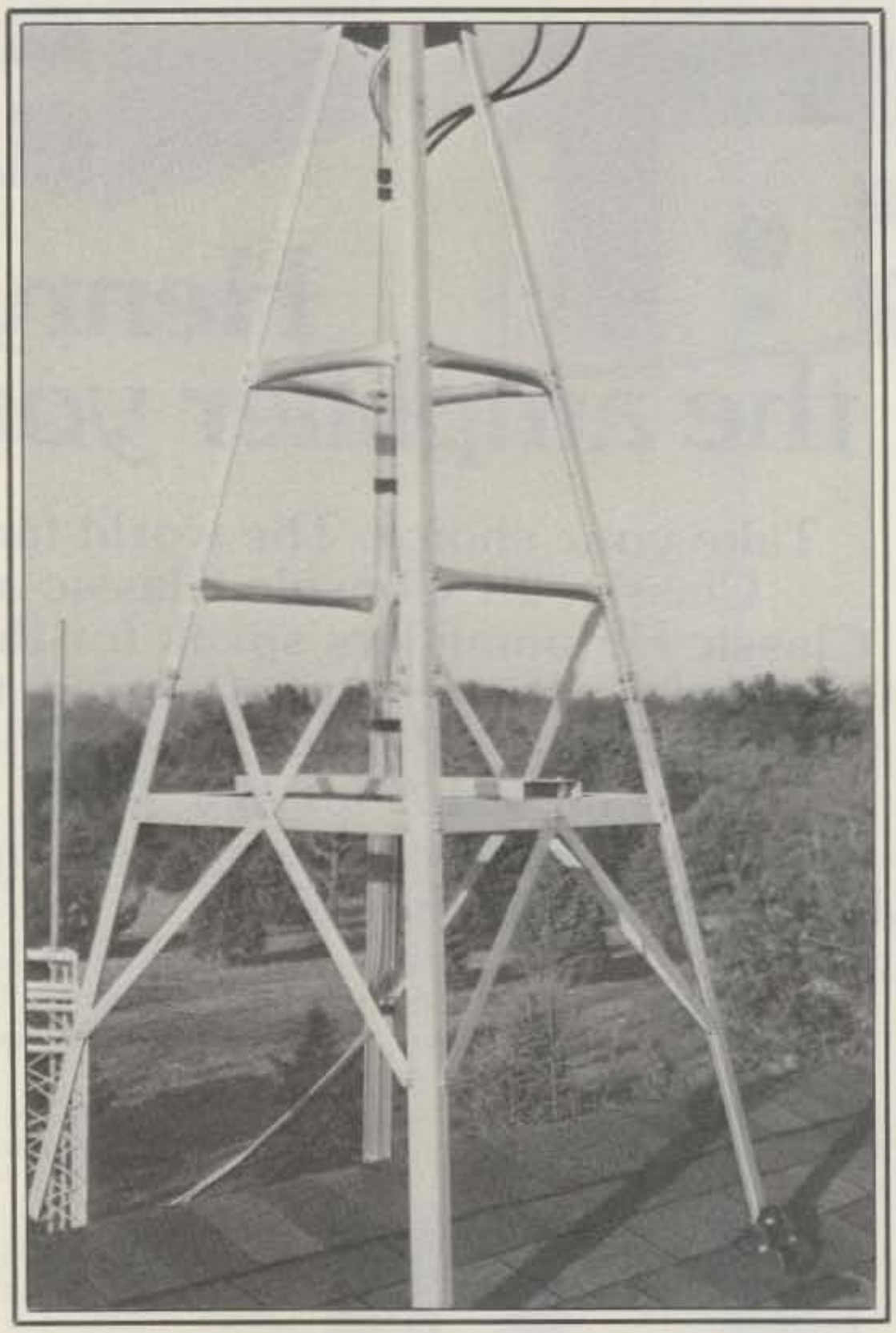
Enter the roof tripod, or in this case, quadruped—a framework which may be securely fastened to the roof while supporting an antenna mast and rotator. This is surely the best approach to the problem, next to a ground-mounted tower. A roof tripod or tower offers its user some "free" antenna height (the roof was up there, anyway), and in some cases will serve as well as a real tower.

The ETS-210 weighs about 28 pounds and is packed in a container small enough for UPS delivery, a decided advantage for customers. (Ever try to get a full-size tower delivered? They come via big truck, after having been loaded with a fork lift that conveniently plugged its fork through the tower webbing in just the right place to break something.) Unpacking the ETS-210 reveals 48 fabricated metal parts and hundreds of nuts, bolts, and washers. All the hardware is metric, and one needs only 10 mm and 13 mm wrenches to assemble the whole tower—this, plus a lot of patience, because the Alinco assembly instructions are rather sketchy. To be honest, the instructions are contained on one side of a letter-size page and are much less than worthy of such a fine product.

The ETS-210 "roof tower" (I'd rather call it a quadruped; it's too small to be a tower.) is made of aluminum. The advantages of this construction are light weight and no maintenance; a disadvantage could be less than ideal strength and load-bearing ability, but after assembling the ETS-210, I'd say it is as strong as a steel tower section of similar proportion. The secret of its strength lies in its dual-wall extruded leg sections, plus lots of properly-applied reinforcement at stress points. This is a strong 28 pound antenna mount. Once assembled, it gives one a nice, warm feeling about installing hundreds of dollars worth of antennas on thousands of dollars worth of roof.

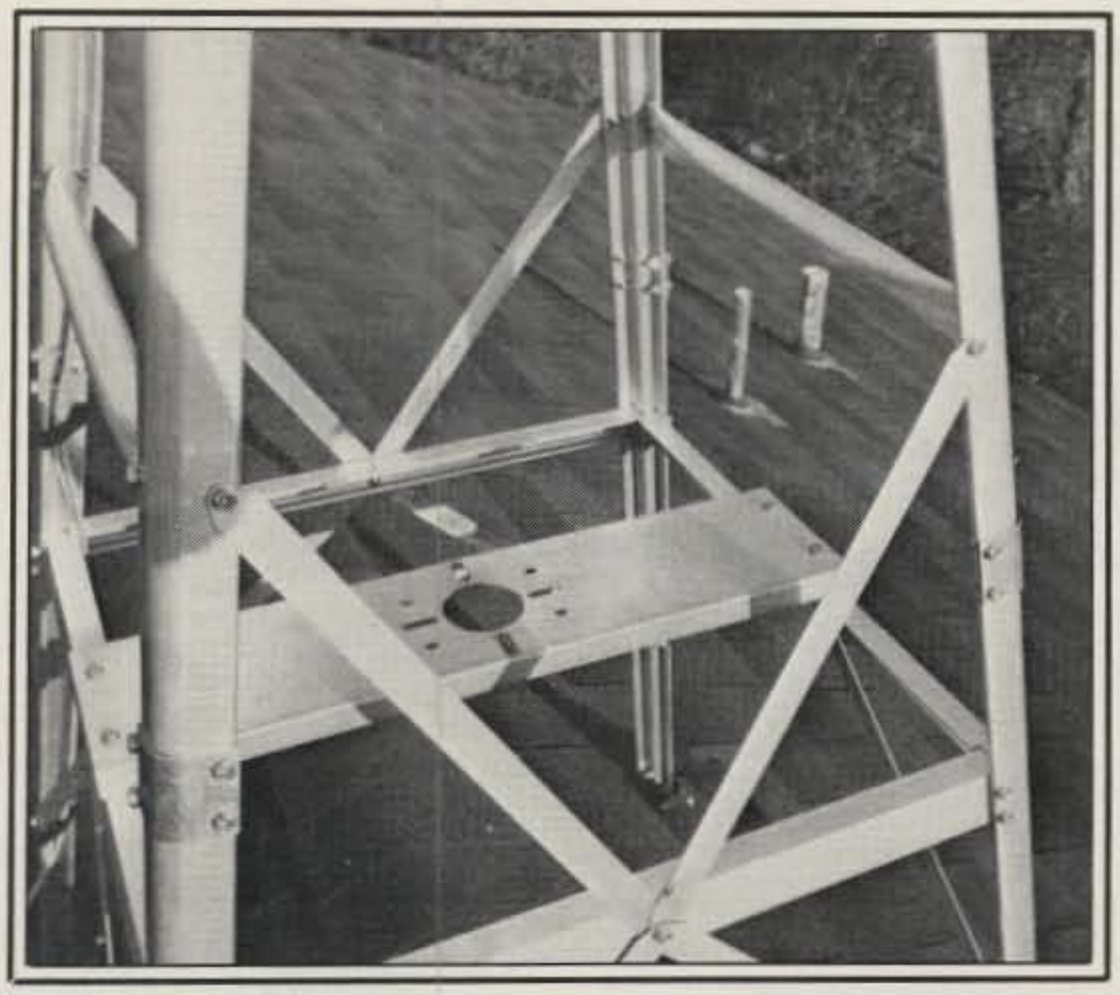
This Alinco product is only 78 inches tall but is 35 inches wide at its base, offering a pyramid-like form which would withstand centuries of use, if not for acid rain and such. The tower's upper rotor plate also serves as the mount for an optional thrust bearing, in which case the rotor itself must be mounted on a lower plate, sacrificing about 4 feet of mast. The upper plate and the tower's four mounting feet are factory-painted steel. I don't know if they're all like this, but mine came through with these pieces painted fire-engine red—kind of jazzy. Since I didn't intend to erect stacked 20 meter monobanders on my little roof tower, I threw caution to the wind and did without the thrust bearing, using the upper plate as the mount for a Telex/Hy-Gain CD45 medium-duty rotator.

The ETS-210's mounting feet are ingeniously designed to allow the system to tilt in either of two directions, thus accommodating nearly any installation. Each foot is securely attached to its mounting surface (presumably a roof) at any reasonable angle; if properly installed, tilting the whole affair will be a simple matter of removing just two 8 × 40 (metric) bolts. The distance between the holes in the mounting feet is just about right for



The Alinco ETS-210 is a sturdy 4-legged affair which mounts to any conceivable roof in just minutes and provides support for 5 square feet of antennas in 60 mph winds.

*153 Rodman Court, Eatontown, NJ 07724



Close-up view of the center structure of the ETS-210. While the center plate is intended to mount a rotator, it isn't necessary to do it this way; I mounted the rotator to the upper plate instead. Everything "fits" precisely in place with the ETS-210.

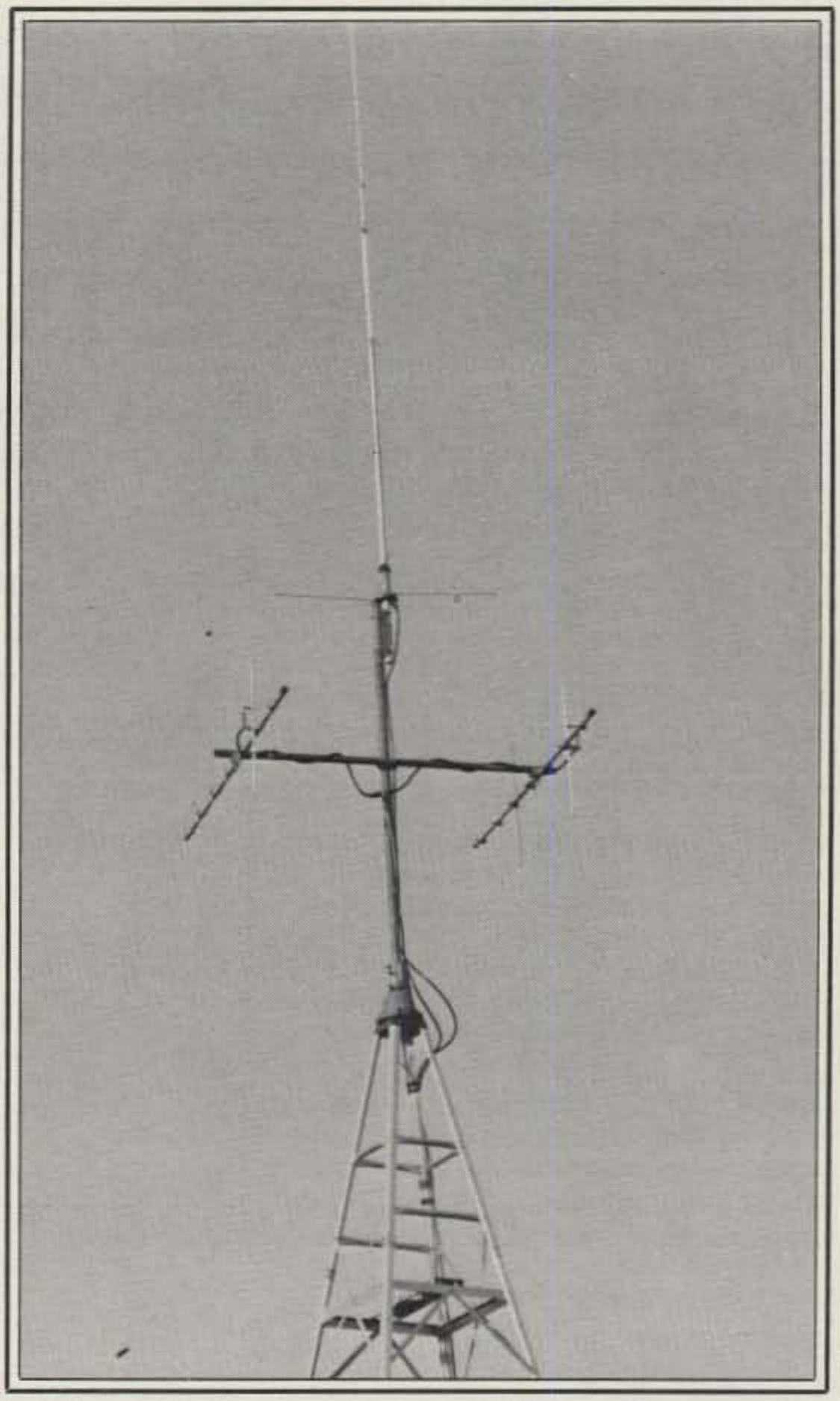
landing over the centers of conventional roof rafters, which are generally spaced every 16 inches. I say "about right" because while some of the holes are 32 inches apart, others are not (there are four mounting holes per foot, predrilled near the corners of 3 inch square plates). Still, landing on "studs" (actually, rafters) for half the hardware is better than missing entirely.

In my installation I "hit" the centers of rafters with about half the mounting hardware, in my case $\frac{5}{16}$" × 3" hex-head lag screws. These got a very good "bite" into timber and would probably have been sufficient to support the system, but just to play it safe I used $\frac{1}{4}$" × 2" carriage bolts going through the roof material (plywood, about 1 inch thick) and fastened with flat washers and nuts in the places where I "missed" the rafters. Thus, in my installation I used all 16 possible mounting points (4 per foot). I should mention that I had to drill out all 16 holes in the mounting feet, as they were too small for the size hardware I chose to use.

I'd recommend anyone contemplating the installation of an ETS-210 or similar product do what I did and study the underside of the roof from the attic to determine how the rafters are spaced and what can be done when you miss. And you *will* miss.

Obviously, all the normal precautions should be taken when installing any tower or antenna: Stay away from utility lines and roof edges, and carry a carpenter's level at all times. The level can be handy as an all-around tool (straightedge, hammer, flyswatter) but is most useful to assure that the installed tower is vertical. Which brings up another point: Since the ETS-210 is a quadruped with angled, not vertical, legs, the way to determine its perpendicularity to the ground is by measuring the tower's horizontal cross-members for levelness. Believe me, the ETS-210 is so accurately machined that the cross members are truly horizontal when the installed support mast is perfectly vertical.

In all, the ETS-210 is a fine product which will provide users with many years of trouble-free service. Its workmanship is excellent. The piece parts fit together like a well-machined jigsaw puzzle. There were no spare parts, but there was some spare hardware, a blessing from a thoughtful manufacturer. The ETS-210 even comes with "guy wire connectors" (little fabricated metal parts which may be bolted to the top plate for the purpose of attaching guy wires), but guying a 78 inch tall tower which is as well built as this one seems a little overkill. The product's only weakness is its lack of proper assembly directions. I've done a lot of building, but I still scratched my head for at least a few minutes during this project. The good news is that you really can't put the thing together improperly. It won't let you, for something won't fit!



Here's a view of the completed installation at WB2WIK: A pair of 135 cm beams and a 10 foot tall omni for 2 meters are mounted to 5 feet of 1⅝ inch pipe atop a CD45 rotator. Typical satellite antennas would be supported as well.

I'd recommend the ETS-210 be used as a stand-alone product for small VHF/UHF arrays, satellite antennas, and the like. As can be seen in the accompanying photograph, I chose to use mine to support a pair of stacked 135 cm FM beams and a Hustler G-6 2 meter FM omni. I might add one or two more lightweight antennas to the mast, but I would not go too crazy without remounting the rotator on the lower plate and installing the optional AAZ-7A thrust bearing ($44). In my case, the ETS-210 is used to support the "extra" antennas I just couldn't fit on my primary ground-mounted tower. For you, the ETS-210 might fill a different need.

The Alinco ETS-210 is manufactured in Japan and distributed by various retailers in the U.S. Its retail price is $126. For further information, contact Alinco Electronics Inc., 20705 South Western Ave., Suite 104, Torrance, CA 90501. CQ

A specific HF tuner is described here in some detail along with suggested variations. A weekend to collect the parts and a weekend to put a tuner together are all that is required.

More Easy-to-Build Antenna Tuners

BY JOHN J. SCHULTZ*, W4FA/SV0DX

In my articles on building antenna tuners I always seem to mention that I consider the building of an antenna tuner a useful and fun project that almost any amateur can undertake. One can most often save quite a bit of money compared to purchasing a tuner, and one can tailor it to individual station needs.

Having now repeated myself again, I'll proceed to describe the little tuner and its variations, which are the subject of this article. The basic tuner was designed to handle 100–300 watts output, although the tuner can be "beefed up" to handle almost any power level. The tuner is really designed to handle antenna loads which might represent an SWR of up to 1:5 or so—namely, the type of situation which might happen if a coaxial line feed antenna is used quite a bit off of its resonant frequency. Such a value of SWR will cause the power output of a solid-state transceiver used alone to essentially "shutdown," but the use of the tuner will allow the transceiver to deliver essentially its full power output to the antenna load. The tuner also incorporates some additional switching so it can prove useful with fairly high-impedance loads—1,000 ohms or so—as might be represented by random-length wire antennas. Therefore, the tuner is fairly versatile over the HF range.

Some experimentation was done with the type of switches used in the tuner so construction could be made as simple as possible, and that will be described shortly. The basic tuner does not include an SWR bridge or balun for a balanced output line. Many, many circuits and construction details for those two items appear in various handbooks, but one might "think it over" before incorporating them unless one has a defined need for them. Almost all solid-state transceivers, for instance, now provide SWR monitoring, and it is the SWR measuring point in the transceiver which must see a 1:1 SWR if the transceiver is to deliver full output.

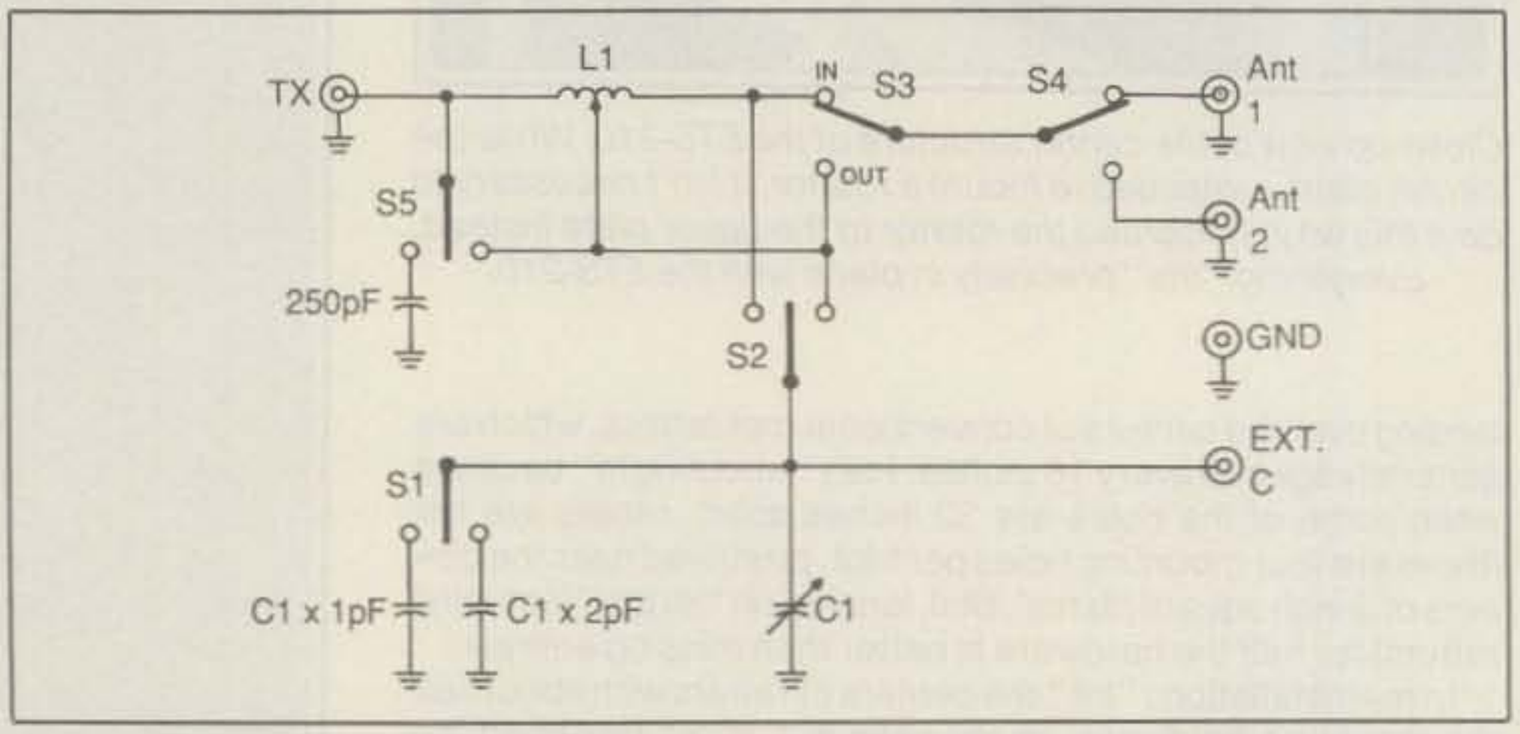


Fig. 1– Diagram of the tuner. Component values not shown are mentioned in the text. Also, some features (S4 and S5) can be left out to simplify the unit.

Circuitry

Fig. 1 shows the circuitry of the basic tuner. If for a moment one forgets about all the switches except S2 and S3 and imagines that the dashed line shown next to S5 is a solid connection, it will be seen that all of the networks shown in fig. 2 can be developed between the input and output terminals by the manipulation of S2 and S3. They all are, of course, variations on a single LC network and include the usual CL, LC forms of fig. 2(B) and 2(C), a straight-through connection without any component loading, fig. 2(D), and the not so usual form of fig. 2(F) which might be helpful for random-length wire antenna loads.

The rest of the switches just add a bit

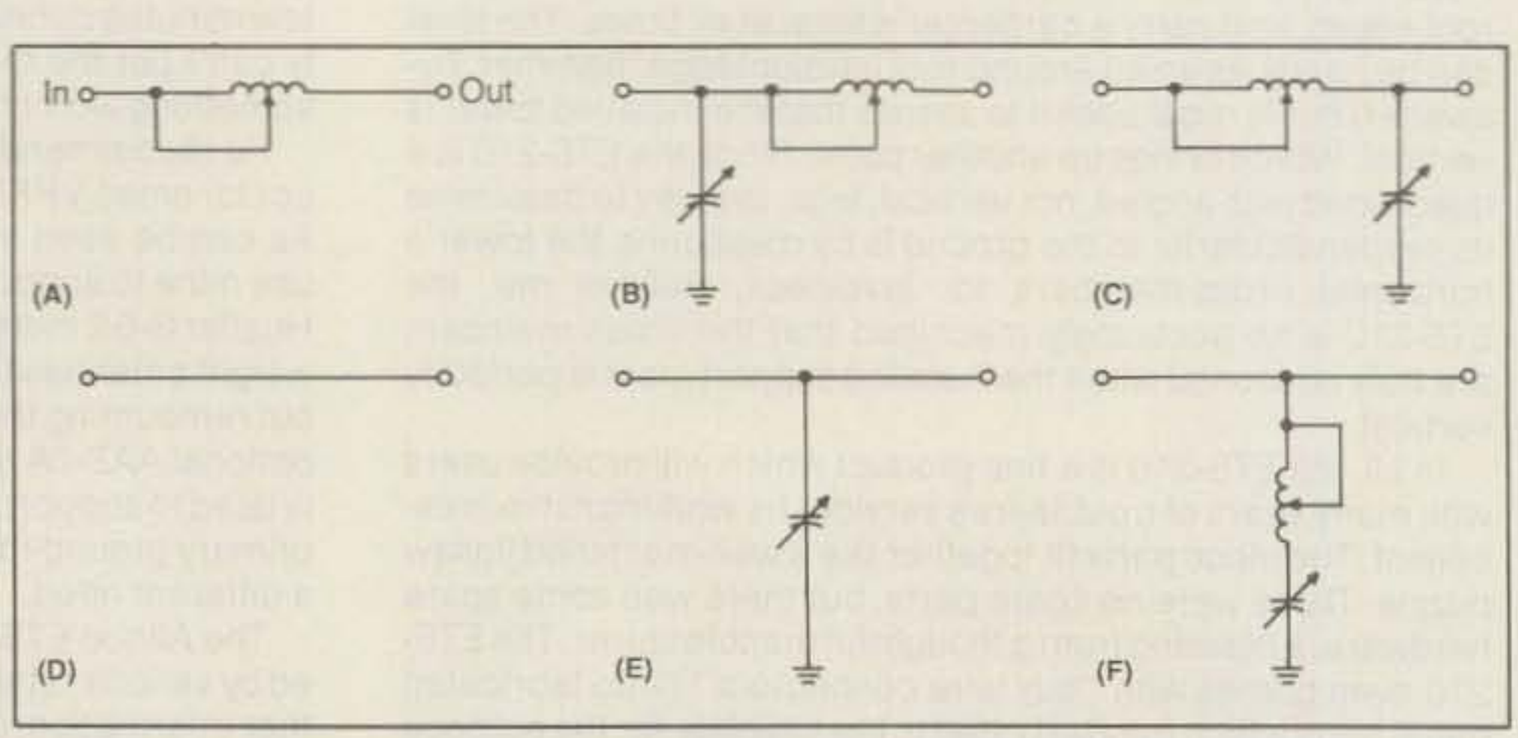


Fig. 2– Networks that can be formed by the tuner. (D) is just a "bypass" position.

*c/o CQ magazine

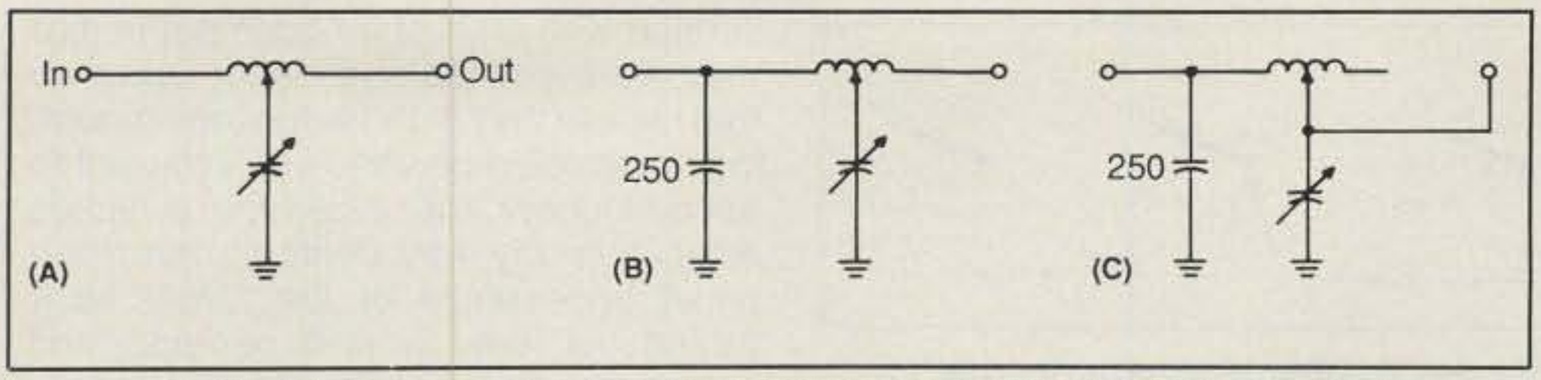


Fig. 3– Additional networks which can be formed if S5 is incorporated.

more versatility to the basic design. Switch S1 just adds padding capacitors across the main tuning capacitor to increase the total C range. S4 is a selector switch for one of two antennas. S5 is strictly optional, but if it is added, it allows the formation of three additional tuning networks as shown in fig. 3 in conjunction with the positioning of S2. These networks, particularly those of fig. 3(A) and 3(B), will probably be found to be most useful if one is trying to load into a wire, worked against ground, which is less than ¼λ long on a low-frequency band. Note that S1, S2, and the optional switch S5 all have "center off" positions.

The external connection going to the contact arm of S2 is for the addition of an external padding capacitor for C1 in case additional capacitance is required. It can also be used in a "trick" manner to add an external inductor to a stubborn antenna load that otherwise one might not be able to tune, but one would hardly ever have to use it for the purpose.

Component Dimensioning

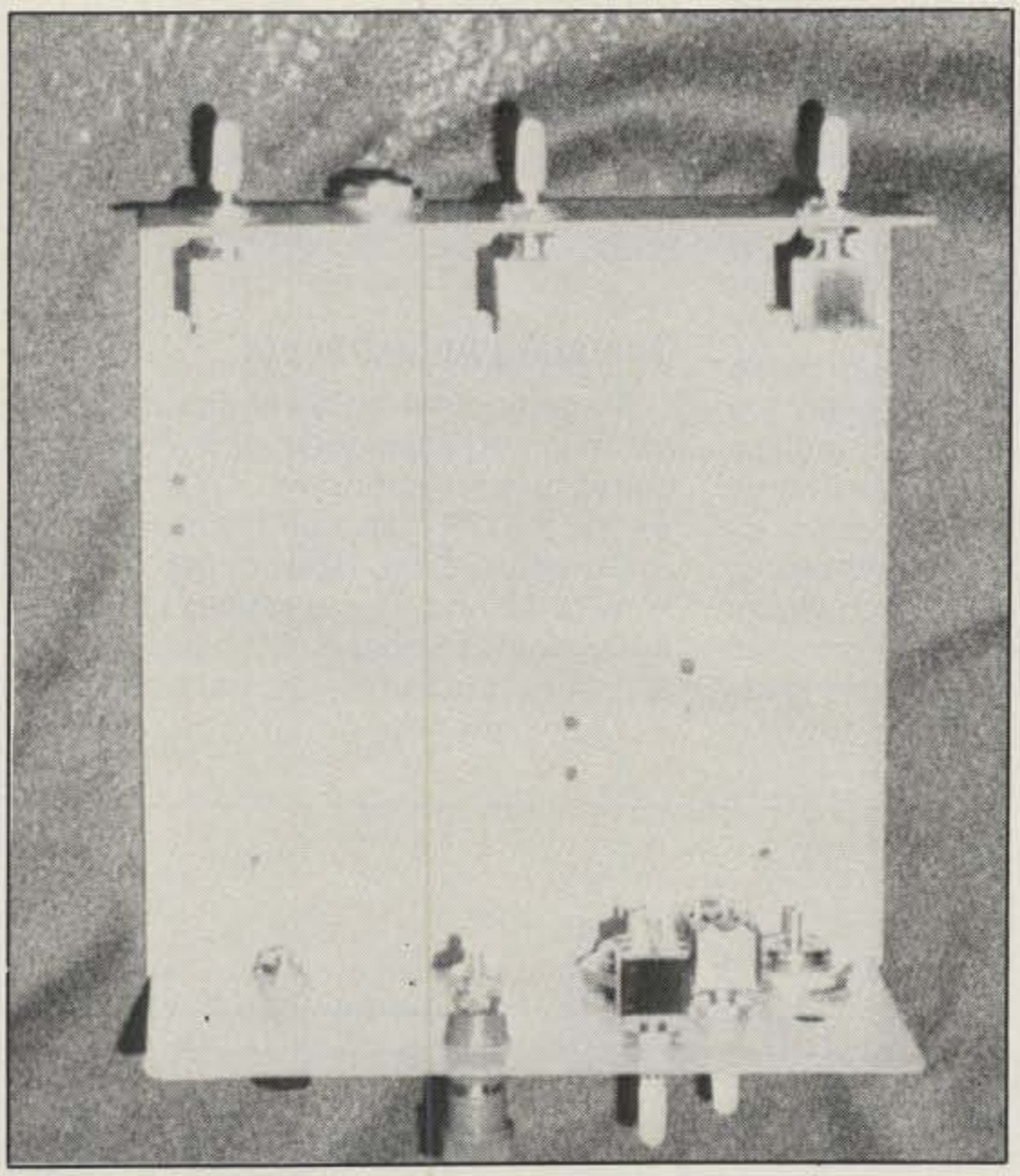
In the basic tuner that was constructed, L1 was a 10 μh roller inductor and C1 a 300 pF/1 KV variable capacitor. The two fixed capacitors switched by S1 were 330 pF/1 KV and 620 pF/1 KV units (disc ceramic or mica). Those component dimensions allowed the tuner to perform over the full range of load conditions on 40–10 meters and a somewhat more restricted range (roughly loads with SWRs of 1:3 or less) on 75/80 meters.

For better, or that is to say more extensive, matching provisions, on 75/80 meters, L1 should be a 18 μh to 28 μh roller inductor. The problem then becomes the physical size of the roller inductor and the correspondingly larger size of the whole tuner unit. For base-station operation this consideration may be minor, but for portable operation it may produce a tuner half the size of a modern-day transceiver. My own feeling, and experience, is that a tuner with a 10 μh inductor will suffice for 90% of all 80–10 meter applications.

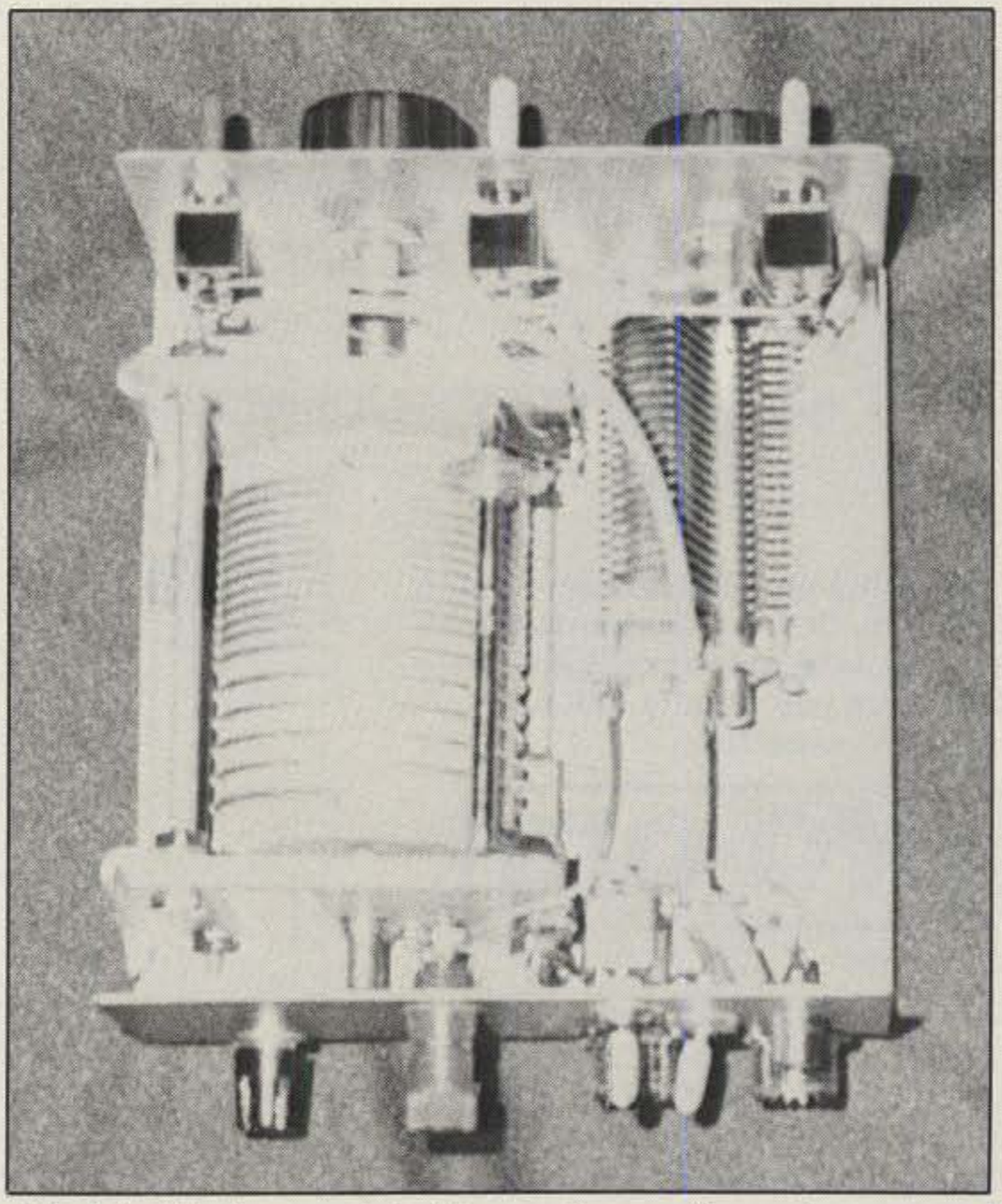
Construction

The photographs show how one tuner was constructed. The component layout is very simple. The coaxial input/output connectors, S4, the ground binding post and S5, if used, are all mounted on the back panel of the enclosure. The reason for placing S5 on the back panel is twofold. It is not likely to be used too often unless one encounters a special matching need. Also, once one has a roller inductor in hand and looks at its wiring, it will be seen that it is very easy to insert S5 towards the rear of the inductor (wide spaced turns end for those roller inductors which have taper turns) where the strapping is usually done between the roller contact arm and one end of the coil. Again, this idea may seem a bit elusive or unclear when one simply sees it in print, but it's quite clear when one actually picks up and handles a roller inductor.

Switches S1, S2, and S3 are all mounted on the front panel of the tuner's enclosure. All of these switches can access, with very short leads, all of the connection points needed to L1 and C1 by being mounted directly on the front panel and,



There isn't much to see in this photograph, but that is the point. Drill all necessary holes first, and then mount the switches and connectors, wire them up, and then put L1 and C1 in place. Doing this, the tuner becomes quite easy to construct.



A look inside the completed tuner. No specific enclosure need be used. Any metal enclosure that will contain the components used is all that is necessary.

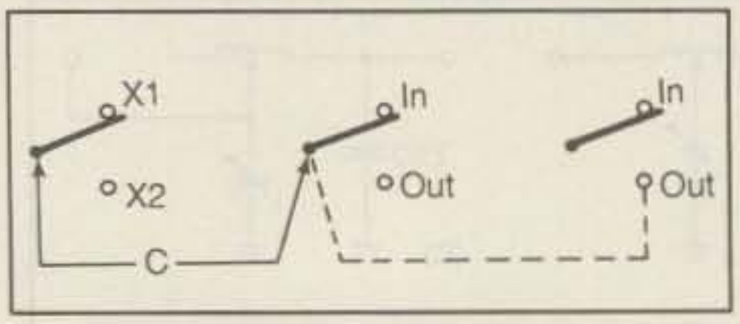


Fig. 4– Possible, simple front-panel labeling for S1, S2, and S3. The I/O labeling for S2 indicates if C1 is placed on the input or output side of L1. The dashed line indicates that S2 must be in its center off position when S1 is placed in its "O" position to bypass the tuner.

of course, are simultaneously where they are needed for operational use. Again, this point becomes very clear when one has the components in hand and looks at their connection terminals. Only one short piece of coaxial cable is needed within the tuner going from the contact arm of S3 to S4, and probably even that is not totally necessary since it is on the output side of the tuner and adjustment of the tuner would undoubtedly compensate if it were just a length of insulated wire.

Switches that can handle RF currents and also provide sufficient voltage insulation to ground have in recent years been more and more of a problem to obtain. Normally, I would prefer to use steatite or at least phenolic insulated wafer switches. However, they are a bit difficult to obtain and do take up a fair amount of panel space.

As an alternative for simple switching arrangements, I have used so-called heavy-duty AC slide switches (6 ampere contacts at 120/220 volts) and they have worked remarkably well (e.g., Radio Shack 275-403). They require, however, a square cutout mounting hole in a front panel which is not all that easy to make with simple tools if one is to do a neat job of it. However, once when constructing a tuner, I took a chance and used some simple miniature toggle switches for direct RF switching. They worked amazingly well and are extremely easy to mount via a single ¼ inch hole. They were used in the construction of the tuner being described with a bit of a hedge bet in that they were spaced sufficiently apart so that in case they didn't work, their mounting holes could be used and enlarged to accommodate the slide-type switches without in any way defacing the front-panel appearance of the tuner. As it turned out, they worked perfectly and were never replaced. Switch purists may object, but what can I say? Radio Shack type 275-1546 was used for S3 and S4 and type 275-1545 for S1, S2, and S5. Both switches are DPDT types, but their contacts were wired in parallel to increase their current-handling capability as SPDT switches.

A very simple front-panel labeling for the switches was done as shown in fig.4 using a decal set. S3 has labeled I or O for its in/out positions. S2 was labeled with arrows to indicate whether C1 was connected to the input or output terminals of L1. S1 was labeled with + or + + to indicate how much additional relative capacitance was added to C1. A dashed line was added between the "O" marking on S3 and the center off position of S2 to indicate that if the tuner were to be completely in its bypass position (S3 at "O"), S2 must also be in its center-off position. In practice, the front-panel labeling is very easy to use, since one normally will not be doing much more than switching the tuner in or out and switching the variable capacitor to be either on the input or output side of L1. Just how simple the wiring of the front-panel switches can be is illustrated by fig. 5.

No attempt was made to label S5. A separate "crib sheet" was drawn to diagram the networks developed by the three positions of S5 and affixed to the bottom of the tuner's enclosure for reference purposes.

Operating Adjustments

Forgetting the possible use of S5 for the moment, adjustment of the tuner requires only the setting of L1, C1, S2, and S1 for a SWR "dip" on a transceiver's SWR meter. Once determined, the settings of S2 and S1 are usually the same throughout any band. By having some sort of calibration for C1, either a direct

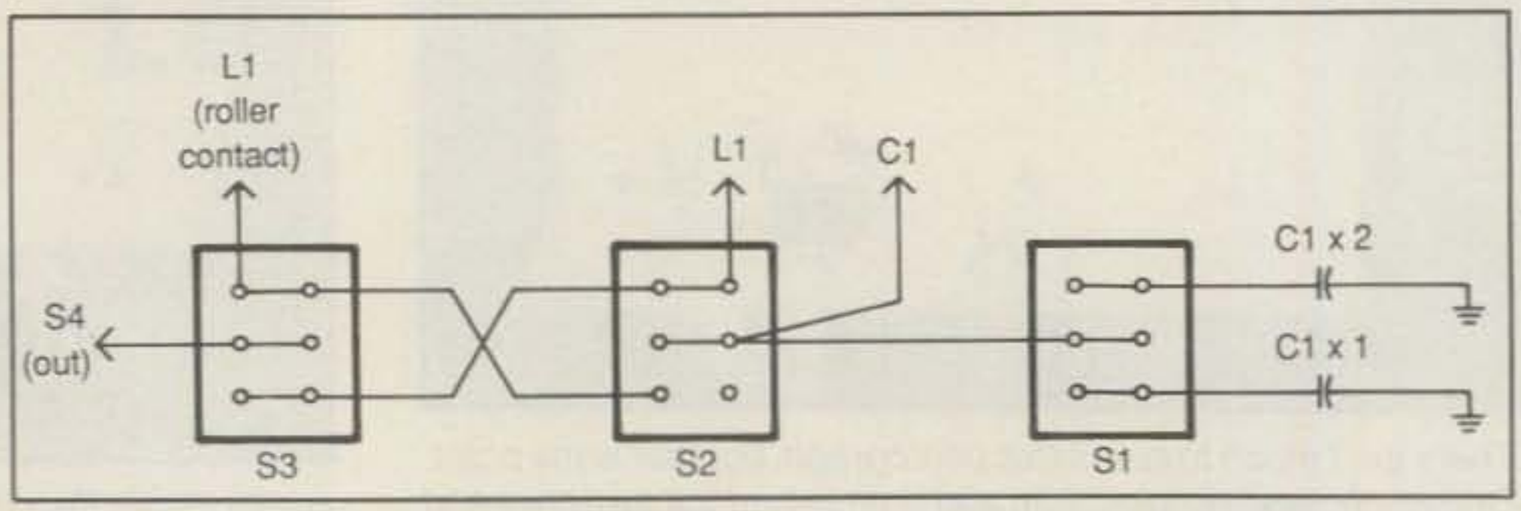


Fig. 5– Rear view of the wiring to S1, S2, and S3 just to illustrate how simple wiring of the tuner can be made.

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CR-64 High stab. ref. xtal (745/751)	63.00	
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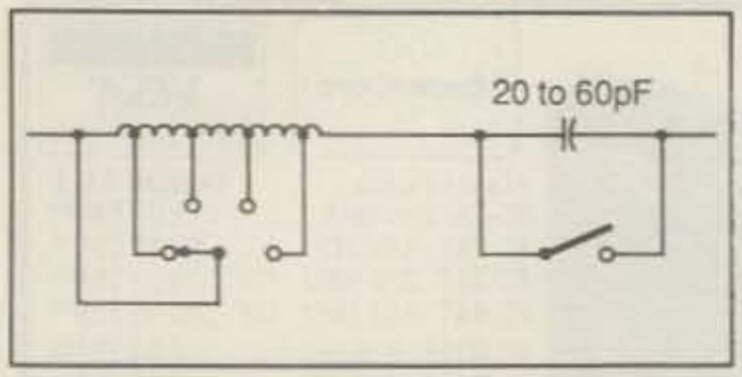

Fig. 6– A classical trick to "magnify" the tap positions on a fixed coil is to switch a small capacitor in series. However, not just any capacitor can be used, as is mentioned in the text.

0–180 scale or via a vernier drive, it is generally unnecessary to have a turns-counter dial on L1. This greatly simplifies construction and the front-panel layout. S2, S1, and C1 are preset to previously determined settings for an approximate SWR minimum at an operating frequency, L1 adjusted for the near final SWR minimum, and C1 adjusted for the final SWR minimum.

Using S5 to develop additional matching possibilities adds only the minor logging complication that its setting has to be also recorded in relation to all the other switch/control settings. However, if the networks of fig. 3(A) or 3(B) are set up, something to watch for is that false resonances do not occur where the transceiver essentially pours a major amount of its power output into the tuner's LC network rather than into the antenna load. The problem does occur at times with all T-networks, and it is deceptive since the input SWR to the tuner will indicate a perfect 1:1 SWR. About the only thing one can watch for is that the coil in the tuner does not heat up excessively.

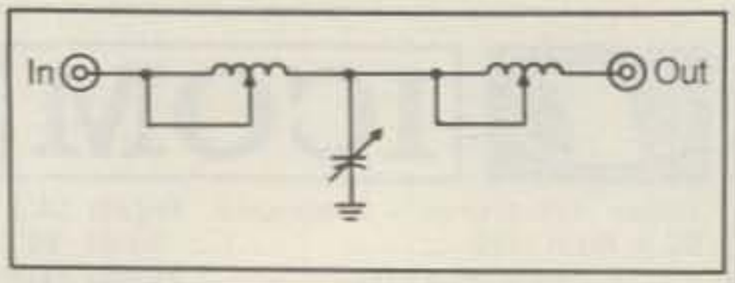

Fig. 7– If you can find two roller inductors and like to operate on the lower frequency bands, 40/80/160, this form of tuner can have some advantages.

Construction Variations

Although a roller inductor offers many advantages in a tuner, and although it's worth the effort to obtain one at a modest price, it may not be worthwhile to pay the new price for such a component since it can range in cost from $30 to $50! An alternative to the roller inductor is, of course, a straightforward switch tapped inductor having the same inductance value as the roller inductor. Suitable tap switches having 12 or more positions are not too difficult to find. However, the problem with such an arrangement is that a disproportionate number of switch positions has to be allocated to tapping every turn or so at one end of the fixed inductor if a wide range of load impedances is to be matched on 10, 15, and possibly 20 meters.

One "trick" solution to this problem is to switch a fixed capacitor in series with the inductor on the higher frequency bands as shown in fig. 6. Switching in the capacitor essentially decreases the coil's inductance value so on the higher frequency bands more of the coil tap positions are useful. The effect is not the same on all bands since the capacitor's reactance varies with frequency, but nonetheless it's an old-fashioned trick which can work quite well. The only thing one has to remember is that the capacitor used has to pass a fair amount of RF current (1.5 amperes or more with a 100 watt transceiver, depending on the antenna load). Therefore, one can't use a "postage stamp" size mica capacitor. It will burn up. Transmitting-type micas or the "doorknob" type of 5 KV ceramic capacitor are suitable. Fortunately, they can be found at very reasonable prices.

If one is particularly interested in operation on the lower frequency bands and comes across roller inductors at a reasonable price, the T-network of fig. 7 may be of interest. Although one does have to watch for false resonances in the tuning of this type of network, it has quite an advantage on 75/80 meters in that only a single capacitor, as shown, will usually suffice to match into a wide range of load impedances. It's not necessary to switch in any capacitors across the variable one, and the only switching needed in the whole tuner, if desired, would be for bypass switching of the tuner or for the selection of different antennas.

The basic tuner described in this article would, I suspect, handle the output of a small linear into loads other than very high impedance ones (e.g., random-wire antennas). However, it was not tested under such conditions. If the tuner is to be constructed for KW output level usage, the toggle switches should be replaced by heavy-duty rotary types. Also, the voltage rating of the variable capacitor used should be at least 3 KV, and the padding capacitors across the variable capacitor should either be transmitting-type micas or 5 KV ceramics of the "doorknob" type (Centralab 750 series). CQ

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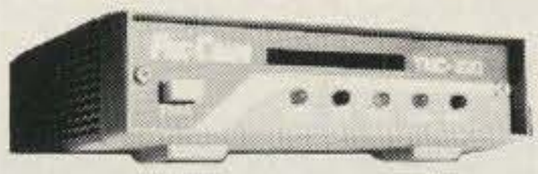

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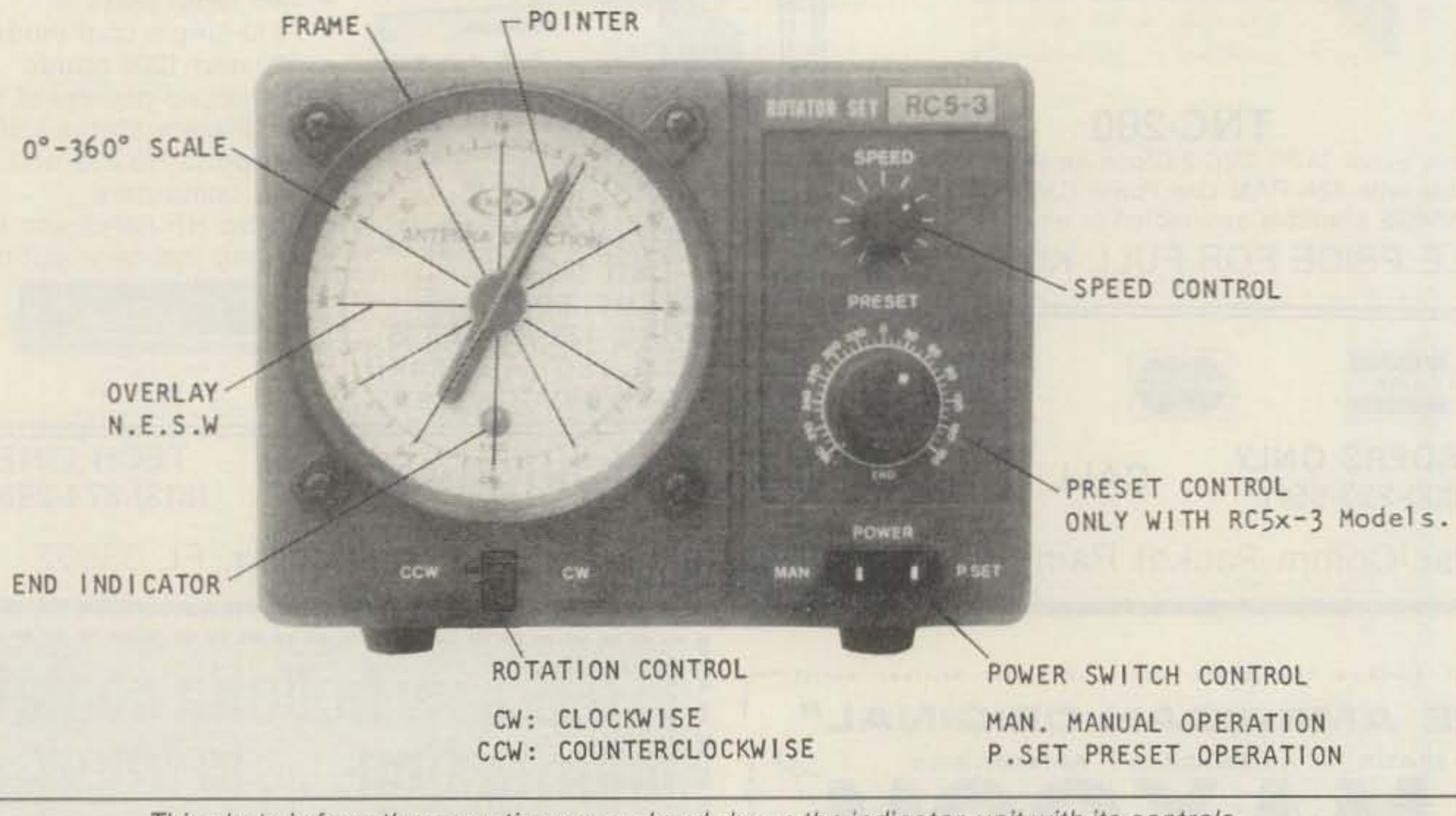
CIRCLE 22 ON READER SERVICE CARD

CQ REVIEWS:

Creative Design RC5A-3 Rotator

BY LEW McCOY, W1ICP

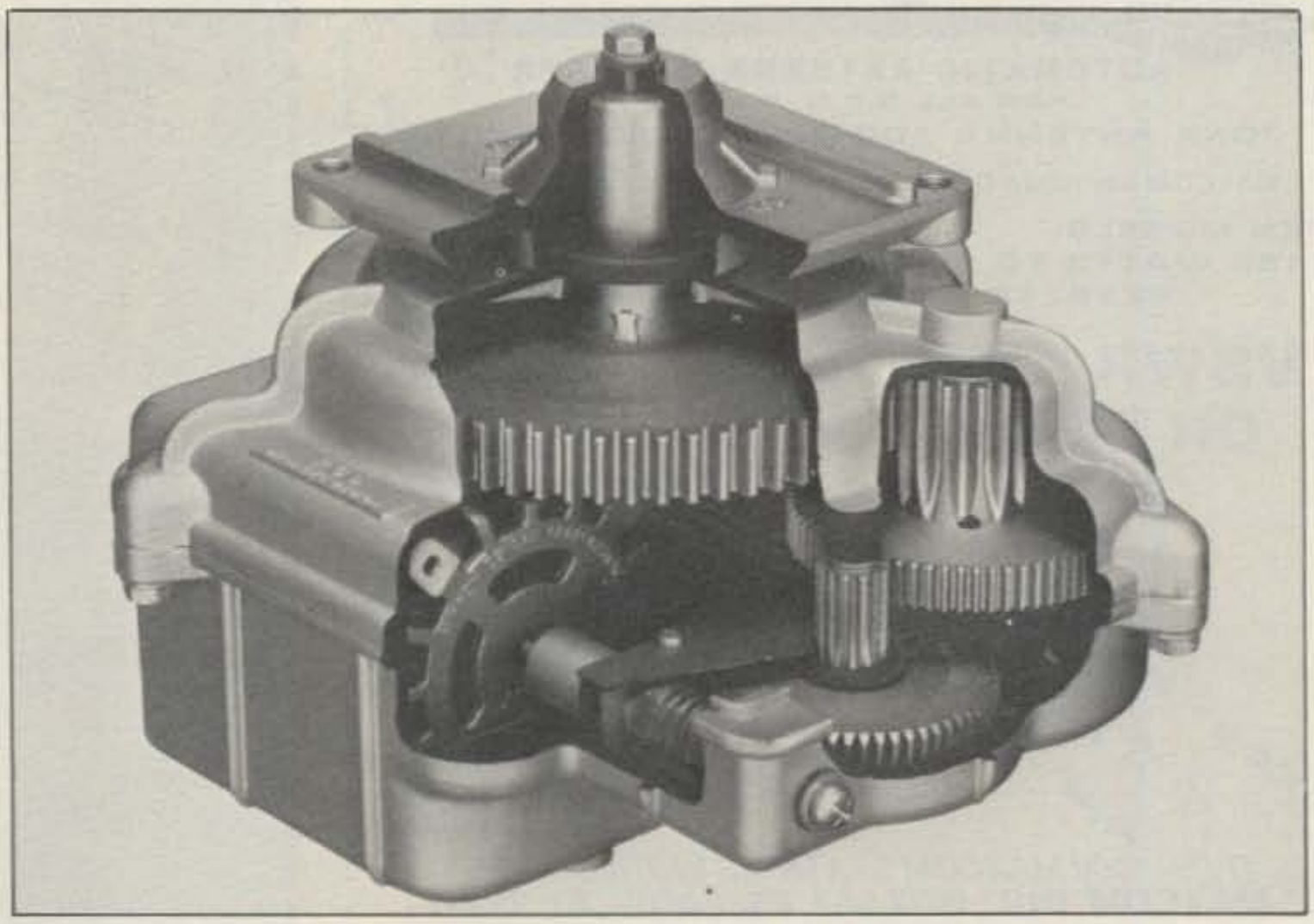


This photo is from the operating manual and shows the indicator unit with its controls.

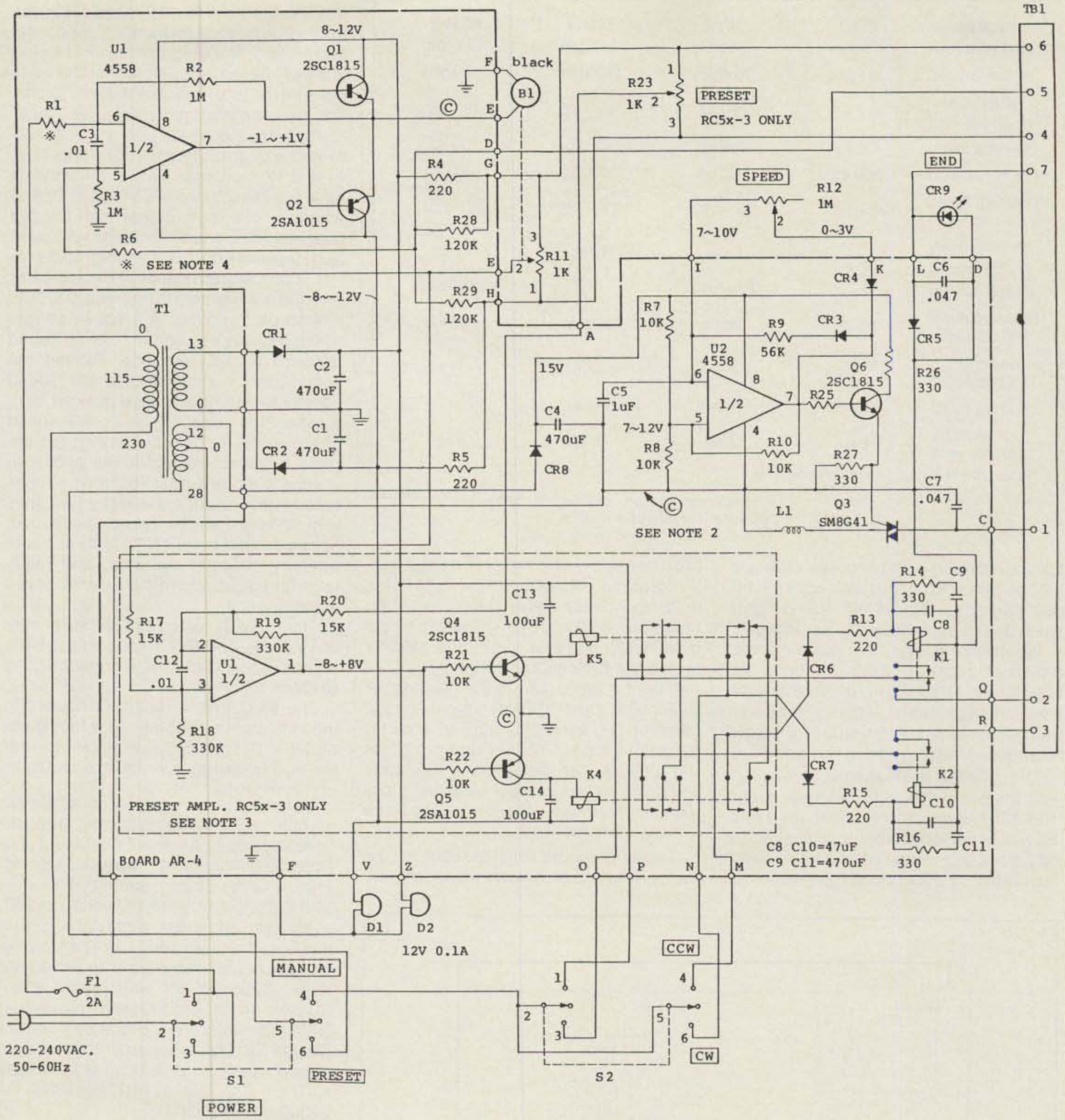
Creative Design Co. Ltd. makes several items in the amateur radio market, including antennas and rotators. I received one of their RC5A-3 rotators for test last fall and have had the unit installed since that time, going through a rather rough winter of high winds and what I would call very tough test conditions. I am located on the Continental Divide at 6400 feet above sea level. My tower is a 60 footer. I support and rotate a variety of antennas, including the DJ6UT 507 series beam, which by itself weighs 66 pounds plus 10 feet of wind loading (no small load).

Included in this review is a cut-away view of the rotor showing the internal gearing. The gears are made of high-tensile-strength special steel. Other parts are zinc alloy or aluminum.

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



A cutaway view of the internal parts of the rotor unit.



NOTE: 1. DIODE CR1 THRU CR8 ARE 10D-1

2. INDICATED VOLTAGE SHOWS BETWEEN C AND EACH POINT

3. RC5A-2 ROTATOR DO NOT HAVE THE PRESET AMPLIFIER CIRCUIT IN A DOTTED LINE

4. FOLLOWING ASTERISK ARE SELECTED INDIVIDUALY AT THE MANUFACTURE

Fig. 1– Circuit diagram of the RC5A indicator control unit. U.S. models have 115 volt AC input.

The initial gear in the RC5 rotors is a 1/60 worm gear which provides quiet and smooth operation and effectively counters any backlash from the antenna. This worm gear is encased in a sealed greased chamber to reduce friction. Broad (30 mm) teeth are used in the final gear, which is the most vulnerable point in the gear assembly. Three-stage reduction takes the speed down to an overall rate of 1/1,800. (More in a moment about the rotor speed rates which are unusual.)

A potentiometer for detecting direction is linked to the rotor shaft and gears. The drive motor is a high-starting-torque, 28 volt AC capacitance motor. If you refer to fig. 2, you will note limit switches S3 and S4 which stop the motor and keep it from

Model No.	RC5-1	RC5-3	RC5A-2	RC5A-3
Rotation torque	6 kg/m	6 kg/m	16 kg/m	16 kg/m
Brake torque	70 kg/m	70 kg/m	150 kg/m	150 kg/m
Mast size (mm)	48 ~ 65	48 ~ 65	48 ~ 65	48 ~ 65
Vertical load	400 kg	400 kg	700 kg	700 kg
Horizontal load	800 kg	800 kg	1000 kg	1000 kg
Rotation speed (sec.) 50 Hz	75 ~ 180	75 ~ 180	75 ~ 180	75 ~ 180
Reversal delay (sec.)	—	1 sec.	3 sec.	3 sec.
Preset control	—	Provided	—	Provided
Required power 120, 230 VAC	80 VA	90 VA	140 VA	150 VA
Indicator accuracy	±5°max.	±4°max.	±4°max.	±4°max.
Control cable	7-core	7-core	7-core	7-core
Weight (Rotator unit)	6 kg	6 kg	8 kg	8 kg

Note: Unit of torque: kg/m = 100 kg/cm

Table I– Specs for the various rotors.

turning more than 380 degrees. (There is a 20 degree tolerance at the end of the full 360 degrees.) The "END" lamp lights when one of the switches is activated.

When considering rotor performance, the most important considerations are braking and rotation torque. Naturally the weight of the antenna, length of the boom and elements, and wind surface area are all important when making this choice.

Creative Design makes several different rotators to fit a wide variety of needs. The RC5A-3 is an extremely rugged rotator with very respectable specifications. It has a braking torque of 150 kg/m which translates to 330 pounds pressure approximately 3 feet (1 meter) from the center of rotation. Rotation torque is 16 kg/m, or 35 pounds at a meter. Before installing the rotator on the tower, I mounted it on a metal wall (side of a truck) and actually tested the braking and turning power—and bent a lot of pipe in the process! A braking torque of 150 kg/m means that a force of 150 kilograms applied 1 meter from the rotor will neither turn nor break the rotor. By the same token, a rotation torque of 16 kilograms means that starting the rotor motor will apply a 16 kg force 1 meter from the rotor.

Table I gives the specifications for the various models of rotators made by Creative. Please note that all specs are given in kilograms (one kilogram = 2.2 pounds) and meters. The weight of the unit I tested is 8 kg (17.6 pounds). Note that the vertical load the rotor will take is over 1½ tons, and the horizontal load is well over 2 tons!

The indicator is excellent, being calibrated in degrees from 0 to 360 plus N, S, E, and W markings. Two of the models have a preset control (RC5-3 and RC5A-3) whereby one can preset the desired beam heading and the antenna will rotate and stop at the desired heading. This control is on the front panel of the indicator unit and is calibrated in degrees, 0 to 360.

Also on the panel is a speed control which permits setting the rotation speed from 75 to 180 seconds. Turning the speed-control knob causes the speed control to vary the voltage derived from a triac. This changes the overall speed of the motor turning by varying the periods of motor rest, not the speed at which the motor actually turns when powered. Rotor rotation therefore becomes less constant as the speed is reduced. Speed control is thus different than with ordinary rheostat systems, and maintains full torque and reliable starting even at low speeds.

The POWER switch can be set for either MANUAL or P.SET. In addition, there is a lever-type switch which provides CCW or CW rotation.

The electronic circuitry is housed in the indicator unit cabinet. This measures 6½"W × 5¼"H × 5¼"D. A seven-wire cable is required to connect the indicator unit to the rotor.

I was pleased to see how complete the manual was, even including troubleshooting information. Incidentally, Table I may be confusing to the reader with reference to the power required. The units sold in this country are 117 volts, not 230.

My own personal conclusion is that this is a very high-quality rotator which is extremely well-designed. The prices are RC5-1 $253, RC5-3 with preset $350, RC5A-2 $415, and RC5A-2 with preset $474. The rotors are made by Creative Design Co. Ltd. in Japan and distributed through dealers in this country by ORION Hi-Tech, P.O. Box 8771, Calabasas, CA 91302 (213-663-2541). CQ

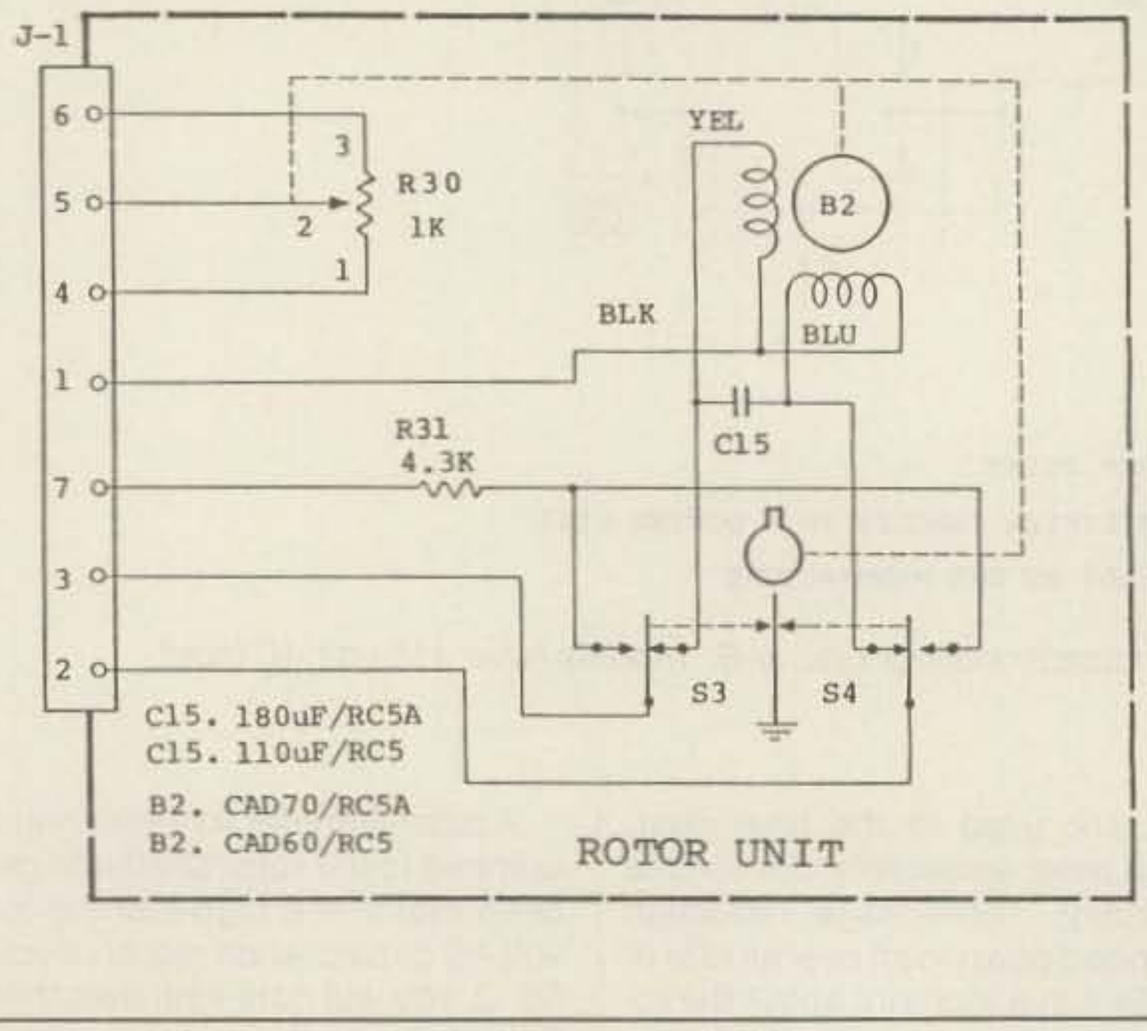


Fig. 2– The rotor unit circuit.

You don't need much to put this antenna together. It's an ideal space saver that will give you hours of enjoyment.

The Simple, Cheap All-Band Antenna

BY JERRY FELTS*, NR5A

When the new WARC bands came out, I wanted one simple antenna to cover all bands. It had to be cheap because of my limited budget, easy to construct, not require an antenna tuner, and perform fairly well. I needed one antenna to cover all HF bands. Because I'm in the military, I also have antenna restrictions on base.

*202 Frank Ave., Ellsworth AFB, SD 57706

My commercial vertical works great, but its drawback was limited bandwidth, and it only covered four bands, so it had to go!

Description

The antenna is nothing more than a ¼-wave vertical ground mounted with clip-on extensions to cover any other bands you want. The extensions are lengths cut to equal a quarter wave for the desired band with an alligator clip on one end. The band extensions are clipped on the end of the 10 meter vertical element and then hoisted up by a small rope. The other end is supported by a tall support such as the house, a tree, or tower. I'm a short person, and band changing is no problem for me, as a step ladder isn't needed.

Construction

Figs. 1 and 2 will help you in constructing the antenna. A 6 foot piece of 1″ × 1″ wood is fastened to a 4″ × 12″ × ½″

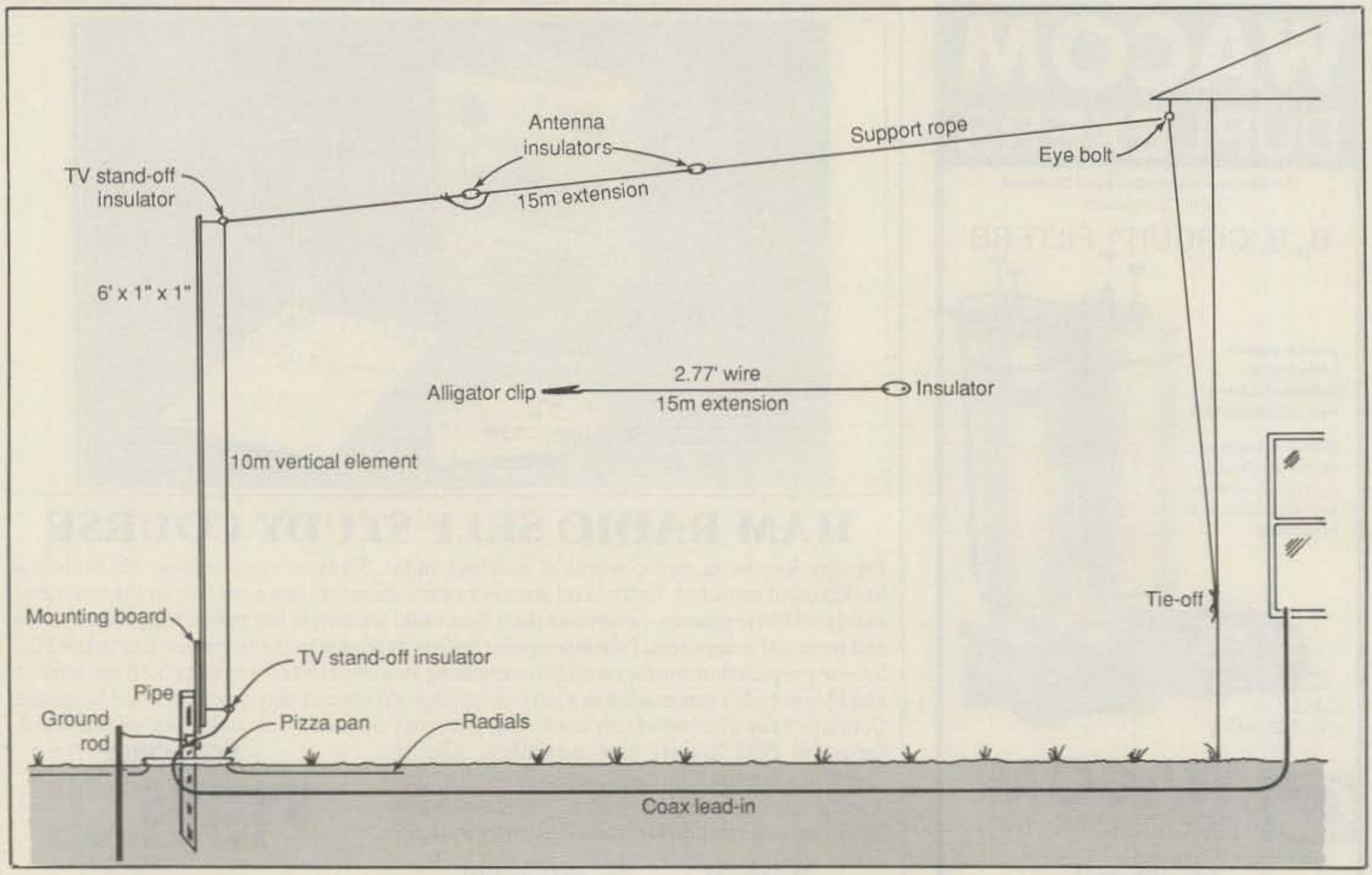


Fig. 1– General layout of the antenna system set up for 15 meter operation.

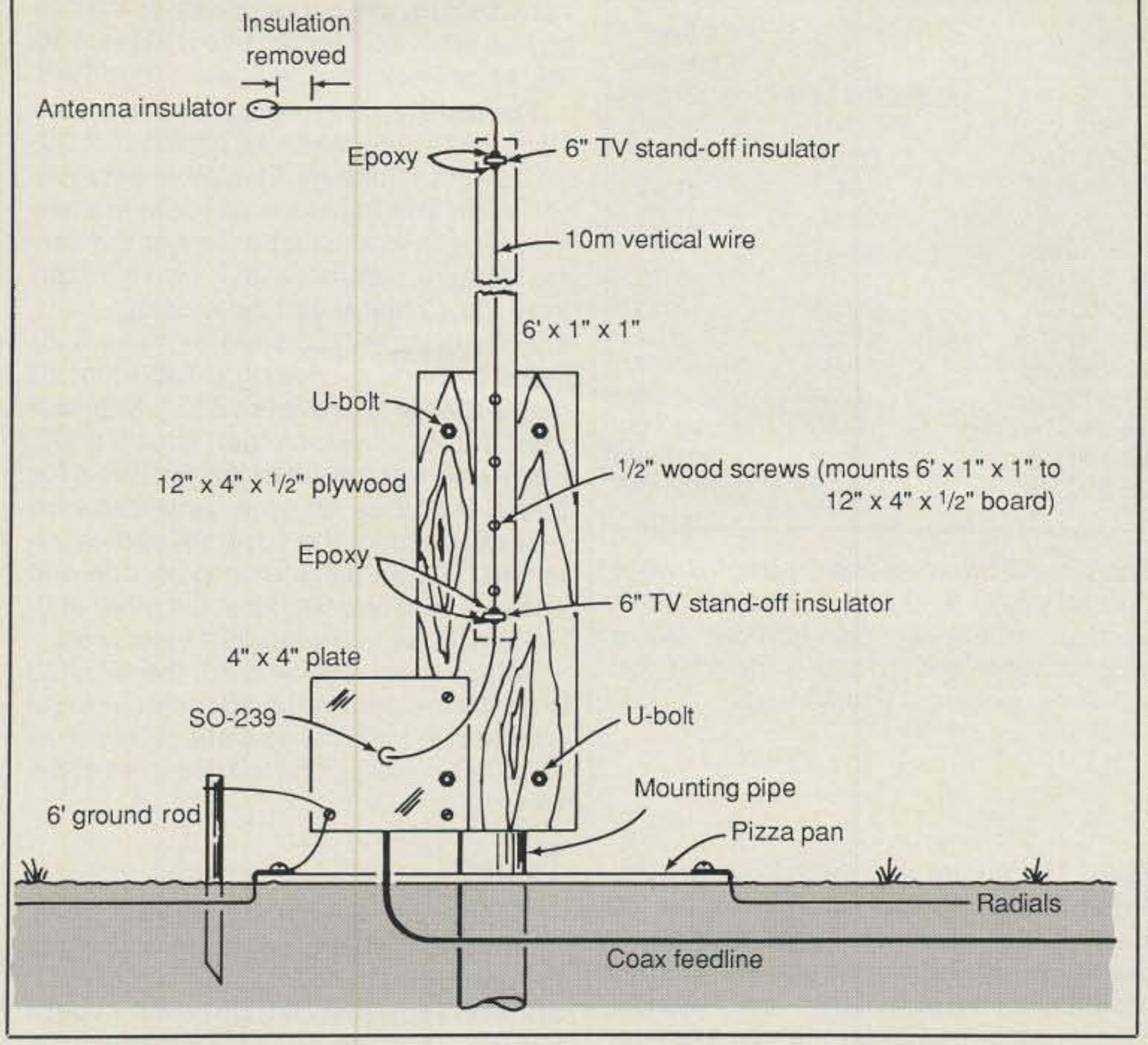


Fig. 2– Vertical antenna mounting board details.

piece of plywood with four 1½ inch wood screws. A coat of varnish is applied to the wood to help protect it from the weather.

Two 6 inch TV stand-off insulators are screwed into the 1″ × 1″ piece of wood, one about 1 inch from the top and the other 1 inch from the bottom.

I mounted my vertical to the existing pipe that used to hold my old commercial vertical with two u-bolts, one placed at the top, and one at the bottom of the mounting board. The mounting board is about 1 inch above the ground.

Next cut a piece of aluminum about 4″ × 4″; size is not critical. Drill a hole in the center of it to accept an SO-239 chassis mount coax connector, and mount the connector. Drill a hole in the lower left corner of the aluminum plate to accept a ¼ inch nut and bolt; this will be for the

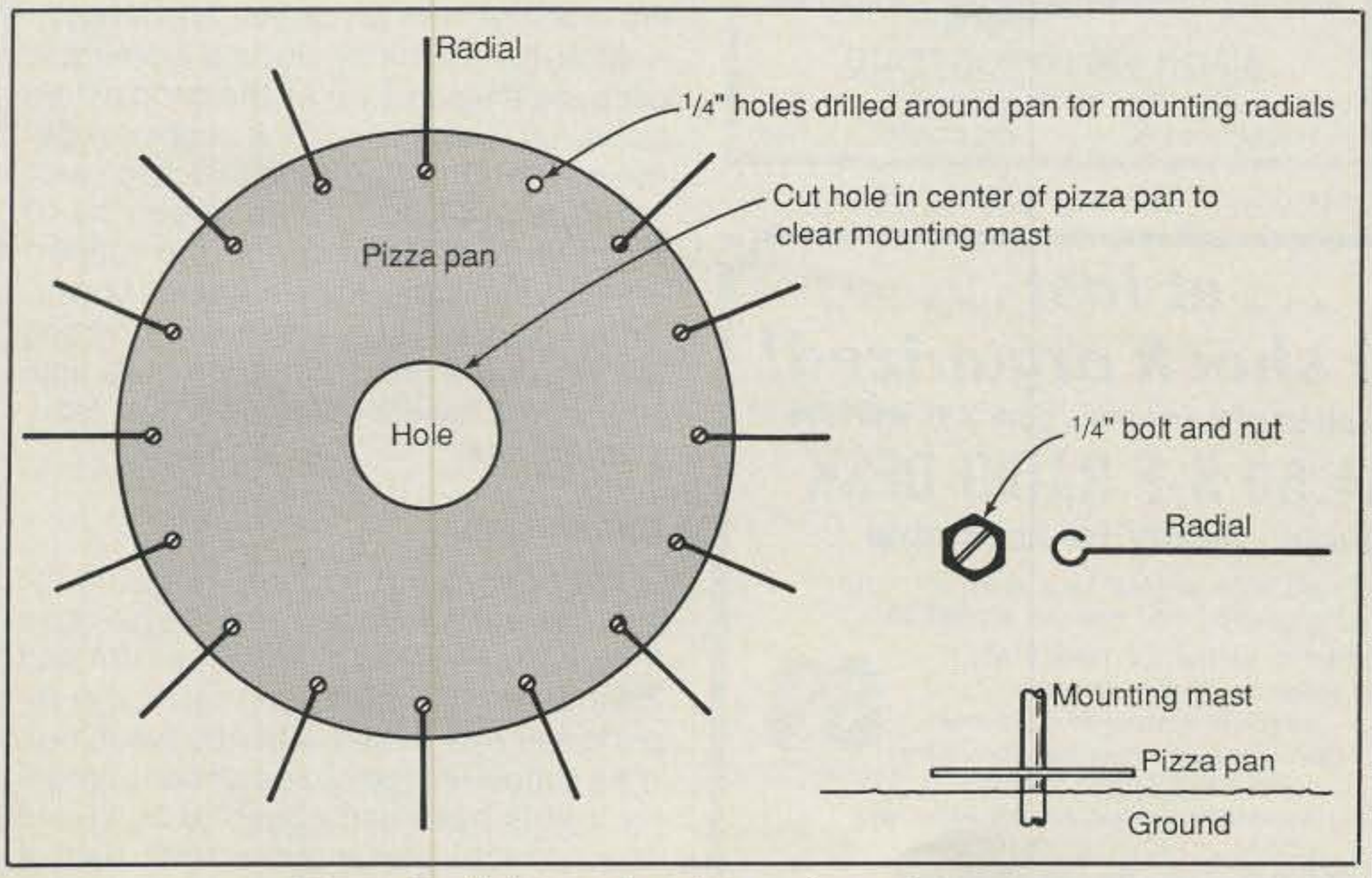


Fig. 3– Radial mounting plate using a pizza pan.

ground wire system. Drill two holes to accept ½ inch wood screws on the aluminum plate, and fasten it to the mounting board.

Since the antenna works against ground, it must have some type of ground system to operate properly. The very minimum ground system I would use would be a 6 foot copper ground rod driven in the ground. I used the ground system left over from my old vertical, which consists of 20 radials buried 1 to 2 inches under the ground. They are attached to a pizza pan with a hole cut in its center, then placed over the mounting pipe and laid on the ground (see fig. 3). Put a ¼ inch nut and bolt in the lower left corner of the aluminum plate, wrap a turn of #8 aluminum wire around this, and tighten. The other end of the aluminum wire is attached to your ground system. Any size of heavy wire will do for the ground system.

For the actual vertical itself you can use just about any kind or size wire you wish. I used #12 insulated wire on mine. Cut a piece 9 feet long. This will become the ¼-wave 10 meter vertical. At one end remove about 1 inch of insulation and solder it to the center connection of the SO-239 coax connection. Thread the other end through the bottom TV stand-off insulator and pull it through, leaving a little slack. Mix and apply a liberal amount of epoxy around the top and bottom of the TV stand-off insulator. This will hold the wire tight and in position. When it has dried, run the wire through the top TV stand-off insulator and pull it tight. Apply epoxy just like you did for the bottom insulator. Make sure you keep it fairly tight. When the epoxy has dried, take the top end of the wire and remove about 9 inches of insulation. Attach an antenna insulator to the end of the wire. Twist the wire around the insulator and make sure you have about 1 inch of bare wire showing, enough on which to place an alligator clip. You can buy the insulators, or make them out of scrap pieces of plexiglass. How big they are isn't really important. Attach a small rope to the other end of the insulator (I used ⅛ inch nylon rope for mine.) and run it to your end support. Like I said before, use a tree, tower, or the eve of your roof. Just try to keep it at least 10 feet above ground. The higher the better!

MHz	¼ Wave Length (in feet)	Band Extension Length (in feet)
3.700 CW	63.24	54.92
3.900 SSB	60.00	51.68
7.100 CW	32.95	24.63
7.250 SSB	32.27	23.95
10.125 CW	23.11	14.79
14.050 CW	16.65	8.33
14.300 SSB	16.36	8.04
21.100 CW	11.09	2.77
21.300 SSB	10.98	2.66
24.940 CW/SSB	9.38	1.06
28.100 CW	8.32	Not used
28.550 SSB	8.19	Not used

Table I– All band extension lengths were figured using 8.32 feet as the 10 meter vertical element. One-quarter wave lengths were figured using the formula: length = 234/f(MHz).

The last step is to make the band extensions units. I've made extensions for 30, 20, 15, and 12 meters. Decide what bands you want and then look at Table I to see how long they should be. To get the correct length, subtract the ¼-wave length from the 10 meter vertical element.

For example: You want to make a 20 meter extension. Looking at Table I for 20 meter CW, a ¼ wave is 16′9″. Subtract from that 8′3″, which then equals 8′6″. Cut the wire about 1 foot longer; this is for tuning purposes. Use the same size wire that you used for the 10 meter vertical element. Put an alligator clip on one end and an antenna insulator at the other end. Do this for as many bands as you wish.

Attach your feedline to the SO-239 coax connector on the 10 meter vertical element and run it to your shack. My coax is buried in the ground to keep it out of the way.

Tuning

Connect an SWR meter to your transmitter and the feedline. Tune your rig to the part of the band that you want to operate, and apply just enough power to get a full-scale reading in the forward position. Now check and see what the reflected power is. Since the 10 meter vertical element and extension unit have been cut long, you will need to trim them for minimum reflected power. I was able to get mine down to 1.4:1 or less on all the bands that I use.

Go out to the 10 meter vertical element and lower the support rope. Trim 1 to 2 inches off the end at a time, making sure you leave about an inch of bare wire at the end of the antenna insulator. Pull the support rope tight again and then check for minimum reflected power. Repeat this as often as necessary until you get the readings with which you are happy.

After the 10 meter vertical element is done, do the same for all the band extensions you made. Lower the support rope. Attach the end of the band extension with the alligator clip to the bare wire on the 10 meter vertical element. Pull the support rope tight and check the reflected power. Once again repeat this process, trimming the end of the band extension units until you get the lowest reflected power readings you can.

Conclusion

I've been using this antenna system for about six months, and it gets the job done for me. I've worked all over the USA and several DX countries. Average signal reports are 579 to 599 with 100 watts out. It's a simple limited-space all-band antenna that is easy and cheap to build and doesn't require an antenna tuner. Best of all, it works! Try it. I think you will like it. CQ

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Ingenuity is not dead or even missing. KA0RUM, a recently licensed amateur, delves into the mystery of wire antennas and comes out a winner.

An Easy-To-Build All-Band Vertical Antenna

A Driven, Phased Array That Needs No Radials

BY PHIL MORGAN*, KA0RUM

Many years of antenna experimentation by amateurs have produced an endless parade of designs in various publications and reference materials. Licensed only three years, I have shared the bewilderment of hundreds of new amateurs confronted by this myriad of schemes and information.

To dispel my confusion I began to study as much authoritative material on antennas as I could find. Much I did not understand, something else I share with most fellow amateurs I'm sure, but some of it began to soak in and from this study emerged the antenna described here. It's a compromise design, to be sure, but it has many attributes, notably:

1. Operates on all HF bands plus 160 meters
2. Low radiation angle
3. Gain
4. Moderate steerability
5. Compactness
6. Inexpensive and easy to construct

The only limiting factor is the need for a couple of 45 foot (13.7 meter) high supporting structures such as towers, masts, houses, or as in my case a couple of tall trees.

Through my reading I came to realize there are only two basic designs from which all antennas are derived. The variations are endless, some simple and some complicated, but all relate back to either the dipole or the simple end-fed wire. Most end-fed variations can be difficult to match and can lead to problems with feedline radiation and RF in the shack. So what remained, in my opinion, was the old-fashioned dipole. However, obtaining low radiation angles with a dipole at the

*RR 4, V-42, Lake Lotawana, MO 64063

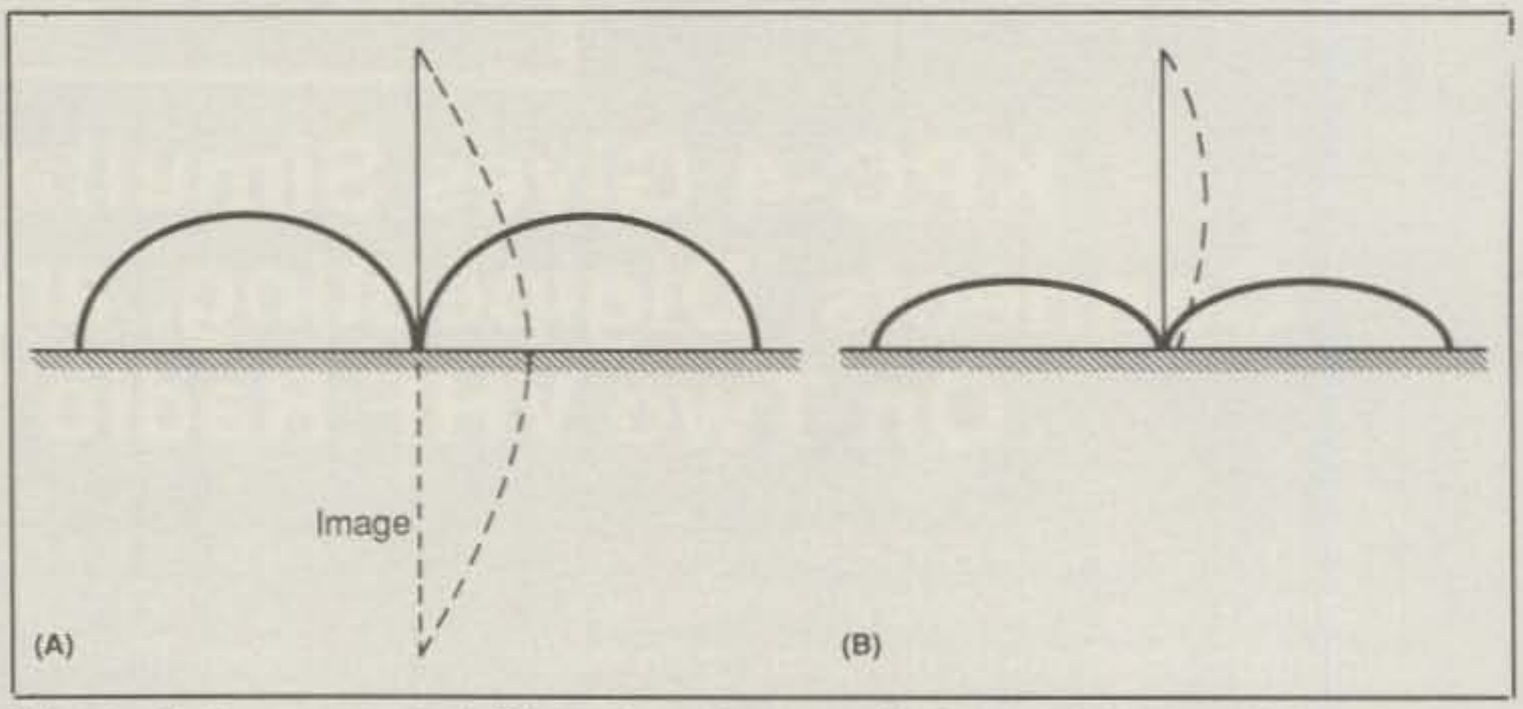
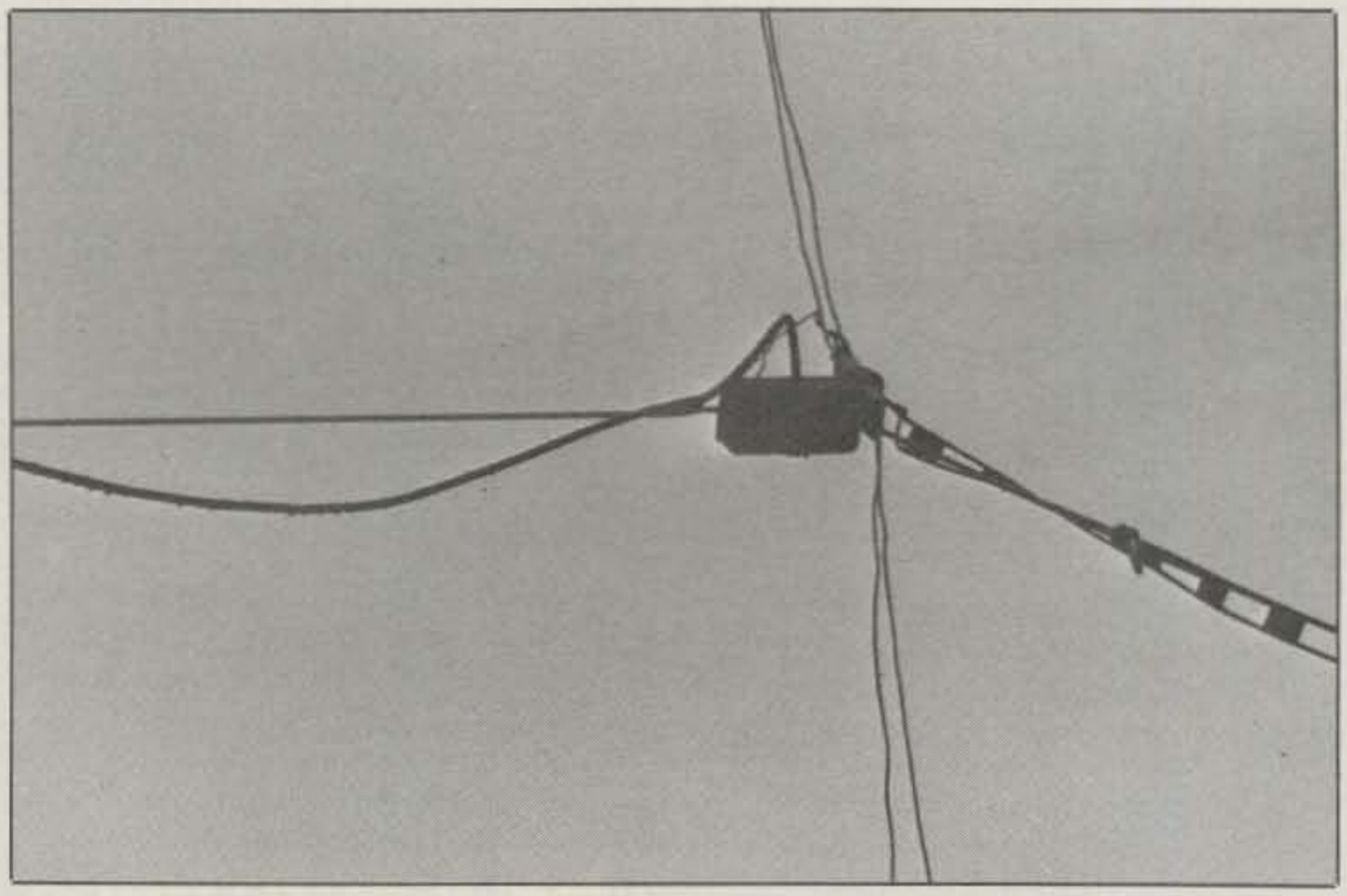
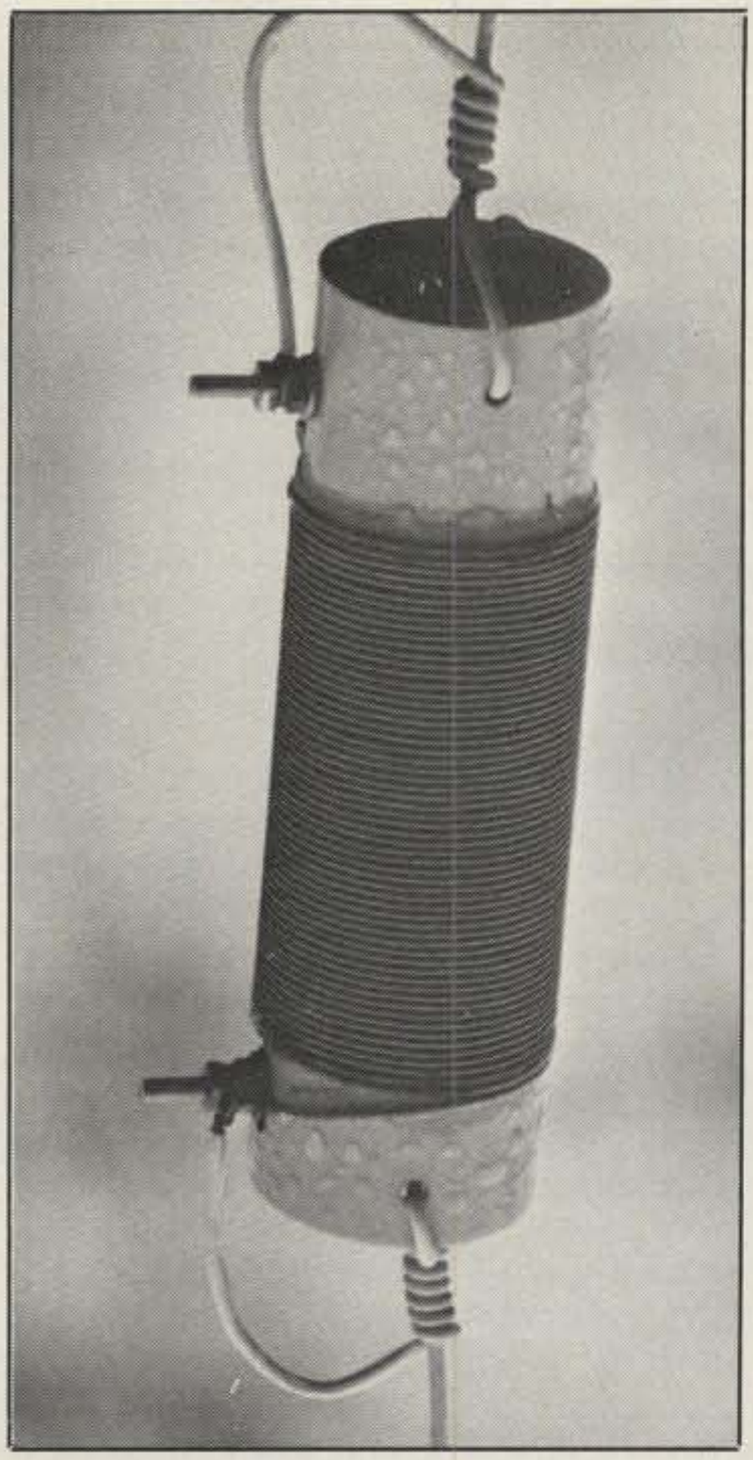


Fig. 1– Half-wave vertical (B) produces lower radiation angle and maximum current point at higher elevation than does quarter-wave radiator (A). No radial system is required for the half-wave vertical to operate effectively.



The phase control relay box is mounted at the feedpoint of one dipole and controlled by 12 volts switched at the operating position.



The 80 meter resonator is constructed of 1½ inch (3.75 cm) PVC pipe and close-wound with No. 18 insulated hook-up wire. No. 8 hardware secures the ends of the coil and the antenna elements.

The all-band phased array installation at KAØRUM. The top support is nylon rope stretched between the tops of two high trees. The bottoms of the dipoles are weighted by concrete blocks with screen-door springs to relieve wind stress. Feedpoints are held apart by additional nylon cords pulling away from the center of the array.

lower HF frequencies requires supporting structures too high to be practical for many amateurs. Getting an 80 meter antenna up the necessary ½ wavelength would call for a tower or mast approximately 130 feet (39.6 meters) high, 65 feet (19.8 meters) high for 40 meters.

For most of us the answer to this problem has been the ¼-wave vertical in one of its several variations. But proper performance of the ¼-wave vertical does require radials of sufficient length and numbers for adequate current-gathering capacity. Recommended lengths are usually at least ¼ wave long for the lowest design frequency of the antenna, and this can take up a lot of space, a commodity in short supply on the average city lot.

There *is* a vertical antenna that does not need radials to perform well, possesses even better radiation angle than the ¼-wave vertical, and needs no complicated matching device to link it to the transmitter. I am referring to the simple ½-wave dipole stood up on its end in the vertical format (fig. 1).

Realizing that an 80 meter ½-wave vertical would also require a mast or tower an impractical 130 feet (39.6 meters) high, I began to search for a loaded, shortened dipole antenna to reduce this height.[1]

"Lo-and-behold," there was Bill Fanckboner, W9INN, with just such a design in his "space saver" dipole which measures only 46 feet (14 meters) long and can be used on all bands, 10 through 80 meters. Employing a combination of loaded and parallel dipoles with a common feedpoint, Bill has created an antenna which resonates naturally on the 15, 20, 40, and 80 meter bands and, with a transmatch, works very well on *all* of the HF bands.

My variation, described here (fig. 2), differs in that it resonates on 10, 20, 40, and 80 meters and is 5 to 6 feet (1.5 to 1.8 meters) shorter by virtue of the 80 meter elements being folded back on themselves. This narrows the operational bandwidth on both 40 and 80 meters, but this is of no importance when used with a transmatch and low-loss feeder.[2] It also operates very well on 12, 15, and 30 meters with the use of a transmatch.

My support-structure height requirements now were down to about 45 feet (13.7 meters), and a nylon rope thrown over the top limbs of a tall tree in my front yard did the trick. This antenna performed remarkably well on all bands, and substitution of 450 ohm twin feeder for the coax allowed operation on the 160 meter band.[3]

Next I began looking for an inspiration on how to improve my new baby. Turning to the *ARRL Antenna Book* section on driven arrays,[4] I learned how to turn the simple vertical dipole into a driven array with the capability of radiating either end-fire or broadside.

A second "space saver" dipole was built and I tuned it to match the first one. The nylon support rope was then strung between the tops of two tall trees, and the second antenna was hung with the center feeds separated and connected by 33 feet (10 meters) of 450 ohm twin line (fig. 3). The balanced feeder from my transmatch was attached at a spot exactly halfway between the antennas and brought away from the feedpoint perpendicular to the plane of the array for a distance of about 30 feet (9 meters) before running off toward my shack.

Using Radio Shack parts, a simple control can be constructed to invert phase. A double-throw, double-pole, 12 volt relay (fig. 4) with points rated at 10 amps is mounted in a weatherproof plastic box

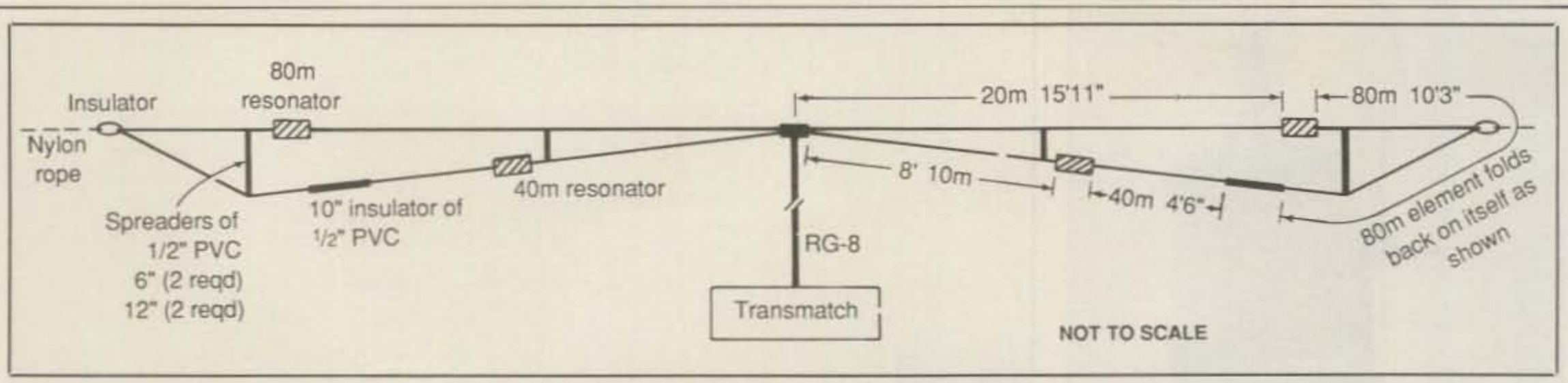


Fig. 2– The KA0RUM version of "Space-Saver" dipole is only 40 to 41 feet (12.2 to 12.5 meters) long and is naturally resonant on 10, 20, 40, and 80 meters. With a transmatch it will tune all HF bands with good effectiveness.

at the feedpoint of one antenna. A 12 volt plug-in power supply provides the energy, through a push-button switch at the operating position, to change the array from 180 degrees to 0 degrees phase difference, thereby altering the radiation pattern.

As most amateurs are aware, by virtue of the placement of the amateur bands in the spectrum, the same 33 feet (10 meters) of separation which works out to ⅛ wavelength at 80 meters is also ¼ wavelength on 40 meters, ⅜ wavelength on 30 meters, ½ wavelength on 20 meters, ¾ wavelength on 15 meters, ⅞ wavelength on 12 meters, and 1 wavelength on 10 meters. With this in mind, a quick glance at the H-plane patterns in chapter 6 of the *ARRL Antenna Book* will give you some idea of the radiation patterns available on all the different bands with switchable 0 and 180 degree phasing. There is also a bonus of some gain, differing in amount depending on the phasing and frequency used.

Construction of the shortened dipole is pretty straightforward. Approximate wire lengths are given in fig. 2. Tuning may vary in accordance with personal preference and local conditions. The 40 and 80 meter sections will interact, so check resonance frequency of both elements each time you adjust either one. All materials for these antennas are readily available from your local hardware and electronic-supply stores.

Forms for the 40 and 80 meter resonators are of 1½ inch (3.75 cm) rigid PVC pipe with 6 inch (15 cm) outer circumference. The 80 meter resonator form is 6½ inches (16.25 cm) long, with 60 close-wound turns of number 18 insulated hookup wire. For the 40 meter resonator use a form 4½ inches (11.25 cm) long and 30 turns of wire. I use a couple of coats of clear acrylic on the coils to help them resist deterioration from the weather. The two spacers which separate the ends of

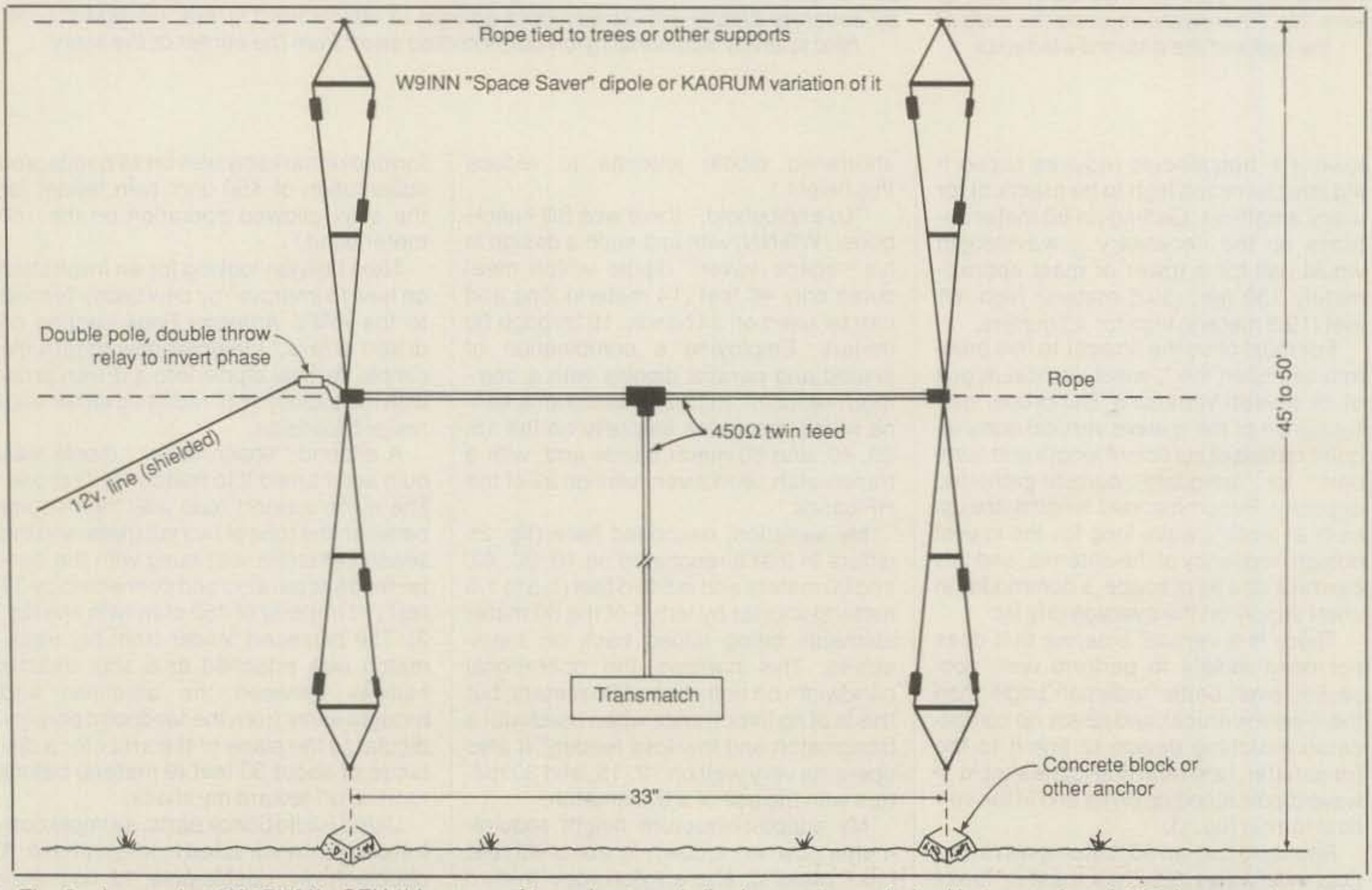


Fig. 3– As used at KA0RUM's QTH this array of two shortened dipoles can be switched between 0 and 180 degrees phase difference to alter radiation patterns. Gain ranges from 0.2 dB to 4.9 dB over a single dipole. Multiple lobes show up at higher frequencies.

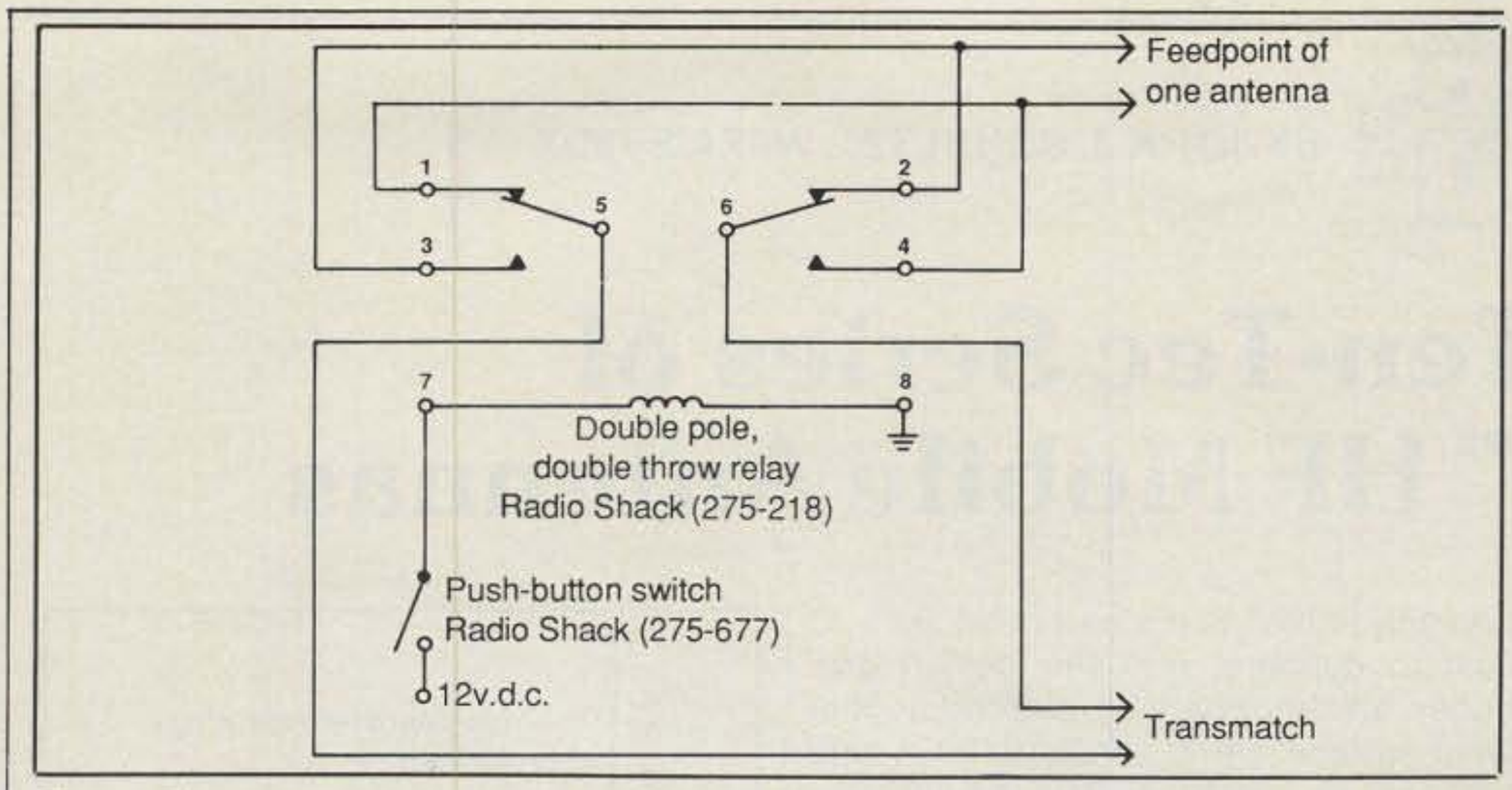


Fig. 4– Phase switching relay is mounted in plastic box (Radio Shack 270-220) at feedpoint of one dipole. Twelve VDC is supplied from plug-in battery eliminator (Radio Shack 273-1652) through single-pole switch mounted at operating position.

the 40 and 80 meter elements and which hold the parallel elements apart are made of ½ inch (1.25 cm) PVC pipe. Ordinary antenna insulators were used at the feedpoints and the ends to attach the ropes. In addition to the heavy nylon rope I used to support the two antennas, ¼ inch (6.25 cm) nylon cord was woven through the webbing of the twin-feeder for extra support. The bottom of each antenna was tied to a screen-door spring and to a concrete block for weighting. This spring relieves some of the stress from winds.

Both the original W9INN antenna and the shorter KAØRUM version can be ordered directly from the manufacturer already assembled and tuned. But if you prefer to build the variation described here and plan to use more than the normal 100 watt output of most of today's solid-state transceivers, you may want to acquire the sturdier and better insulated resonating units from the manufacturer.[5] My home-brew resonators have not been tested at powers higher than 100 watts.

How does it work? Well, much better than I dared to hope. Low-angle radiation gives good DX results even in this period of very poor propagation. Operating barefoot 10 through 80 meters with my ICOM IC-745 and a Heathkit SA-2060 transmatch, the signal reports to me by other stations using amplifiers are usually equal to or better than my reports to them. This array consistently outperforms my ¼-wave trap vertical and my 4-band ground-fed sloper. With this antenna system, even barefoot, if you can hear 'em you can probably work 'em. Many of my QSOs have expressed surprise when they discover I'm not using an amplifier. The limited 40 and 80 meter bandwidth of the single "space saver" dipole is not a problem with this array and transmatch combination.[2]

And, would you like another bonus? Try tying the two sides of the feedline together and connecting them to the single wire output of a wide-range transmatch.[3] You'll discover, as I have, a really fine 160 meter radiator which has helped me get my share of 59 reports right in there with the big boys and their amplifiers.

I have a more substantial nonmetallic support structure in the planning stage. You may have your own ideas for avoiding the instability of trees blowing in the wind. I call it the 80 meter jig. However, I would avoid use of a metal tower or mast if possible. Someone with more expertise than myself will have to speculate on the effect of a nearby metal structure on this system.

Total cost of this antenna system, as outlined, amounted to less that $90 including rope, feeder, wire, insulators, PVC pipe, 12 volt power supply and relay, etc. All was purchased new. But if you have a well-stocked junk box, you can probably build it a lot cheaper.

There is nothing new about this antenna. It uses information readily available in current reference materials in just a little different configuration. IT WORKS!

Thanks to Bill Fanckboner, W9INN, for his patience and helpful counsel in bringing this antenna project and report to fruition.

References

1. "Off-Center-Loaded Dipole Antennas," *The ARRL Antenna Book*, 1983, chapter 10, pages 5–6.

2. "The Conjugate Match and the Z_0 Match," *The ARRL 1986 Handbook For The Radio Amateur*, chapter 16, pages 10–11. J.M. Haerle, WB5IIR, *The Easy Way, HF Antenna Systems*, 1984, Overtones Inc., pages 1–11. W. Maxwell, "How Does a Transmatch Work?", Technical Correspondence, *QST*, March 1985, pages 45–46.

3. J.M. Haerle, WB5IIR, *The Easy Way, HF Antenna Systems*, 1984, Overtones Inc., page 96.

4. *The ARRL Antenna Book*, 1983, chapter 6, pages 4–14, chapter 8, pages 10–11.

5. W9INN Antennas, P.O. Box 393, Mt. Prospect, IL 60056, set of 4 resonators for one dipole: $40.

CQ REVIEWS:

BY JOHN J. SCHULTZ*, W4FA/SV0DX

The Ten-Tec Series of "Ultimate" HF Mobile Antennas

Ten-Tec tends to label their products with rather lofty sounding names. I would not disagree that the performance of their products lives up to the names, but they are not always physically descriptive. My impression upon unpacking some of the "Ultimate" HF mobile antenna units was that a name such as "Super Slim-Jim's" would be more descriptive. The Ten-Tec mobile antennas are certainly a departure from the rather heavy stainless steel designs with either base or quasi-center loading that have been around for years. They are also a departure from mobile antennas which utilize helical loading throughout their entire length. Both of these mobile antenna designs have disadvantages in that they are prone to mechanical damage (unless folded down, for example, when a vehicle enters a low overhead garage area) and that partial damage of the antenna (e.g. hitting a low tree branch) may spell the end of the whole antenna. Their wind resistance may also be high enough so they sway at high vehicle speeds and depending upon their capacitance change with respect to a vehicle's body, shift resonance.

Ten-Tec's design approach to their line of *single-band* mobile antennas is illustrated in fig. 1. If you examine the dimensions noted, my use of the expression "Super Slim-Jim's" should become clearer. Table I is a listing of the antennas available and accessory items.

The base section of the antennas consists of a stiff fiberglass rod section of very small diameter which has an internal loading coil spread out over its length. It is topped off by a very slim, tapered VHF-type stainless steel whip element which provides "top loading" and brings the whole antenna into resonance on any given band. Electrically, this arrangement means that the current distribution on the antenna is in between that associated with base loaded and center loaded designs. The current maximum is brought up along the length of the antenna more than with base loading but not quite as much as with center loading. Physically, however, the design allows for the easy replacement of the top section only, which is the part most likely to sustain damage, and the design produces an antenna with extremely little wind surface. So, it seems to be a nice balance of electrical and mechanical compromises (I hate to use that word but it is a truism for any mobile antenna).

The actual construction of the antennas has to be rated as excellent. The fiberglass bottom section has stainless steel fittings—a standard ⅜ inch × 24 threading at one end and a ring at the other end which contains a set screw to secure the top whip section in place. The whip section can be moved in and out of the bottom section about 6 inches for tuning purposes. The bottom section is helium filled and sealed as a protection against corrosion and to eliminate possible electrolytic action between the metal of the loading coil and the stainless steel end fittings.

The very light weight and relatively inconspicuous appearance of these antennas allow them to be mounted on a vehicle in locations one would probably not consider with conventional HF mobile antennas. The best place to mount a mobile antenna is, of course, on the roof of a ve-

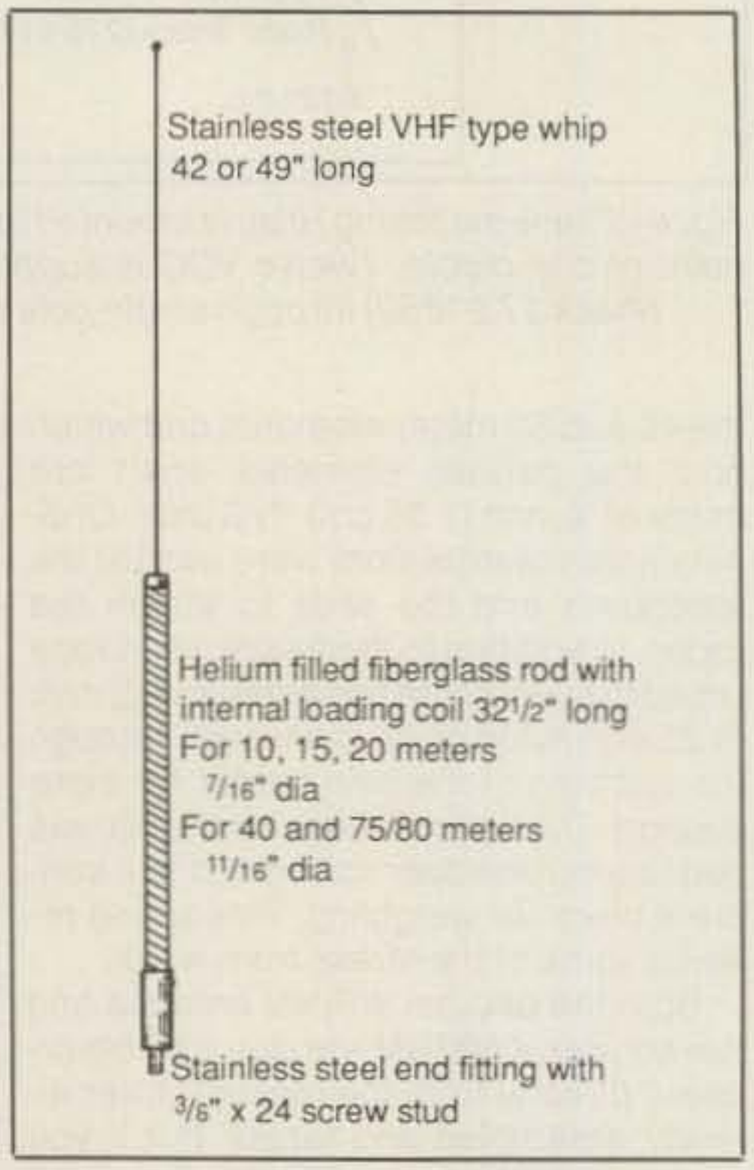


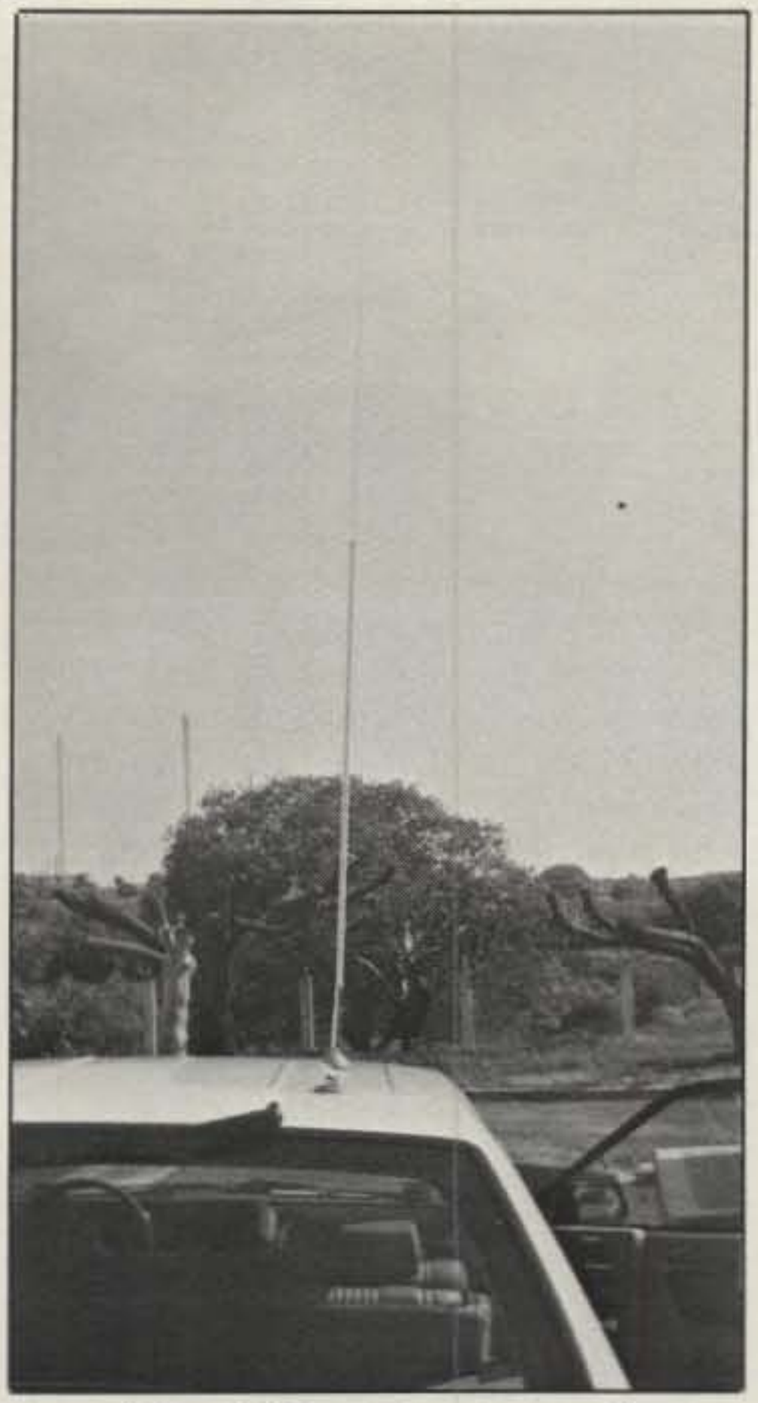
Fig. 1– Basic construction of the "Ultimate" antennas.

Model 3180 Mobile 80 Meter Antenna 78" High
Model 3175 Mobile 75 Meter Antenna 78" High
Model 3140 Mobile 40 Meter Antenna 72" High
Model 3130 Mobile 30 Meter Antenna 72" High
Model 3120 Mobile 20 Meter Antenna 72" High
Model 3115 Mobile 15 Meter Antenna 72" High
Model 3110 Mobile 10 Meter Antenna 72" High
Model 3101 42" Top Section Stinger
Model 3001 Switchable Mobile Matcher for 80–20 Meter Bands

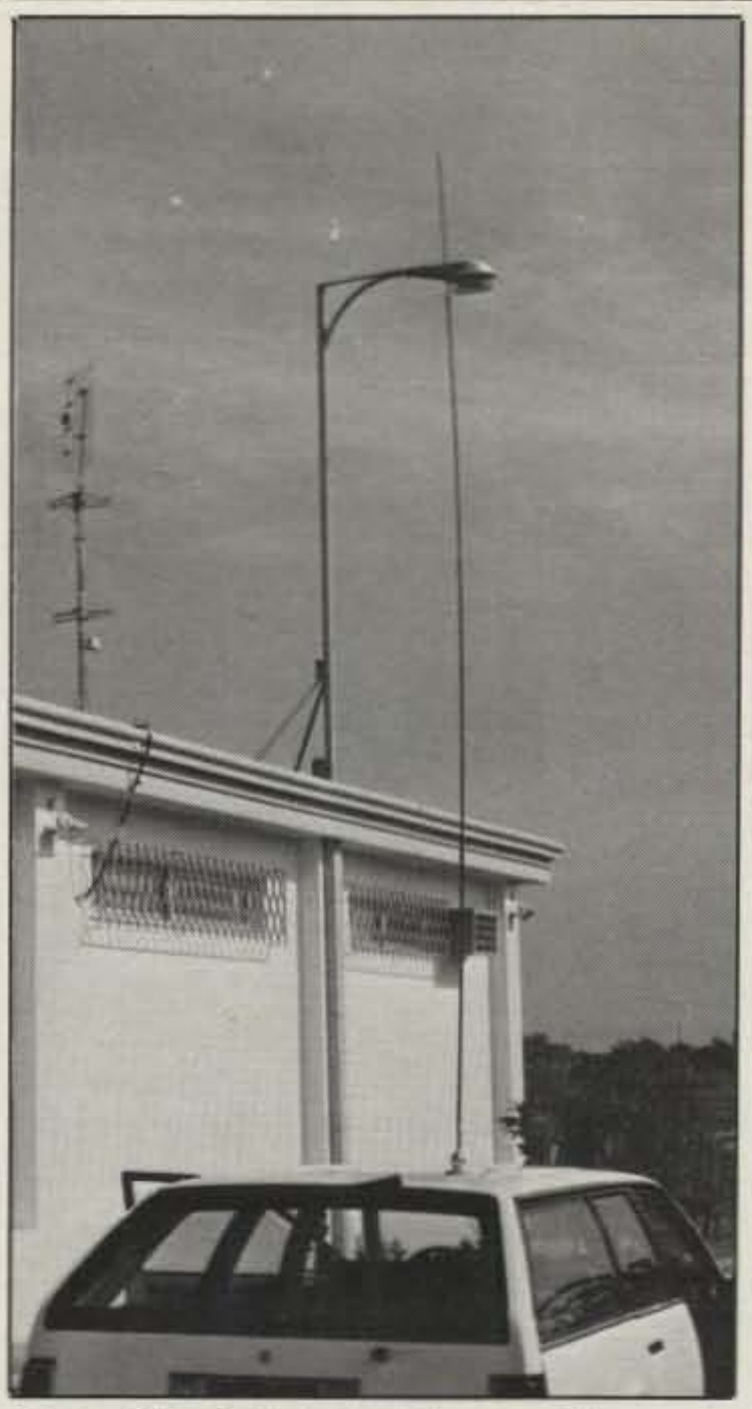
Table I– Available "Ultimate" antennas and accessories.

The bottom section of the antennas looks just like a fiberglass rod, while the top section appears to be a VHF-type whip.

*c/o CQ magazine



One of the "Ultimate" antennas in use. Note that it is hardly more conspicuous than a VHF antenna.



One of the full-size whips used for portable operation and to comparison test the "Ultimates" on 10, 15, and 20 meters.

hicle and that is what was done with the Ten-Tec antennas that were tested, as can be seen in one of the photographs. A flexible spring base is not necessary and, in fact, Ten-Tec recommends against it since it lowers the resonance range of an antenna, and the spring action allows the position of the antenna to vary with respect to the vehicle's body, thus constantly changing the resonant frequency of an antenna. The latter effect may not be much of a problem on the higher frequency bands since the SWR bandwidth of the antennas for 10, 15, and 20 meters is relatively large. However, it can be a severe problem on a band like 75 meters where the SWR bandwidth is narrow.

A number of tests were made with the Ten-Tec antennas on the higher frequency bands against what I call my standard portable antennas. The latter are full-size ¼ wavelength whips for 10, 15, and 20 meters which mount on my vehicle in place of the mobile antennas. They are constructed of old war surplus "MS" type tapered, 3 foot long whip sections which screw together. They make an excellent antenna when one wants to convert from mobile to stationary portable operation. The lowest section has only to be modified with a ⅜ inch × 24 thread stud to fit a mobile mount. For test purposes, the Ten-Tec antennas and the "standard" antennas were equipped with "quick disconnects" and stations were asked for comparative signal reports without being told which antenna was being used. The Ten-Tec antennas almost always got a lower signal report, which was expected, but the surprising thing was how little the reports with the Ten-Tec antennas differed from those received using the full-size whips. Don't forget that the 20 meter full-size whip is about 16 feet long. The Ten-Tec antennas were down from ½ "S" unit on 10 meters to about 1½ "S" units on 20 meters. I had expected and, indeed, would have accepted much poorer results from mobile antennas only 6 feet long. Since no standard was available for 75 meters (I couldn't dream up a 61 foot long whip) no comparative tests were made on the lower frequency bands but it would not be unreasonable that the Ten-Tec antennas would be several "S" units down from full-size antennas. That would still allow excellent results to be obtained during mobile operation.

Quick disconnects may be used to rapidly change the "Ultimate" antennas. If you do use them, purchase quality units. Some of the inexpensive imported types can wobble quite a bit.

Resonance adjustments on the "Ultimate" antennas were easy enough to perform. The top whip section is slid in and out of the bottom section until the lowest SWR is achieved at the desired center operating frequency within a band. Once the point is found, the locking set screw in the bottom section is tightened to keep the whip in place (a hex wrench is supplied with each antenna). On the 10, 15, and 20 meter bands, the adjustment is quickly done since the antennas have a very wide SWR bandwidth. Fig. 2, for instance, shows the "uncompensated" bandwidth actually measured on the 20 meter antenna. For the 40 and 75 meter bands, the resonance adjustments require a bit more time since the top whip section has to be moved in and out of the bottom section in increments of ¼ inch or less. The bandwidth on 75 meters for a 1:2 SWR limit is about 150 kHz. The relatively short length of the bottom section of the antennas further simplifies the tuning adjustments since even if an antenna is mounted on the roof of a vehi-

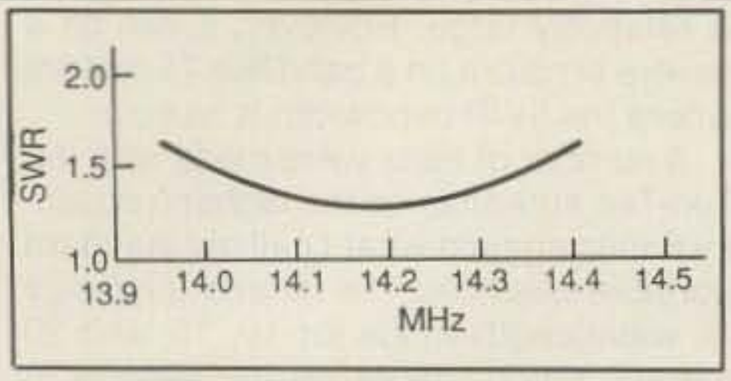


Fig. 2– Measured SWR for a 20 meter "Ultimate."

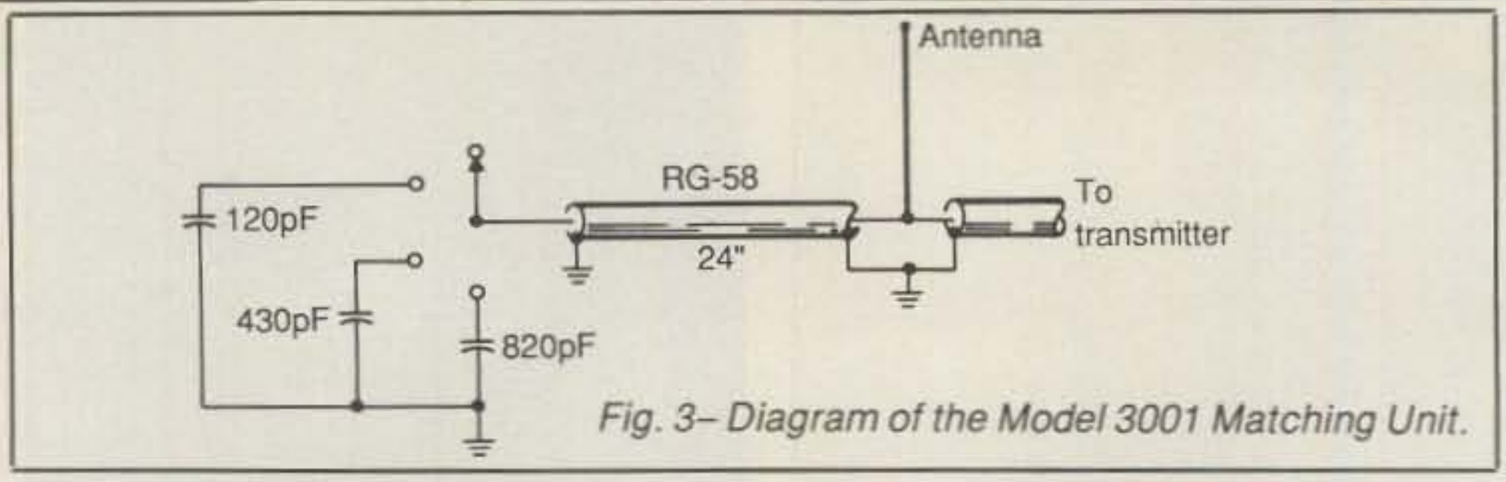


Fig. 3– Diagram of the Model 3001 Matching Unit.

cle, a small stepladder can be used to reach the top of the bottom section rather than having to remove the entire antenna from its mount every time a whip adjustment is made.

The term "uncompensated" was used in reference to fig. 2 to indicate that no compensating capacitor was used at the base of the 20 meter antenna to bring the SWR down to an absolute 1:1 value. The use of such a capacitor would also further enhance the SWR bandwidth of the 20 meter antenna, although really it would be of moot value since the SWR bandwidth is so great without compensation. Depending upon the mounting position of one of the antennas relative to a vehicle's metal body, a compensating capacitor may prove useful starting with the 20 meter band. However, it is definitely necessary for the 40 and 75/80 meter antennas if the maximum SWR bandwidth is to be achieved on those bands. The compensating capacitor is a simple 1 KV disc ceramic type that is connected between the "hot" connection on the antenna base mount and ground. Ten-Tec does produce a switchable capacitor unit (Model 3001) which does the job very nicely and is meant to be mounted internally in a vehicle in the area of the antenna base mount. Fig. 3 is a schematic of the Model 3001 unit. Note that even if none of the capacitors are switched in, the capacitance of the 24 inch length of RG-58 cable (about 60 pF with stray capacitance) remains across the antenna terminals. The cable length was chosen deliberately, since 60 pF is just about right to slide the 1:1.25 SWR value shown in fig. 2 at 14.2 MHz down to a 1:1 SWR.

The "Ultimate" antennas are, in practice, just great fun to use. They solve just about all of the problems associated with conventional HF mobile antennas. Their low profile makes them look like a sort of simple CB antenna, and yet they are efficient radiators on all of the HF bands. There is no denying that there is a certain amount of inconvenience involved in having to change antennas for operation on different bands. However, I consider that a minor thing compared to having some sort of monstrous looking and very prone to damage conventional multiband HF antenna mounted on my vehicle.

I suspect, and hope, that Ten-Tec's new line of mobile antennas will generate a renewed interest in amateur HF mobile operation. I think quite a few amateurs often speculate about trying mobile operation and enjoying the intrinsic fun involved in such operation, but then are "turned off" when they consider the practical aspects of installing a conventional HF mobile antenna. Having operated a mobile station of some sort for many years (W2EEY in 1950 on 10 meters and presently SVØDX/SV5 on all HF bands), I consider the "Ultimate" antennas among the best all around HF mobile antennas I have ever used.

I would like to add a final note regarding the use of antennas designed for mobile applications as stationary portable antennas. I, as well as many other amateurs, have used mobile-type antennas in balcony installations working the antenna against a metal balcony frame (for a ground plane) or in indoor attic installations where two mobile antennas are used to form a compact dipole antenna. The results that are obtained can often be surprisingly good. The "Ultimate" antennas are outstanding candidates for such applications because of their low profile, weight, and cost. Two 15 meter "Ultimate" antennas, for instance, can be used to construct a 12 foot long 15 meter dipole that can easily be transported, set up quickly using only a single support point for the center of the dipole, and yet provide a signal only about one "S" unit down from a full-size dipole. In reality, the one "S" unit disadvantage can often be totally compensated for in a portable situation by the fact that the portable dipole can be raised to a higher elevation or to a less obstructed position than a regular wire-type dipole antenna requiring two end support points. I surely wish that I had had a bunch of "Ultimate" antennas to use as portable antennas during some of my portable operations in Europe.

The antennas do come with an instruction sheet that fully covers their adjustment, location considerations, and matching. The antennas are priced in the $25 to $35 range. They are manufactured by Ten-Tec, Highway 411 East, Sevierville, TN 37862. CQ

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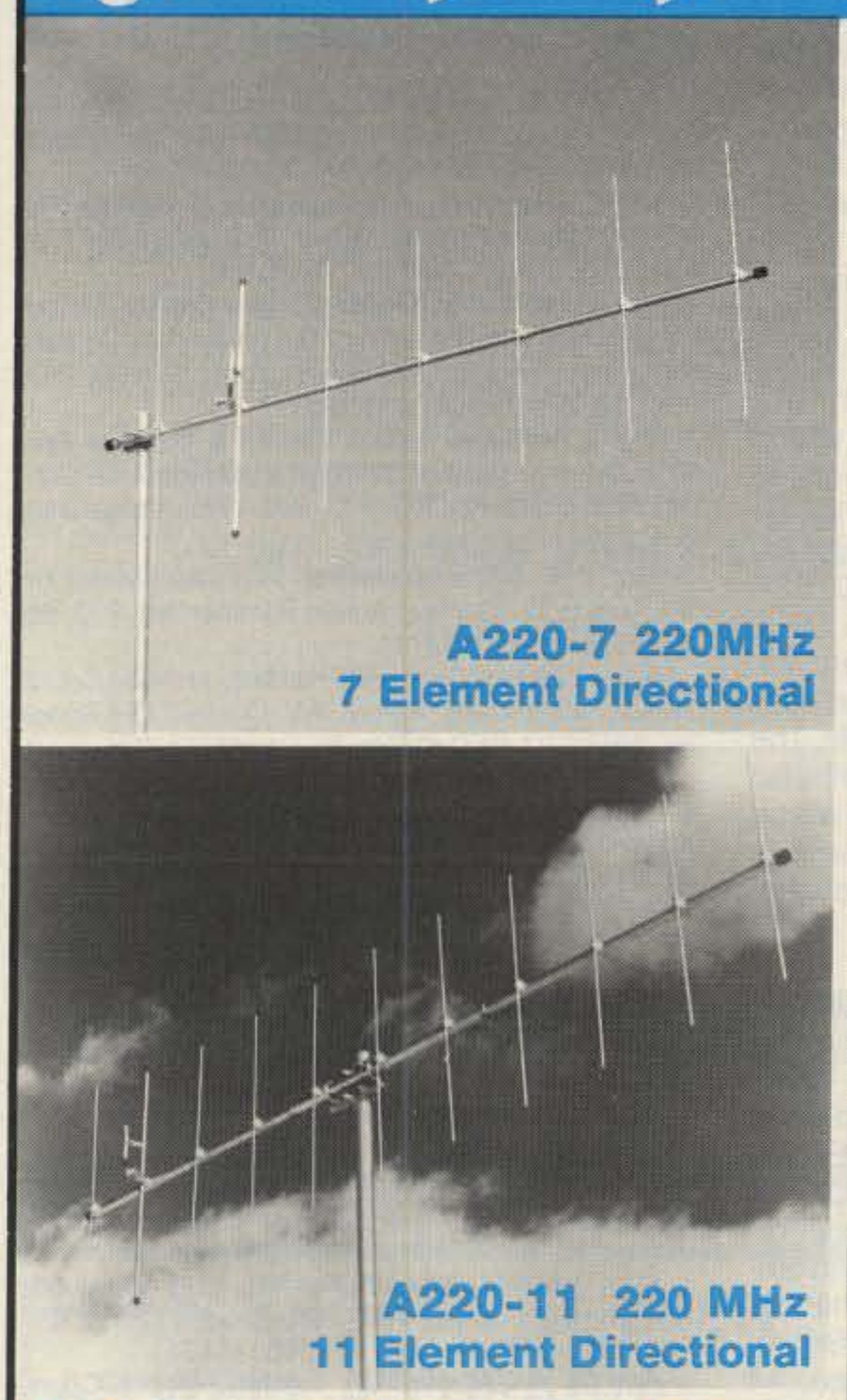

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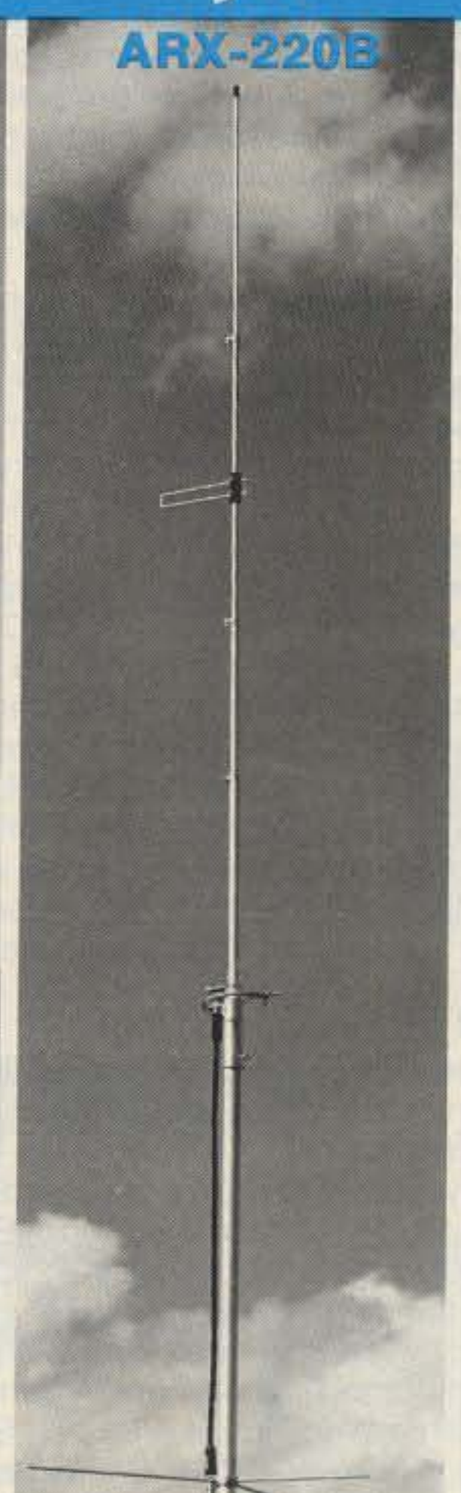

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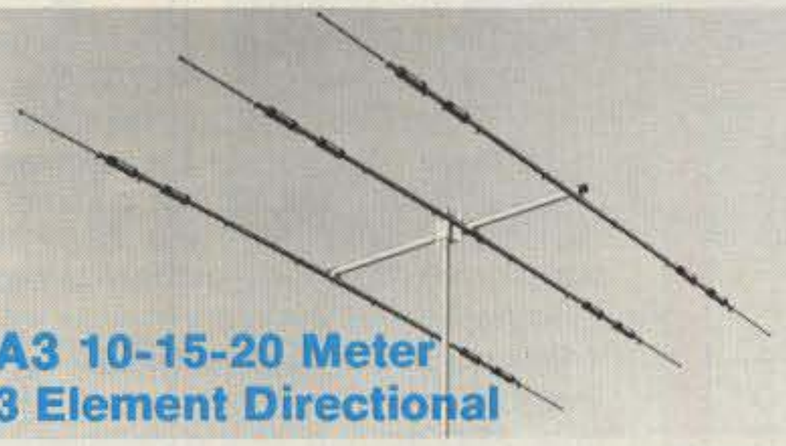

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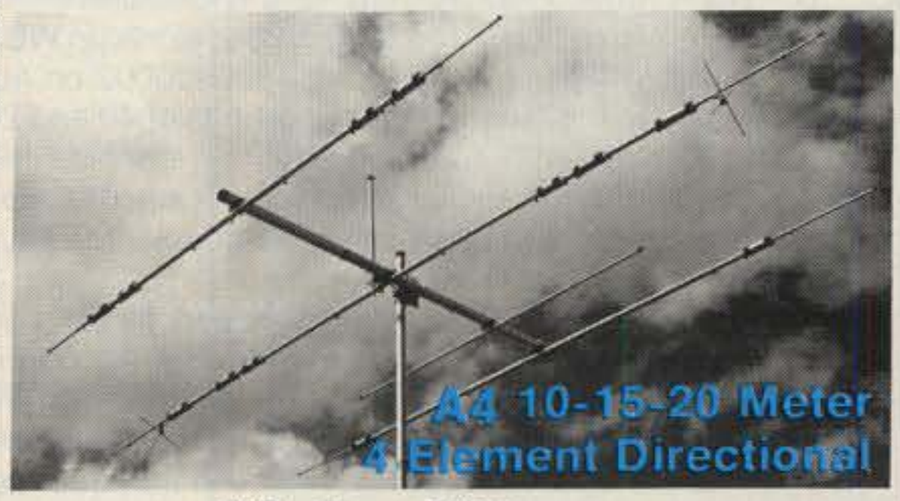
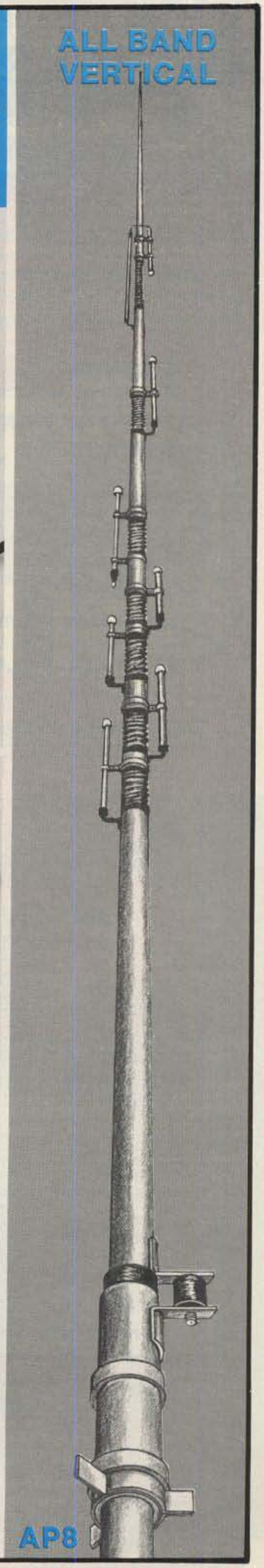


A4 10-15-20 Meter
4 Element Directional



ALL BAND VERTICAL

AP8

cushcraft CORPORATION

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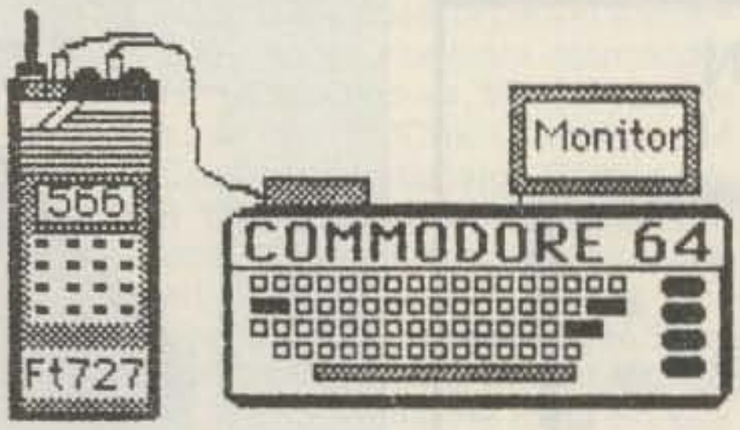
AVAILABLE THROUGH
DISTRIBUTORS WORLDWIDE

CIRCLE 2 ON READER SERVICE CARD

CQ Showcase

Mini "Bear" Cat Scanner For the Yaesu FT-727R And Commodore Computer

The Engineering Consulting Model 727S "mini" bear Cat scanner for the FT-727R and the Commodore 64 computer has been introduced. The interface provides the user with a scanner for programming the Yaesu FT-727R at 4800 baud via the Mini Cat computer interface. The entire contents of the radio can be loaded in under 15 seconds. All parameters are stored and up to ten sets of channels (ten each) can be scanned. Information can be saved to disk which allows 100 channels per disk. All ten memory groups can be scanned at once or individually. Scan lockout for individual channels is provided. The scan speed and resume time are adjustable. All transmit and receive frequencies plus offsets and encode/decode subtones can be input and loaded into radio on command. Return data from the FT-727R provides a full screen digital "S" meter which may be used to stop the scan on preset signal strengths from S-1 to S-9. A comment field is provided for each channel entered and is displayed while scanning the channel. All information for each channel programmed (in groups of 10) is simultaneously displayed on the monitor.



Once the channels are entered via the computer keyboard the information in any of the ten frequency groups may be downloaded to the HT for portable use. All 100 channels may be scanned as one group while under computer control. The model 727S is supplied with hardware and software to operate with the Commodore 64/64C/C128/SX64 series of computers. The hardware interface includes the circuit board, component cables, instructions, and connectors necessary (in kit form). Assembly time is approximately 10 minutes. The Model 727S is priced at $39.95, which includes shipping USA. For more information, contact Engineering Consulting, 583 Candlewood St., Brea, CA 92621, or circle number 103 on the reader service card.

ICOM IC-900 Mobile Transceiver

ICOM has introduced the first fiber-optic multi-band (six bands) mobile transceiver available, the IC-900. This all-mode mobile transceiver allows you to operate six bands ranging from 10 meters to 1.2 GHz with one controller. The IC-900 includes an ultracompact remote controller for remote mounting, an Interface A unit, Interface B unit, SP-8 speaker, HM-14 up/down DTMF microphone, fiber optic and controller cables. Measuring 2"H × 5.7"W × 1"D, the remote controller can be installed on the car's dash or sun visor with the supplied velcro. The unit also comes equipped with a large LCD for easy viewing. The IC-900 allows the operator to listen on two bands simultaneously or transmit on one band while receiving on another band (true full duplex crossband operation). All subaudible tones are built-in and the actual subaudible frequency is displayed. Ten memories are available for each band, with capability of individual PL tone and offset programming. Two scanning systems are available: programmable band scan and memory scan. Fiber optic technology enables a 3/16" cable to transport all data between Interface A (installed near driver's seat) and Interface B (installed in trunk or rear of vehicle). Fiber optic cable also eliminates RF feedback.

The IC-900 is available at a suggested list price of $589.00. Various band units are available. The UX-29A 2 meter 25 watt band unit is available at a suggested list price of $295.00. For more information, contact ICOM America, Inc. 2380 116 Ave. N.E., Bellevue, WA 98009-9029, or circle number 102 on the reader service card.

Novice Voice Class Self-Study Course

The Gordon West Radio School and The W5YI Report now offer this Novice voice-class self-study program package which includes a 112-page fully illustrated textbook, two long-play stereo cassette code tapes, a new-version Form 610 application, and a ready-to-go Novice examination in a sealed envelope, enclosed in a colorful cassette binder. The textbook takes a "fun" approach to learning how to become a ham radio operator, and contains an overview of the hobby, plus how to find an examination,

how to pass the test, the Novice Element 2 question set complete with multiple-choice answers and explanations, and more.

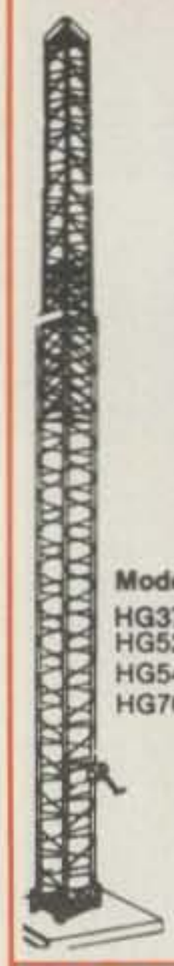
The radio course sells for $19.95 plus $2.00 postage and handling, and is available from the Gordon West Radio School, 2414 College Drive, Costa Mesa, CA 92626; or from The W5YI Report, P.O. Box 10101, Dallas, TX 75207.

Dinet Data-Mate 3000 Mobile Radio Data Terminal

Dinet Inc. has introduced the Data-Mate 3000 Mobile Data Terminal for 2-way radio. The new model has a full Alpha/numeric illuminated and sealed keyboard with a backlit 2 line by 40 character liquid crystal display. Maximum text storage of the Data-Mate is 99 messages of 8000 alpha-numeric characters. In the event of a transmission error, the Data-Mate Central Controller corrects or repeats the message. Total air time for the average message, including correction and acknowledgement, is less than 2 seconds. Messages which exceed the display capacity may be scrolled for the complete message. In addition, the Data-Mate provides for a remote emergency switch, 9 pushbuttons for automatic transmission of predetermined status, and 4 canned messages.

List price is $990 per unit. The Data-Mate central controller is listed at $1200 for each radio channel with a maximum of 16 channels. This controller requires a host computer such as an IBM PC to display incoming data, and to assemble outgoing messages, etc. For more information, contact Dinet Inc., 2182 El Camino Real, Suite 202, Oceanside, CA 92056, or circle number 108 on the card.

ANTENNA/TOWER SALE!



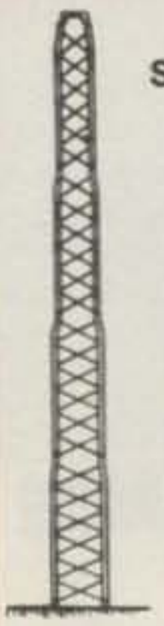
hy-gain CRANKUP SALE!

All Models Shipped Factory Direct—Freight Paid*!

Check these features:
- All steel construction
- Hot dip galvanized after fabrication
- Complete with base and rotor plate
- Totally self-supporting—no guys needed

Model	Height	Load	Sale Price
HG37SS	37 ft	9 sq ft	$CALL
HG52SS	52 ft	9 sq ft	$CALL
HG54HD	54 ft	16 sq ft	$CALL
HG70HD	70 ft	16 sq ft	$CALL

Masts—Thrust Bearings—Other Accessories Available—Call! Prices Shown Are Your Total Delivered Price In Continental U.S.A.!



ROHN Self Supporting Towers On SALE!

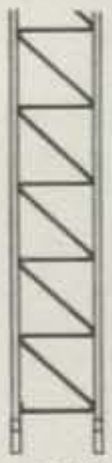
FREIGHT PREPAID

- All Steel Construction—Rugged
- Galvanized Finish—Long Life
- Totally Free Standing—No Guy Wires
- America's Best Tower Buy—Compare Save $
- Complete With Base and Rotor Plate
- In Stock Now—Fast Delivery

Model	Height	Ant Load*	Weight	Delivered Price*
HBX40	40 ft	10 sq ft	228	$359
HBX48	48 ft	10 sq ft	303	$459
HBX56	56 ft	10 sq ft	385	$539
HDBX40	40 ft	18 sq ft	281	$429
HDBX48	48 ft	18 sq ft	363	$529

***Your Total Delivered Price Anywhere in Continental 48 States. Antenna Load Based on 70 MPH Wind.**

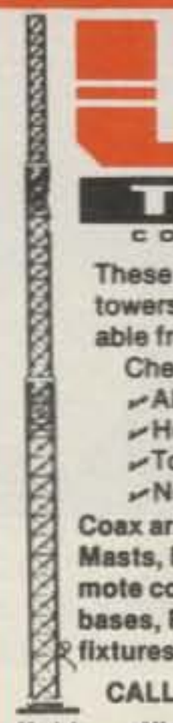
ROHN Guyed Tower Packages



- **World Famous Rohn Quality and Dependability**
- **Rugged high wind survival-provides safe installation**
- **Multi purpose towers satisfy a wide range of needs**
- **Complete packages include: guy hardware, turnbuckles, guy assemblies, w/torq bars, concrete base, rotor plate and top section per manufacturers specs.**

Packages shown below are rated for wind zone "B" (86 mph wind). Zone "C" (100 mph wind) design prices slightly higher. All tower packages shipped freight collect from our Plano, TX warehouse, in stock for prompt delivery.

	Model 25G	Model 45G	Model 55G
50'	$ 629	$1119	$1489
60'	689	1259	1669
70'	749	1379	1829
80'	909	1539	2019
90'	979	1809	2189
100'	1059	1969	2369
110'	1259	2099	2769
120'	1329	2259	2959



US TOWER CORPORATION

These rugged crankup towers and masts now available from Texas Towers!

Check these features:
- All steel construction
- Hot dipped galvanized
- Totally self-supporting-
- No guys needed

Coax arms, Thrustbearings Masts, Motor drives, Remote controls, Hinged bases, Rotor bases, & Raising fixtures also in stock-

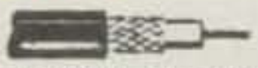
CALL FOR SALE PRICES!

Model	Min. Ht.	Max. Ht.	Ant. load*	Sale price
MA40 mast	21'	40'	10 sq ft	$ 549
MA550 mast	22'	50'	10 sq ft	899
TX438	22'	38'	18 sq ft	829
TX455	22'	55'	18 sq ft	1249
TX472	23'	72'	18 sq ft	2059
HDX556	22'	55'	30 sq ft	1879
HDX572	23'	72'	30 sq ft	3229

Note - US Towers Shipped Freight Collect From Visalia, CA Factory

**Note-towers rated at 50 mph to EIA specifications*

RG-213U



$.29/ft $279/1000 ft
Up to 600 ft via UPS

- RG-213/U—95% Bare Copper Shield
- Mil-Spec Non-contaminating Jacket for longer life than RG8 cables
- Our RG-213/U uses virgin materials.
- Guaranteed Highest Quality!

RG-8X

$.19/ft $179/1000 ft

- RG8X—95% Bare Copper Shield • Low Loss
- Non-contaminating Vinyl Jacket Foam Dielectric

9086

$.39/ft $379/1000 ft

- Same specs as Belden 9913
- Lower loss than RG8U
- 100% shielded-braid & foil

HARDLINE/HELIAX®

Lowest Loss for VHF/UHF!

½" Alum. w/poly Jacket	$.79/ft.
⅞" LDF4-50 Andrew Heliax®	$1.79/ft
1¼" LDF5-50 Andrew Heliax®	$3.99/ft

select connectors below.
Heliax® is a Registered Trademark of the Andrew Corp.

Coaxial Cable Loss Characteristics (DB/100 ft)

Cable Type	Imped.	10MHz	30MHz	150MHz	450MHz
RG-213/U	50	.6	.9	2.3	5.2
RG8X	52	.8	1.2	3.5	5.8
9086	50	.4	.64	1.7	3.1
½" Alum	50	.3	.5	1.2	2.2
½" Heliax	50	.2	.4	.9	1.6
⅞" Heliax	50	.1	.2	.5	.9

HARDLINE & HELIAX® CONNECTORS

Cable Type	UHF FML	UHF MALE	N FML	N MALE
½" Alum	$19	$19	$19	$25
⅞" Heliax®	$25	$25	$25	$25
1¼" Heliax®	$49	$49	$49	$49

COAX CONNECTORS

Amphenol Silver PL259	$1.25
UG21B N Male	$2.95
9086/9913 N Male Connector	$4.95

ANTENNA WIRE & ACCESSORIES

Stranded Copper 14ga	$.10/ft.
¼ mile 18ga copper-clad steel wire	$30
Dog bone end insulator	$.79 ea.

Van Gordon

1:1 Balun	$11	Center Insulator	$6
Dipole Kits		D80 $31.95/D40	$28.95
Short Dipole Kits		SD80 $35.95/SD40	$33.95
All-band Dipole w/ladder line			$29.95
G5RV all band antenna			$49.95

ALPHA DELTA

DX-A 160-80-40 Sloper	$49

CUSHCRAFT

A3 3-el Tribander	$229
A4 4-el Tribander Beam	$299
A743 & A744, 30/40 mtr KIT for the A3 & A4 ea	$79
AP8 80-10 mtr Vertical	$139
AV5 80-10mtr Vertical	$109
D40 40mtr Dipole	$159
40-2CD 2-el 40 mtr Beam	$299
A50-5 5-el 6 mtr Beam	$85
215 WB NEW 15-el 2 mtr Beam	$85
230 WB NEW 30-el 2 mtr Beam	$229
4218 XL 18-el 2 mtr Beam	$105
3219 19-el 2 mtr Beam	$99
220B 17-el 220MHz Beam	$99
424B 24-el 432MHz Beam	$85
ARX2B 2 mtr Vertical	$39

hy-gain

CALL FOR SPECIAL PRICES!

- **Discoverer 2-el 40-mtr Beam**
- **Discoverer 3-el Conversion Kit**
- **EXPLORER-14 SUPER-SPECIAL**
- QK710 30/40 mtr. Add-On-Kit
- V2S 2-mtr Base Vertical
- V4S 440MHz Base Vertical
- TH5MK2S Broad Band 5-el Triband Beam
- TH7DXS 7-el Triband Beam
- TH3JRS 3-el Triband Beam
- 205BAS 5-el 20-mtr Beam
- 155BAS 5-el 15-mtr Beam
- 105BAS 5-el 10-mtr Beam
- 204BAS 4-el 20-mtr Beam
- 64BS 4-el 6-mtr Beam
- 12 AVQ 20-10 mtr vertical
- 14 AVQ 40-10 mtr vertical
- 18 AVT/WB 80-10mtr Vertical
- 18HTS 80-10 mtr Hy-Tower Vertical
- 23BS 3-el 2 mtr Beam
- 25BS 5-el 2 mtr Beam
- 28BS 8-el 2 mtr Beam
- 214BS 14-el 2-mtr Beam
- 2BDQ 80/40 mtr Trap Dipole
- 5BDQ 80-10 mtr Trap Dipole
- BN86 80-10 mtr KW Balun W/Coax Seal

HUSTLER

6BTV 80-10 mtr Vert	$129	5BTV 80-10 mtr Vert	$109
4BTV 40-10 mtr Vert	$89	G7-144 2-mtr Base	$119
G6-144B 2-mtr Base	$89		

Mobile Resonators	10m	15m	20m	40m	75m
400W Standard	$16	$17	$19	$22	$26
2KW Super	$20	$22	$25	$29	$39

Bumper Mounts - Springs - Folding Masts in Stock!

BUTTERNUT ELECTRONICS CO

HF6V 80-10m Vertical $129 Delivered
- Full Legal Power
- Highest Q Tuning Circuits

HF2V 80-40m Vertical $129 Delivered
- Full Legal Power
- Automatic Band Switching

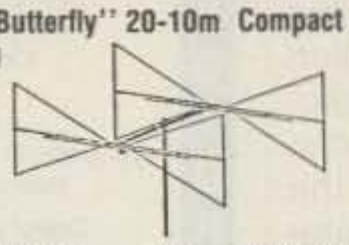
Accessories:

RMK II Roof Mtg. Kit	$49
STR II Stub-Tuned Radials	$29
TBR160 160m Coil Kit	$49
30m Add-on Kit	$29
20m Add-on Kit	$39
17/12m Add-on Kit	$27

HF6V HF2V

FREE UPS on ACCESSORIES when purchased w/antenna

HF4B "Butterfly" 20-10m Compact Beam $199.00



- Unique Design Reduces Size
- No Lossy Traps
- Turns w/TV Rotor
- Boom Length 6 Feet
- Element Length 12.5 Feet

FREE UPS Shipping in Continental USA

MIRAGE/KLM

KT34A 4-el Broad Band Triband Beam	$399.95
KT34XA 6-el Broad Band Triband Beam	$589.95

ROTORS

Daiwa MR 750 PE (16.1 sq ft rating)	$289
Additional Motor Units	$89
Alliance HD73 (10.7 sq ft rating)	$119.95
Alliance U110 (3 sq ft rating)	$49
Telex CD 45II (8.5 sq ft rating)	$Call
Telex HAM 4 (15 sq ft rating)	$Call
Telex Tailtwister (20 sq ft rating)	$Call
Telex HDR300 Heavy Duty (25 sq ft rating)	$Call
Kenpro KR500 Heavy Duty Elevator Rotator	$189
Kenpro KR5400 AZ/EL Rotor Package	$319

ROTOR CABLE

Standard 8 cord cables (vinyl jacket 2-#18 & 6-#22 ga)	$.19/ft
Heavy Duty 8 Cond cable (vinyl jacket 2-#16 & 6-#18 ga)	$.36/ft

ROHN GUYED TOWER SECTIONS

10 FT. STACKED SECTIONS

20G	$45.00	45G	$116.00
25G	$52.00	55G	$160.00

ALL ACCESSORIES IN STOCK—CALL

ROHN FOLDOVER TOWERS

Model	Height	Ant. Lead*	Price
FK2548	48 ft.	15.4 sq. ft.	$ 999.
FK2558	58 ft.	13.3 sq. ft.	1049.
FK2568	68 ft.	11.7 sq. ft.	1099.
FK4544	44 ft.	34.8 sq. ft.	1319.
FK4554	54 ft.	29.1 sq. ft.	1399.
FK4564	64 ft.	28.4 sq. ft.	1499.

25G Double Guy Kit	$249.
45G Double Guy Kit	$269.

*Above antenna loads for 70 mph winds w/guys at hinge and apex. All foldover towers shipped freight prepaid in 48 states. Prices 10% higher west of Rockies.

TOWER/GUY HARDWARE

3/16 EHS Guywire (3990 lb rating)	$.15/ft
1/4 EHS Guywire (6650 lb rating)	$.18/ft
5/16 EHS Guywire (11,200 lb rating)	$.29/ft
5/32 7 × 7 Aircraft Cable (2700 lb rating)	$.15/ft
3/16 CCM Cable Clamp (3/16" or 5/32")	$.45
1/4 CCM Cable Clamp (1/4" Cable)	$.55
1/4 TH Thimble (fits all sizes)	$.45
3/8EE (3/8" Eye & Eye Turnbuckle)	$6.95
3/8 EJ (3/8" Eye & Jaw Turnbuckle)	$7.95
1/2 × 9EE (1/2" × 9" Eye to Eye Turnbuckle)	$9.95
1/2 × 9EJ (1/2 × 9" Eye & Jaw Turnbuckle)	$10.95
1/2 × 12EE (1/2" 12" Eye & Eye Turnbuckle)	$12.95
1/2 × 12EJ (1/2" × 12" Eye & Jaw Turnbuckle)	$13.95
5/8 × 12EJ (5/8" × 12" Eye & Jaw Turnbuckle)	$16.95
3/16" Preformed Guy Grip	$2.49
1/4" Preformed Guy Grip	$2.99
6" Diam - 4 ft Long Earth Screw Anchor	$14.95
500 D Guy insulator (5/32" or 3/16" Cable)	$1.69
502 Guy Insulator (1/4" Cable)	$2.99
5/8" Diam - 8 ft Copper Clad Ground Rod	$12.95

PHILLYSTRAN GUY CABLE

HPTG2100 Guy Cable (2100 lb rating)	$.29/ft
HPTG4000 Guy Cable (4000 lb rating)	$.49/ft
HPTG6700 Guy Cable (6700 lb rating)	$.69/ft
9901LD Cable End (for 2100/4000 cable)	$8.95
9902LD Cable End (for 6700 cable)	$9.95
Socketfast Potting Compound (does 6-8 ends)	$14.95

GALVANIZED STEEL MASTS

Heavy Duty Steel Masts 2 in OD - Galvanized Finish

Length	5 FT	10 FT	15 FT	20 FT
12 in Wall	$29	$49	$69	$89
.18 in Wall	$39	$69	$99	$129
.25 in Wall	$69	$129	$189	$249

ORDER TOLL FREE 1-800-272-3467

Texas, Alaska & for information 1 (214) 422-7306

TEXAS TOWERS

Mon-Fri: 9am - 5 pm
Sat: 9am - 1 pm

Div. of Texas RF Distributors Inc. 1108 Summit Ave., Suite 4 • Plano, Texas 75074

(Prices & Availability Subject To Change Without Notice)

(Antenna/tower product prices do not include shipping unless noted otherwise)

CIRCLE 6 ON READER SERVICE CARD

KENWOOD

TS-940S LIST $2249
NEW Top-of-the-Line HF Transceiver
• 100% Duty Cycle
• 40 Memory Channels
CALL FOR SPECIAL PRICES!!

TS-440S NEW! LIST $1199
CALL FOR SPECIAL SALE PRICE

TS-430S LIST PRICE $859
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TS-711A LIST $899
TS-811A LIST $1049
CALL FOR SPECIAL PRICE

TW4100A LIST $649
CALL FOR SPECIAL PRICE

TR-751A LIST $599
All Mode 2m Mobile

COMPACT 2M FM MOBILE

TM 2570A (70W)	LIST $559
TM 2550A (45W)	LIST $469
TM 2530A (25W)	LIST $429
TM 3530A (25W)	LIST $449

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TH 205 AT
High Tech 2M HT XCVR

NEW
TH215AT
2m HT XCVR
TH21BT, TH31AT
TH41AT Also In Stock-
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YAESU

FT 767 GX HF/VHF/UHF
LIST $1895 CALL FOR SALE PRICE

FT-757GX/II LIST PRICE $1,049
CALL FOR SPECIAL SALE PRICE!

FT2700RH NEW 2M/70cm Dual Band Transceiver Full Duplex-Cross Band Operation LIST $599
CALL FOR PRICE-SAVE $$!

NEW FT290R 2m Portable LIST $579.95
NEW FT690R 6m Portable LIST $569.95
CALL FOR SALE PRICES!

FT 209/709 RH NEW HIGH Tech HT's 5W Output

New! FT727 RH 2m/70 cmHT
• 5w Output
• 10 memories
• Battery saver
Call For Sale Prices

FT 23R 2m HT LIST $299.95
FT 73R 70 cm HT LIST $314.95
• compact size
• 10 memories
• up to 5W output W/FNB-11
CALL FOR SALE PRICES!

ASTRON POWER SUPPLIES

Heavy Duty- High Quality - Rugged -Reliable
• Input Voltage:105-125 VAC Output:13.8 VDC ± .05V
• Fully Electrically Regulated 5mV Maximum Ripple
• Current Limiting & Crowbar Protection Circuits
• M-Series with Meter A-Series Without Meter

Model	'Cont. Amps	ICS Amps	Price
RS4A	3	4	$ 39
RS7A	5	7	49
RS12A	9	12	69
RS20A	16	20	89
RS20M	16	20	109
RS35A	25	35	135
RS35M	25	35	149
RS50A	37	50	199
RS50M	37	50	229

ICOM

IC735 NEW General Coverage HF Transceiver Full Featured Ultra Compact - Economical
LIST PRICE $999
CALL FOR SPECIAL PRICE!

IC-R7000 25-1300 + MHz Rcvr. LIST $1099
IC-R71A 10 kHz-30 MHz Rcvr. LIST $949
CALL FOR SPECIAL PRICES!

IC-27A LIST $429 **IC-27H LIST $459**
IC-28A LIST $429 **IC-28H LIST $459**
IC-37A LIST $499 **IC-47A LIST $549**
IC-38A LIST $459
CALL TODAY FOR SPECIAL ICOM PRICES!

IC02AT - 2mtr
IC03AT - 220 MHz
IC04AT - 70cm
High Tech HT XCVRS

NEW IC-μ2AT 2m HT

• micro design covers 140-163 MHz
• 10 mem. w/scan
• LCD Readout
CALL FOR SALE PRICE!

TEN-TEC

PARAGON
General Coverage HF Transceiver Microprocessor Controlled Multi-Scan, 62 Memories

561 Corsair II	SALE $1,149.95
960 Power Supply	$209.95
229 2KW Tuner	$259.95
425 Titan Amplifier	$2,299.95

rfconcepts

rfc 2-317 2M
30W In = 170W out

Model	Band	In-Out	List Price
2-23	2M	2-30W	$112.00
2-217	2M	2-170W	$299.00
2-117	2M	10-170W	$299.00

Call For Sale Prices

MIRAGE

AMPLIFIER SALE!
B3016
ONLY $229!

Model	Band	Pre-amp	Input	Output	Sale Price
A1015	6M	Yes	10W	150W	$289
B23S	2M	No	2W	30W	$ 99
B23A	2M	Yes	2W	30W	$129
B215	2M	Yes	2W	150W	$259
B108	2M	Yes	10W	80W	$159
B1016	2M	Yes	10W	160W	$259
B3016	2M	Yes	30W	160W	$229
D1010N	440	No	10W	100W	$319

AMP SUPPLY

Model	List	Model	List
LA 1000	$ 499	LA 1000 NT	$ 579
LK 500 ZB	$1295	LK 500 NT	$1595
LK 800 A	$2695	LK 800 NT	$2995
AT 1200	$ 229	AT 3000	$ 499

SALE PRICES TOO LOW TO PRINT
CALL AND SAVE $$$$$

ETO ALPHA SALE

MODEL	LIST	MODEL	LIST
76A	$1,985	374A	$2,595
76PA	$2,395	78	$3,495
76CA	$2,695	77DX	$5,695

SALE PRICES TOO LOW TO PRINT
CALL & SAVE $$$!

ALINCO

ELH-230D	89.95	ELH-730D	149.95
ELH-260D	129.95	ELH-730G	119.95
ALR-206T	279.95	ALM-203T	249.95
		ALR 22T	299.95

ACCESSORIES IN STOCK—CALL!

AEA

PK-232 Packet Controller	$299.95
PK-64 Packet Controller	$219.95
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CIRCLE 14 ON READER SERVICE CARD

1987 CQ WPX SSB Contest
High-Claimed Scores

The following scores are early-bird high-claimed scores as of 1 June 1987. These are raw scores subject to verification.

U.S.A.
SINGLE OPERATOR
ALL BAND

KM1H	4,556,180
K5ZD/1	3,140,460
NSØZ	2,866,428
KY2J	1,844,296
K6HNZ	1,844,208
NJ2L/1	1,683,109
WS4Q/5	1,660,161
AI2C/4	1,200,480
KE5FI	1,013,588
KBØG	989,898
KG5U	928,710
KF2O	899,811
N8BJQ	710,562
KA5W	498,126
WB5SSD	453,870
KVØI	447,488
KS7T	430,292
WR6R	400,860
K6EID	392,150
WQ5C	386,254

28 MHz

K5MK	13,500
WB7FDQ	10,143
K2OLG	8,496
KD1U/4	4,480
N7RP/5	3,762
KU2Q	3,636
WB4VQO	3,074
KE2N	1,113
KA8UOC/N	243
KA6ING	117

21 MHz

K6SVL	397,800
KS9U	104,643
K8HVT/1	56,398
W2IQL	36,356
NJ9Q	27,136
KDØFW	12,416
KN8D	5,292
N4OGW	3,764
WA3VPL	1,708

14 MHz

K2VV	3,551,456
K1VUT	2,002,385
ND1X	1,566,760
KQ9L	866,636
K1KJT	844,360
WX6M	769,860
W3UM	432,000
WF5E	377,784
KBØU	292,462
W8IMZ	182,750

7 MHz

KM6B	1,167,360
WO5G	679,112
WC4E	584,784
KL7XO/1	123,200
KQ3V	101,640
AG9S	56,430
WA2CWX	35,964
KR9G	29,700
KA5EJX	21,716
K6SIK	2,394

3.7 MHz

KN8R	355,904
NB1B	225,568
W5WMU	202,740
NI1N	95,410
KE8AZ	79,500
W6AXX/W3	18,020
K8DD	14,112

1.8 MHz

K5UR	64,848
K5NA/2	46,746
W3BGN	16,660
AA4MM	10,752
K5WXZ	1,952

QRP/p

N8CQA	A	58,000
WAØVBW	A	47,385
WB6JMS	A	42,957
N6OJ	A	37,669
WA7TUX	A	9,088
KS9J/Ø	21	2,728
W5FO	14	145,236
W6YVK	14	18,468
KA5PVB	14	1,800
NZ5A	7	4,332

Multi-Single

N4WW	4,142,190
KI1G	4,080,000
NJ1F	4,048,668
KM9L	2,750,937
KC7V	2,562,336
NE8T	2,526,159
KJ9D	2,470,338
NI2T	2,262,708
KI6CG	1,979,572
WC6H	1,625,972
AG6D	1,129,536
NQ8V	1,120,660
AAØA	976,375
NTØP	960,290
N6CCL	610,155
KS3F	597,780

Multi-Multi

KW8N	7,800,043
KØRF	6,423,130
KC3EK	3,119,637
KV5F	60,102

DX
SINGLE OPERATOR
ALL BAND

6Y4V	6,405,750
VP2MBA	5,297,385
OK1RI	4,084,498
K4YT/4F	3,950,277
9J2EZ	3,790,950
VE3XN	3,450,084
WL7E	3,245,639
YEØX	2,946,316
DJ6QT/9L	2,589,356
CX9CO	2,491,950
I6FLD	2,351,412
VO1MP	1,905,498
DL8PC	1,884,792
JE4VVM	1,733,446
KL7LF/KH3	1,662,738
OH6EI	1,447,624
OHØ/G4JVG	1,130,220
YB5NOF	960,828
FV7NDX	802,696
FE6AOJ	797,416

28 MHz

LU1E	1,124,304
CX2AAL	364,896
LU6EJP	222,855
ZL1BWM	153,328
PY5NF	129,168
JO1NZT	72,240
ZS6P	65,646
JE1VGE	29,149
EA6VQ	11,312
I8BYG	10,175

21 MHz

CE6EZ	5,232,808
TI1T	4,227,509
CE4FXY	3,867,248
PJ9J	3,723,948
ZS6CDJ	3,184,948
3G3Z	1,844,019
TR8LD	1,639,728
ZV9ZE	1,612,793
YC2CTW	1,577,583

14 MHz

ZP5JCY	6,195,288
CSØNH	3,352,020
OA4ZV	3,299,904
GW4BLE	3,239,292
AZ6ETB	3,198,129
IO1ZEU	2,350,282
VE3CPA	2,142,448
AL7CQ	1,745,821
OH2AM	1,491,395
VE1BDK	1,293,103
VE7IN	1,194,740

7 MHz

H24LP	5,365,584
I5FCK	1,354,254
LZ1KSN	1,146,141
SM5AQD	868,322
FF2LY	758,992
OH2HE	704,506
CS3RTP	635, 030
IV3YYK	571,564
SK7CE	215,816
HK1LDG	215,506

3.7 MHz

CT3DL	1,196,210
EA8AFS	1,173,492
PA2TMS	903,462
DF8XC	638,528
VE1GB	84,420
YO2DFA	69,678
JA7HMZ	48,416
PY2DP	34,848
SP6LUV	25,542
SP9RTF	18,450

1.8 MHz

OH1RY/CT3	291,118
CT1AOZ	92,480
GB8DX	62,256
OE1DH	37,714
VE1BNN	19,560
SP6CZ	14,832
OK1KPU	14,124
YT3A	13,800
CT1FL	12,768
G3XWZ	4,300

QRP/p

TR8SA	A	1,041,112
4X6IF	A	317,148
ON8WN	A	57,961
JH9HXF/1	28	13,026
JR3RWB	28	11,448
JK1JQQ	21	52,624
IK6ATS	21	40,530
JE8FOU	21	22,092
PAØNRD	14	5,712
JR7JLU	14	1,475
SM5ARR	7	11,088
YO6LA	3.5	10,492

MULTI-SINGLE

PJ2FR	18,504,614
NP4CC	13,299,624
IO5NPH	12,054,784
TW7C	10,608,896
IO4WZT	8,056,544
VE6OU/3	8,005,660
YSØYS	7,952,523
LU2E	7,275,505
ZF2KT	6,906,795
YU3MM	4,816,524
PY3BD	4,523,776
EA8RCT	3,845,274
FOØSSJ	3,801,490
JA3YKC	3,787,300
VE7UBC	3,676,897
AY6D	3,591,250

MULTI-MULTI

ZZ5EG	38,858,328
KH6XX	21,731,383
YT2R	9,505,509
JA1YCV	191,268

Note: Queries pertaining to the WPX Contest should be sent to N8BJQ at 4121 Gardenview Dr., Beavercreek, OH 45431.

HOW WE MADE *TUNE IN THE WORLD WITH HAM RADIO* EVEN BETTER!

The **BIG NEWS** about the League's beginner's package is that we have replaced the 60-minute cassette with two 90-minute cassettes in order to give almost three time the Morse Code instruction. Production of these tapes was a team effort. First, selected ARRL registered instructors were asked to review prototype tapes. ARRL staff incorporated the suggested improvements on the master tape. A special keying interface was designed in the ARRL lab.

The result is vastly superior to the code practice material contained in the previous editions. The popular Farnsworth method is used: the letters are sent at 18 WPM with appropriate spacing so that the actual speed is 5 WPM. The code is recorded on both stereo channels, but the voice-over is recorded only on one. Students with a stereo tape player can learn the code as the text is described on the tape, and then switch to the "code only" channel to test themselves as they go along.

The first tape is devoted to teaching the letters of the alphabet, prosigns, and numbers; the knowledge of each is required on the code portion of the Novice exam. Each new letter (or character) is sent several times, then words are sent containing previously learned letters and the new letter before going on the the next. The audio channel explains what is being sent. The first side of the second tape consists of 9 practice sessions; which are described on the tape and in greater detail in Chapter 3 of the *Tune In The World* text. The other side of the second tape consists of six sample Amateur Radio contacts for use as final practice by the student. Sample 10-question tests covering each of the QSOs are also presented in the text in order to give the student a feel for what the code portion of the exam will cover. The new tapes should made learning the code a fun experience.

We've improved the text too! Material has been added to the text to cover what the prospective Novice needs to know in order to pass the new 30-question Novice exam.

Tune In The World With Ham Radio is suitable for individual or classroom instruction. With the expanded text and improved code learning cassettes, this package should be *your* choice for Novice instruction material.

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NEWINGTON, CT 06111

HAM RADIO

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—More fun to operate

Tune In The World With Ham Radio has put the fun back into learning what Amateur Radio is all about. Enhanced Novice class privileges have brought the fun back into operating. Now beginners with their Novice licenses no longer have to spend all of their time on the air using only Morse Code. Novices can now use voice communications on 10-meters and use VHF and UHF repeaters. The new privileges include the use of digital communications so that home computers can be linked through packet radio networks. The FCC requires that Novices know something about their new privileges and that's where the expanded *Tune In The World With Ham Radio* text comes in. You'll find what you need to know explained in clear, concise bite-sized chunks of information. You'll find all 300 possible questions that may appear on the 30-question Novice exam with their distractors and answer key.

Besides improving the text, we've added almost three times the code practice material to the package in the form of two C-90 tape cassettes. One tape teaches the code, the other provides practice. They are recorded in stereo so you can switch off the voice portion for even more practice. These new tapes make learning the code a snap!

Tune In The World With Ham Radio is available at your dealer or from ARRL for $15.00 plus $3.50 for UPS shipping and handling.

THE AMERICAN RADIO RELAY LEAGUE, INC.
225 MAIN STREET
NEWINGTON, CT 06111

CIRCLE 125 ON READER SERVICE CARD

Awards

a monthly feature by
DOROTHY JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for August is:

Antonio A. Gomez, YV5AGD
USA-CA All Counties #534, 20M SSB, 3-6-87

"It all started one sunny day in July 1967 when I was in QSO with a certain station in the vicinity of 14,330 MHz. The party said, 'Very light copy, very heavy QRM, so let's go up five.' I landed exactly on 14,336 and called my friend with power up to a full gallon. Quickly I was asked very politely to move because 'This is the County Hunters Net.' I decided to stay and watch this operation. Right then my county hunting activity started. That was the beginning of perhaps the longest hunt ever—19 years.

"My ham radio activity started way back in 1934 with the call CO8TG, using a very small homebrew rig with a pair of 45 tubes. During World War II, I worked as a CW operator for a nickel mine in Nicaro, Cuba. In the early days of operation of the plant my CW was the only means of contact with the outside world.

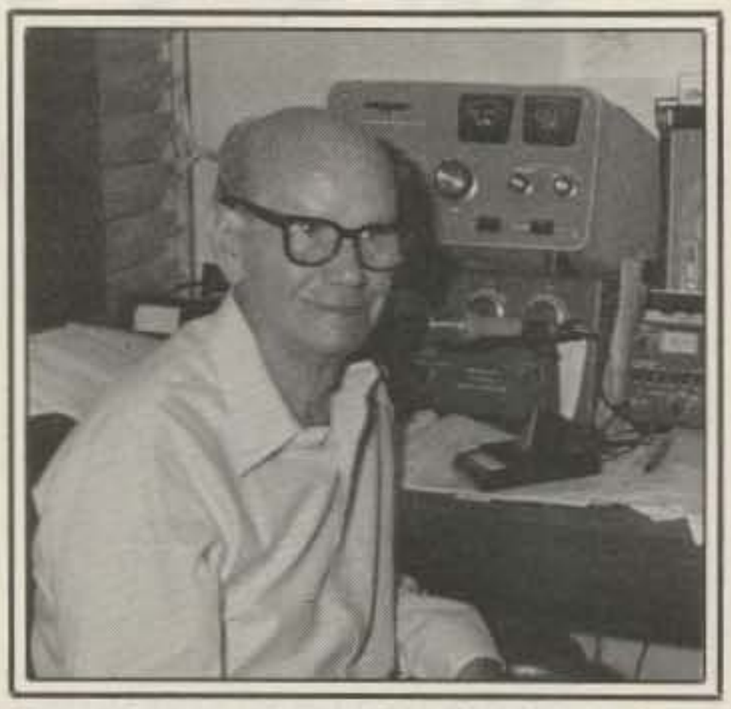
"The Venezuelan call YV5AGD was assigned to me in 1959, and since then I have been a very active DX operator, with 308 DX countries confirmed. I was also an operator on the YV0AA Aves Island DXpedition in 1962. Later I was a member of the group that operated station YV9AA in the *CQ* WW DX Contest. Our group won first place in both the CW and SSB sections, multi-multi class, three years in a row, a record that is still unbeaten. Using my own call, YV5AGD, I also won second place in the world in both modes, SSB and CW, in the 1962 ARRL International DX Contest. This also is a record that has not been equaled.

"I hold eighteen trophies from different contest activities, and have been a winner eight times of the YV Independence Contest. I am now very happy to be the first Latin American to achieve the USA Counties Award sponsored by *CQ* magazine. One of the happiest occasions of my life was opening the carton and beholding the All Counties Award for station YV5AGD. You would not believe how many people have already seen it, including my youngest granddaughter, age 2 months.

"Fellow amateurs are holding a fiesta at our radio club to celebrate the occasion of the first All Counties Award to a Latin American. My family, friends, and many YV5s will be in attendance. It is truly a happy occasion.

"Now I am planning to start all over again and work all the counties a second time, just like so many of my friends on the nets.—73, Tony"

333 South Lincoln Ave., Mundelein, IL 60060



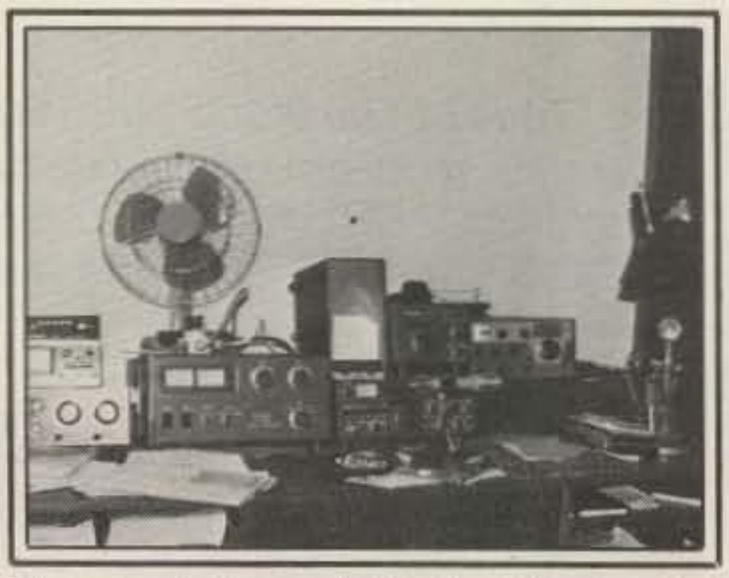
Tony Gomez, YV5AGD, USA-CA All Counties #534, All 20M SSB, No. 1 to Latin America.

Awards Issued

Nicholas R. Raffaelly, KA1NX, made a clean sweep by claiming All Counties #537, USA-CA 3000 #570, USA-CA 2500 #640, USA-CA 2000 #703, USA-CA 1500 #789, USA-CA 1000 #964, and USA-CA 500 #2170, All SSB Mobiles, dated 4-13-87.

Hollis E. Thigpen, KC3X, finished his paperwork and qualified for All Counties #538, Mixed, dated 4-14-87.

F. Alan Fischer, K8CW, claimed a full complement of seals with his good application for All Counties #539, USA-CA 3000 #571, USA-CA 2500 #641, USA-CA 2000 #704, USA-CA 1500 #790, USA-CA 1000 #965, and USA-CA 500 #2171, Mixed, dated 4-15-87.



The shack from which the FB signal of YV5AGD originates.

Peter Kragh, K2UPD, finished his quest and applied for All Counties #540, and USA-CA 3000 #572, Mixed, dated 4-22-87.

Charles M. 'Mort' Fults, WB7VIZ, completed all his paperwork and claimed All Counties #541, USA-CA 3000 #573, USA-CA 2500 #642, USA-CA 2000 #707, USA-CA 1500 #792, USA-CA 1000 #967, and USA-CA 500 #2173, All 20 Meter SSB Mobiles, dated 4-24-87.

Raymond Gomes, K9KKX, received USA-CA 3000 #569, and USA-CA 2500 #639, All 20 Meter SSB, dated 4-4-87.

Dave C. Rochier, KE5KC, claimed

USA-CA Special Honor Roll

Nicholas R. Raffaelly, KA1NX
All Counties #537, All SSB Mobiles, 4-13-87

Hollis E. Thigpen, KC3X
All Counties #538, Mixed, 4-14-87

F. Alan Fischer, K8CW
All Counties #539, Mixed, 4-15-87

Peter Kragh, K2UPD
All Counties #540, Mixed, 4-22-87

Charles M. "Mort" Fults, WB7VIZ
All Counties #541, All 20M/SSB/Mobiles, 4-24-87

USA-CA Honor Roll

3000		K8CW	790
K9KKX	569	KY1I	791
KA1NX	570	WB7VIZ	792
K8CW	571	KE5KC	793
K2UPD	572		
WB7VIZ	573	**1000**	
		NA8O	963
2500		KA1NX	964
K9KKX	639	K8CW	965
KA1NX	640	KY1I	966
K8CW	641	WB7VIZ	967
WB7VIZ	642	DJ5WO	968
KE5KC	643	KE5KC	969
2000		**500**	
KA1NX	703	WD4IIO	2168
K8CW	704	NA8Q	2169
KA5RNH	705	KA1NX	2170
KY1I	706	K8CW	2171
WB7VIZ	707	KY1I	2172
KE5KC	708	WB7VIZ	2173
		G4BUE	2174
1500		WA6CQW	2175
NA8Q	788	WB1DEU	2176
KA1NX	789	CX4HS	2177

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 non-subscribers, it is $10.00. Initial application must be submitted in the USA-CA record book which may be obtained from CQ Publishing Company, 76 North Broadway, Hicksville, NY 11801, U.S.A. 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 a SASE to the USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, U.S.A. DX stations must include extra postage for air mail reply.

Tony, YV5AGD, contemplates a few of his trophies, many of them won during contests.

High in the clouds over beautiful Caracas, Venezuela is the antenna belonging to Tony, YV5AGD.

Alberto E. Symonds, CX4HS/CX6BBY, USA-CA 500 #2177, No. 1 to Uruguay.

USA-CA 2500 #643, USA-CA 2000 #708, USA-CA 1500 #793, and USA-CA 1000 #969, Mixed, dated 4-29-87.

Joseph C. Cannon, Sr., KA5RNH, qualified for USA-CA 2000 #705, All SSB, dated 4-16-87.

Robert P. Hastings, KY1I, filed his application and received USA-CA 2000 #706, USA-CA 1500 #791, USA-CA 1000 #966, and USA-CA 500 #2172, Mixed, dated 4-23-87.

Clare H. Stead, NA8Q, received USA-CA 1500 #788, USA-CA 1000 #963, and USA-CA #2169, All Mobiles, dated 4-8-87.

USA-CA 500 certificates went to:

Cloverleaf ARC (W4ILE, Trustee), WD4IIO, USA-CA 500 #2168, All CW, 4-2-87.

Clare H. Stead, NA8Q, USA-CA 500 #2169, All Mobiles, 4-8-87.

Nicholas R. Raffaelly, KA1NX, USA-CA 500 #2170, All SSB Mobiles, 4-13-87.

F. Alan Fischer, K8CW, USA-CA 500 #2171, Mixed, 4-15-87.

Robert P. Hastings, KY1I, USA-CA 500 #2172, Mixed, 4-23-87.

Charles M. Fults, WB7VIZ, USA-CA 500 #2173, All 20 Meter SSB Mobiles, 4-24-87.

Christopher J. Page, G4BUE, USA-CA 500 #2174, All CW, 4-24-87.

George Hammon, WA6CQW, USA-CA 500 #2175, All 20 Meter SSB, 4-24-87.

Alphonse J. Longo, WB1DEU, USA-CA 500 #2176, All CW, 4-25-87.

Alberto E. Symonds, CX4HS/CX6BBY, USA-CA 500 #2177, All 2 × SSB, 4-29-87; #1 to Uruguay.

Awards Available

Alfredo Emilio Luciano, LU6DJX, Award. This award is offered by the CW Group of Argentina (GACW). It is available to all radio amateurs and SWLs who have worked/heard six different Argentine stations. Stations worked/heard must have been located in continental, antarctic, or insular territory of Argentina, and four of the six must have been members of GACW.


GRUPO ARGENTINO DE CW

DIPLOMA

ALFREDO E. LUCIANO - LU6DJX

Confirmamos por Ud. C.Q. RADIO AMATEUR

Buenos Aires, 06 de Enero de 1987

Alfredo E. Luciano, LU6DJX, Award offered by Grupo Argentino de CW.

Contacts after 1 June 1977, the date GACW was founded, are valid.

Make application by submitting logs showing call, date, time, mode, RST and band, along with photocopies of confirming QSLs. The fee is ten (10) IRCs. Send application and fee to Grupo Argentino de Radiotelegrafia, Carlos Diehl 2025, 1854 Longchamps, Buenos Aires, Argentina.

West Kent ARS Award. The West Kent Amateur Radio Society has simplified the rules for the WKARS Award. The complete revised rules follow.

The WKARS Award is available to all licensed amateurs and SWLs (on a "heard" basis) for confirmation of QSOs with WKARS members and also with other amateur radio stations located in the county of Kent. Kent lies in the southeast of England (G).

To qualify for this award, applicants must accumulate 15 points. Points per QSO are as follows:

QSO with club stations G1WKS, G3WKS, and GBxWKS—5 points.

QSO with present or past member of WKARS—3 points.

QSO with other Kent station—1 point.

This award is available for all CW, phone, or mixed modes either HF (1.8–30 MHz), VHF (50 MHz and up), or mixed bands; also QRP (15 watts), QRPp (3 watts), or via satellite.

Do not send QSL cards. Send GCR list with the following data: date, time UTC, frequency band, QTH, and mode.

Fee: European stations 1 IRC (or 35p in English stamps); others 2 IRCs (or 70p in English stamps). The same fee is required when separate application is made for additional band or mode stickers. Send application to Alexander Korda, G4FDC, 5 Windmill Court, North Street, Royal Turnbridge Wells, Kent, TN2 4SU, England, GB.

Present and past members of the WKARS (as of February 1, 1987) are: K3HZO, LA0DO, ZS6M, 5B4DN, GJ6TWF; G0–DBL, DEV, DJC, EBS, EMZ, FSX, GNN, GKW, GUV, HAX; G1-BGL, FQK, GJH, JBO, LTX, NZA, OBQ, PAZ, SWD, UNO, UTH, VTN, VZK; G2-BT, UJ, AOL; G3-AIO, AMG, FVV, HCK, HOU, IOM, KIP, KOM, LMS, PEY, RST, TLB,

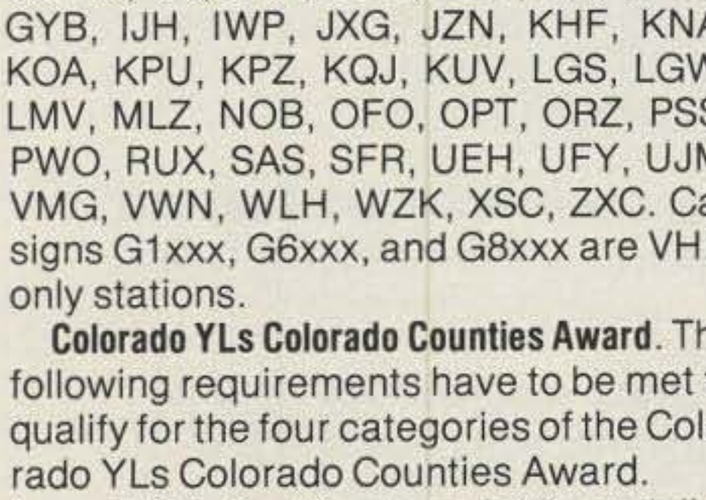
TLG, TXZ, XPX, YOU, YPY, ZYP, ZZD; G4-IB, BIA, BKG, BMD, BOO, BUO, BWH, CCQ, CNE, DFY, DIX, DRB, DRV, DYF, EMV, ERW, EUK, FDC, FGU, FWG, FYG, GTN, HUW, IBQ, IJH, JFD, JZP, KIU, LNM, MXL, NAJ, OSH, OTV, OYW, PBF, PML, RPQ, RWT, SGI, SLD, UDW, UPI, XCZ, XDS, XIA, XRN, ZFP: G6-PS, TQ, BNJ, DUU, HVW, JUB, HFX, JZN, RHU, OOE, KLG, TBO, TBY, TKG, TWF, UJY; G8-KG, VG, CAA, CDD, CDP, DHP, FFG, GYB, IJH, IWP, JXG, JZN, KHF, KNA, KOA, KPU, KPZ, KQJ, KUV, LGS, LGW, LMV, MLZ, NOB, OFO, OPT, ORZ, PSS, PWO, RUX, SAS, SFR, UEH, UFY, UJM, VMG, VWN, WLH, WZK, XSC, ZXC. Call signs G1xxx, G6xxx, and G8xxx are VHF-only stations.

Colorado YLs Colorado Counties Award. The following requirements have to be met to qualify for the four categories of the Colorado YLs Colorado Counties Award.

Award "D": Certificate and sYLver dollar seal with ribbons.

For U.S. amateurs—Contact with 15 Colorado counties.

For DX amateurs—Contact with 10 Colorado counties.



Colorado Counties Award available from the Colorado YLs club.

Award "C": Second sYLver dollar seal with ribbons.

For U.S. amateurs—Contact with 30 Colorado counties.

For DX amateurs—Contact with 20 Colorado counties.

Award "B": Third sYLver dollar seal with ribbons.

For U.S. amateurs—Contact with 45 Colorado counties.

For DX amateurs—Contact with 30 Colorado counties.

Award "A": Fourth sYLver dollar seal with ribbons.

For U.S. amateurs—Contact with 55 Colorado counties.

For DX amateurs—Contact with 40 Colorado counties.

Special Award—For working all 63 Colorado counties. The award is a white, name tag type, badge. The pin is not attached so that you may attach it to your certificate. You may glue the pin to the back if you want to wear it as a badge. Lettering: "All Colorado Counties USA." The Colorado YLs insignia is in the center.

Your application should state which certificate you want. Mixed-mode operation is valid for all contacts. Please remit $1.00 US with your application to cover mailing. If you are mailing your certificate back for another sYLver dollar seal, send $1.00 to cover return postage. If you are applying for the Special All Counties award, please send an additional $1.00 to cover the cost of the pin.

A written verification of your QSL cards signed by at least two other amateurs or the officers of an amateur radio club and the money must accompany your application. Application is to be sent to the Colorado Counties Custodian: Marie Dambrosky, WB0HUC, 2146 So. Washington Street, Denver, CO 80210, U.S.A.

DX Suffix Award. The DX Suffix Award is offered by Joe Cannon, KA5RNH, for confirmed contacts with DX stations whose suffix spells a word (example: FD1*JOE*).

There are four classes: Class 1 is 25 contacts; Class 2 is 50 contacts; Class 3 is 75 contacts; and Class 4 is 100 or more contacts.

Suffix Award offered by KA5RNH.

Stateside Suffix Award. The Stateside Suffix Award, similar to the DX Suffix Award, is offered by Joe Cannon, KA5RNH, for confirmed contacts with stateside stations whose suffix spells a word (example: K8*BEN*). No abbreviations are allowed. The dictionary will be used to verify a word. There are no band or mode restrictions, and no start date. SSB or CW endorsements are available on request.

Send log data, and verification by two other amateurs that QSL cards are in your possession, along with $2.00 or 4 IRCs to Joe Cannon, KA5RNH, P.O. Box 673, Gonzales, LA 70707-0673 U.S.A.

There are two classes: Class 1 is 25 contacts; and Class 2 is 50 or more contacts.

No abbreviations are allowed. The dictionary will be used to verify a word. There are no band or mode restrictions, and no start date. SSB or CW endorsements are available on request.

Send log data and verification by two other amateurs that QSL cards are in your possession, and $2.00 or 4 IRCs, to KA5RNH, Joe Cannon, P.O. Box 673, Gonzales, LA 70707-0673 U.S.A.

Notes

A new *Awards Guide* is now published by the leperse Radio Club V.Z.W. (Radio Club Ypres) in Belgium. This huge guide (434 large pages) describes 1027 amateur radio awards from 74 different countries. The guide contains 371 illustrations, DXCC countries list, explanation of the GCR list, how to use IRCs, and abbreviations commonly used for various currencies.

A copy of the guide costs 1390 Belgian Francs, $34.00 U.S., or 59 IRCs. Payment in the form of cash or IRCs in a registered letter, or an International Postal Money Order, will be accepted. Regular foreign checks must also include an additional $8.00 U.S. for bankers service charge. The price includes shipment via surface mail. Order from The Secretary, leperse Radio Club V.Z.W., P.O. Box 32, 8900 leper, Belgium.

I hope your summer holidays are pleasant ones and not too quickly gone.

73, Dorothy, WB9RCY

Antennas & Accessories

a monthly feature by
KARL T. THURBER, JR., W8FX

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

More On Software

This time author W8FX continues his discussion of some excellent software—software that may find a real use in your hamshack, whatever your operating interests. You should find this month's column refreshing and interesting!

—K2EEK

Last month we checked out some new and exciting software that we felt could substantially increase the power of your hamshack personal computer. We examined two excellent programs for the IBM-PC, BandAid™, a full-featured propagation program, and SCORE™, a very thorough Sweepstakes contest logging program. After examining these two programs, we took notice of some additions to the hamshack library, highlighted some new antenna products, and reserved some room for a couple of "short bursts" before signing off.

This time we'll continue our look at software for the hamshack. We'll discuss several IBM-PC packages by BV Engineering for the serious technical user; look at K2LAF's MULTI-FAX facsimile program; describe two code programs, one by LARESCO and the other by Archway Data; and also look at COCORADIO, a multimode operating package from Spec-Com. Following our coverage of software, we'll describe several new antenna products, including the Bugcatcher HF Mobile Antenna and the ready-made G5RV antennas from Amp Supply Co. We'll also highlight some good hamshack reading material and reserve some room for some more "short bursts."

Let's look at the software first.

More Software of Note

BV Engineering Notes. We've previously mentioned in the column the high-quality line of engineering software marketed by BV Engineering. Most of the software they sell is designed for the engineers among us, but several of their communications-oriented products are useful to *CQ* readers.

From Wilda Daggett at BV Engineering we find that the firm is a small, privately-owned company established in 1980. The product line is geared primarily to the electronics engineer and technician. They are attempting to provide a complete range of products from design, synthesis, and analysis tools to presentation and documentation programs, to aid in the communication of findings, developments, and results.

Looking through their catalog shows more than 16 such programs available in a variety of computer and disk formats. They are, in fact, one of the few firms still supporting CP/M computer systems to any great extent; about 70 different computers are supported. Programs offered include a plotter driver, scientific calculator, AC and DC network analysis, graphics, filter design, specialized wordprocessor utilities, and several others.

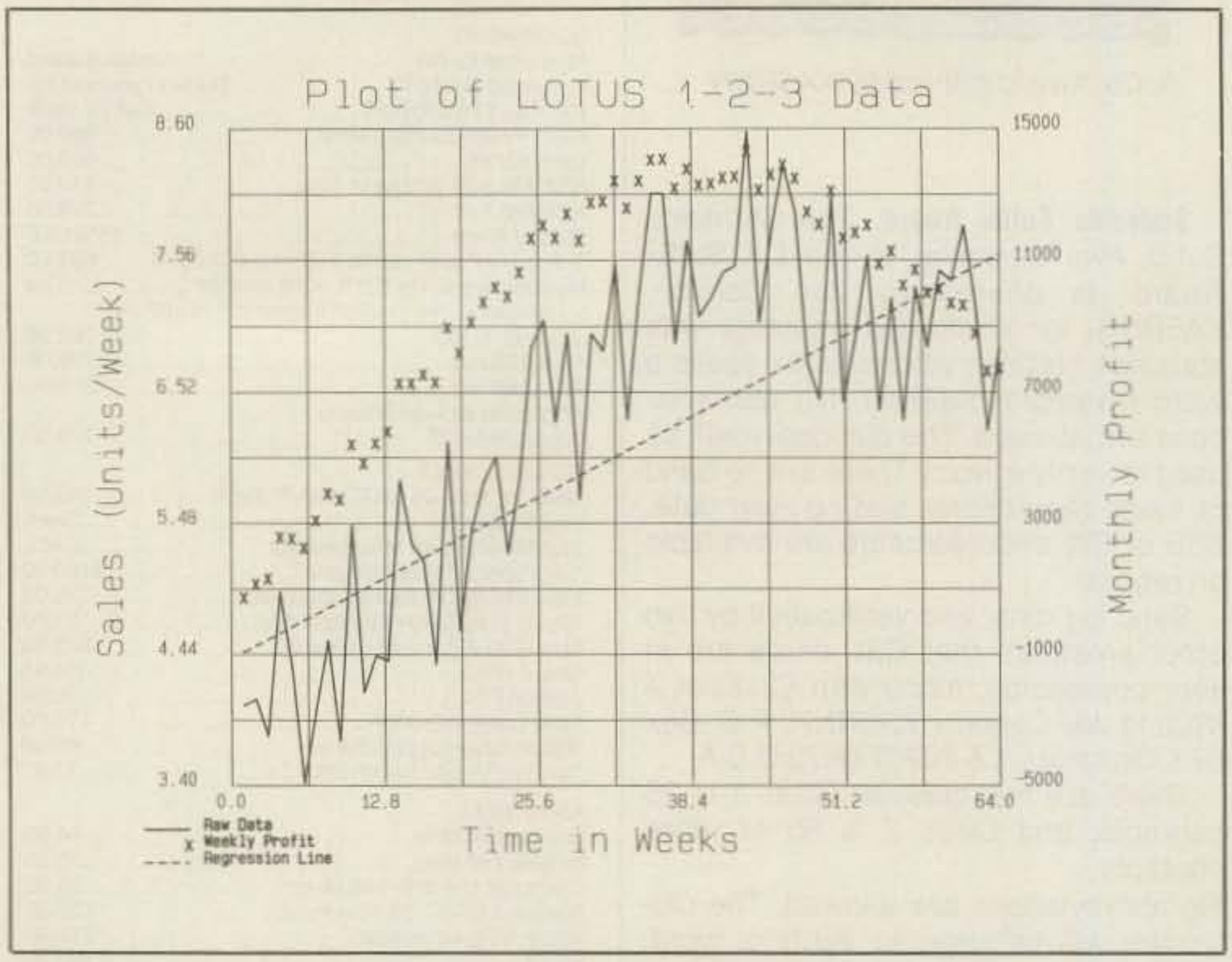


Fig. 1– Sample PDP program plot. Shown here is an example printout of Lotus 1-2-3 data using BV Engineering's PDP program. The plot, though reproduced here in black and white, is in several colors.

One of the more interesting programs is PDP, a program which makes multicolor scientific and financial graphs on single and multiple-pen plotters. Files can originate just about anywhere—from BASIC, FORTRAN, and PASCAL programs, wordprocessors, and text editors, and even programs such as the popular Lotus 1-2-3™ and the DBase™ series. Up to six plots from different files may be plotted on the same graph, and each of the six plots may contain as many as 1000 data points. Fig. 1 shows some Lotus 1-2-3 spreadsheet data prepared by PDP. Hmmm . . . how would those contest results look prettied up like that?

Speaking of spreadsheets, most of us know how popular computer spreadsheets have become in the business world. Their popularity has invaded the engineering community as well, with BV's COMCALC. A "communications design spreadsheet," it is a menu-driven computer-aided design tool suited to the radio communication systems designer or user. With it, various components of a system such as transmitter power, frequency, path attenuation, receiver noise figure, and the like, are entered.

The COMCALC program displays the system's performance characteristics, as well as a "communications budget" which tells the designer how much signal energy margin he has. The display responds rapidly to user commands, with the display being updated as soon as one of the system components' values is changed. This affords a simple means of trying out "What if I changed this?" questions and getting intermediate results, a feature of all spreadsheet-type programs. COMCALC also includes a specialized calculator which solves many common communications problems such as line-of-sight (LOS) distances, parabolic antenna design, and units conversion.

Of special interest to me as a technical writer is BV's RightWriter, a proofreader and writing style analyzer which they market for DecisionWare Corp. For certain, everyone who writes can use an editor to help develop a crisp, clear, concise, and fluid style. The RightWriter package uses artificial intelligence techniques to evaluate your writing for correct grammar, style, usage, punctuation, and spelling. It points out awkward language, passive-voice constructions, too-long sentences, and other writing deficiencies.

RightWriter notes its findings by creating an annotated copy of the document, which contains comments that point out ways to improve it. A summary report evaluates the strength of delivery, readability, sentence structure, and jargon (and we all know how much jargon there is in this hobby!). The summary even contains

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6 position antenna switch (2 coax lines, through tuner or direct, random/balanced line or dummy load). SO-239 connectors, ceramic feed-throughs, binding post grounds.

Deluxe aluminum low-profile cabinet with sub-chassis for RFI protection, black finish, black front panel with raised letters, tilt bail.

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MFJ's fastest selling tuner packs in plenty of new features. New styling! Brushed aluminum front. All metal cabinet. **New SWR/Wattmeter**! More accurate. Switch selectable 300/30 watt ranges. Read forward/reflected power.

New antenna switch! Front panel mounted. Select 2 coax lines, direct or through tuner, random wire/balanced line or tuner bypass for dummy load.

New airwound inductor! Larger more efficient 12 position airwound inductor gives lower losses and more watts out. Run up to 300 RF power output.

Matches everything from 1.8 to 30 MHz! dipoles, inverted vee, random wires, verticals, mobile whips, beams, balanced and coax lines.

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MFJ's best 300 watt tuner is now even better! The MFJ-949C all-in-one Deluxe Versa Tuner II gives you a tuner, cross-needle SWR/Wattmeter, dummy load, antenna switch and balun in a new compact cabinet. You get quality conveniences and a clutter-free shack at a super price.

A new cross-needle SWR/Wattmeter gives you SWR, forward and reflected power—all at a single glance. SWR is automatically computed with no controls to set. Has 30 and 300 watt scale on easy-to-read 2 color lighted meter (needs 12 V).

A handsome new black brushed aluminum cabinet matches all the new rigs. Its compact size (10 x 3 x 7 inches) takes only a little room.

You can run full transceiver power output—up to 300 watts RF output—and match coax, balanced lines or random wires from 1.8 thru 30 MHz. Use it to tune out SWR on dipoles, vees, long wires, verticals, whips, beams and quads.

A 300 watt 50 ohm dummy load gives you quick tune ups and a versatile six position antenna switch lets you select 2 coax lines (direct or thru tuner), random wire or balanced line and dummy load.

A large efficient airwound inductor—3 inches in diameter—gives you plenty of matching range and less losses for more watts out. 100 volt tuning capacitors and heavy duty switches gives you safe arc-free operation. A 4:1 balun is built-in to match balanced lines.

Order your convenience package now and enjoy.

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MFJ-1702. $19.95. 2 positions. 60 dB isolation at 450 MHz. Less than .2 dB loss. SWR below 1:1.2.

$29.95 MFJ-1701

MFJ-1701, $29.95. 6 positions. White markable surface for antenna positions.

MFJ's Smallest VERSA TUNER

MFJ-901B **$59.95**

MFJ's smallest 200 watt Versa Tuner matches coax, random wires and balanced lines continuously from 1.8 thru 30 MHz. Works with all solid state and tube rigs. Very popular for use between transceiver and final amplifier for proper matching. Efficient airwound inductor gives more watts out. 4:1 balun for balanced lines. 5 x 2 x 6 inches. Rugged black all aluminum cabinet.

MFJ's Random Wire TUNER

MFJ-16010 **$39.95**

MFJ's ultra compact 200 watt random wire tuner lets you operate all bands anywhere with any transceiver using a random wire. Great for apartment, motel, camping operation. Tunes 1.8-30 MHz. 2 x 3 x 4 inches.

MFJ's Mobile TUNER

MFJ-945C **$79.95**

Designed for mobile operation! Small, compact. Takes just a tiny bit of room in your car. SWR/dual range wattmeter makes tuning fast and easy. Careful placement of controls and meter makes antenna tuning safer while in motion.

Extends your antenna bandwidth so you can operate anywhere in a band with low SWR. **No need to go outside and readjust your mobile whip.** Low SWR also gives you maximum power out of your solid state rig—runs cooler for longer life.

Handles up to 300 watts PEP RF output. Has efficient airwound inductor, 1000 volt capacitor spacing and rugged aluminum cabinet. 8x2x6 inches. Mobile mounting bracket available for $5.00.

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measures of the reading grade level, and it also displays a list of so-called "uncommon words" which contain misspellings, slang, and jargon.

An accessory customization package, RightWords, lets you add a number of specialized word lists to the RightWriter dictionary, thus enabling you to customize the dictionary to meet your own professional, business, or hobby needs, and it can add up to 100,000 words to the dictionary.

Incidentally, I've taken these two wordprocessor utilities out for a spin, and find that they work very well indeed, having the capability for real improvement of one's writing. Perhaps a few of these programs in the hands of those who write our computer and software instructions, as well as our amateur manuals, would make things easier all around!

A catalog of more than 50 pages is available. Write to BV Engineering, 2200 Business Way, Suite 207, Riverside, CA 92501.

MULTIFAX. Many of us have had the urge to use our amateur and personal computer to get a jump on the weather by dumping weather facsimile photos to our screen or printer. Elmer Schwittek, K2LAF, has done just that with his MULTIFAX program for the IBM-PC and compatibles. The program is designed to enable reception of a wide range of specialized FAX-type signals, such as WEFAX transmissions from GOES satellites, HF FAX from Navy weather broadcasts, APT from NOAA polar orbiting satellites, and WEFAX rebroadcasts from TV transponders—in up to four colors on a color monitor.

According to Elmer, MULTIFAX grew out of his experience with two programs he co-authored in the June 1985 *QST* article "WEFAX Pictures on Your IBM PC." His new program incorporates significant improvements over the earlier magazine programs in that MULTIFAX can be used to copy all types of FAX signals. It offers magnified views of sections of the picture shown in great detail, and also allows you to monitor the full picture while it is being recorded.

The program is adaptable to a variety of facsimile transmissions and computer clock rates, since sweep speeds are keyboard adjustable. It therefore allows you to view and store pictures and charts transmitted by a variety of facsimile services. Among these services are the GOES (geosynchronous) and NOAA (polar orbiting) weather satellite systems, as well as the various US and foreign HF radio weather facsimile services. The program was developed for the IBM-PC, but also functions on some clones, having a minimum of 320K of memory. K2LAF wrote his program in BASIC, but it contains a machine-language subroutine that performs the fast time-sensitive functions. Data entry to the program is by means of the computer's game port.

A 23-page instruction booklet is furnished with the package. It includes a tutorial on the program's operation and features, a description of the key elements of a computer facsimile system and interface hardware, and a technical appendix. The MULTIFAX program is priced at $49, though for those who want to walk before they run, the instruction booklet may be purchased for $10 and applied as a credit toward later purchase of the program.

Morse: The Code Machine. Lawrence A. Reed sent us information on a sophisticated Morse code instructional program he has developed for the Apple II + /c/e series of computers. His program is "Morse: The Code Machine," and it is available in six versions (Fundamental, Basic, Classic, Deluxe, Super Deluxe, and Elite).

A very thorough and detailed package, the program includes a number of operating modes, selection menus, lesson plans, graphics (except in the Fundamental and Basic versions), and a wordprocessor (in the Elite version only). The Elite package contains 31 modes, while the other packages are less fully featured, though all versions have disk commands and the view mode. The modes offered include code command, code frequency select, practice, drill, teach, view, character generator, wordprocessor, disk operation, and several other modes.

The package consists of a disk and manual used to teach and enhance one's ability to send and receive code, and has a selectable sending speed of approximately 1 to 100 wpm. The test generator creates text for program use, done automatically by the computer or manually (using the text processor). Characters created in memory may be saved to or loaded from disk. The view mode displays the eight-page text memory, each page of which consists of 24 lines by 40 characters.

The programs described require an Apple II + /c/e computer with 48K memory and one disk drive. The products are priced from about $15 to $45. For more information, contact LARESCO, P.O. Box 2018, 1200 Ring Rd., Calumet City, IL 60409.

Code Tutor. Another new Morse instructional tutor, this one for the IBM-PC family, is offered by Merrill G. Thor at Archway Data Systems, 13 Timber Rd., Edison, NJ 08820. The inexpensive ($9.95) program is designed also to be a testing aid for volunteer license examiners.

The program offers three major operating modes, in addition to a built-in help screen. In the Single Character Mode the program allows you to type in individual letters, numbers, and punctuation to learn the proper code for each. The code is heard as "dits and dahs" on the computer's speaker and as written-out dits and dahs on the computer screen. This is useful to one first learning Morse.

The Practice Session Mode enables you to practice receiving Morse. As the computer sends code over its speaker, the program simultaneously displays the word-by-word message on its screen. A learner can begin practice by watching the screen as the message is sent. Later on he or she can look away from the screen or darken it to practice code reception

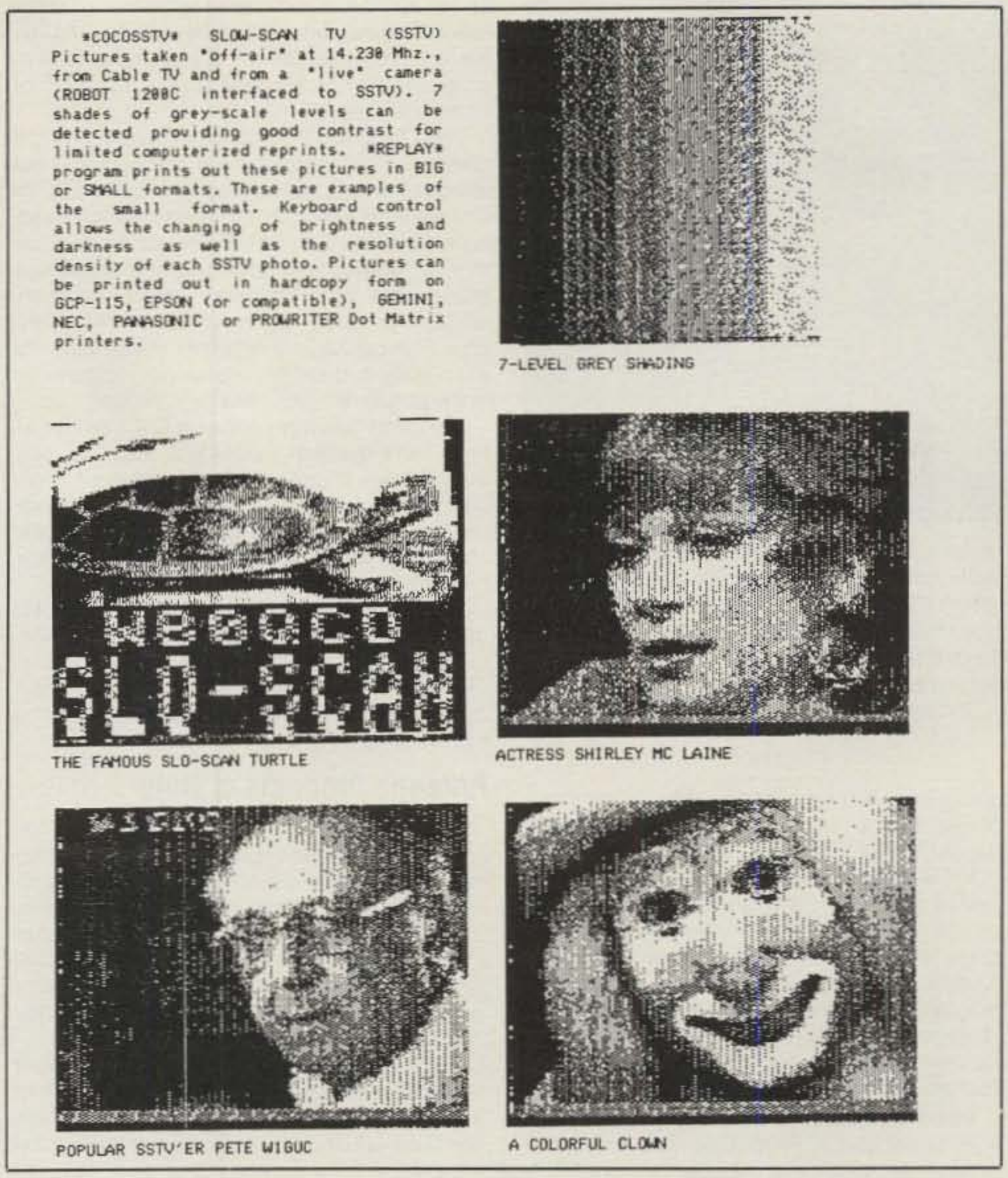


Fig. 2–COCORADIO SSTV pictures. Here are several off-the-air, 20 meter photos as received on Spec-Com "interfaceless" software for the Radio Shack CoCo computer. The program allows keyboard control of picture brightness and darkness, as well as the resolution density of each SSTV photo. (Courtesy WB0QCD)

Menu screen from the AMSAT AMS-2064 satellite tracking program for Commodore computers. This program has been superseded by programs such as Quicktrak 2064 and C-64 Supertrac, representatives of the roughly two dozen satellite programs found in the AMSAT Software Exchange library. (W8FX photo)

on his own. After the message has been completed, he then compares his transcription to the computer's version.

In the Select Speed Mode you can adjust the rate at which the computer sends code. Thus, as you gain proficiency in Morse, you can continue to build speed in receiving messages. Also, once you have mastered the messages built into the program, you or the instructor can replace them with new ones. You can do this by creating ASCII text using practically any text editor or wordprocessor.

New from Spec-Com. Some correspondence with Mike Stone, WB0QCD, who also publishes *The Spec-Com Journal*, highlighted a number of new amateur software packages to support the very popular Radio Shack TRS-80C CoCo, as well as software for other popular hamshack computers.

The most interesting of these packages is COCORADIO, which Mike says is the best CoCo software program package he has ever offered, and the hobby's only all-mode disk-based "interfaceless" communications software. Consisting of a bundle of about 50 related programs, COCORADIO allows you to receive and decode various transmission modes, such as Slow Scan TV (SSTV), Fast Scan TV (FSTV), facsimile (FAX), RTTY, Morse, TVRO, and OSCAR transmissions.

Spec-Com furnishes the package, which is priced at about $60, on three floppy disks (the main operating disk an two FAX/SSTV picture demo disks). In addition to the programs needed to get you on the various operating modes, there are also a number of utility programs included in the package. These include programs to display a time clock on your monitor's screen; create TV banner messages (for FSTV or SSTV); locate satellite positions; do contact logging; produce SSTV hardcopy printouts; generate TV test patterns; and perform several other useful station functions.

Although the program is "interfaceless," meaning that it works without the need for external terminal demodulators to provide signal processing, the program does require a single pair of audio wires from your receiver to the computer. This audio link routes incoming receiver audio to the cassette jack on your computer. This may be done using a dual-port miniature Y-plug if you're using a cassette recorder, or directly to the cassette jack if you're not using a recorder.

The COCORADIO package is largely menu-driven and simple to operate. Although it is not intended to be a replacement for more sophisticated (and expensive) high-resolution hardware systems, it does provide an economical introduction to a variety of communications modes that most amateurs would find financially impractical to experiment with otherwise. The package is regularly updated (mods are $3.00), and continuing support is provided in the pages of *The Spec-Com Journal*.

Although the emphasis is on CoCo software, Mike tells me that Spec-Com also has produced several collections of amateur radio utility programs for the IBM-PC and the Apple. For more information on COCORADIO and other programs, contact Spec-Com Software, P.O. Box H, Lowden, IA 52255.

Fig. 2 shows some off-the-air SSTV photos generated using COCORADIO and taken from cable TV and a ROBOT 1200 camera. Pictures can be printed out in hardcopy form on Epson, Gemini, NEC, ProWriter, and other dot matrix printers.

Antenna Products of Note

The Bugcatcher. Jim Alexander, W5UVF, has come up with what should be a popular antenna for those diehard HF mobilers among us who would rather fight than switch to VHF or UHF while cruising the highways and byways.

The colorfully named antenna gets its moniker from the appearance of the hi-Q resonator, which uses an air inductor for high efficiency. The antenna consists of four main parts: a stainless steel base section, a bandswitching resonator, a stainless steel antenna spring, and a tapered steel whip. The antenna functions as an inductive loaded quarter-wave vertical.

The Bugcatcher is available with a 16 inch base section for an overall length of 102 inches, for 10–80 meter coverage. A longer version has a 42 inch base section with an overall length of 128 inches, for 15–80 meter coverage. Frequency coverage is continuous, to allow operation on up to eight amateur bands plus MARS, CAP, and some marine frequencies. Versions are available to handle either 500 watts or 1 kw. The latter heavy-duty version requires a sturdier mount to handle its added weight and wind load.

The continuous-coverage Bugcatcher is bandswitching, eliminating the need to carry extra resonators and antenna sections. The antenna uses a hi-Q inductor which can be set up with pretuned taps for any desired band or specific operating frequency. You accomplish bandswitching by moving a shorting cable from one tap point to another with an alligator clip. Jim furnishes the resonator with four coil clips to set the antenna up on the five primary bands.

While we haven't put the antenna through its paces, Jim strongly asserts efficient performance for his product, and claims it is more efficient than its competitors, mainly due to the design of the resonator. Various models are priced from $75 to $90, depending on configuration. In addition to the Bugcatcher, Jim's catalog includes a number of mobile and portable antenna products and accessories, including several HF multiband RV and portable/emergency dipole antennas.

Contact Jim Alexander, W5UVF, Texas Radio Products, 5 East Upshaw, Temple, TX 76501.

Ready-Made G5RV. We've mentioned the popular 102 foot G5RV antenna many times in the column and have regularly reported on reader acceptance of the antenna. Now someone has put together a G5RV kit!

Amp Supply Co. sells a $50 model which they dub the "G5RV Signal Injector," billed as an excellent all-band (3.5–30 MHz) dipole. The antenna is the twinlead-and-coax feeder G5RV variant, and consists of a 102 foot flattop and 31 feet of 300 ohm transmission line to achieve multiband operation in a single package. This design should present an impedance at the end of the 300 ohm transmission line segment of about 50–60 ohms on most bands, a good match to coax.

The antenna kit consists of 102 feet of copper antenna wire, 31 feet of 300 ohm twin line, 70 feet of coax, two end insulators, one center insulator, a PL-259 connector with sleeve, and a "transformer coupler" used at the point where the twin line joins the coax.

While our research into the G5RV shows that antennas fed all the way with twin line to the antenna tuner give fewer problems with balun overheating and transmitter loading, the twin line and coax design has its adherents. Too, you may be able to use this type of G5RV without an antenna tuner in some cases. You may also achieve good results on 160 meters by tying the center conductor and shield of the coax together at the transmitter end of the system, feeding the antenna as a Marconi against ground through an antenna tuner.

For more information, contact Amp Supply Co., P.O. Box 147, Raleigh, NC 27602.

From the Bookshelf

AMSAT Satellite User's Catalog. "My, how you've grown!" is the best way to describe my surprise upon picking up a new AMSAT catalog. It had been nearly two years since I had seen one of their program listings, and I was amazed at the variety of programs offered for the computer-based amateur satellite user.

The AMSAT Software Exchange offers about two dozen satellite utility programs to support most of the computers you're likely to find in the hamshack. These include the IBM-PC, Apple, Atari, Heath, Hewlett-Packard, Radio Shack, North Star, Timex and CP/M families (Have I missed one?).

The most powerful, flexible, and useful package is probably the new PC SUPERTRAC for the IBM-PC family, which includes two main elements, the W0SL and N4HY tracking programs. The W0SL program is a menu driven, updated version of the classic W3IWI program for tracking and scheduling of amateur satellites. It includes both batch output and a graphics display of a world map on which the coordinates of up to eight satellites are displayed in real time. The N4HY QUIKTRAK program is similar in function, and it includes a very fast algorithm for finding usable passes of the satellite of your choice. Satellite pointing angles relative to your QTH and a window track mode are included. This feature identifies mutual "windows of opportunity" between your QTH and other specified locations around the world.

Another very popular and competent AMSAT program is SuperTrak, for the Commodore 64. This package, actually made up of three major programs, allows you to track up to eight satellites at the same time on a sharp world map, while simultaneously providing all of the ne-

Shown here is a typical screen display from the early AMSAT satellite tracking program, AMS-2064. AMSAT now offers at least 24 satellite programs for a wide variety of PCs. As we went to press, we learned of a new, state-of-the-art satellite tracking program developed by G3RUH. First indications are that it is in contention for being the premier tracking program (without graphics) for OSCAR-10 users. The new PLAN10 program is said to be the first to give details on when satellite conditions are best during each orbit. It's available for most popular PCs from Project OSCAR, Inc., P.O. Box 1136, Los Altos, CA 94023-1136. (W8FX photo)

cessary tracking data for antenna positioning. A graphic feature allows you to choose any one of 12 satellites, to follow its ground track on successive orbits. This feature is highly useful for determining mutual visibility between two locations. The three programs in the package share an easy-to-use, menu-driven utility program for updating the Keplerian data needed for the programs to work their magic.

Some of the programs AMSAT offers for other computers are the W3IWI Tracking Program for the Apple, Heath, and Atari; QuikMac for the Macintosh; QuikTrak 2064 for the C-64 and Vic-20; and two programs for the HP-41 Programmable Calculator (Orbit I and Orbit II). Program costs run between about $20 and $40, depending on the particular program and computer, and whether or not the purchaser is an AMSAT member.

While we don't intend this to be an advertisement for AMSAT, we should mention that the organization does publish a nice set of hardcopy (book) materials to help one get started in satellites. Three publications, in particular, are of real use to the satellite beginner. These are *The AMSAT Beginner's Manual* ($5), *The AMSAT-Phase III Satellite Operations Manual* ($15), and *The Satellite Experimenter's Handbook* ($10). The AMSAT Bookstore also carries the OSCAR orbital prediction book for tracking satellites in conjunction with the ARRL OSCARLOCATOR or ZRO Satellabe or Satellipse.

Requesting the Satellite User's Catalog and the Program Availability Notice should get you a fat package of interesting material. Write to AMSAT, P.O. Box 27, Washington, DC 20044.

Timex-Sinclair Resource. We've mentioned the still strong following for "the little computer," the Timex and its many variants, and we've run several features on the Timex and its various incarnations in the past.

Several correspondents have pointed to a very good source of "Timex stuff," which is A+ Computer Response, 69-B Island St., Keene, NH 03431. A+ carries a large supply of increasingly hard-to-find Timex-based accessories and supplies. These include various hardware items, printer ribbons, cables, power supplies, cartridges, and software.

A+ also sells the very capable Sinclair QL computer. This little machine represents a very low cost ($200) entry into the 32-bit computer world. The QL, for those who are not aware, is a full-size computer designed around the Motorola 68008 chip. The machine includes 128K RAM, expandable to 640K, two built-in 100K "microdrives," a full-sized 64-key QWERTY keyboard, high-resolution color, two RS-232C serial interfaces, and joystick cursor control. The QL also includes a proprietary operating system, QDOS, which provides single-user multitasking capabilities, thus allowing you to run several programs at the same time. The QL may be operated in a local area network (LAN) with up to 64 computers being interconnected. The QDOS operating system also enables you to view up to 20 independent windows. Sounds something like a poor man's Atari ST to me!

For the more adventurous experimenter, A+ also offers a QL computer *kit*, which includes the QL circuit board, two microdrives, a heat-sink, case and keyboard, diagram, manuals, cables, and power pack, for $139.

Short Bursts

A Note from History. This June *CQ* celebrated the 41st anniversary of its propagation column, certainly one of the longest running columns in any amateur radio publication. The column first appeared in the June 1946 issue, and it was written by the late Oliver P. ("Perry") Ferrell. His column inaugurated propagation forecasts specifically designed to serve the needs of amateurs, as opposed to international broadcasters and the military.

George Jacobs, W3ASK, succeeded Perry in March 1951 and has served continuously since—I believe without ever missing a month. The column has been written by George in his travels on five continents and in over two dozen countries, ranging from Arctic Circle Scandinavia, to the jungles of Peru, to the Middle East and Southeast Asia. As George put it, "Whatever the situation, there was my crystal ball and typewriter, and a deadline never missed." These statistics are particularly noteworthy, as his editorship extends from the middle of Sunspot Cycle 18 to the final months of Cycle 21.

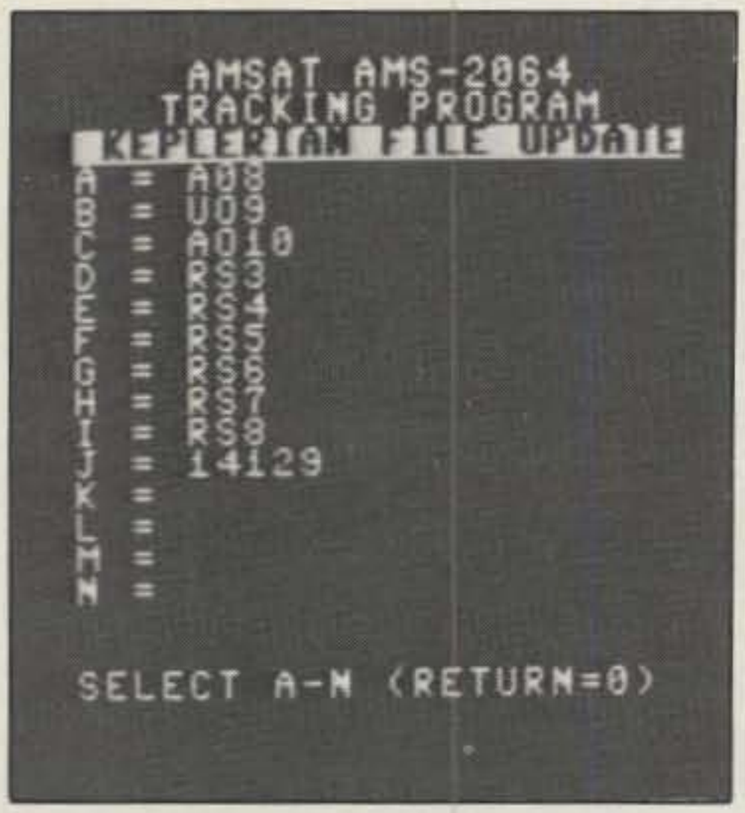
In George's 37th year as Propagation Editor, we'd like to salute him and wish him many more years of good propagation conditions!

Wrapping It Up

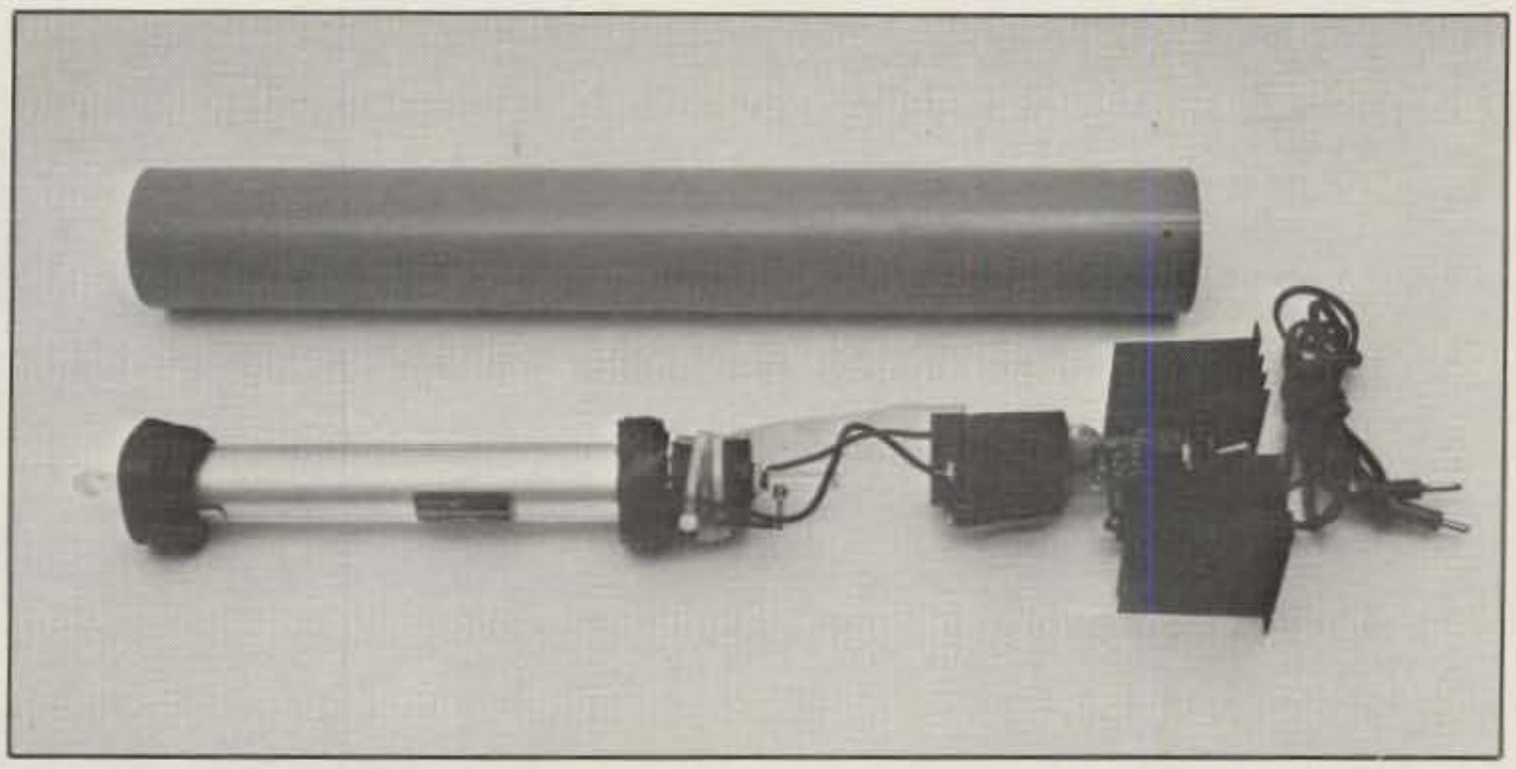
Well, gang, that's it for this month's column. Here we've followed up on last month's software column with a look at more useful ham-shack software, identified some new antenna products for the shack, and highlighted some additions to your reading list. We also saluted one of *CQ*'s longtime columnists, Propagation Editor George Jacobs, W3ASK.

Next month join us for more Antennas & Accessories subjects of current topical interest. See you then.

73, Karl, W8FX



Shown here is one of the update screens from the AMSAT AMS-2064 Tracking Program for Commodore computers. This was an early AMSAT Software Exchange program and is now just one of the two dozen or so satellite utility programs offered. (W8FX photo)



What's this, you say? Actually, it's the inside of a portable helium neon laser of the type that's practical for amateur lightwave communications. In a few months we'll feature one of amateur radio's newest frontiers when we highlight the work of Steve Noll, WA6EJO, and his manual, Amateur Lightwave Communications. *We'll cover Steve's book in more detail in the coming months, but if you can't wait, it is available for $13.98 postpaid from Steve J. Noll, WA6EJO, 1288 Winford Avenue, Ventura, CA 93004-2504. The photo shown is Copyright 1985 by Steve J. Noll, and is used with his permission.*

VHF

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

More WPX

This column should almost coincide with the July VHF WPX Contest on the 18–19th, so maybe the following information will be useful to those who receive their copies of *CQ* early.

"The well-traveled W1XX multi-op VHF contesting team will activate the United Nations station 4U1UN during the *CQ* VHF WPX Contest on all bands, 50 through 2304 MHz, SSB, CW, and FM. 4U1UN is a separate DXCC country, and the 4U prefix counts as a multiplier in the contest. Good antennas atop the 40-story UN building in Manhattan should produce good signals on all bands. High power to short coax runs will be used."

This information was received from Bart, KB9NM, on behalf of the crew: W1GNC, KA3V, W1XX, NJ2L, and W3UBQ. They wish to thank the United Nations Stafff Recreation Council Amateur Radio Club for making their operation possible.

Unfortunately, this release was received about a week too late for it to be published in the July issue. With any luck, at least a few "eager beavers" will read this before the contest starts. If not, then consider this some advance feedback related to the contest.

I must say that John Lindholm, W1XX, has become quite a VHF/UHF contester over the past few years. Originally I thought his influential position on the ARRL VHF/UHF Contest Committee a little superfluous, because at the time the League was going through their VHF contest rules changes, John was not particularly active on VHF, although he was a well-known contester elsewhere in the spectrum. As such, John and I had a somewhat heated argument (by mail, actually) relating to the proposed rules changes, most specifically the change which was to delete the 2 meter FM "calling frequency" (146.52 MHz) from the list of valid operating frequencies for the League's VHF contests. I even went so far as to stand up and argue my point at the VHF/UHF Contest Committee forum at the Dayton Hamvention that year, stating that nobody wins or loses the contests based on 146.52 MHz operation, the "calling frequency" concept on FM had gone the way of the dinosaurs, and hundreds of non-contesters who frequented 146.52 MHz actually looked forward to "DXing" on that frequency a few times per year.

A couple of other "big gun" VHF contesters agreed with me; most notably, Wayne, N6NB, who held about every VHF contest record in the southwestern U.S. (not to mention a couple in the northeast), and Bill, NF2L, who held a few records of his own under former callsign WA2DPU. Wayne wanted to retain 146.52 MHz to keep the contests from becoming boring in the LA area; Bill was against the rules changes in general and became disenchanted with VHF contesting altogether. Too bad, as we lost a couple of excellent operators from the game.

153 Rodman Court, Eatontown, NJ 07724

The ICOM IC-275A front panel contains 11 knobs, 35 pushbuttons, 2 LED status indicators, a multipurpose LCD display screen, mic and headphone connectors, and an analog S-meter! Despite all this, the rig is easy to use and becomes an extension of its operator's thoughts after a brief familiarization period.

That's all water under the bridge. W1XX has since become an avid VHF/UHF contester, and he's doing very well at it. I went with the flow and still operate most of the contests. N6NB has dropped out of the contesting scene for a while, but plans to return. And we now have an innovative July contest for all to enjoy. As this is written in May, I'm looking forward to this year's VHF WPX and will surely be operating from somewhere.

Speaking of contests, the ARRL Spring Sprints are loads of fun. Due to an overloaded schedule and the very recent birth of my daughter Jessica, the only sprint I operated was 23 cm on May 14. Putting in about 2 hours and just "fooling around," I worked about 50 stations up and down the eastern seaboard from WA1OUB (Hillsborough, NH) to K4QIF

The IC-275A rear panel has both AC and DC input connectors, antenna jack, accessory jacks for key, external speaker, digital communications modem, external power amp, and receive preamp connections; switches to control QSK and VSWR meter; and controls to adjust CW sidetone, mic tone, and compression level! This rig's got it all.

(Portsmouth, VA) and everyone had strong signals. I was overjoyed to see activity from FN30, that densely populated grid which for years showed zilch activity on the band. Conditions here were so good that Mark, AA2Z/1, in CT actually pinned my S-meter from a distance of 100 miles. Apparently, ICOM is selling their IC-1271A with some success and nobody is happier for them than I. Now if only the FCC would reconsider and give Novices the entire 23 cm band . . . .

Oh, yes—my apologies to those stations I worked in the 23 cm sprint. I gave everybody an "FN20XL" 6-digit locator as my exchange, and I was all wet (but at least consistent). Having just recently moved to a new QTH, I never bothered figuring my 6-digit locator until the night of the contest, and I used a map from a state road atlas which had poor definition of the longitude and latitude lines. I've since used a geodetic survey map to determine I'm actually in FN20XG—not to nitpick.

Operating Impressions: The ICOM IC-275A 144 MHz All-Mode Transceiver

I've used the IC-275A on and off now for the past several weeks and had the chance to compare its performance to both other multimode transceivers and my regular home station equipment, an IC-740 HF transceiver with a Microwave Modules MMT144/28R transverter (normally followed by a KW amplifier).

Right from the start, I must say the IC-275A runs rings around ICOM's previous efforts (IC-211A, IC-251A, IC-271A, IC-271H). The 275A has so many features, most of which are actually quite useful, that I could devote an entire column to a discussion of this rig. In about two months of using the IC-275A I can come up with only a few rather minor complaints:

One, the squelch circuit, which works on SSB/CW, is still not acceptable for use with weak signals; then, I don't believe I've encountered an SSB squelch that is.

Two, the rig produces a little "popping" sound from its speaker when tuning FM signals using the 1 kHz step tuning function; each "pop" coincides with a 1.000 kHz change in frequency and is obviously related to frequency synthesizer programming. The sound is only heard when tuning across a signal; it is absent otherwise.

Three, the S-meter is terribly inaccurate (see discussion which follows).

Four, the rig is so overloaded with features that initial operation can be a bit overwhelming. For example, the "General Operation" section of the user's manual is eight pages long. The "Functions Operation" section likewise goes on for eight pages. And the instructions for setting up the scanning functions is three full pages of information that will likely need to be read through a few times.

Then, again, the "Guide to Operations" for my IBM-PC is a three-ring binder with six sections containing hundreds of pages of rather meaningless drivel which I never bothered to read. And, yes, I typed this column on the PC.

A full product review of the IC-275A is in the July issue of *CQ*, so rather than rehash what another author wrote, I'll try to concentrate on the stuff that matters to me.

The IC-275A is astonishingly sensitive. Using a 3SK121 GaAsFET front end, it meets its claimed receiver sensitivity specifications of 0.1 uV for 10 dB S/N (SSB) and 0.25 uV for 20 dB quieting (FM). My laboratory measurements on the unit under test revealed its SSB **MDS** (**m**inimum **d**iscernible **s**ignal) at 144 MHz to be −140 dBm[1] on SSB, −130 dBm on FM; 20 dB quieting (FM) occurred at −117 dBm (0.3 uV), close enough to the 0.25 uV specification that I'll allow ICOM's claim based on normal measurement error.

Since the IC-275A features a general-coverage VHF receiver covering 138 to 174 MHz, I measured FM sensitivity across this span. Worst-case sensitivity was found at 138 MHz (−113 dBm) and 174 MHz (−116 dBM), with better numbers (−123 to −127 dBm) in between. For a general-coverage public-service-monitor receiver, these are good numbers. They look even better when one begins to realize that a PIN-diode T/R switch and front-panel adjustable (diode type) RF attenuator precede the front end. Neither of these features would normally be included in a "receive only" unit.

The receiver's selectivity is excellent as well. I made some rather critical skirt selectivity measurements on both SSB and FM (I don't have the optional CW filter installed in my unit) and was pleased to find the 275A to give a good accounting of itself. SSB skirts showed 24 dB rejection at ±1.3 kHz and 64 dB rejection at ±2.5 kHz, with absolutely symmetrical response about the center frequency. I realize the absolute values presented here are a bit odd, but there are complex reasons for my choice of signal ratios. FM skirts showed 8 dB rejection at 11 kHz and greater than 40 dB at 14 kHz. The response on FM was not quite symmetrical, with slightly better "high side" rejection; however, this unit had been bounced around a bit and it is possible that the discriminator alignment was bumped from the factory setting. In any case, the selectivity on each mode is sufficient for satisfactory operation even under very crowded band conditions.

The IC-275A's transmitter is a joy to use and produced the best on-air reports I've ever received for both SSB and FM audio quality. Reports ranged from "wonderful audio—sounds like Collins," to "extremely natural—sounds just like you, Steve." Based on my operations using the ICOM-supplied hand microphone, I'd recommend using the built-in speech compressor all the time. However, ICOM's recommended "mic gain" setting appears incorrect. On page 26 of the user's manual ICOM recommends setting the mic gain at 12 o'clock when using the speech compressor. I found this produces too much background noise, and a more optimum setting is about 9 o'clock.

Transmitter power output is rated to be "2.5 to 25 watts continuously adjustable." My measurements concur. I found TX output to be 28 watts at 146 MHz, 27.5 watts at 144 MHz, and 27 watts at 148 MHz. At all frequencies the power can be adjusted down to 2.5 watts on all modes. The IC-275A is capable of transmitting outside the U.S. amateur band (be careful!) and produced usable power down to 142 and up to 150 MHz, making the unit ideal for out-of-band MARS operations. Since the rig has two VFOs and programmable TX frequency offsets, one may set it up for any desired repeater split, including some which would result in out-of-band operation. All my tests were performed using a well-shielded dummy load, so I wasn't worried about where my signal would land. With an antenna connected, one must be aware of where one will transmit prior to pressing the mic button—just a word to the wise.

Since the IC-275A is one of the very few radios which allows continuously adjustable output power on SSB, I made a point of measuring instantaneous output power upon TX key closure to be sure that the rig doesn't come up with 25 watts and then pull back down to the preadjusted level some time later. Many rigs which use an ALC loop to adjust output power suffer this anomaly and could potentially damage a solid-state amplifier which follows. Thankfully, the 275A keys up with precisely the power level for which it is adjusted, according to my measurements using a sampling-type storage oscilloscope.

Speaking of speed, the IC-275A uses ICOM's "proudly announced" Direct Digital Synthesizer system, which locks up in less than 5 milliseconds, making the unit ideal for the popular digital transmission modes (Packet, AMTOR). The rig also features a rear-panel terminal socket for AFSK operation and a DATA keying function to switch between receive and transmit at any desired rate.

I measured the unit's frequency display accuracy to be 120 Hz low compared with my WWV-adjusted standard, incredibly precise for a rig which was probably factory adjusted months prior to my test. The 120 Hz error occurs at all frequencies and offsets, because all frequency steps are digitally controlled and therefore produce no additional error. An error of 120 Hz at 144 MHz is better than 1 ppm (parts per million) accuracy, a far cry better than almost anyone needs.

The 275A features a built-in AC power supply (117 volts), but can be operated from a 13.8 VDC source if need be, as the power supply connection is made at the rear panel. This do-everything rig also features receiver notch and passband tuning, and both work well. While the manufacturer does not specify any details regarding the merits of the Notch and PBT functions, I measured the notch depth to be 31 dB and PBT range to be ±800 Hz from center frequency. These controls are quite useful under crowded band conditions, and work about as well as similar controls on HF transceivers.

A general impression one derives from operating the IC-275A is that the rig is "smooth" to operate. Controls feel silky and turn effortlessly. The main tuning knob tension is adjustable, and the RIT (receiver incremental tuning) control tunes at a precise rate of 1 kHz per revolution, producing ±9.99 kHz change over a full 20 turns of the knob.

One small point where the IC-275A, and most transceivers in general, falls down is in S-meter accuracy. The receiver S-meter, a large, well-lighted instrument whose needle bobs at the mere hint of an incoming signal, is inaccurate. Of course, I'm used to this problem in amateur radio equipment. The only receiver I've owned which has an S-meter that actually means anything is my nearly 30-year-old Collins 75A4, the S-units of which are actually 6 dB increments and the calibration of which, after all these years, is still correct.

The IC-275A S-meter responds differently on FM and SSB/CW, but at no time is it really "correct." For example, on FM, S1 equals an incoming signal of −118 dBm. Fair enough. But S9 represents a signal level of −102 dBm,

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[1]Note: dBm is dB related to 1 mw in a 50 ohm system; 0 dBm = 1 mw = .2236 V; −100 dBM = 10^{-10} mw = 7.07 uV; −140 dBm = 10^{-14} mw = 2.23 × 10^{-8} V, or .0223 uV. dBm is a convenient way of expressing signal levels, for it allows the comparison of very large and very small signals using small numbers.

only 16 dB stronger. This works out to about 2 dB per S-unit (the standard is 6 dB). S9 +20 dB requires an input level of −98.5 dBm (3.5 dB above that required for S9); S9 +40 dB equals −96 dBm (a mere 6 dB above the S9 signal level); the meter "pins" at S9 +60 dB, which takes only −91 dBm (11 dB more than the S9 signal required) to produce.

On SSB the rig's S-meter is a bit more "true." S1 equals −117 dBm, about the same as on FM. But S9 represents −97 dBm, or 20 dB more signal than the S1 level. This works out to 2.5 dB per S-unit. S9 +20 equals −87 dBm, or 10 dB more signal than required to produce S9. Not great, but better accuracy than on FM. S9 +40 requires −77 dBm (again, 10 dB real change for 20 dB indicated), and the meter "pins" at S9 +60 with a −54 dBm signal.

The only reason I've gone into such detail with this S-meter stuff is that I, for one, watch my receiver's S-meter constantly, noting level changes as I adjust antenna heading, as band conditions fluctuate, or whatever. As such, I'd like to be able to say, "The band is up and down 20 dB"; often, I log this information for future reference. With an S-meter that indicates 20 dB for a 3 dB change, these notations become meaningless.

While the new ICOM multimode rig truly offers every kind of 2 meter operator about every operating convenience imaginable, some features stand out especially for the weak-signal enthusiast. For example, the IC-275A allows four different scan functions (memory channel scan, programmed scan, selected mode memory scan, and skip scan) I found to be quite useful. Each of the rig's 99 memories can be programmed to include not just frequency, but also mode, PL tone, and offset data; thus, the unit is capable of scanning favorite SSB, CW, and FM frequencies and locking on to any in use, automatically selecting the pre-stored mode. The rig makes no assumptions regarding what made you "should" be using for a particular part of the band. I use the "programmed scan" function to search from 144.050 to 144.250 (SSB) while I'm at my desk doing paperwork or at the workbench evaluating new equipment. If the band opens, even for a few minutes, you can be sure I'm aware of it. The scan functions work across the entire receiver tuning range (138–174 MHz).

By the way, the IC-275's receive sensitivity is so good that I can receive numerous NOAA stations transmitting 24-hour weather information using my 2 meter omnidirectional (vertical) FM antenna. One such station is in Maryland, about 150 miles away.

Since the 275A uses totally solid-state T/R switching with nearly instantaneous synthesizer lock-up, it is fully capable of real QSK on CW. This is a pleasure to use, and allows one to monitor his frequency between bits or characters—very helpful in alerting one to breaking stations, changes in band conditions, possible "doubles," and so forth. Of course, the QSK function only works when using the rig "barefoot," since I know of no full-QSK 2 meter amplifiers.

Tidbits

Like the idea of 2 meter SSB mobile? I do, and by the time this is printed, I should have my mobile SSB station installed. Have to compete with Roger, you know. Roger who? K2SMN of Hopewell, NJ who runs an FT-726R driving a Microwave Modules 200 watt (output) amplifier and a *beam* antenna from his car, while he motors along the New Jersey Turnpike. Roger is a bit nuts, but his mobile station outperforms a lot of base-station setups in this area. I've heard him make 300+ mile contacts on 2 meters from his car under average band conditions, so at least his highly noticeable mobile station works well.

I probably won't go that far. But since Cushcraft discontinued production of their "Big Wheel" omnidirectional gain antenna, mobile antennas that really work for 2 meter SSB are hard to come by. Enter Val Comm, Inc. of Albuquerque, NM. They offer a "Mobile Omnidirectional Horizontal Eggbeater Antenna," called the VC Eggbeater, claimed to offer outstanding performance for 2 meter mobile enthusiasts. Their ad states, "the Eggbeater is very effective as it produces a right-hand circular polarization off the top. When placed ⅛ wavelength over a metallic surface, such as a vehicle rooftop, the signal level off the top portion of the antenna increases by as much as 6 dB. No rotation or steering is necessary." The Eggbeater is said to have horizontal polarization when viewed from the side, for point-to-point communications with other horizontally polarized stations. The manufacturer also claims its wind survivability to be 100 mph (those driving Ferraris, please note) and power handling to be 1 kW.

The VC Eggbeater is available directly from the manufacturer at 249-B Muriel NE, Albuquerque, NM 87123 and sells for $119.95. I haven't tried one yet, but I'm tempted. I wonder if you can whip up a souffle with it?

Another unusual antenna has been announced by Creative Design Company (Kawasaki, Japan), distributed by Orion Hi-Tech of Calabasas, CA. Creative model CLP5130-1 is described as a "High Performance Log Periodic Antenna" and has 23 elements on a 69 inch long boom. The manufacturer claims the antenna to have a gain bandwidth of 1250 MHz (50–1300 MHz), with 10–12 dBi forward gain, 15 dB F/B, and a VSWR of less than 2:1 over the frequency range. Rated at 500 watts PEP, the CLP5130-1 is intended to mount on a 1½ to 2 inch diameter mast and weighs just 11 pounds. Creative's data sheet shows polar plots at 80, 480, and 800 MHz, indicating the antenna to have about 9 dB gain at 80 MHz, 10 dB at 480, and 11 dB at 800 MHz with a radiation angle of 15–20 degrees above the horizon.

The CLP5130-1 just might prove a useful addition to an active VHF/UHFer's station, or solve a "cliff dweller's" dilemma regarding efficient operation on more than one VHF/UHF band from an apartment site. I know a number of amateurs in New York City who must live with restrictions regarding the erection of their amateur antennas. The Creative log periodic beam looks enough like an ordinary TV antenna to probably pass the scrutiny of apartment managers. I hope to obtain one of these unique antennas for a review in this column. According to Orion principal AA6PY, the CLP5130-1 costs $199 and is available directly from Orion Hi-Tech. Call or write for further information: P.O. Box 8771, Calabasas, CA 91302 (213-663-2541).

Will Encomm never stop importing neat stuff for VHFers? A product announcement dated May 7 detailed a new Ken-Pro product called the KR-1000 SDX antenna rotor. What's so special? This rotor offers 450 degree rotation; can be centered north, south, east, or west; and has variable speed rotation control (to as fast as 43 seconds for 360 degrees), "gentle antenna handling" with preset and "soft landing" automatic slow down before stop, and an optional computer interface board. How's *that* for features every big-gun VHFer can use? I like the idea of 43 second rotation speed, 90 degree overlap beyond full circle, and "soft landing" slow down to avoid bending H-frames and popping tower welds. This sounds like a rotor a lot of us can use. Contact Encomm, Inc., 1506 Capital, Plano, TX 75074.

By the time you read this, I'll have had the chance to use ICOM's new IC-375A 220 MHz multimode and IC-575A 28/50 MHz multimode transceivers. At this writing, there was only one of each of these rigs in the U.S., but since we're in a position to pull strings, we've tentatively arranged to borrow the new rigs for the June VHF QSO Party, which we intend(ed) to operate from rare grid FM27, Chincoteague Island, VA. Obviously, the June contest will be passed by the time this is published. I should have some operating observations for next month. If the 28/50 MHz and 220 MHz multimodes are as good as the 2 meter unit discussed earlier in this column, I'll probably want to keep them!

Need grid EM94 on 50, 144, or 432 MHz? Try making a sked with WA4VCC and/or KB4CSE of Fort Mill, SC. Ted ('VCC) says they are available for tropo or meteor-scatter skeds and will welcome calls: (803) 547-6980. He cautions, "no calls after 11 PM EDT."

Wow, another long column. I'll probably hear about being so long-winded. See you next month.

73, Steve, WB2WIK

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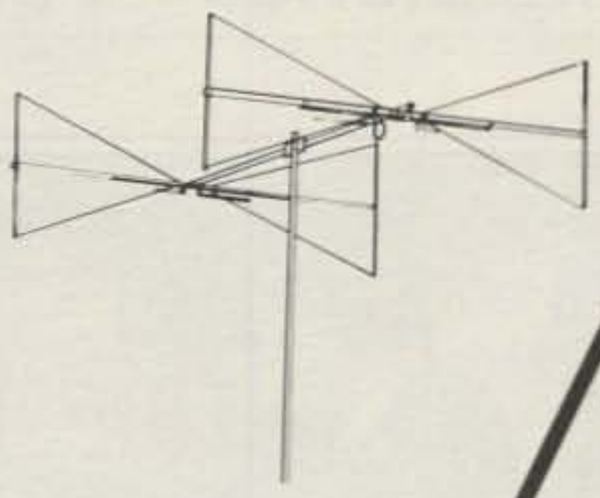

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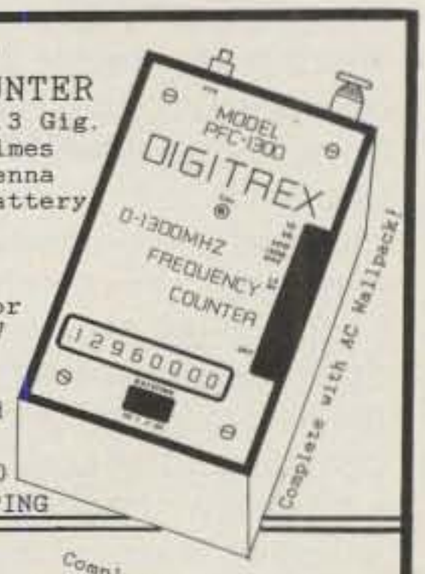

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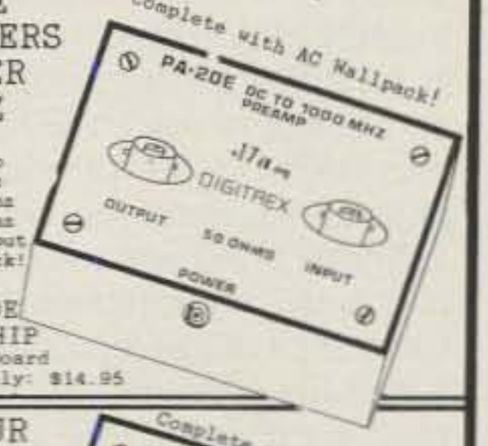

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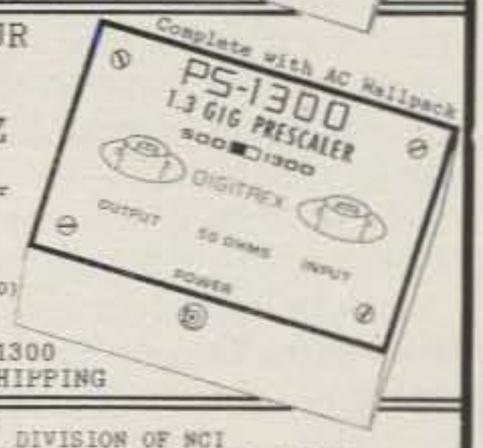

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CIRCLE 41 ON READER SERVICE CARD

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Getting Started—Part VII

This is the seventh part of an eight-part article that has been written to help new amateurs get on the air. Each part of this article is useful by itself; however, maximum benefit can be derived from reading the entire article. Previous issues of *CQ* can usually be purchased for $2.50 each by writing to *CQ*, 76 N. Broadway, Hicksville, NY 11801.

Headphones and Speakers

It is extremely important to minimize any possibility that operation of your amateur radio station will disturb others in your home. One major step towards making your station operation acceptable is to use headphones instead of a loudspeaker. The station you are listening to or working on the air may sound great to you, but it is just noise to non-amateurs in your home. Code can have a very piercing quality that penetrates walls, floors, and ceilings too well to suit others. The use of headphones provides the added advantage that it greatly improves an operator's ability to hear weak stations. There is also much less chance that an operator will be distracted from the signal being copied if he/she uses headphones to provide desired isolation from household and street noises. It is best to get a very good set of communication headphones in the beginning because it is one thing you probably won't change, no matter how long you are an amateur. Good communication headphones have a limited (narrow) frequency range, are very sensitive to small input signals, have extremely effective earmuffs, and can easily be adjusted to minimize operator discomfort. The April 1982 Novice column provides a good introduction to microphones, headphones, and headsets.

There is no advantage in purchasing high-fidelity earphones that have a wide frequency range reproduction capability. Amateurs just need "communication taper" earphones. The normal audio frequency range we listen to on the high-frequency bands is about 300 to 3000 Hertz. An ideal communications headset would include limited frequency response, excellent sensitivity, adjustable head (ear) pressure, replaceable contour conforming earmuffs, correct impedance, reasonably light weight, rugged construction, dual earphone configuration (covers both ears), and a coiled cord. Some headphone sets have plug leads that can be connected for either high- or low-impedance use, permitting suitable impedance matching to the receiver's output impedance. Good communication headphone sets are not common, but some are available.

Pierre Bordeleau, VE2OPB, of Cap-de-la-Madeleine, Quebec, was a shortwave listener before he became an amateur. He credits CQ magazine with helping him get a good start in amateur radio. His station includes a Yaesu FT-101-E transceiver, MFJ Versa Tuner II antenna tuner, MFJ deluxe RF preselector, and 80/40 meter antenna. Pierre has contacted more than 200 U.S.A. amateurs.

QSL Cards

Immediate Need. New amateurs are very anxious to receive confirmations (QSL cards) of their two-way contacts with other amateur radio stations. Unfortunately, most new amateurs don't order their own QSL cards until they finally realize that one has to send cards to have a better chance of receiving them. Get a plentiful supply (500–1000) of top-quality QSL cards as quickly as possible, and send confirmations as you work stations. Good cards are said to generate a better response ratio than junk ones, and postage costs are so high that one may as well mail good cards. Many operators consider the QSL to be an integral part of each contact with a station they have not previously worked on the air. Some operators send many cards, while others send very few. Good operators usually record cards sent and received in their logbooks and make it a practice to be sure they have at least sent a QSL in response to each card received. The January through March 1979 Novice columns provide all the information you should ever need to know about QSL cards. This is recommended reading for every new amateur.

Advertisers usually have your call sign on material they send you even before you get your license from the FCC. It is a good practice to send a card to each station when you work it for the first time. Don't pull the old routine of telling the other amateur that you'll send a card after you get his card. One doesn't have to be a genius to realize that no cards would ever be exchanged if all amateurs waited to get one before they sent one. Cards received during Novice operation count towards operating awards you may seek after you've upgraded to higher class tickets. The QSL is part of any good contact. Properly (and completely) address each card you're sending. Improperly addressed cards often wind up in the Dead Letter Office. It's wise for Novices to send their name and address to anyone who requests this information. Don't assume that every amateur has the latest callbook and supplement, because the average amateur uses one that's a bit ancient. When you've become a bit experienced, get in the habit of addressing each USA card as you are working the contact. If the other fellow's address isn't in the callbook (or if it disagrees with the town he gave you), you can get his correct information before you finish the contact. Indicate sent and received cards in your station log and do not file a received card until you check your log to make sure that you did send your QSL.

Display. Most Novices like to display some of the QSL cards they receive, and the best way to display them is in clear plastic holders. These QSL display holders are advertised in amateur radio magazines, and their use eliminates any need to damage prized QSL cards with tape or thumbtacks. It is also easy to rearrange cards being displayed in these holders. Similar clear plastic holders are available to conveniently display the operating certificates one earns.

DX Cards. Before leaving the subject of QSL cards, I want to advise you that almost all DX QSL cards being sent to American amateurs are received through the ARRL Incoming DX QSL Bureau. It takes too much time for a busy DX (foreign) operator to look up the name and address of each station worked and to write this information on each card. No

2814 Empire Ave., Burbank, CA 91504

Here are Johnnie Allen, W5ESI, Mary Pat, KA3QHH, and Benjamin Moore, KA3QHI, aboard the M/V Aurora in the eastern part of the Mediterranean Sea. Johnnie helped this husband-and-wife team prepare themselves to pass the Novice tests. They can be heard on 15 and 80 meters. When it is open, they operate 10 meters. Their station includes a Kenwood TS-430S transceiver and a vertical antenna. Johnnie is the ship's radio/electronics officer and Benjamin is the ship's captain. Listen for KA3QHH/M1 and KA3QHI/M1.

name or address is required on cards sent through the bureau, saving a lot of time and effort for busy operators. Also, relatively large groups of cards are packaged for shipment to each bureau, which is much cheaper than individually mailing each card. The foreign (DX) operator almost always routes QSL cards through the bureau system, and you must have self-addressed stamped envelopes (SASEs) on file with your call-area DX QSL bureau to receive your incoming DX cards. Call-area DX QSL bureaus are listed in the domestic (U.S.A.) and foreign (DX) amateur radio callbooks advertised in amateur radio magazines. If you want a free copy of a class aid about how the ARRL DX QSL Bureau functions for both incoming and outgoing DX cards, send your written request to me, including a self-addressed and stamped envelope. Get your envelope in to your bureau as soon as you start to operate, particularly if you operate 10 and 15 meter Novice

This is Wesley D. Jennings, WH6BKU, of Wahiawa, Hawaii. His station includes a Yaesu FT-DX-560 transceiver and a National NCX-5 transceiver. He recently operated from Korea as HL9CWN, with WB8DIT serving as QSL manager.

bands, where it is common to work foreign stations. One of the many benefits related to ARRL membership is almost free use of their outgoing DX QSL Bureau. It is efficient, economical, and easy to use. Incoming DX QSL cards are handled at no charge for all U.S.A. amateurs, whether or not they are ARRL members.

Instruction Manuals. Regardless of how simple or complex your station is, you owe it to your equipment and yourself to carefully read each instruction manual. Learn how the equipment functions and the exact purpose of each control. Whenever you purchase used gear, ask the previous owner for the manual. If you don't get a manual with a piece of used equipment, try ordering one from the company that built it. If all else fails, the Sams Photo Facts may provide a schematic and parts list. Sit down in front of your equipment with the manual and really learn what you have to work with.

Logbooks and Legal Considerations

Logs. Recent FCC rule changes have minimized our logging requirements, but most amateurs still prefer to maintain accurate and detailed station logs. It is advisable to obtain a full-size (not mobile type) station log and to record all station activities in the logbook.

Logging. It is best to record only 24-hour (0000–2400) UTC time in your log. Why use a local time which means nothing to other amateurs you work all over the world? Do your logging and scheduling per UTC and you will eliminate an unnecessary area of confusion. Maintain an accurate station log in ink. Fill in your name, call sign, and location on the inside front cover so you won't have to repeat this information throughout the log. Do not write your own call sign in the log for each contact. Just use an "X"; this makes it easier to spot the call signs of the stations you have worked. Do not repeat entries such as the emission type, input power, date, and frequency when they do not change from one contact to the next; just use quotation marks to show that there was no change. This minimizes clutter and makes it easier to spot the changes made as you operated.

Indicate the month and year vertically at the upper left corner of each log sheet and just write the day in the blank space to the left of the contact entry line in your log. Enter a new date only when you are operating during a different day; this will again help keep your log free of useless clutter. Equipment changes should be indicated in the station log, along with all information related to your station/operator's license and your station's operation. Purchase a pair of #20 binder (clips) at a stationery store and attach one to the bottom edge of the logbook on both sides. These binder clips will prevent the log pages from getting dog-eared and torn. Your logbooks provide an excellent his-

tory of your amateur radio operation, and they deserve reasonable care. Most amateurs keep their logbooks as long as they live.

Current Address. Don't be fooled by FCC rule changes related to easing modification requirements for relocated stations. The FCC still must be able to reach you at the mailing address you listed on your Form 610 amateur-radio-station/operator-license application. You have trouble if the FCC can't reach you at your stated mailing address, so keep your address current. It is also important to keep your station address correct so that other amateurs can find it in callbooks when they want to send QSL cards to you. It is good code practice to exchange names and addresses on the air, if you have been licensed less than a year, but amateurs do not like to do this if they have been listed correctly for several years in callbooks. It is also impractical to exchange addresses during contest contacts. If your finances will allow you to do it, get a current set of domestic and DX callbooks, and order the matching updating supplement that is issued in June.

Rules and Regulations. Each amateur should maintain a current set of Part 97 of the FCC rules and regulations. This part covers our amateur radio service, and we are required to know these rules and regulations. Amateur radio is dynamic and this causes frequent changes to Part 97. An up-to-date copy of Part 97 can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20404, as part of FCC Rules and Regulations, Volume VI. I believe it is better to buy the current issue of the *ARRL FCC Rules Book*, which includes explanations of regulations and operating practices.

Third-Party Agreements List. Maintain a current list of countries (by their call signs) with which we have third-party agreements permitting the exchange of non-commercial messages between amateurs in different countries. It is possible that a DX contact will ask you to handle a message for him, and you should know whether or not it is legal to perform this service. The June 1986 Novice column shows the countries with which we have third-party and reciprocal operating agreements.

Identification. Normally, identification is only required at the end of each transmission. If a transmission exceeds 10 minutes in duration, identification is required at least at 10-minute intervals. If you're making a series of short transmissions in which no transmission is 3 minutes long (or longer), identification is just required at least 10 minutes during such a series. Current FCC regulations just require us to identify our own station, but it is still good operating practice to identify both stations. Both stations involved in the contact are identified only when international third-party traffic is being handled.

This concludes the seventh part of this eight-part article. The concluding part covers interference, station location, operating, theory advancement, and printed aids. If you know new amateurs who need help getting started on the air, you can make things easier for them by directing them to this article.

Photographs Wanted

Photographs of Novices in their shacks provide introductions to a few of the newer amateurs. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year *CQ* subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest *CQ* issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs. I have not received a picture from a Novice in Hawaii or Vermont.

73, Bill, W6DDB

Ticket Talk

a monthly feature by
FREDERICK O. MAIA, W5YI

INFO ON AMATEUR RADIO LICENSING

VECs Assume Responsibility For Amateur Radio Testing

The FCC has finally responded to the various *Petitions for Reconsideration* seeking review of various points in Docket 85-196, the August 1986 rulemaking that further deregulated volunteer testing above the Novice level in the Amateur Radio Service. That proceeding introduced new amateur testing guidelines transferring the responsibility for maintaining the question pools for written examination elements in the VE system from the Commission to the Volunteer Examiner Coordinators. A VEC acts as the administrative link between the volunteer examiner and the FCC.

The new rules also clarified that VEs *solely* have the responsibility for determining the correctness of a candidate's answers to the questions (without appeal) as part of their duty to grade each examination element.

Deregulation in Amateur Radio Examining

On December 1, 1983 the Commission implemented a volunteer testing program for the amateur who wanted to upgrade above the Novice level. The new program, called the *VEC System*, provided for accredited volunteer examiners administering written tests furnished by VEC testing administrators who used published questions from an FCC developed question pool. The Commission told the VECs which questions to use in their examinations. Later, VECs were authorized to design the examinations according to an FCC formula which required a certain number of questions be selected from each of nine topics. Last August the FCC further deregulated amateur radio operator testing by:

1. . . . transferring the responsibility for periodic revision of all question pools (including the Novice questions, which are not a part of the VEC System) to the various VEC organizations beginning January 1, 1987. Question-pool maintenance had previously been an FCC function. The PR Bulletin 1035 series, which contained the FCC question sets, were abolished. The potential now existed for different question pools among separate VEC organizations.

2. . . . providing for a new type of volunteer examiner. A *Preparing VE* would be one who submits questions or prepares written or telegraphy examinations for amateur operator licenses. It was specified that a Preparing VE could only prepare questions or tests for classes of examinations he/she has already successfully passed.

3. . . . authorizing VEs (in addition to VECs) to select the specific question sets to be administered to candidates providing they used the proper question selection process as defined by the VEC . . . .

4. . . . directing that Morse code tests (which have always been a VE responsibility) to contain *all* alphabetical and numerical characters plus certain punctuation and operating procedure signs. This was a major change from rules then in force which required applicants to be knowledgeable of *but not necessarily tested on* these characters. Now *every* code test had to contain *all* characters!

5. The FCC agreed that the matter of amateur radio examination standardization was important, but that "any greater testing standardization would have to be achieved through cooperative effort among VEC organizations."

It was agreed among VECs at the 1986 VEC Conference that no test question changes (except those required by rule changes and typographical errors) would be made until January 30, 1988. This is why, except for the additional questions necessitated by the recent increased privileges to beginners, the various written question pools have remained the same during 1987.

Petitions For Reconsideration Filed

The public has 30 days to file an objection to any new government rules, and several individuals did so, asking that various provisions of the new testing rules be reexamined.

The ARRL was concerned that different VECs might have different written test questions and argued that "Congress intended for the FCC to be the entity to maintain the pool." Arthur H. Ekblad, KØQQ, argued that the existence of different question pools would "introduce competition in the examination process as examinees seek the easiest tests."

We (the W5YI-VEC program) protested the rule that required VEs (or VECs) to complete new Morse code examinations containing all 42 characters. We argued that this would cause both a financial hardship (since VEs and VECs already had recorded code tests produced) and an operational burden since it would be difficult to use all 42 characters in a 5 minute code transmission, particularly at the Novice 5 word-per-minute level. Lyndell Miller, WAØKUH, believed that it would be nearly impossible to prepare a QSO-type code test due to conflicting meaning of certain characters. Gordon Girton, W6NLG, asked that certain punctuation and prosigns be omitted "since the telegraphy requirement for Novices and Technicians should be minimal."

David B. Popkin, W2CC, an ex-FCC employee, contended the rule concerning the grading of examinations was deficient because it did not provide for any persons other than the administering VE to pass on the correctness of the examinee's answers. He also maintained it was difficult to determine how many questions should be selected from each subtopic since the number did not result in a whole number when the appropriate percentage was applied to the question set.

Ruling on the Petitions

After nearly eight months the FCC has now ruled on these Petitions for Reconsideration. The Commission did admit that originally it was contemplated that each VEC could, if it wished, compile its own pool of test questions, but said much work had progressed toward standard question pools. "In view of the widespread sentiment in favor of standardized pools, we will amend §Section 97.521 to *require* that the VECs cooperate in maintaining a common standard question pool for each element."

"Maintenance of a question pool includes the revision of existing questions and the addition of new questions to reflect changes in technology, regulations or other developments which have a bearing on the amateur service," the FCC said. "This requirement will go into effect January 30, 1988 . . . ." This is the date to which VECs agreed the existing pools would be frozen.

Ruling that the new telegraphy test guidelines were reasonable, the Commission refused to change the new code examination requirement that every test must contain all characters. On the financial burden question . . . "There never has been a requirement that recorded messages be used for the telegraphy exami-

National Volunteer Examiner Coordinator, P.O. Box 10101, Dallas, TX 75207

nation, nor that the VECs provide messages to VEs."

We understand, however, that this is *not the final word.* We heard that the FCC might still go back to the former telegraphy test standard which held that applicants *may*—instead of *must*—be tested on all characters. The Commission also ruled that Girton's request that certain characters be eliminated from code tests "was outside the scope of the proceeding" and would not be dealt with.

The FCC stated they found no need for additional review of §Section 97.29(a), which makes the administering VE responsible for determining the correctness of the examinee's answers. They also said the examination designer has the flexibility to incorporate one or more additional questions should the need arise to do so. "While the percentage of questions specified for each topic may not always result in a whole number, the administering VEs can round the number as necessary."

1987 Conference of VECs

The Commission ruling on these Petitions for Reconsideration sets the stage for the 1987 Conference of Volunteer Examiner Coordinators scheduled to take place July 10. (It probably will have already been held by the time you read this.) Very important decisions affecting the future of amateur radio will be made at this meeting by the VECs in attendance. Except for FCC oversight, VECs now are in complete charge of the amateur testing program.

Volunteer Examiner Coordinators representing over 95% of all amateur examinations administered have already committed to meet at the World Congress Center in Atlanta to discuss and decide on important points such as . . .

1. Future timing of the various amateur radio question pools. (When should each step toward newly revised question pool implementation take place?)

2. Development of a system for *Preparing VEs* to submit proposed question revisions.

3. Preliminary and final procedures for selecting and approving new questions.

4. Further amateur testing standardization. (Should specific multiple choices and correct answers also be required? At present, only the exact question must be used. The answer format is left to the VE/VEC.)

5. Should code tests be standardized? If so, how?

6. Maintaining integrity and the reduction of fraud in the VE/VEC system.

One thing seems certain! There will be major changes to the Amateur Radio Service's license testing program. We will let you know what happens!

From The Mailbag

We welcome your questions on FCC rules, particularly those which affect the volunteer testing program. The first one is from Don Kelly, KA5UOS, of Edmond, Oklahoma.

Can an interim/AG satisfy the requirement for the *second* VE in a Novice testing session? What Don is asking is can an amateur who has passed his General Class license but who has not yet received the *hard-copy* ticket be the *second* volunteer examiner required for a Novice examination. We get into the *hair-splitting* department here, but I would say yes! I always base my (close) decisions on the effect it will have on the Amateur Service. An interim AG has indeed passed the General Class license requirements, but is not yet licensed. All that remains is for the actual license to arrive.

We (the W5YI-VEC program) accredit amateurs who have passed their Extra Class license requirements to assist (but not act as *lead* examiners) on Technician Class and up examinations. It is the same idea. Frequently these are the only VEs available.

Another case where rules are *bent* a little is allowing an applicant who has answered 22 questions correctly to pass the Novice *Element 2* theory examination. §Section 97.29(b) clearly states that "An applicant passes a written examination if he/she answers *at least 74 percent* of the questions correctly." Twenty-two out of 30 questions is really 73.3%, but we shouldn't preclude an applicant from being a new Novice for just six-tenths of a percent! Twenty-three questions out of 30 is 76.7%.

We have applicants going from one exam session to another. How can we ensure that the candidate receives a different exam on both occasions as required by the rules? The FCC dealt with just that specific question when they ruled on the recent *Petitions for Reconsideration* discussed above. "It has been our policy that neither the same telegraphy message nor the same question set should be readministered to an examinee. We believe the intent of the rule is necessary and reasonable and should not be deleted based upon the speculation that an examinee might seek out another VEC (VE team) using the same test for reexamination. We recognize that another VEC (VE team) might *unknowingly* give the same examination as the one that the examinee failed. Where this was not intentional, we do not contemplate that enforcement action would be taken."

What causes you the most problems in your duties as a national VEC? I guess the answer to this would be people (both VEs and applicants) who don't read the instructions. It gets frustrating at times when applicants use a post-office-box number or rural route for their station location, or send us copies of their upgrade *certificate* when we write for a copy of their most recent *license* so we can append

it to an FCC Form 610 application we are holding.

Illegible writing is also a *very big* problem and causes many delays in issuing upgraded licenses. Although application data is entered from the Form 610 in Gettysburg, Pennsylvania, the FCC compares this information to their data base in Washington for compliance purposes. This is so they will not authorize a license to anyone who has sanctions against him. If the application is not legible, the wrong information can easily be entered into the terminals in Gettysburg and won't match properly when it is run through the comparison process in Washington. The application hits the *error list* for later research, with an accompanying delay.

Another problem we seem to have is VE failure to check over the Form 610 application for routine errors and omissions. Handling phone calls from applicants wanting to know the status of their application is also very time consuming. But it is all part of the game and we do the best we can.

Where can I find a Novice study material and an examination session? The Novice test is usually one you have to arrange. While it is true that instructors frequently conduct testing at the end of a Novice class, most newcomers seem to study on their own by purchasing written and code preparation material. We have written a Novice package entitled the *Novice Voice Class Self-Study Course* in collaboration with Gordon West, WB6NOA, well-known amateur radio educator. We feel this package is destined to become the standard study material dealing with *how to become a ham*.

The Novice Voice Class ham radio course is not self-published. In fact, the authors do not even own the copyright. The package was commissioned and professionally produced by a publishing house who has already received commitments for thousands of copies to be distributed across the nation. Even though we produced it, we have to obtain it from the publisher just like everyone else.

The initial run should be in stores about August 1st and will *immediately* become the most widely distributed amateur radio study package ever. It will be retailed for $19.95 and contain two long-playing code learning cassettes, a 112-page textbook that tells you *everything* you need to know, a (new version) Form 610, and a ready-to-go Novice examination in a sealed envelope. The shrink-wrapped course, which takes a "fun learning approach" to amateur radio, is also available from the authors if you can't find it locally. (Include an additional $2.00 shipping charge.)

Once you have digested the manual and learned the code, you will be ready to pass your Novice Element 2 (theory) and Element 1(A) slow code exams. Every city has amateur radio operators. One way to tell where they live is by their large Yagi beam antennas. That is a good place to start. It now takes two VEs to administer the Novice test, and chances are that if you can locate a local amateur, he will know a friend who will be glad to assist as the second VE. Another good place is the local amateur equipment supplier or amateur radio club. And almost any three examiner VE/VEC test sessions for the Technician and higher examinations will be glad to administer the Novice requirements to you without charge! All you have to do is appear and ask to take the test.

Why is there a test fee to take the Technician amateur test but not the Novice? The Novice test has *always* been a free volunteer-administered examination and is usually given in a VE's home. The Technician (and higher) VE program, on the other hand, is relatively new. These test sessions are larger and more costly. It was felt that a provision was needed to recoup any expenses associated with the cost of administering the program since there are so many more amateurs upgrading than newcomers entering the hobby. Over 25,000 examinees have already taken volunteer examinations at the Technician and higher level during the first six months of this year alone, an increase of about 15% over last year.

The interim operating identifiers confuse me. Amateur Extra is AE, Advanced is AA, General is AG. Why aren't Technician operators identified as AT? The interim suffix that is appended to your call sign notifies everyone (including FCC monitoring stations) that you have upgraded your license but have not yet received the actual "hard copy" ticket. When operating on Morse code, you must sign your call sign with a slant bar followed by the two-letter suffix. When operating in the voice mode, you use the word "temporary" and the two letters.

It used to be that the two letters indicated the location of the FCC field office where you upgraded. Amateurs who upgraded here in Dallas got to use "temporary DL," or /DL on CW. Many amateurs—particularly those in other parts of the world and those not familiar with the upgrade program then in effect—thought that the /DL meant that the amateur was operating from West Germany since it is customary for amateurs operating under reciprocal licenses to append their call sign with the prefix of the country from which they are operating.

To end the confusion, when the FCC went out of the testing business they elected to use interim suffix identifiers that were prefixes internationally assigned to the United States. AE, AA, and AG are all ITU call sign prefixes allocated to the U.S. The ITU (International Telecommunications Union—the United Nations body governing worldwide telecommunications) allocates different prefix blocks to different countries to aid listeners in identifying the locations of transmitting stations. These prefixes become very important, particularly in the shortwave range.

Unfortunately, only the AA to AL block is internationally assigned to the U.S. The AT prefix is allocated to India, so the FCC elected to go with KT, even though it would have been legal to use AT, since this is actually a suffix and not a prefix.

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

After taking a look at the September and October list of scheduled contests, you will have to agree that we have just about reached the saturation point. Do we really need another contest to decide the world champion? The picture is as confusing as it is in the boxing heavyweight world. Who is the real world champion? We make no claims in our *CQ* World-Wide DX Contest, but after all, isn't that the one that produces the real world champion?

The IARU contest in July has already claimed the championship. The *73 Magazine* National contest in September is for U.S. stateside competition only, so that one might be justified. But another world championship in October? *Radiosporting Magazine* should have given a little more consideration before scheduling their IRSA on the same dates that have long been established by the VK/ZL/Oceania contest in October.

Fortunately, the conflict on October 11th is not as serious as it would appear. The two activities only overlap for a short period during the CW portion.

The CRRL CAM-AM on the same weekends as the Scandinavian Activity in September does not really pose a problem. Either by luck or design, opposite modes are being used on those weekends.

In spite of the apparent congestion, the overall picture is not as grim as it appears. There are bound to be some conflicts, but it is almost impossible to avoid them when two and three events are scheduled on the same weekend.

As I have often suggested, when planning a contest, QSO party, or whatever, you just don't pick dates for your convenience. Check the pattern of the previous year before making a decision. The number one rule for established events is stick to the same weekends used in previous years.

The Ripley County Repeater Association will be operating Special Event station N9DOK from 1300 to 2200Z on Sunday, September 6th to honor the Milan, Indiana high school basketball team winner of the State Championship in 1954, the basis of the movie *Hoosiers*. Frequencies are 7245, 14245, 28320, and 146.205/805 through the local repeater. Novice and Tech contacts on 10 meters are urged. Send a large SASE to RCRA, Box 318 R3, Osgood, IN 47037 for certificate.

Deadline for November announcements is August 15th, and September 15th for the December issue. Send material to my home address please.

73 for this time, Frank, W1WY

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	Aug.	1	YLRL YL-OM SSB Sprint
*	Aug.	1-2	New York State QSO Party
*	Aug.	1-2	ARRL UHF QSO Party
*	Aug.	1-3	Two Meter QSO Party
	Aug.	8-9	European CW Contest
	Aug.	15-16	SARTG RTTY Contest
	Aug.	15-16	New Mexico QSO Party
	Aug.	15-17	New Jersey QSO Party
**	Aug.	22-23	All Asian CW Contest
	Aug.	29-30	Alabama QSO Party
	Sept.	5 & 6	National CW & SSB Champ.
	Sept.	9-11	YLRL "Howdy Days"
	Sept.	12-13	European Phone Contest
	Sept.	12-14	ARRL VHF Contest
	Sept.	13	North American CW Sprint
	Sept.	19-20	Fernand Raoult F9AA Cup
	Sept.	20	North American SSB Sprint
	Sept.	19-20	Scandinavian CW Contest
	Sept.	19-20	CRRL CAM-AM SSB Contest
	Sept.	26-27	Scandinavian SSB Contest
	Sept.	26-27	CRRL CAM-AM CW Contest
	Sept.	**26-27**	**CQ WW RTTY DX Contest**
	Sept.	27-28	Homebrew Radio Exchange
	Oct.	3-4	California QSO Party
	Oct.	3-4	VK/ZL/Oceania SSB Contest
	Oct.	10-11	VK/ZL/Oceania CW Contest
	Oct.	10&11	WRSA SSB & CW Champion
	Oct.	10-12	Pennsylvania QSO Party
	Oct.	14-16	YLRL Anniv. CW Party
	Oct.	17-18	Boy Scout Jamboree
	Oct.	17-18	Rhode Island QSO Party
	Oct.	**24-25**	**CQ WW DX Phone Contest**
	Oct.	28-30	YLRL Anniv. SSB Party
	Ot.30	-Nv.1	Maryland/DC QSO Party
	Nov.	14	ALARA YL/OM Contest
	Nov.	14-15	European RTTY Contest
	Nov.	**28-29**	**CQ WW DX CW Contest**

** Covered last month.*
*** See June Issue.*

European DX Contest

CW: Aug. 8–9 SSB: Sept. 12–13
1200Z Saturday to 2400Z Sunday

This is the 32nd annual contest sponsored by the DARC. The activity will be between European countries and the rest of the world, on all five bands, 3.5–28 MHz.

There are many rules changes this year from those used in previous years. Operating time has been reduced, a new class has been added, and call areas in certain countries are no longer considered a multiplier.

Only 30 hours of operating time out of the 36-hour contest period are permitted for single operator stations. The 6 hours off time may be taken in one, but not more than three, periods any time during the contest and must be shown in the log.

Classes: Single operator, all band. (b) Single operator, high bands, 14, 21, and 28 MHz. (c) Multi-operator, single transmitter. Only one signal on any band at the same time. (d) SWL.

Exchange: RS(T) plus a progressive QSO number starting with 001.

Points: One point per QSO and 1 point for each QTC reported.

Multiplier: The multiplier for non-Europeans is determined by the number of European countries worked on each band (WAE list).

Europeans will use the ARRL country list of non-Europeans. A quick band change to work a new multiplier is permitted if the activity on the originating band is interrupted by at least 5 minutes.

Bonus Multiplier: Multiply your multiplier on 80 meters by 4, on 40 by 3, and on 10/15/20 by 2.

Final Score: Total QSO points plus QTC points times the sum total multiplier from all bands.

SWL: Only (a) single operator, all band class. It is not necessary to hear both stations of a contest QSO, but the serial number sent by the reported station and both call signs must appear in the log. Count 1 point for each QSO and 1 point for each QTC logged the first time on each band. The multiplier same as above.

QTC Traffic: Additional point credit can be realized by making use of the QTC traffic feature. A QTC is a report of a confirmed QSO that took place earlier in the contest and was later sent back to a European station. It can only be sent from a non-European station back to a European. The general idea is that after a number of Europeans have been worked, a list of these stations can be reported back during a QSO with another station. An additional, one point credit can be claimed for each station reported.

A QTC contains the time, call, and QSO number of the station being reported (i.e., 1300/DL2DN/134, which means that at 1300Z you worked DL2DN and received #134).

A QSO can be reported only once and not back to the originating station.

A maximum of 10 QTCs to a station is allowed. The same station may be worked several times to complete this quota. Only the original contact, however, has QSO value.

Keep a uniform list of QTCs sent; (3/7

indicates that this is the 3rd series of QTCs sent and that 7 QSOs are being reported).

If more than 100 QTCs are claimed, a list of the calls from or to whom the QTCs were received or sent is requested.

Awards: Certificates to the top scorers in each class in each country and areas listed in the multiplier. Continental leaders and stations having at least half the score of the continental leader will also be honored.

Disqualification: Violation of the rules of the contest, unsportsmanlike conduct, or taking credit for excessive duplicate contacts will be deemed sufficient cause for disqualification.

Logs: It is suggested that you use the official DARC or equivalent forms. Figure 40 contacts to the page, and use a separate sheet for each band. A large-size SAE and IRCs will get you a supply.

All entrants are now required to submit cross-check dupe sheets for each band with 200 or more QSOs. A penalty of three contacts will be deducted for each duplicate QSO that is removed by the committee.

Mailing deadline is September 15th for CW and October 15th for Phone. All entries go to: The WAEDC Contest Committee, P.O. Box 1328, D-8950 Kaufbeuren, West Germany.

WAE Country List: C31, CT1, CT2, DL, EA, EA6, EI, F, FC, G, GD, GI, GJ, GM, GM Shetland, GU, GW, HA, HB9, HB0, HV, I, IS, IT, JW Bear, JW, JX, LA, LX, LZ, M1, OE, OH, OH0, OJ0, OK, ON, OY, OZ, PA, SM, SP, SV, SV Crete, SV Rhodes, SV Athos, TA1, TF, UA13456, UA2, UA Franz Josef Land, UB5, UC2, UN1, UO5, UP2, UQ2, UR2, Y2, YO, YU, ZA, ZB2, 1A0, 3A, 9H1, 4U1 Geneva, 4U1 Vienna.

SARTG RTTY Contest

Three Periods GMT
0000–0800 & 1600–2400 Sat., Aug. 15
0800–1600 Sun., Aug. 16

This is the 17th annual contest sponsored by the Scandinavian Amateur Radio Teletype Group. Use all bands 3.5 through 28 MHz. The same station may be worked on each band for QSO and multiplier credit.

Classes: Single operator, Multi-operator single transmitter, and SWL.

Exchange: QSO no., signal report.

Points: QSOs with own country, 5 points. With other countries on same continent, 10 points. With other continents, 15 points. The U.S., Canada, and Australia call areas count as separate countries for scoring.

Multiplier: Each DXCC country and each W/K, VE/VO, and VK call area. A multiplier will not be considered unless the claimed station appears in at least five logs, or a log is received from that station.

Final Score: Sum of QSO points from all bands times the sum of the multiplier from each band.

SWL's use same scoring but based on sum of stations and messages copied.

Awards: Certificates to the top-scoring stations in each class in each country and each call area of the U.S., Canada, and Australia.

Use a separate sheet for each band, and include a summary sheet showing the scoring, comments, and other essential information, and your name and address in block letters.

Logs must be received by October 10th and go to: Contest Manager, Jorgen Dudahl-Lasjon, OZ1CRL, Egebjergvej 90, 4500 Nykobing Sj, Denmark.

There were 78 entries from 21 countries in last year's contest. WA7EGA was 2nd world high in the multi-operator class, and WB5HBR finished 6th in the single operator group. The rest of the North American single operator entries finished in this order: W2FG 12th, W2JRG 17th, VE1ASJ 22nd, K6WZ 26th, K8CV 35th, KA1LMR 38th, KL7PG 40th, and KJ4XP 41st.

The J6DX crew from the 1986 CQ WW DX CW Contest. Pictured (l. to r.): Red Smith, W8RKL; Keith Hoyt, K6GXO; Chuck Gelm, NC8Q; Steve Miller, WD8IXE; Roy Hearsum, W8PR; Bob Kuhnle, WB8ENR; Ron Moorefield, W8ILC; Bill Schnitker, W8WPV; Scott Lehman, N9AG; and Frand Schwab, W8OK.

New Mexico QSO Party

1600Z Sat. to 2100Z Sun., Aug. 15–16

Sponsored by the Albuquerque DX Assn., the format is somewhat different from the usual state QSO party. Following rules are verbatim, so come to your own conclusion.

Stations may be worked once on each band and mode, mobiles on each band and mode in each county.

Classes: (A) Inside NM but outside home county. (B) NM at home QTH. (C) NM mobiles, capable of operating in motion. (D) All stations outside NM.

Exchange: RS(T) and QTH. County for New Mexico; state, province, or country for others.

Scoring: CW contacts count 3 points, SSB 2 points.

Multiplier: NM counties (maximum 33), VE provinces (maximum 12), DXCC countries (except W/K and VE), and US states (maximum 48).

Final Score: Total QSO points from all bands times the sum of the multiplier as indicated above. Class (A) multiply total score by 3, (B) by 2, (C) by 5, (D) by 10.

Frequencies: CW—1810 and 55 kHz up from bottom of each band 3.5–28 MHz. SSB—1845, 3945, 7280, 14280, 21380, and 28580 MHz.

Awards: Certificates to winners in each state, province, DX country, and NM county. Plaques to overall winners in New Mexico and out of state. Additional awards possible if returns warrant.

Include a summary sheet and dupe sheet if your log shows more than 200 contacts.

Mailing deadline is September 30th and logs go to: New Mexico QSO Party, Att: Bob Thanisch, KN5D, P.O. Box 997, Corralles, NM 87048.

New Jersey QSO Party

2000Z Sat. to 0700Z Sun. Aug. 15–16
1300Z Sun. to 0200Z Mon. Aug. 16–17

This is the 28th annual party sponsored by the Englewood ARA. Phone and CW are part of the same contest, the same station may be worked on each band and mode, and NJ stations may con-

tact in-state stations for QSO and multiplier credit.

Exchange: QSO no., RS(T), and QTH. County for NJ, ARRL section or country for others.

Scoring: NJ stations score 1 point for W/K and VE/VO contacts, and 3 points for DX. Multiply total by ARRL sections worked (maximum of 74). KP4, KL7, KH6, etc., are 3-point contacts and section multipliers.

Out-of-state stations multiply total NJ QSOs by number of NJ counties worked (maximum of 21).

Frequencies: 1810, 3535, 3900, 7035, 7135, 7235, 14035, 14280, 21100, 21355, 28100, 28610, 50–50.5, and 144–146. Try phone on even hours, 15 on odd hours, and 160 at 0500 UTC.

Awards: Certificates to the top scorers in each NJ county, ARRL section, and DX country. Second-place awards if four or more logs are received from that section. Also Novice and Tech., and mobile awards.

Use UTC time, indicate the multiplier only the first time it is worked, include a QSO check sheet, and include a summary sheet showing the scoring, etc. Send a large SASE if you wish a copy of the results.

Stations planning activity in NJ are requested to advise the EARA by August 1st so that coverage of all counties may be planned.

Logs must be received no later than Sept. 13th and go to: Englewood ARA, P.O. Box 528, Englewood, NJ 07631-0528.

All Asian CW Contest

0000Z Sat. to 2400Z Sun., Aug. 22–23

Complete rules appeared in the June issue. Unfortunately, I indicated the wrong dates for the phone section. The correct dates were June 20–21, the following weekend. Fortunately, some of the DX bulletins were able to make the correction in time. It was impossible for me to do so.

Announcing an event before receiving the official announcement is always risky, even when it's a national organization. They don't always follow an established pattern.

Mailing deadline for the phone contest was July 30th. You have until September 30th for the CW section. They go to: JARL, All Asian CW Contest, P.O. Box 377, Tokyo Central, Japan.

Alabama QSO Party

1600Z Sat. to 2300Z Sun., Aug. 29–30

This year's party is sponsored by the Birmingham ARC. Each station may be worked on each band and each mode. Mobiles and portables in each county change, and Alabama to Alabama contacts are permitted.

Exchange: RS(T) and QTH. County for Alabama; state, province, or country for all others.

Scoring: Count 2 points per phone QSO, 3 points per CW. Alabama stations multiply total by states, provinces, countries, and Alabama counties worked. All others use Alabama counties for their multiplier (maximum of 67).

Bonus: Stations using 200 watts or less, multiply final score by 1.5. Mobile add 500 points for each county from which 10 or more QSOs are made.

Frequencies: CW—1810 and 50 kHz up from bottom of each band. Phone—3900, 7260, 14300, 21360, 28400, 50110, 144.2, and 146.50 MHz. Novice—10 kHz up from low end of each Novice band.

Awards: Certificates will be issued to *all* participants. Special endorsements for the top scorers in each Alabama county, each US state, VE province, and DX country.

Mailing deadline is September 30th to: Bill Levey, WA4FAT, 3164 Cahaba Heights Road, Birmingham, AL 35243. Include a large SASE for your certificate and contest results.

National CW & SSB Championship

CW: 0000Z–2400Z Sat., Sept. 5
SSB: 0000Z–2400Z Sun., Sept. 6

This is a new one organized by *73 Magazine*. It's for the National Championship.

Only single operator stations within the 50 U.S. states are eligible.

Power is limited to 200 watts exciter output, no external amplifier permitted. Operating time is limited to 18 hours out of the 24-hour contest period. Stations must be capable of operating two or more bands. There are no single bands categories.

There are other limiting factors using a rather complicated format. I strongly recommend you send a large SASE to Bill Gosney, KE7C, for official rules and forms.

Following is a brief run-down of the rules:

Exchange: RS(T) and your state.

Points: (A) 10 per QSO on 10 or 160 meters. (B) 5 per QSO on 15, 20, 40, and 75/80 meters.

Multiplier: Two for each state worked on (A). One for each state worked on (B).

Multiplier Average: Is determined by totaling multiplier points and dividing by the number of bands operated. (*Now it gets complicated.—ed.*)

Antenna Multiplier: Three for each band worked using a wire antenna or a vertical antenna. Must be fed with a single feedline. Quad not considered a wire antenna.

Two for each band worked with a duo, triband, or four-band antenna using a single feedline.

One for each band worked with none of the above.

Mandatory Band Switching: Stations must operate only on a single band during the following time frames: 0000–0300Z, 0300–0600Z, 0600–0900Z, 0900–1200Z, 1200–1500Z, 1500–1800Z, and 1800–2100Z. You must establish a band within a time frame and cannot move from that band until the next frame. At least one time frame must pass before the same band can be used again. After the above time frames, 2100–2400Z you can switch to any band as often as you wish.

Final Score: Total QSO points × Multiplier Average × Antenna Multiplier.

Penalties: One multiplier point, before averaging, will be assessed for each duplicate contact not removed in your log. Scores requiring more than 3% scoring adjustment due to duplicate contacts or errors will be disqualified.

Awards: Awards will be issued to the top-scoring station in each Call District and each U.S. State (minimum of 250 QSOs). Plaques to the National CW and SSB Champion. And "Operator of the Year" to the highest combined score of both contests.

Use a separate log sheet for each band, a summary sheet showing the scoring, a description of antennas used on each band, and the usual signed declaration that all rules and regulation have been observed.

All entries must be postmarked no later than October 20th and go to: The National Championships, Att: Bill Gosney, KE7C, 2665 Busby Road, Oak Harbor, WA 98277.

(Once again, I strongly recommend that you send a large SASE for an official copy of the rules and forms, and make your own interpretation.—ed.)

YLRL "Howdy Days"

1400Z Wed. to 0200Z Fri., Sept. 9–11

This activity is for YL's, and scores will be based on contacts between YL's only. All licensed women operators throughout the world are invited to join the party.

All bands and modes 10 through 80 meters may be used. Only one contact with the same station is permitted regardless of the band. Crossband and net contacts do not count. Use only 24 hours out of the 36 hour contest period, and indicate the breaks in your log.

Score 2 points for each YLRL member worked; 1 point if it's with a non-member. Therefore, members should identify themselves in the exchange. There is no multiplier; just add the QSO points.

Suggested Frequencies: CW—3555, 7055, 14055, 21135, 28195. SSB—3955, 7255, 14265, 21395, 28595. (Plus or minus 15 kHz.)

The top-scoring YLRL member will receive her choice of a YLRL pin, charm, or stationery. The non-member winner will receive a one-year membership in the YLRL.

Submit your original log, no carbon copies. Indicate if you are a member, score your log, and sign the summary sheet.

You are expected to delete all duplicate contacts. For each duplicate contact that is removed by the committee, a penalty of three additional and equal contacts will be removed from your score.

Logs must be received by October 6th and go to: Mary Lou Brown, NM7N, 504 Channel View Drive, Anacortes, WA 98221.

1987 CQ 160 Meter Contest High-Claimed Scores

CW

The following are early-bird high-claimed scores as of May 12, 1987. These are raw scores subject to verification. Asterisks denote multi-operator stations.

Call	Score	QSOs	Mult.
NP4A	968,622	1045	138
		(K1ZM Op.)	
KM1H	396,492	802	111
K2EK	394,795	864	115
AA1K	390,610	918	110
K5NA	348,915	866	105
HK1AMW	345,254	388	91
VE1ASJ	305,952	586	96
VE6OU/3	296,352	685	84
ON4UN	273,677	603	73
DJ6RX	272,792	525	86
*W2GD	268,290	822	99
W3BGN	266,805	612	99
*UP1BZZ	262,330	623	74
YV3AGT	257,312	297	88
N5RZ	252,480	822	96
W3GM	243,628	629	98
*KS8S	238,900	772	100
YU3EF	238,200	581	75
*EA3VY	236,208	490	76
I2UBI	233,590	575	70
*LZ1KDP	227,562	546	69
CT1AOZ	216,223	357	79
N2MM	215,904	677	95
*YT2R	215,460	542	70
KH6CC	214,656	331	64
PJ9J	213,000	305	71
*SP6PAZ/6	211,820	530	70
DK6AS	210,240	483	72
*W9AZ	208,210	784	114
*UR1RWX	208,130	578	65
W3LPL	203,980	665	94
		(WB3JRU Op.)	
WB8JBM	198,260	684	92
		(KD8NS Op.)	
UG6GAW	198,120	350	60
W0ZV	196,779	744	89
W3UM	193,440	574	93
N4WW	182,685	532	95
VE3KP	180,090	528	69
VE1ZZ	179,190	291	99
VO1MP	179,010	315	85
YV1OB	177,858	221	82
*PA3CLH	177,684	447	67
EA6ET	176,932	417	71
VE5UF	174,835	498	73
*W0AIH	171,000	734	90
N4PN	168,544	619	93
*GM3IGW	162,279	361	73
K4TEA	159,988	615	92
VE3INQ	159,942	474	69
*K0DD	159,516	742	84
YU2TW	159,040	400	64
OL1BLN/p	156,608	473	64
*UR1RYY	156,587	466	61
N4IN	155,118	429	103
4X4NJ	154,318	276	62
*PA3DQW	152,561	449	61
G4OBK	151,980	382	68
*W0CD	150,586	670	86
W0JLC	147,117	637	89
*KY0A	145,860	652	78
*HG9R	145,320	437	60
VE3PN	142,681	351	77
N4XR	140,624	448	94
K5MM/7	140,217	529	77
*HG5A	139,920	465	55
K4JPD	135,056	542	92
		(W8ZF Op.)	
K1TO	134,568	456	89
*W0KEA	133,614	536	78
K0ZZ	130,508	609	79
*K7QQ	129,078	622	71
*KJ0G	128,925	601	75
G4VGO	128,832	327	66
*UZ6LWZ	127,764	354	63
K4LTA	126,924	555	84
W3GU	124,520	447	88
VO1HP	123,600	239	75
W3FV	122,995	432	85
OH2BBF	118,503	378	57
*YT2B	117,292	366	59
KS1J	114,666	446	87
*OK3KAP	111,534	374	58
*W0CEM	111,518	608	74
N8EA	110,363	546	79
*K6XV	110,334	410	74
UA3XDM	109,736	347	58
W1PL	108,228	372	87
K3UEI	107,835	472	79
WB9YXY	105,150	568	75
*OK3KFF	103,320	417	56
*K8LX	102,960	513	78
*N6RZ	102,930	461	73
*KY1H	101,992	474	76
W1IS	100,646	361	79
UB5ZAL	100,440	295	60

SSB

Call	Score	QSOs	Mult.
*OK3RMB	325,350	1086	54
LZ2CJ	319,134	1020	59
WB9HAD	292,358	1234	97
UL7ACI	264,245	668	41
UG6GAW	251,889	514	51
8R1RPN	184,500	251	75
*K1NG	138,548	754	76
LZ1KOZ	133,980	602	42
K0HA	128,112	800	68
*KB4I	126,840	569	84
*KR9S	123,690	745	70
HK4DUM	122,760	195	66
*WA4JXI	121,104	474	87
*W0CEM	115,180	754	65
*WB4GNT	111,680	560	80
*YV2IF	105,240	182	60
VE1BPY	103,914	283	69
*WB4ZNH	97,052	520	76
*KA8POW	95,106	621	66
*N4NX	95,013	445	81
AA4MM	91,520	387	80
EA3CCN	88,102	251	62
*NF9R	85,280	580	65
*KA7AUH	84,350	440	70
VE3XN	82,423	284	59
VE3PN	82,376	315	56
WA4VDE	81,700	422	76
K6HNZ	81,444	451	66
W4TMR	80,640	575	64
KC0FJ	72,292	506	62
*SP6PST	71,472	283	48
*YT2R	71,325	296	45
*KB5DN	68,544	463	64
N1CTD	68,442	450	61
K8XR	66,665	401	67
4X4NJ	65,868	159	44
*I8CZW	64,866	211	57
WA0LRJ	64,841	473	59
*W8IMZ	63,555	489	57
UO5ONQ	64,545	311	39
OK1AJN	62,752	331	37
WA1UJU	58,618	502	53
*N4FNB	58,560	418	60
OK1DFP	54,739	251	43
K1IK	54,208	357	64
UA9AKO	53,618	425	19
TI2CC	53,520	152	60
*N4RJ	53,508	251	78
W3TS	53,190	427	54
IV3PRK	52,992	208	48
UA6HRZ	51,947	274	41
*HB9CXZ	51,075	214	45
CO2CB	46,060	188	49
GW4IOI	45,838	197	43
*YZ7A	45,182	214	41
NO8H	45,024	418	48
*K9HWU	42,984	354	54
*XE2PQ	42,536	164	52
KF4HK	42,020	341	57
N4IN	41,020	196	70
RB5DX	40,854	301	33
ND1X	38,826	312	54
NT0V	37,740	259	60
*UB4QWW	37,617	475	23
KR9G	37,576	256	61
*KA5DLM	37,125	307	55
K5TVC	36,517	307	53
OL5BPH	35,910	207	38
K0GAS	34,424	288	52
WA5NFC	33,867	317	53
OE1DH	32,868	183	36
KA8YGL	32,830	327	49
*OE3WQB	32,472	166	41
OK1KPU	32,200	165	40
		(OK1JDX Op.)	
CT1AOZ	29,937	103	41
W9MQZ	29,478	248	51
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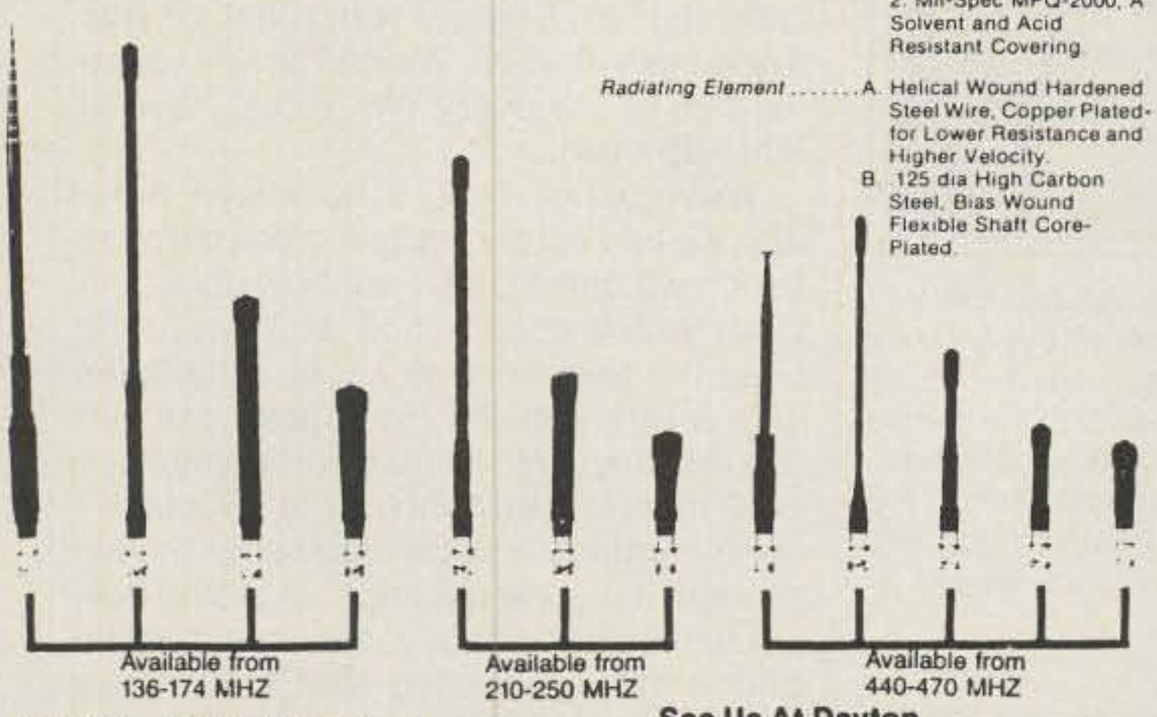

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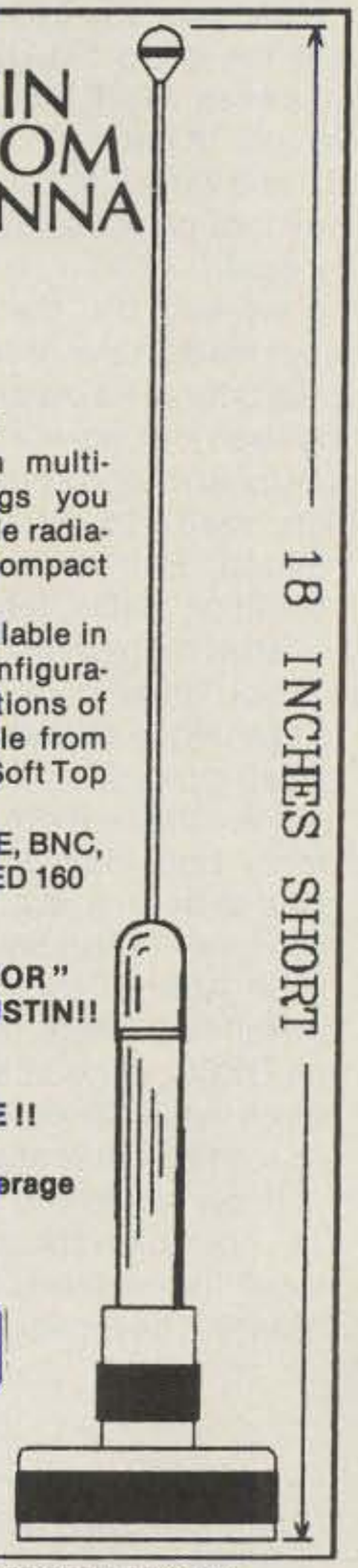

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DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATION AROUND THE WORLD

Seek thine DX? What paineth thee?
That others on the list might be . . .

Some have stated that there are no old DXers, only DXers with varying lengths of experience in the knowledge and joys of DXing. Once we would have had reservations when such statements were heard, but the years have brought a better understanding. Understanding has not ended the realization that there are still things in DXing that will raise the flags of battle, and though the weapons may be but words of inpenetrable logic, the conflicts never cease.

Not long ago the tide of battle washed up the hill with a Local. "Tell me something," this eager one said. "Don't you really believe that list operations should be banned for DXCC credit? You know, something like that Item 5 in th DXAC survey." It was a time to groan, for the question was back again. All we could say was "Why?"

The answer was simple and direct. "Tradition," the Local told us, "tradition and the good old DXer way of working countries. Work them all by yourself—no list, no DX net, no nothing. Hunt down the DX and work it all on your own. That's the way it once was; that's the way it should be again. Absolutely! DX should always be worked the traditional way. That's what made it the greatest thing going!"

Of course he was right. Any DXer hearing such stirring words would recognize a call to arms and immeditely leap to attention, ready to throw his weight where needed. But we wondered about that "tradition" label. It bothered us.

"How many over the 300-country mark are you these days?" we asked, tacking to put things on a different heading. The Local glowed. "Three-eleven," he told us. "A couple more and I will be on the Honor Roll. How about that?" That was good to hear, and anyone on the edge of the Honor Roll is always a believer in tradition. After all, for a half-century the Honor Roll has been the traditional apex of the DXCC. A good salesman always believes in his wares, and this one was selling tradition. It is always a good product.

"How would you disqualify a QSO or a DX operation because of list operations?" we asked, an the Local smiled. "Easily," he replied. "All you should have

77 Coleman Drive, San Rafael, CA 94901

Years back we published a DX bulletin that covered the Sudan like a blanket. Every DXer, every amateur in the country, read it—100% coverage. Here is a recent photo of that single reader. Dr. Sid Ahmed Ibrahim is an opthalmologist in Khartoum on the upper reaches of the Nile. Back then when you worked Sid you earned your "Worked All Sudan" award.

to do is file a complaint with the DXCC Desk and the operation should be investigated and disqualified. Naturally DX nets would automatically be disqualified. A list of suspect DX stations would be maintained, these operating with either lists or DX nets, and any of their QSLs would automatically be on a "suspect" list. Possibly there would even be available lists like those credit-card lists you see in stores. Some have even mentioned a 24-hour hotline that you can call to see if a station is on the list before you try a call. That's how it would work. Maybe there will be even more safeguards when things get rolling."

This was interesting. It was apparent that there had been a lot of thinking on the subject and a lot of the peripheral matters had been covered. Attention to details is always the mark of a successful effort, but we had to know more.

"You are looking at the matter from the viewpoint of a W6, aren't you?" we noted. "Possibly you expect every DX station to speak English. But what if he has a limited knowledge of English, or maybe even none at all. How about that?" We asked the question seriously, as we have never forgotten our first T19-Cocos contact of maybe a quarter-century back. It was a rare one then, and a needed one. The T19 showed, but the operator did not speak English. For two days he was just below the phone band on 20 at 14195 kHz. Many called, but few were worked. On the third day a T12 stepped forth, spoke to the T19 in Spanish, and then announced in English that he would take a list 10 kHz above the band edge. The QSO rate immediately went from 1 or 2 an hour to 35 or 40. A callsign given slowly in the clear could be recognized and answered. In a pile-up it could not. We wondered how the Local would handle such situations. It did not take him long to come up with the logical solution in the matter.

"Why," the Local said, confidence in his voice, "it will be necessary for every DXer to learn English. Naturally!" It was a good explanation. We had been expecting him to say every W/K would have to learn Spanish.

We were not yet out of questions. Actually, we had hardly started. "You mention lists," we continued, "but how about the DXer with a good supply of money who uses the telephone to set up schedules with a rare station? You know, call him 'on the longwire' as they sometimes say on 2 meters. How about that? Shouldn't such contacts also be disqualified?" We thought it a good question, recalling how some for a number of years used the telephone for scheduling QSOs to move swiftly up the DXCC listings. In some instances it was not unusual for the telephoner to drop everything and travel overseas to ensure that the needed QSO was hand-delivered. The system was both productive and efficient. We related all this to the Local and waited for a response. It might be hard to believe, but in these latter days of DXing this one had never heard of such a practice. "You mean . . ." he started off and lost his voice in thought. We nodded our heads, and that was enough. Maybe to cover this possibility it might be necessary to go to wire-tapping to get the basis for a disqualification complaint. Thinking that perhaps time would be needed to work out this one, we did not push the matter any further.

While the Local was thinking, we were talking again. "How's that new antenna system of yours working?" we asked, and the Local beamed, the thinking forgotten. "Fine, fine," he said. "Everything is up and that 125 footer sure looks good. All the antennas are up—the multi-monos for 10, 15, and 20 and the 2-elements for 40 and 80. You would be surprised how good the signals are and what I'm hearing." The smile was dazzling. This one was a real DXer who appreciated a good antenna.

Years back we had asked a famous DXer who operated from all the far-away places why he consistently came back to the same group of muscular DXers. The answer was logical. "In a pile-up the ones you work are the ones that stand out above the QRM, and while we try to pick up the others, it tends to be that the strong signals are the ones we work." We had to acknowledge the logic in his expla-

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1281	IK4CQJ	1284	HA9PP
1282	G4PWA		

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1889	XE1ND	1894	KC7EM
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1891	KS4S	1896	JL1BYZ
1892	G4PWA		

CW

2441	HA7SU	2443	OK3CAB
2442	G4PWA		

Endorsements

Mixed: 450 KA8MVT, I2CZQ, WA8SXM, WA4WIN, IK4CQJ, G4PWA, KD8IW, HA9PP. 500 I2CZQ, KA8MVJ, WA8SXM, G4PWA, KD8IW, HA9PP. 550 I2CZQ, G4PWA, KD8IW. 600 I2CZQ, G4PWA, KD8IW. 650 I2CZQ, G4PWA, KD8IW. 700 I2CZQ, G4PWA, KD8IW. 750 I2CZQ, WB3DNA, KI8B, KD8IW. 800 I2CZQ, WB3DNA, KI8B, VE3NBE. 850 I2CZQ, WB3DNA. 900 AB9O. 1000 G3YBH. 1300 WB8ZRL, HI8LC. 1350 HI8LC. 1400 HI8LC. 1450 N6JM, HI8LC. 1500 SM3EVR, KL7AF. 1550 I2MQP. 1600 I2MQP.

S.S.B.: 350 WA4WIN, KS4S, G4PWA, KC7EM. 400 WA4WIN, KS4S, G4PWA, KC7EM. 450 KT1H, G4PWA, KC7EM. 500 G4PWA, K8KUH. 550 G3UKH, KD9OT, G4PWA, KM1I. 600 G3UKH, G4PWA. 650 KU9C, KE6KT. 700 PA3DBG. 750 PA3DBG. 900 AB9O. 1550 I2MQP. 1600 I2MQP. 1650 I2JSB.

C.W.: 350 HA7SU, G4PWA. 400 HA7SU, G4PWA. 450 HA7SU, G4PWA. 500 HA7SU, W3GXK. 550 HA7SU. 600 DL2GBB, WB2FFY. 650 KT2C. 700 DL3HAH, WB8ZRL. 750 DL3HAH. 800 VE4AEX, DL3HAH, I8YRK. 850 I8YRK, OE1KJW. 900 I8YRK, W9PWM. 950 I8YRK, W9PWM. 1000 HP1AC. 1050 HP1AC. 1100 HP1AC.

15 Meters: VE4AEX
20 Meters: VE4AEX, KE6KT, KC7EM, G4PWA, OK3TAY
40 Meters: AB9O, DL7GK
80 Meters: JA0SU
160 Meters: WA8SXM, DL7GK

Asia: KC7EM, G4PWA, JL1BYZ
No. America: ONL-4003, WA8SXM, DK7GK
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Oceania: ONL-4003, KC7EM

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nation, and some DX efforts will try various ways to spread the QSOs such as calling by prefix, call-area, or even continent. But possibly there will never be a satisfactory way to handle such things, and pile-ups are where the muscular types love to pile in and plow their way to a QSO—maybe even three or four times.

How do you tell a DXer? It is always "Wow, dig that signal!" Here is John Minke, N6JM, the DX Editor for WORLDRADIO. *DXers always admire loud signals, especially their own.*

We still had the Local with us, and to give him some attention we slipped in another query on his current state of DX preparedness. "Got the big linear on the line?" we asked, and the smile got even broader. "Sure have," he almost chortled, "and it's a beauty! Of course, I run it at half-capacity, just loafing along easily, but there is no trouble breaking a pile-up. Just line up things, give a call, and it's time for the logbook. Heck, after they come back to my call, I can back the linear down and there is no trouble at all in completing the QSO. But it sure does help in DXing. That's for sure!"

We could understand. A good tall antenna and a good brawny linear are always a comfort to the DXer. But there were more areas to cover and more of the current problems facing DXers to be analyzed. "What's the problem with DX nets?" we asked, and the Local came back to the real world. This one had contempt for lists.

"Look," the Local said, "some will try to justify DX nets on the basis that they are the low-powered DXers' refuge. They say that on DX nets they need not battle the big signals, that they don't even have to compete. All they do is stand and wait, and when their turn comes, they call the DX station and get a report. And that's it! Do you call that DXing?"

"Well, they did work the station, didn't they?" we temporized, but that was not an acceptable answer. "It is not THAT they worked the station," the Local said with some indignation. "It is HOW they worked it! Hasn't it always been the tradition in DXing that the real sport comes from the chase, that you find the DX station on your own, you bust through the pile-up, and you work the station? What's wrong with some of these DXers these days? Don't they understand what DXing is all about and that the real sport is the working of a rare DX station with low power and with but a dipole! Whatever happened to the traditional values of DXing? You tell me!"

Son of a gun! We were wondering ourselves. We had to know more. ". . . rare DX with low power off a dipole?" we echoed, and the Local was off. "You heard me right," he said. "Back in 1963 that's the way I worked VR3-Christmas Island. And while Christmas Island might not be one of the top needed ones these days, it was back then. And I worked it—low power and a dipole!"

This was one we remembered. VR3 had been fairly rare. Then an operator with a strong Aussie accent was on the island doing some contract work, and all his free time was spent on the air. VR3 went from rare to common quickly, and soon you could hear most every evening the VR3 calling CQ with few takers. We did not dispute that one can work most anything, rare or otherwise, under certain conditions. But we wondered why, if this is so possible, so many feel that a linear and a high tower are needed. We made a note to seek knowledge in this area in the future, but first we had a question.

"You still work a lot of rare DX with low power and off a dipole?" we asked, and the Local shrugged his shoulders. "Not many these days," he acknowledged, "but it can be done. All you have to do is try. Try and avoid lists and DX nets!"

It was hard to disagree with the Local. It had been made clear that one can work DX with low power and a dipole. Possibly patience, endurance, and longevity are helpful, but it can be done. But we had yet more questions.

"What about those semi-rare stations

The WAZ Program

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3104	EA5DW	3112	VE7CBH
3105	EA3BMT	3113	I4ASV
3106	IK7AFM		

Phone/CW

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6086	NA5S	6093	JA1BFN
6087	HB9DDZ	6094	EA8ABG
6088	KD0OH	6095	HA8XX
6089	HC1H	6096	K2JF
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Mention DX and you will find an OH station in there somewhere. But there is more than just DX in OH-land. Martti Laine, OH2BH, says that beyond the poetry, the Sibelius' Symphonies, the classic literature, and bubbling champagne, there are opportunities to greet visiting DXers such as EA9AM. Oh, to be in Helsinki now that August is near! (Photo via N6IC)

from remote areas?" we asked. "You know, places like Wake or Kure, for instance. Maybe even Norfolk or the Galapagos. Or maybe Ascension or Diego Garcia. You know, somewhat rare but with operators there on a tour of duty with lots of time on their hands. Some join DX nets for a number of reasons. Some want to offer the DXCC country with a minimum of effort and to escape what can become a boring callsign/signal-report routine. Some say they escape the tedium of handing out reports and gain some acquaintances and friends on the air. Maybe they even find a QSL manager for that chore. It has been said in some instances that they find this to be a more personal form of DX-ing. They are part of a group, yet still readily available to anyone who needs them. What do you think about such instances? Should they count for DXCC?"

This was one the Local had to think over. Possibly we will never know what his answer and solution might be, for about then the Old Timer came into view on his daily walk down to the village. We hailed him to a stop, and the Local also thought he might be gaining an ally. After all, most old DXers are always fierce in protecting what they have, aren't they? We waited in anticipation, for this was a subject on which we previously had heard the Old Timer speak. He was a traditionalist.

It was not long before the Old Timer knew what way the wind was blowing in the Local's quarter. "Look," the Old Timer interrupted, "what you are saying is that some QSOs are better, more honorable, and more legitimate than others, right?" The Local was quick to acknowledge the premise, perhaps the note of heat in the Old Timer's voice speeding the reply.

"Try to remember," the Old Timer continued, "that there are various viewpoints held by DXers on how things should be, and because you might not agree with how another DXer works DX does not necessarily make it wrong, does it?" The Local was not disagreeing. He just nodded his head.

"You have to keep in mind," the Old Timer roared on, "that the FCC in Part 97 has never wavered in its clear stating that amateurs are licensed in part for their unique ability to foster international goodwill." The Old Timer paused to rivet the Local's attention by leaning close to him. "You do remember that part of Part 97?" he asked, and the Local found his voice to admit that it had slipped his mind, but only momentarily.

"And while some DXers may properly take pride in thier overwhelming signals and their ability to blast through a pile-up, there are other DXers who DX just for the simple social pleasure of meeting friends around the world, to pick up a few countries occasionally, to be part of a group maybe, and just to expand their own personal horizons through amateur radio. Some of these will never be found in a pile-up. They would rather spend their time listening on a DX net. Have you given much thought to that?" The Local conceded that perhaps he had not as yet.

We could see that while the Old Timer was just warming up a bit, the fires of reform were starting to dwindle. In fact, they dwindled very fast, and it was not long before the Local was gone. We were somewhat disappointed because we were curious about what the Old Timer might work up if he really got all units on line. It might be something to see, but we realized that maybe we would have to wait for another day and another good cause.

Finally we thought we would put in a question of our own. "You really do believe in DX lists?" we asked, and it was almost party time again. "No, I didn't say that," the Old Timer said, and in recollection we had to admit that he had not. So we thought we would wait for a bit. It always pays to wait for the Old Timer to speak.

"My thinking, when I hear such proposals," he finally said, is that there will always be someone trying to improve something that has worked for years. And often in making changes they create more problems than they cure. Always watch for those ideas which have a one-dimension solution to a three-dimension activity. They change what they think is one problem and end up with two new ones. Maybe you've seen it happen yourself?"

We could think of a few instances. "It does happen," we acknowledged, "but shouldn't DXers try to improve things in DXing?" It was not the best question to ask.

"You might first make sure that it will be an improvement," the Old Timer shot back, showing a bit of fire, "but if you look back over the years you will find that if there is something in DXing which needs attention, DXers seem to be able to solve most of their problems without more rules, rulings and regulations. Haven't you noticed that?"

We had to admit that we had. "But how about DX lists and DX nets?" we pressed on. "Would you consider them a problem?" We had to get our thinking clear on these. It did not take long.

"If they are problems," the Old Timer roared, "they sure have been around for a long time. And they sure have a lot of DXers still mixed up in them. And while you may at times come across some list operations that have neither sense, legitimacy, nor reason, they tend not to last very long. They self-destruct!"

At this point we were thinking that the Old Timer would not walk, but most likely would run the rest of the way down to the village. He was on his feet and ready to

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3. N4WW, 199
4. K6YRA, 199
5. W8UVZ, 199
6. JA0CWZ, 199
7. JA3CWZ, 199
8. K9CEB, 199
9. DJ9ZB, 199
10. SP6JCY, 199
11. W2YY, 198
12. K7UR, 198
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409 Stations have met the 150 Zone level.

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A DXer is always relaxed, never ruffled, never stressed. And here is Bernd Langer, DL1VJ, to prove it. This was Bernd at his 5T5XX operation in Mauritania some months back. One always works those pile-ups with the teapot handy. One must observe those DX necessities!

The WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ master prefix list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or to confirm present total. If no up-date, file will be placed into "inactive" until next up-date. Lifetime Honor Roll fee $2.00 (U.S.) for each mode, with no fees required for up-dates.

MIXED

3158	YU2AA	1877	W9NUF	1420	EA9IE	1141	N4IB	855	K9BQL
2853	K2VV	1863	I2PJA	1414	IT9QDS	1123	3A2LF	848	W9JBR
2750	W2NC	1841	W1NG	1395	SM6DHU	1117	KC8CC	840	I2EAY
2572	K6JG	1836	YT7DX	1391	IS0LYN	1114	N8BJQ	773	YU7DR
2502	K6XP	1833	WA8YTM	1347	I2UIY	1109	AI8S	759	OE1KJW
2501	VE3XN	1824	EA2IA	1322	NN4Q	1074	VK9NS	747	KD8IW
2359	W9DWQ	1736	W0SFU	1308	W6OUL	1067	I1WXY	745	VE6VW
2345	W4BQY	1676	KF2O	1305	DK5AD	1060	WD9IIC	715	KL7VZ
2297	YU2TW	1671	PY4OD	1293	SM0AJU	1043	YU2TY	708	G4SDJ
2277	N4MM	1665	IN3ANE	1291	YU7AJD	1025	WD4RAF	695	W5ASP
2224	N4NO	1661	K9BG	1283	K2POF	1018	DF6EX	679	K6UXO
2118	N6JV	1601	CT1LN	1266	YU2CQ	1007	AI6Z	678	W4WKQ
2072	I2PHN	1600	N5TV	1263	I1POR	986	NE6I	668	N3KR
2069	N6CW	1593	I2MQP	1249	W7CB	980	N2CIC	668	YT7WW
2056	YU7BPQ	1562	PY1APS	1247	W5PWG	972	PY2DBU	652	G4OBK
2040	N9AF	1537	N6AW	1234	SV1PL	943	I0AOF	650	JO1BMV
2002	I8YRK	1512	K7NN	1227	WB8ZRL	914	EA1CIM	637	F6HMJ
1944	YU1AB	1484	SM3EVR	1219	K2OLG	906	AB9O	633	Y44UI
1940	N2AC	1470	K8LJG	1215	G4FAM	901	W0JIE	620	YU1PJ
1924	K5UR	1451	KL7AF	1200	AC2J	900	I1EEW	602	W9IAL
1898	PA0SNG	1442	N6JM	1153	N2AIF	877	I2CZQ		

SSB

2711	I0ZV	1638	K5UR	1201	I8KCI	993	AG2K	744	K8ZZU
2410	K2VV	1614	WF4V	1151	KL7AF	984	W0ULU	716	IT9ONV
2273	K6JG	1599	I8YZP	1143	W4UW	981	K8LJG	710	N2AIF
2271	ZL3NS	1573	I2MQP	1112	KK0L	965	IK5ACO	702	I3ZSX
2210	K6XP	1508	CT1LN	1108	CT4UW	939	WA2FKF	698	I2KKL
2209	K2POA	1470	WA4QMQ	1095	K5RPC	936	W3GXK	698	G4KHF
2291	I0AMU	1451	VE1YX	1088	KC8CC	930	N4IB	698	KC2FC
2111	CT1UA	1441	W9NUF	1085	PY4OD	929	I8WYD	694	AI6Z
2053	I2PHN	1434	NJ0C	1079	N2AC	910	AB9O	692	YB3CEV
2047	N4MM	1431	I4CSP	1071	NN4Q	900	I2TZK	686	W6YMH
1942	W0YDB	1416	CT1FL	1067	SM6DHU	898	N2CIC	665	AB1U
1904	I4ZSQ	1406	KF2O	1062	EA8AKN	892	I2EOW	662	CT1AHU
1859	I2PJA	1399	W1NG	1060	CX9CO	871	EA4KK	661	VO1AW
1832	I3ZKD	1312	W3ARK	1048	I2UIY	857	I1EEW	659	I4UFX
1765	I6ZJC	1307	EA2IA	1048	PP2ZDD	818	IN3AHO	657	KE6KT
1761	I8YRK	1303	G4CHP	1047	EA3AQC	813	WN5MBS	654	NE6I
1749	W4BQY	1300	N5TV	1035	WB8ZRL	808	KK5P	652	CP8HD
1701	CT4NH	1293	AC2J	1030	F6BVB	798	K3IXD	642	OE5BGL
1699	W9DWQ	1283	XE1OX	1020	SM0AJU	788	W6OUL	607	YB3CDL
1693	N4NO	1218	W2NC	1000	KI3L	752	K9BQL	605	VK9NS
1661	PA0SNG	1204	KC8YM	997	CT1BY				

CW

2511	W2NC	1752	N2AC	1211	IT9VDQ	904	NN4Q	744	CT1LN
2315	K2VV	1672	YU7BCD	1178	WA8YTM	904	YU2CQ	711	I2EAY
2110	WA2HZR	1593	LZ1XL	1167	W1NG	899	I2UIY	707	WB8ZRL
2097	N6JV	1570	N4MM	1131	KF2O	897	W9PWM	705	OE1KJW
1991	ON4QX	1525	K5UR	1098	K2POF	889	F6HKD	700	N4IB
1973	N6CW	1502	VO1AW	1026	K8LJG	871	AI6Z	693	NE6I
1951	K6JG	1448	EA2IA	1001	AK2H	854	KN7K	663	LA7JO
1947	W9DWQ	1443	W9NUF	1000	I7PXV	827	VE1ACK	659	KA1CLV
1924	N4NO	1428	PY4OD	993	KL7AF	823	G4FAM	655	K6UXO
1900	VE7CNE	1414	N4YB	980	W1WAI	823	LAL9XG	654	W0JIE
1880	K6XP	1385	I1YRL	973	DJ1YH	813	VE4AEX	644	JA2GCW
1844	W4BQY	1300	N5TV	940	SM0AJU	800	I8YRK	634	OZ5UR
1836	W3ARK	1289	JE1JKL	936	N2AIF	799	SM5DAC	625	W6YMH
1820	G2GM	1261	I2DMK	915	AB1U	777	EA5QR	602	VK9NS
1779	OZ5EV	1255	KA7T	906	W6OUL	767	TI4BGA	600	G3VQO

trot, pausing for one last admonition. "Don't go trying to improve something that works," he said, and that was it. Then he leaned close to ask, "Understand?"

We did. How could it be otherwise?

Berlenga Island

There will be an operation from Berlenga Island (IOTA EU-40) by six CT-operators, these signing the prefixes of CT0/CQ0, and CR0 from June 18 to 21. Modes will include SSB/CW and RTTY, all the bands, and everything from 1.8 MHz to 28 MHz, these including the 10, 18.1, 24.9 MHz bands. Low end of the bands on CW; 1845, 3645, 3795, 7075, 14195, 14260, 21295, and 28585 kHz for SSB. QSLs will be handled by CT1AHU, Box 2763, 1119, Lisbon, Portugal. Jose Barbosa, CT1DIZ, is handling all the arrangements.

North Cook Islands

Ronald Crosby, VK2BCH, departed for Rarotonga in May and was expecting to open up a station in the North Cooks about a week or so later. Last year Ron was in the South Cooks signing ZK1XV. This year it will be the other DXCC country in the Cook Islands. If you caught Ron, QSL to him at P.O. Box 344, Forster, NSW 2428, Australia—SASE or SAE/IRC,

On the left is JA8ATG, Hara, and on the right is JA8RUZ, Toshi, who were in Nepal last December to operate 9N5YDY. They made 2300 QSOs, SSB/RTTY and CW. They could not get permission for 160 meters, and they only could operate 80 for five hours. (DK7PE photo)

naturally. You might find VK2BCH in the Callbook, as it has only showed there recently.

Geoff Watts' List

DXers with long memories will remember Geoff Watts and his "DX News Sheet," this dominating the bulletin scene for years. Time and eye problems eventually led Geoff to give up publishing the bulletin, but he is still in there with an unflagging interest in DXing. Currently Geoff has the Radio Amateur Prefix/Country/Zone List. Get this and you have the normal prefix for a country, the special prefixes, the continent, *CQ* WAZ Zone Number, the ITU callsign block allocations, the ITU Zone Number, and the DXCC status. It also has information on Antarctic stations, USSR club stations, obsolete prefixes for the past 10 years, and even more. With all that DX information, you might think it would cost a steep price. Not at all! For $2.00 U.S. or 6 IRCs, Geoff will wing it your way by airmail, and the list covers 15 pages. Send to Geoff Watts, 62 Belmore Road, Norwich, NR7 OPU, England, and you will be dealing with a real notable in the history of DXing.

Club Programs

With fall and the great new DX season but a few months off, it might be timely to tell those planning programs for clubs about the library maintained by the Northern California DX Foundation. The library has both slide shows and video tapes (VHS) of many big DX efforts in the last decade.

Some of the available programs include the original Kingman effort in 1974, the Colvins operating from Easter Island, the Galapagos, San Andreas and Juan Fernandez in 1984, Clipperton in 1985, Pitcairn by ZL1AMO in 1979 and 9U5JB and TYA11 by ON5NT, these being slide shows. Video tapes include XU1SS, plus BV0YL and BV0JA by the JAs, and 7J1RL on Okino Torishimo in 1976 and 1978. There is also a VK-tape on the climb of Big Ben on Heard Island, all these and a lot more.

How do you line up a program for your club? Write to the Northern California DX Foundation, c/o Josephine Clarke, 207 Evergreen Road, Kentfield, CA 94904 for either the full list of programs or to arrange for a loan. All it will cost is the postage both ways. Even if not primarily a DX club, the programs can be interesting and fascinating and good for a program at any club.

DXAC Survey

While the DXAC survey called for a straight

"yes" or "no" answer, some decisive types were longing for a "maybe," or even "...can't we talk this over?" Maybe the results of the survey will not surface for a bit yet, but the Southeastern DX Club down in Atlanta stepped up and declared their feelings on the DXCC and where they might want, or not want, changes. This is how the club looked at the survey.

Four-square against some proposals, the SEDX does not favor relaxing the DXCC Country Criteria; is not in favor of QSLs being checked at points other than the ARRL; does not feel accreditation decisions have been consistent or realistic; is not in favor of a fresh start for DXCC; does not believe it takes too long to make the Honor Roll; is against deleting inactive or prohibited-amateur-operation countries; is against a DXCC program based on a world grid system; and is against rolling the start of the CW DXCC back to 1945.

On the other hand, the club is four-square in being satisfied with the present DXCC program; favors immediate Honor Roll recognition; favors expanding the DXCC Awards program; favors disqualification of list operations; favors involving the DXAC in accreditation decisions; feels that the DXCC matters are being handled efficiently at ARRL; and believes that the listing of deleted countries does serve a useful purpose in the DXCC Awards program.

"Maybe" showed in the other questions on the survey not covered in the above. It was a standoff in the SEDX Club on the question of working towards a single-band DXCC/Honor Roll, an even split on whether there are some entities on the DXCC countries list which should be deleted. No indication was given on the final question as to what might bring the greatest improvement in the DXCC program.

Possibly you will agree with some of the club's stand on the DXAC survey, while possibly you will disagree with others. It is a study the results of which should be studied by all DXers, as they may influence future decisions. It is also possible that any item not carrying an overwhelming pro or con vote might also end up in the "maybe" or "we'll see" category—sort of held at arm's length. But watch for the final report. It should be interesting.

As long as we are working that side of the street, some of the indicators picked up at conventions and other stops along the way might be interesting. There is support on both sides of the question on many of the topics. These include the administration of the program which many seem to feel might be okay, while list operations get heat from some and support from others, the accreditation process draws fire from some who feel it is too strict, and most seem to want the QSL checking to be done at ARRL. Some question the country criteria, wondering why things cannot be based on a political rather than geographical basis. There does seem to be more support for additional programs and awards, though some question just how many Honor Rolls will be enough.

How will it all end? In a very interesting manner. Some think that so many viewpoints will be expressed that there will be few clear-cut guidelines and some changes may be effected, while some will not. But it will be interesting . . . always!

Why?

Being a firm believer for years that DXers know just about everything, it sometimes helps to run into someone who not only knows everything, but who also knows some of the "whys" involved. Acknowledging that most DXers probably already know all the answers, the following may be of help to those who have not as yet attained the heights.

Once in awhile you will hear some questions on the Pribilofs. The Alaska DX Association is unreconstructed in this matter. So "why?" The why is because the DX Advisory Committee was in favor of country status, the vote 9 to 7. The Awards Committee at the ARRL disagreed with the finding and said the Pribilofs did not meet country criteria. Deep down somewhere there seems to be a difference between the two groups on how to read the country criteria and what it says. Or, as someone noted and put it most clearly, "It's simply semantics!" And that's why!

Some thought Aruba would get country status. It did not. The DXAC vote was a tie. Apparently the DXAC rules are that a tie vote is a negative vote. If that does not sound exactly right, Roberts Rules of Order puts it differently, stating that on a tie vote the motion is lost. Same result, possibly. If you ask long enough, you might find out that the fact that Aruba did not gain full independence until the middle of the 1990s has a lot to do with things. And that's why!

From time to time there is proposed that entities such as the Council of Europe, 4U1VIC, and such be named DXCC countries. Often overlooked when 4U1ITU and 4U1UN are cited as precedents is the fact that while 4U1ITU goes back before the memory of some living DXers and 4U1UN came on line around 1978, the criteria was changed in 1979. Actually, 4U1VIC would have easily qualified in 1978. It could not after 1979 is the argument. Sometimes this argument spills over into the question of sovereign territory. We asked an informed one at Visalia about this, and the explanation does seem to hold water. ZC4-Cyprus are sovereign areas of the United Kingdom and remained so after independence was granted in 1960. Overseas bases such as the U.S. bases in Germany, Japan, Korea, etc., are not sovereign bases of the U.S., but rather continue to be the sovereign territory of the host country. Thus, the hope for these fades. There is a difference. And that's why!

We also heard some comment on North Korea should amateur operation be legalized

5 Band WAZ No. 59

Milos Prostecky, OK1MP, is the winner of the 59th 5 Band WAZ plaque and the 5th OK amateur to gain the award.

A graduate in radio engineering from the Czech Polytechnique Institute in Prague, Milos is 49 years old and an engineer in the Research Institute of the Czech PTT. His XYL is Marta and his sons are Martin and Marek.

Milos was an SWL for two years starting in 1948, and it was not until 1950 that he first had any contact with an amateur radio station, this being OK1OPR. He was first licensed in 1957, holding his original call of OK1MP since that time.

SSB was just coming into widespread use on the amateur bands about the time Milos was first licensed, and after some experimentation he made his first SSB filter in 1961, the rig using an old 829 in the final stage. It was two years later that he got the first two-way WAZ for Czechoslovakia, this in 1964.

Milos is interested in working DX and is on the DXCC Honor Roll for mixed and phone. His shack wall shows the *CQ* DX Award for CW and phone. Milos holds 5BDXCC #121, *CQ*'s USA-CA Award, and the WPX Award of Excellence. When one considers the problem in catching needed counties in the USA County Award certificate, one must wonder what it is like to listen for the sparsely populated areas when one is searching for them from Central Europe. Perhaps some ingrown persistence is necessary.

In 1967 Milos got started on RTTY, and he is now using a homebrew video terminal with the ST-6 terminal unit. He also holds DXCC on RTTY. The operating gear is an FT-200 with a 500 watt linear.

Because of antenna problems, Milos until the last year or so had not done much 75 meter work. For this band he was using a 40 meter GP with a loading coil for 75. Actually, all the other zones were worked on the GP with the loading coils. However, a move to a new QTH on the outskirts of Prague brought a determination to finish the 5BWAZ and an inverted-Vee antenna. This was helpful in getting the last 20 zones needed.

Milos Prostecky, OK1MP, at the operating position. Winner of 5BWAZ #59, Milos is the awards manager for the OK amateur radio society and a checkpoint for the CQ awards programs. Milos works a lot of DX with moderate power and a GP antenna along with an inverted-Vee. He started young as an SWL and has never lost the interest. He is a research engineer for the Posts and Telegraphs in Prague.

Getting QSLs is sometimes a problem, and instances of working a needed station but being unaware that the DX station only QSLs through a manager has brought some long and fretful delays. There have been instances where the station in the Callbook promises 100% QSLing but fails to note that it is the QSL manager who delivers the 100%.

Competition in Europe is always a going thing and one ploy is to learn to avoid jammers when some rare or needed DX is found. Milos checks into the Pacific DX Net at times, but usually likes to work DX on his own. On 75 meters this is not always an easy thing. He is the awards manager for the CRC of Czechoslovakia and is a checkpoint for *CQ*'s awards program.

Again, one must note the technical excellence of a 5BWAZ winner. Especially noted in this instance is the modest antenna system and the moderate power. OK1MP definitely is a top-rated DXer and has proven it.

CQ DX Awards Program

SSB

1537	WB5TED	1538	GW4UZL

CW

696	G4UOL	698	JJ1EMA
697	KC7EM		

SSB Endorsements

310	W9JT/316	300	K4CXY/301
310	VE3GMT/316	300	WB5TED/300
310	ZL1AGO/316	275	N2CIC/278
310	AB9O/310	28 MHz	KC7EM/259
300	I2MQP/302		

CW Endorsements

275	K4CXY/284

Total number of active countries is 317. 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 s.a.s.e. 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.

there. The comment was that it might not be a new country automatically, there being a need to resolve the question as to whether the split between the north and south portions was permanent or merely temporary.

One can learn a bit about DXing at these DX forums at conventions. One should never miss one.

Dave Heil, K8MM/OH2

Once we asked one of the OH DXers why there always seems to be so much DX activity, enthusiasm, and DXpedition planning in Finland. It took some thought, but the OHer finally said, "I think it must be something in the ice cubes." We have believed ever since.

Dave Heil, K8MN, says that he is finishing a tour in Helsinki, and the big ice cube in the harbor is melting. Dave says that he will be leaving soon and will be missing the grand treatment he has grown to love and the good times with OH2BH, OH2MM, and OH2NX. These include efforts from the Aland Islands and Market Reef.

But the good times may not be ending. Dave says he will be next posted to the embassy in downtown Bissau, a comfortable 12° or so north of the equator. That will melt his ice cube. But there are plans to put together a super contest/DX station in Bissau, all this with the help of Marty and Willi. Dave has applied for a J5 call, and later this year there very likely will be big signals, big contest scores, and big DXings in Guinea-Bissau. And, as the Hero of Mafeking would often say, "Be Prepared!" The Great Days of DXing are near! Climb your rooftop every dawn and watch for the sign in the east with the rising sun. The sunspots are back!

Some Mid-Summer DX Notes

A couple of issues back there was mention of the anguished cries from downunder over VR1 callsigns being bootlegged. It seems that things are not always what they seem. We quickly got word from New England way that the problem might be something else, like incorrect copy or something.

Arthur Herbert, N2AU, who publishes the DX bulletin "Inside DX," phoned to note that the suffixes were familiar Soviet Antarctic stations and that the problem seemed to be that the 4K1s were being copied as VK1s. Amazing! Then we had hardly hung up the phone when there was a note from Tom Frenaye, K1KI, noting the same thing. It's hard to confuse those east-coast types.

K1KI notes that the Soviet operators are very good on CW and send at 20 wpm or better. Often these are club stations, but often they also use calls with the 4K1 prefix but their own back-home suffix. Tom also notes that VN1A could likely be 4N1A in Yugoslavia.

If you think that's the end of that side of the street, hold on. Tom also makes available a newsletter entitled "USSR Tidbits." This comes six times a year, and it is available for one SASE per issue. You can send up to three SASEs to keep on file, or $1.00 to cover three SASEs, and if you include anything extra to cover printing costs, it will not be rebuffed. You might even pick up some beginning Russian phrases for CW. K1KI is the ARRL New England Director and a DXer—always the best combination. Tom Frenaye, K1KI, 23 Pinehurst Road, Unionville, CT 06085 is the true-blue route.

At Dayton a couple of months back Don Search named Angola, Mozambique, South Yemen, Ethiopia, Burma, and Afghanistan as countries where the authorities have banned amateur operation. While Burma has been missing for some 30 years, it should be remembered that Ethiopia, Afghanistan, Angola, and Mozambique not too many years back were common DX. Times change, governments change, and the Camel Drivers Radio Club from downtown Kabul has not been heard for some years. If one has patience, everything will return some fine day. Usually they have. Just remember how long mainland China was absent. Live in hope!

SP5EXA/JW will be operating from Svalbard until well into August. The A51PN that showed a couple of months back does not ring true-blue. The DXCC Desk had questions on its legitimacy. Later this fall you might catch the TI9-Cocos effort out of Panama unless they changed plans again. HP1XDR/TI9 was the planned callsign to be used. Europa Island has been reported at a number of times, the callsign FR5ZU/E. You might try the European net at 14275 kHz around 1600Z. Also check sometimes on Snooky's Net at 14183/E. Twenty meters has been holding up well into the evening as the new sunspot cycle heads up and conditions are improving. Europa? Years back we had a Local who got a Europa QSL and discarded it, thinking it counted for no DXCC country. It was not until the mid-seventies that the DXCC Country List had both Juan de Nova and Europa for its FR7 listing. Before that it was just Juan de. The Local could not find Europa in the country list; therefore it was no good. We will supply his callsign in a brown envelope on request.

Ed De Young has shown from Nauru signing C21A. Years back Ed was KH6GLU. He went down to Australia and is now Director of Telecommunications for the Republic of Nauru. Along the way Ed made trips in the Pacific, signing VR3DY and FW8DY. Downunder it was VK4LX, VK8XX, and VK5AXX. He will be on Nauru for at least two years and possibly more. A couple of months back Ed showed on 40 CW, but he should be on most bands by the time you read this.

Jim Smith, VK9NS, in his Heard Island DX Association newsletter notes that the VKØDA operation on Heard from last November to this January had some 2074 QSOs. Jim even counted the QSOs for the various areas: VK/ZL Pacific had 361 in the log; U.S. 624 QSOs; Japan 253; Europe 554; and others 282. That "other" includes Africa, South America, and some Asian countries. All VKØDA's contacts were on 20 meters except for 152 on 40; fifteen did not work well at all.

Last month we mentioned that the Lynx DX Group will be active the first two weeks in August. Watch for this one in the deleted Rio de Oro territory. It has all the earmarks of a new country.

Who worked Peter I? The U.S./VE had 59% of the contacts, or 9367 QSOs; Asia and Japan had 2370, or 15%; Europe 2736, or 17%; VK/ZL Oceania 278, or 2%; South America 917, or 6%; and others 85, or 1%. Not broken down real fine, but it does give you an idea.

If you are looking for something devoted mainly to operating and contesting, get a copy of *RADIOSPORT*. A monthly publication, this one aims at the sporting crowd, DXing, contesting, and everything but dog racing. Even the masthead will show some familiar calls. You can write to Box 282, Pine Brook, NJ 07058 for more information.

There are a number of maritime nets going in the Pacific and the Caribbean. Possibly you have run across them at times. They can be interesting, especially when some of the boats are at some rather interesting and exotic spots. But the nets have attracted some who while having all the gear just never got around to getting a license. Some yachting magazines have made a career of railing at the license requirements, especially the necessity of learning the code. Some yachties take the time to tell how they are licensed amateurs but know nothing about operating the gear after passing a 5 wpm code test and drawing a picture of a vacuum tube. Recently one magazine promised an article "The Idiot's Guide to Buying and Using Ham Radio."

What does it mean? What should you do? Just as you always have. Enjoy talking with the maritime hams; most are legitimate. However, some are cutting corners, and many nets have taken steps to screen these out. Just be wary.

73, Cass, WA6AUD

DX Ten Years Back

K5CO was signing /5A from Libya plus a bit of side action signing TT8SM in Chad. Bill Gary, K8CSG, was back in Saudi with plans to keep HZ1AB warm. Willie at UK9AAN passed the information that in all of Outer Mongolia, there was but JT1AN and JT1KAA. Note was made that some Asian and African stations were needing some rare DX—North Dakota. HL9VA worked hard to catch North Dakota by arranging for W9BG to roust out WAØHHI. TU2EF was advertising he was at 14200 kHz at 0000Z every day looking for the elusive Dakotas. A JA group was in the Eastern Carolinas for some VHF activity, and some ZLs were headed for Kermedec. HD8CD was headed for the Galapagos, and W6YO was on the around-the-world trip in the *Yankee Trader* and was in the Indian Ocean expecting to be in the Seychelles later that month. Exotic calls were breaking out all over the place with TF4F, 4Z1ØUS, 4079WARC, VB3IAT, IH9HLO bringing queries. If back then they thought there were strange callsigns abounding, look how things were improved! KA1S was on Marcus. Louis Muhleisen, K5FVA, DXAC chairman, sent the annual report to the Board, and it included matters such as country status for the Pelagic Islands; whether Geyser Reef, Saudi-Iraq Neutral Zone, and Spratly should be deleted because of their "unadministered status; that Transkei not be given country status; and the question of country status for South Sudan (ST0) after Bill Rindone operated there. There were a number of other items. None were really earth-shaking, but included was the question of whether or not the DXCC should start afresh on January 1, 1980. In a poll 80% were against ever taking the sacred DX QSL from the clutch of the DXer. Never!

QSL Information

QSLs for the 1987 FMØA operation in the CQ WPX Phone Contest must be sent to FM5CD, P.O. Box 9, Floreal, 97251 Fort de France, Martinique.

All of the following was compiled with help from that watcher of the lonely night, W9LNQ.

AZ1ARU/15 to LU5EIC
CP8XA to DL3NAZ
CW6BPAX/7BY to CX1AA
CY8SAB to VE1CBK
DJ6QT/9L1 to DJ6QT
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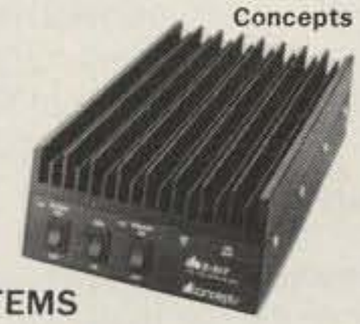

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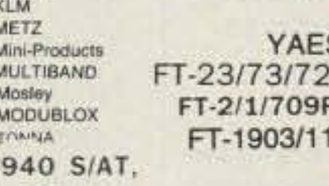

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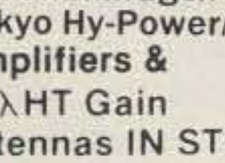

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Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

There is increasing evidence that a new solar cycle, Cycle 22, began during the fall of 1986 and is now on the rise!

The monthly mean sunspot number for April, as reported by the Royal Observatory of Belgium, was 39.3. This is the highest mean reported since June 1984. Daily levels during April remained well above 10, and reached as high as 80 on April 16th. This is the highest daily count recorded since July 10, 1986.

There was a corresponding increase in 10.7 cm solar flux levels during April. The Algonquin Radio Observatory at Ottawa, Canada reports a monthly mean level of 85.

April's increase in solar activity results in a 12-month smoothed sunspot number of 13 centered on October 1986.

Apparently, as a result of the increase in solar activity observed during April, the Solar-Terrestrial Physics Division of the National Geophysics Data Center at Boulder, Colorado has reassessed the date on which it believes that Cycle 22 began. The previous date of March 1986 has been revised to September 1986. This is in closer agreement with Dr. A. Koeckelenberg of the Royal Observatory of Belgium and other experts who have indicated that Cycle 22 in all probability began during the early fall of 1986.

A smoothed sunspot number in the range from the upper 20s to the lower 30s is forecast for August 1987, which would be on the order of 12 to 20 points higher than observed last August.

Solar Data Available

The National Data Center, the official keeper of solar records in the United States, has recently announced the availability of a large amount of solar data both on diskette (IBM formatted) and hard-copy reports.

Daily values of Zurich and International sunspot numbers from 1818 to the present, monthly mean and 12-month running smoothed sunspot numbers from 1749 to the present, as well as yearly mean sunspot numbers from 1700 are available on a set of two diskettes for $60, or in a 112-page report (#UAG-95) for $10.

Daily values of Ottawa 10.7 cm solar flux levels as well as monthly means and yearly means from February 1947 to the present are available on a single diskette for $30, or in booklet form for $10.

A yearly subscription to the *Solar Indices Bulletin*, which is mailed about the 15th of each month, is available for $20.

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LAST MINUTE FORECAST

Day-to-Day Conditions Expected for August 1987

Propagation Index.....	Expected Signal Quality (4)	(3)	(2)	(1)
Above Normal: 2, 8, 11, 29	A	A	B	C
High Normal: 1, 3, 7, 9-10, 17, 19-20, 24, 30	A	B	C	C-D
Low Normal: 4-5, 12-13, 16, 18, 21-22, 25-26, 28, 31	A-B	B-C	C-D	D-E
Below Normal: 6, 14-15, 23, 27	B-C	C-D	D-E	E
Disturbed: None	C-E	D-E	E	E

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

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 (B) on Aug. 1st, excellent (A) on the 2nd, good (B) on the 3rd, good-to-fair (B-C) on the 4th and 5th, etc.**

This two-page monthly report contains daily sunspot numbers and solar flux levels observed the previous month, as well as predictions of smoothed monthly sunspot numbers for the current solar cycle.

Diskettes and hard-copy reports of other solar data are also available. Write directly to the National Data Center at the following address for their latest announcements and for additional data: National Geophysical Data Center; NOAA, E/GC2; 325 Broadway; Boulder, Colorado 80303 (tel.: 303-497-6136 or 6475).

August Propagation

A noticeable improvement in HF propagation conditions is expected this August when compared to last year as a result of increasing solar activity.

Expect a few DX openings on *10 meters* during the month towards southern and tropical regions. Best bet for such openings would be the afternoon hours on days when conditions are expected to be High Normal or better. Frequent short-skip openings between distances of about 500 and 1400 miles can also be expected.

Fifteen meter DX should sound a bit better this August. Look for an occasional opening towards Europe and the east before noon, but conditions should be much better during the afternoon hours, particularly for openings to Africa, South America, the South Pacific, and Oceania. Expect frequent short-skip openings between distances of approximately 400 and 1400 miles.

During August *20 meters* should continue to be the best band for DX propagation. Openings are forecast to most areas of the world between sunrise and midnight, when conditions are at least Low Normal. Peak conditions should occur, with strongest signals, during a two-to-three hour window just after local sunrise, and again during the late afternoon and evening. When conditions are High Normal or better, *20 meters* may remain open through much of the period of darkness, particularly towards southern and tropical areas. Excellent short-skip openings are also expected to continue on *20 meters* from shortly after sunrise to almost midnight. Thse should range from a few hundred miles out to the one-hop limit of about 2300 miles.

Some fairly good *40 meter* DX openings are forecast for the early evening hours towards the east and south. Conditions should improve towards the west and south after midnight, with the band remaining open for DX until sunrise. Look for excellent short-skip openings between about 250 and 750 miles during the daylight hours and between 750 and 2300 miles at night.

Despite seasonally high static levels, some fairly good DX openings should also be possible on *80 meters* for short-skip openings up to about 250 miles during the daylight hours, and between 250 and 2300 miles at night.

It's still too early for *160 meter* DX openings, but an occasional one may be possible during the hours of darkness and the sunrise period. Short-skip on *160* looks good during the hours of darkness for distances up to at least 1300 miles.

Since the summer propagation season usually ends by mid-September, this month's DX Propagation Charts cover only a *one month* period rather than the usual two months. Short-Skip Charts for August appeared in last month's column.

VHF Ionospheric Openings

Although sporadic-*E* ionization is expected to decrease during August, some *6 meter* short-skip openings still should be possible. These openings should normally extend between approximately 750 and 1300 miles, but during periods of widespread sporadic-*E* ionization, *6 meter* "two-hop" openings may be possible up to as great as 2500 miles. During periods of intense sporadic-*E* ionization also check for possible short-skip openings on

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Each package includes top section, mid section, base, rotor shelf, guy brackets, guy wire, turnbuckles, equilizer plates, guy anchors, cable clamps, thimbles. Ask about substitutions and custom designs. Tower packages are shipped freight collect FOB our warehouse.

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HG37SS 37-feet tall	CALL
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Order Hy-Gain tower, Hy-Gain antenna, and Hy-Gain rotor and receive free shipping on all.

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Shipping not included. Shipped direct from factory to save you money.

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CIRCLE 136 ON READER SERVICE CARD

HOW TO USE THE DX PROPAGATION CHARTS

1. Use Chart approprate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8 KP4, KG4 and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9 and 0 areas; the Western USA Chart in the 6 and 7 areas, and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 Meters) for a particular DX region, as shown in the left-hand column of the Charts. An * indicates the best time to listen for 160 meter openings.

3. The *propagation index* is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of *days* during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual *dates* on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, *not* GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts c.w., or 1 kw, p.e.p. on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce. Boulder, Colorado, 80302.

August 15 - September 15, 1987
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	Nil	09-11 (1) 14-16 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	19-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-04 (1) 21-23 (1)* 23-01 (2)* 01-03 (1)*
Northern Europe & European USSR	Nil	09-11 (1)	06-07 (1) 07-10 (2) 10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	20-22 (1) 22-00 (2) 00-03 (1) 22-02 (1)*
Eastern Mediter-ranean & Middle East	Nil	11-13 (1) 13-15 (2) 15-16 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) 22-00 (1)	19-21 (1) 21-23 (2) 23-00 (1) 22-00 (1)*
West Africa	14-16 (1)	09-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	20-23 (1) 23-02 (2) 02-04 (1) 22-02 (1)*
Central & East Africa	Nil	11-14 (1) 14-16 (2) 16-17 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	21-01 (1)
South Africa	12-14 (1)	08-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	07-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-20 (1) 23-01 (1)	21-23 (1) 23-01 (2) 01-03 (1) 23-02 (1)*
Central & South Asia	Nil	17-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 20-23 (1)	05-07 (1) 18-21 (1)
Southeast Asia	Nil	18-20 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-22 (1)	Nil
Far East	Nil	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1)
South Pacific & New Zealand	16-19 (1)	13-16 (1) 16-18 (2) 18-20 (1)	07-08 (1) 08-11 (2) 11-13 (1) 18-21 (1) 21-00 (2) 00-02 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 04-08 (1)*
Australasia	17-19 (1)	16-17 (1) 17-19 (2) 19-20 (1)	06-08 (1) 08-10 (2) 10-12 (1) 15-16 (1) 16-18 (2) 18-21 (1) 21-00 (2) 00-02 (1)	03-04 (1) 04-07 (2) 07-08 (1) 05-07 (1)*
Northern South America	13-15 (1) 15-17 (2) 17-18 (1)	08-12 (1) 12-14 (2) 14-16 (4) 16-17 (3) 17-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-02 (1)	19-20 (1) 20-21 (2) 21-04 (3) 04-06 (2) 06-08 (1) 22-02 (1)* 02-04 (2)* 04-07 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-16 (1) 16-17 (2) 17-18 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-20 (1)	06-08 (1) 14-16 (1) 16-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-00 (2) 00-02 (1)	21-23 (1) 23-01 (2) 01-03 (1) 03-06 (2) 06-07 (1) 04-06 (1)*
McMurdo Sound, Antarctica	Nil	15-18 (1)	07-09 (1) 16-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-01 (1)	01-06 (1)

*Predicted times for 80 meter openings. Openings on 160 meters are also possible during those times when 80 meter openings are shown with a forecast rating of (2), or better.

Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	Nil	09-11 (1) 13-15 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-17 (2) 17-19 (1)	20-22 (1) 22-01 (2) 01-04 (1) 22-02 (1)*
Northern Europe & European USSR	Nil	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-13 (2) 13-14 (3) 14-16 (2) 16-17 (1) 21-23 (1)	20-02 (1) 22-01 (1)*
Eastern Mediter-ranean & Middle East	Nil	10-15 (1)	07-14 (1) 14-16 (2) 16-18 (1) 21-23 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)*
West Africa	12-14 (1)	09-11 (1) 11-14 (2) 14-16 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-22 (1)	20-22 (1) 22-01 (2) 01-02 (1) 23-01 (1)*
Central & East Africa	Nil	12-15 (1)	13-17 (1) 17-19 (2) 19-21 (1) 07-09 (1)	21-00 (1)
South Africa	11-14 (1)	08-10 (1) 10-14 (2) 14-15 (1)	07-09 (1) 12-15 (1) 15-18 (2) 18-20 (1) 22-01 (1)	20-21 (1) 21-23 (2) 23-01 (1) 22-00 (1)*
Central & South Asia	Nil	18-21 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-21 (1)	06-08 (1) 19-21 (1)
Southeast Asia	Nil	17-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 20-23 (1)	06-08 (1)
Far East	Nil	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-13 (1) 17-19 (1) 19-22 (1) 22-01 (1)	03-06 (1) 06-07 (2) 07-08 (1) 06-07 (1)*
South Pacific & New Zealand	16-19 (1)	12-15 (1) 15-19 (2) 19-21 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-21 (2) 21-23 (3) 23-02 (2) 02-07 (1)	00-01 (1) 01-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Australasia	16-19 (1)	14-16 (1) 16-19 (2) 19-21 (1)	00-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-16 (1) 16-18 (2) 18-20 (1) 20-00 (2)	02-04 (1) 04-07 (2) 07-09 (1) 04-05 (1)* 05-07 (2)* 07-08 (1)*
Northern & Central South America	12-15 (1) 15-17 (2) 17-18 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-17 (4) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-16 (2) 16-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-02 (1)	19-21 (1) 21-23 (2) 23-03 (3) 03-06 (2) 06-07 (1) 21-00 (1)* 00-03 (2)* 03-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, Uruguay	13-14 (1) 14-16 (2) 16-17 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-18 (4) 18-19 (2) 19-20 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-01 (2) 01-03 (1)	21-23 (1) 23-01 (2) 01-03 (1) 03-05 (2) 05-07 (1) 02-06 (1)*
McMurdo Sound, Antarctica	Nil	15-18 (1)	15-17 (1) 17-19 (2) 19-21 (3) 21-23 (2) 23-00 (1) 08-10 (1)	01-06 (1)

Time Zone: PDT (24-Hour Time)
WESTERN USA TO:

Reception Area	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western Europe & North Africa	Nil	11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-15 (2) 15-17 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1) 22-23 (1)*
Central & Northern Europe & European USSR	Nil	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (1) 21-23 (1)	19-00 (1)
Eastern Mediter-ranean & Middle East	Nil	09-12 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (1) 20-22 (1)	20-23 (1)
Western & Central Africa	Nil	12-15 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	21-01 (1)
East Africa	Nil	Nil	12-15 (1) 15-17 (2) 17-19 (1)	20-22 (1)
South Africa	Nil	10-12 (1)	07-09 (1) 12-14 (1) 14-16 (2) 16-18 (1) 22-00 (1)	20-21 (1) 21-22 (2) 22-23 (1) 20-22 (1)*
Central & South Asia	Nil	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-20 (2) 20-21 (1)	06-08 (1)

Southeast Asia	Nil	16-20 (1)	08-09 (1) 09-11 (2) 11-13 (1) 18-21 (1) 21-00 (2) 00-01 (1)	02-05 (1) 05-07 (2) 07-08 (1) 06-07 (1)*
Far East	Nil	15-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-20 (2) 20-22 (3) 22-23 (3) 23-01 (1)	01-02 (1) 02-06 (2) 06-07 (3) 07-08 (1) 03-07 (1)*
South Pacific & New Zealand	16-18 (1)	12-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-21 (1)	01-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-14 (1) 14-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-01 (2)	22-23 (1) 23-00 (2) 00-06 (3) 06-07 (2) 07-08 (1) 23-02 (1)* 02-05 (2)* 05-07 (1)*
Australasia	15-18 (1)	13-16 (1) 16-17 (2) 17-19 (3) 19-21 (2) 21-22 (1)	12-19 (1) 19-20 (2) 20-01 (3) 01-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2)	00-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Northern & Central South America	12-14 (1) 14-17 (2) 17-18 (1)	08-09 (1) 09-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-22 (2) 22-02 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-03 (2) 03-07 (1) 20-22 (1)* 22-02 (2)* 02-05 (1)
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	13-14 (1) 14-16 (2) 16-17 (1)	08-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-17 (4) 17-19 (2) 19-20 (1)	04-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-19 (3) 19-22 (2) 22-00 (1)	20-22 (1) 22-00 (2) 00-02 (1) 02-04 (2) 04-06 (1) 01-05 (1)*
McMurdo Sound, Antarctica	Nil	13-16 (1) 16-18 (2) 18-20 (1)	08-10 (1) 16-19 (1) 19-21 (2) 21-23 (3) 23-00 (2) 00-01 (1)	01-06 (1)

2 meters over a range of about 1100 to 1300 miles.

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August is not usually a good month for auroral-type propagation on the VHF bands, but some could occur during times when the ionosphere is disturbed. Check the Last Minute Forecast appearing at the beginning of this column for those days that are expected to be Below Normal or Disturbed. These are the days when chances are best for auroral-type openings on the VHF bands.

Auroral-scatter openings can range from a few hundred up to about a thousand miles and are usually characterized by very rapid flutter fading and Doppler shift on SSB signal.

73, George, W3ASK

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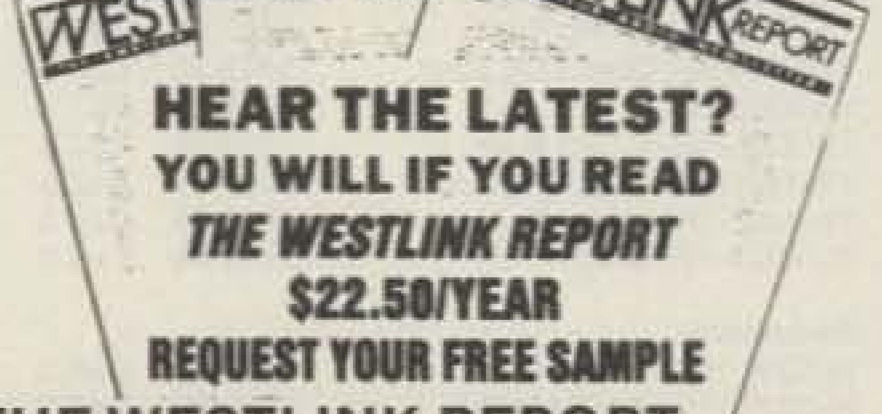

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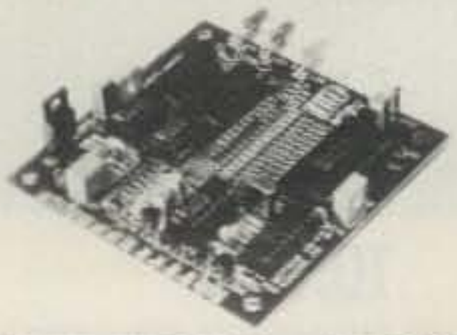
CIRCLE 81 ON READER SERVICE CARD

THE ALL-IN-ONE DTMF DECODER



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