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Amateur Radio

CQ

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AUGUST 1988 $2.50
CANADA $3.50

Antenna Special

CQ Reviews:

- Telex/Hy-Gain TH2MK3-S Trap Beam
- Creative Design 730V-1 Multiband V Dipole
- MFJ-945C & MFJ-989B HF Antenna Tuners

High Claimed Scores:

- CQ WPX 1988 SSB Contest
- CQ 160 Meter CW Contest

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THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur Radio

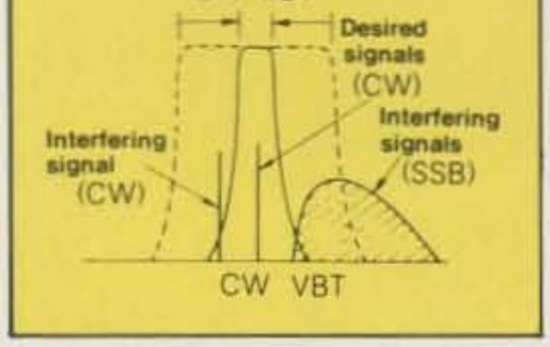
DX-cellence!

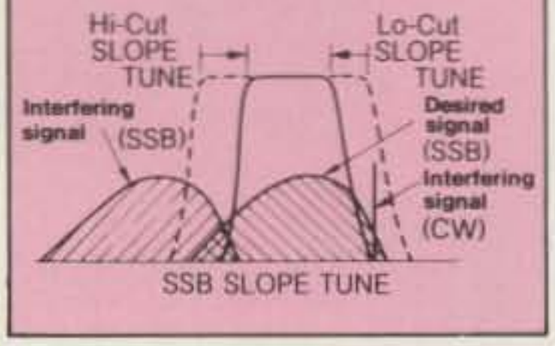
#1 Rated HF!

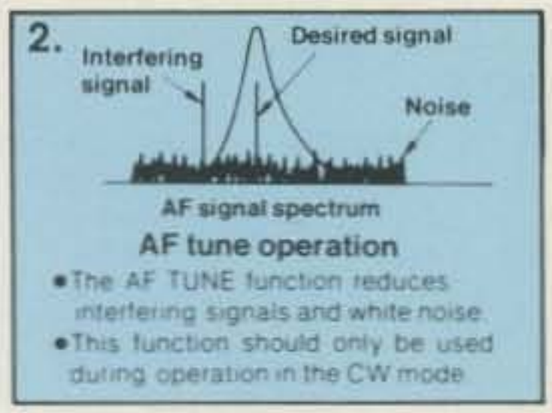
TS-940S
Competition class HF transceiver

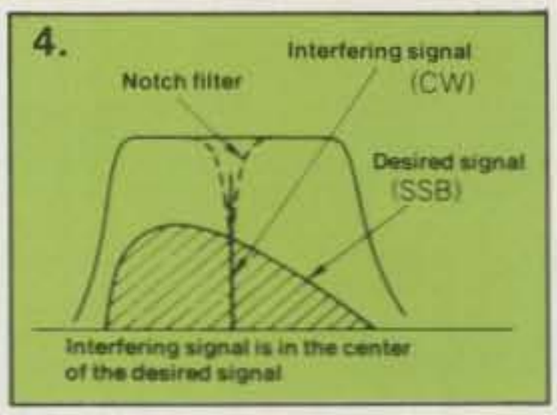
TS-940S—the standard of performance by which all other transceivers are judged. Pushing the state-of-the-art in HF transceiver design and construction, no one has been able to match the TS-940S in performance, value and reliability. The product reviews glow with superlatives, and the field-proven performance shows that the TS-940S is "The Number One Rated HF Transceiver!"

- **100% duty cycle transmitter.** Kenwood specifies transmit duty cycle ***time.*** The TS-940S is guaranteed to operate at full power output for periods ***exceeding one hour.*** (14.250 MHz, CW, 110 watts.) Perfect for RTTY, SSTV, and other long-duration modes.
- **First with a full one-year limited warranty.**
- **Extremely stable phase locked loop (PLL) VFO.** Reference frequency accuracy is measured in ***parts per million!***









1) CW Variable Bandwidth Tuning. Vary the passband width continuously in the CW, FSK, and AM modes, without affecting the center frequency. This effectively minimizes QRM from nearby SSB and CW signals.

2) AF Tune. Enabled with the push of a button, this CW interference fighter inserts a tunable, three pole active filter between the SSB/CW demodulator and the audio amplifier. During CW QSOs, this control can be used to reduce interfering signals and noise, and peaks audio frequency response for optimum CW performance.

3) SSB Slope Tuning. Operating in the LSB and USB modes, this front panel control allows independent, continuously variable adjustment of the high or low frequency slopes of the IF passband. The LCD sub display illustrates the filtering position.

4) IF Notch Filter. The tunable notch filter sharply attenuates interfering signals by as much as 40 dB. As shown here, the interfering signal is reduced, while the desired signal remains unaffected. The notch filter works in all modes except FM.

- **Complete all band, all mode transceiver with general coverage receiver.** Receiver covers 150 kHz-30 MHz. All modes built-in: AM, FM, CW, FSK, LSB, USB.
- **Superb, human engineered front panel layout for the DX-minded or contesting ham.** Large fluorescent tube main display with dimmer; direct keyboard input of frequency; flywheel type main tuning knob with optical encoder mechanism all combine to make the TS-940S a joy to operate.
- **One-touch frequency check (T-F SET) during split operations.**
- **Unique LCD sub display indicates VFO, graphic indication of VBT and SSB Slope tuning, and time.**
- **Simple one step mode changing with CW announcement.**
- **Other vital operating functions.** Selectable semi or full break-in CW (QSK), RIT/XIT, all mode squelch, RF attenuator, filter select switch, selectable AGC, CW variable pitch control, speech processor, and RF power output control, programmable band scan or 40 channel memory scan.

Optional accessories:
• AT-940 full range (160-10m) automatic antenna tuner • SP-940 external speaker with audio filtering • YG-455C-1 (500 Hz), YG-455CN-1 (250 Hz), YK-88C-1 (500 Hz) CW filters; YK-88A-1 (6 kHz) AM filter • VS-1 voice synthesizer • SO-1 temperature compensated crystal oscillator • MC-43S UP/DOWN hand mic. • MC-60A, MC-80, MC-85 deluxe base station mics. • PC-1A phone patch • TL-922A linear amplifier • SM-220 station monitor • BS-8 pan display • SW-200A and SW-2000 SWR and power meters • IF-232C/IF-10B computer interface.

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

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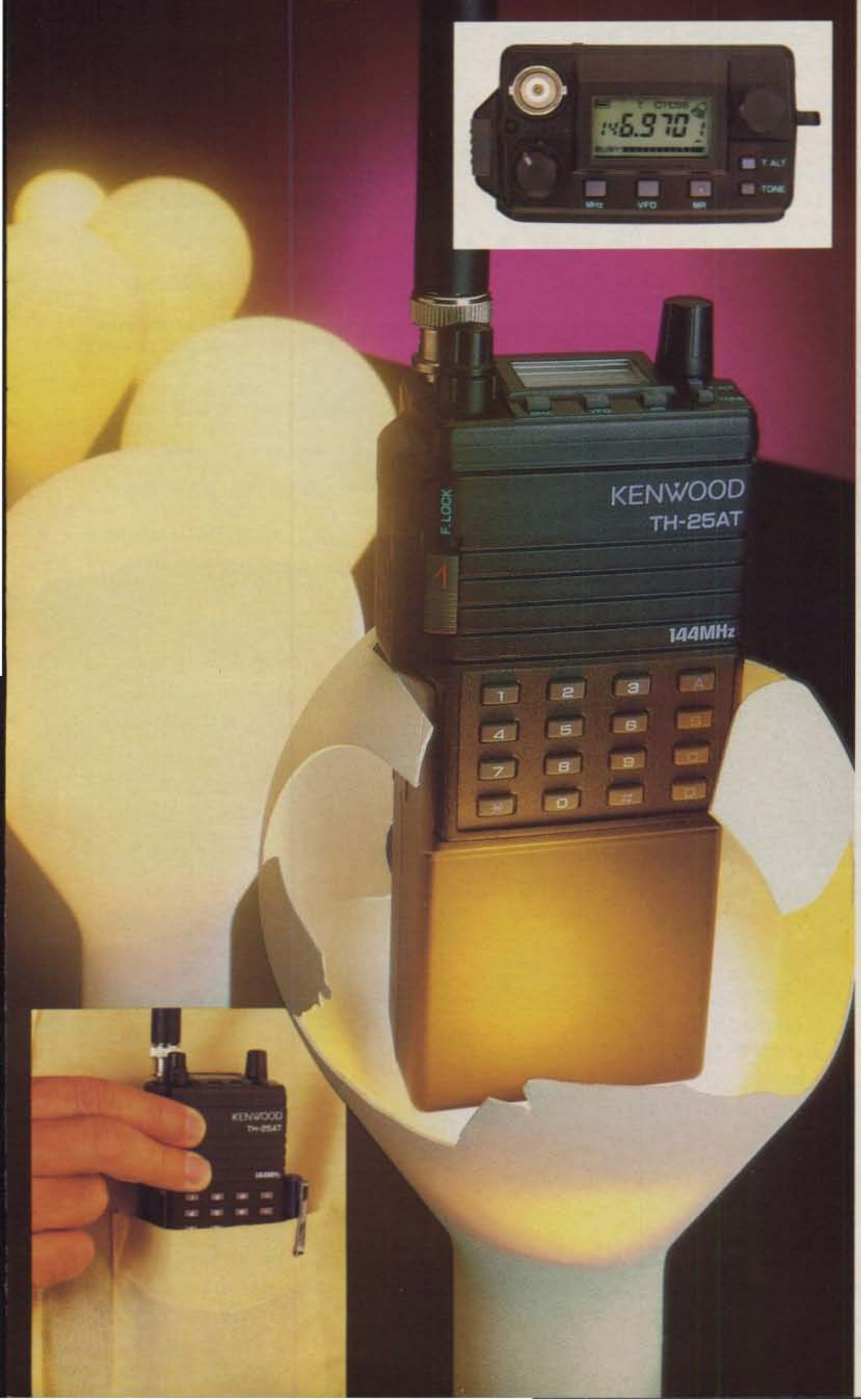
TH-55AT
1200 MHz
Here Now!

Compact Breakthrough!



TH-25AT/45AT

New Pocket Portable Transceivers

The all-new TH-25 Series of pocket transceivers is here! Wide-band frequency coverage, LCD display, 5 watt option, plus...

- Frequency coverage: **TH-25AT:** 141-163 MHz (Rx); 144-148 MHz (Tx). (Modifiable for MARS/CAP. Permits required.)
  TH-45AT: 438-450 MHz.
- Automatic Power Control (APC) circuit for reliable RF output and final protection.
- 14 memories; two for **any** "odd split" (5 kHz steps).
- Automatic offset selection (TH-25AT).
- 5 Watts from 12 VDC or PB-8 battery pack.
- Large multi-function LCD display.
- Rotary dial selects memory, frequency, CTCSS and scan direction.
- T-ALERT for quiet monitoring. Tone Alert beeps when squelch is opened.
- Band scan and memory scan.
- Automatic "power off" circuit.
- Water resistant.
- CTCSS encoder / decoder optional (TSU-6).
- **Supplied accessories:** StubbyDuk, PB-6 battery pack for 2.5 watts output, wall charger, belt hook, wrist strap, water resistant dust caps.

Optional accessories:

• **PB-5** 7.2 V, 200 mAh NiCd pack for 2.5 W output • **PB-6** 7.2 V, 600 mAh NiCd pack • **PB-7** 7.2 V, 1100 mAh NiCd pack • **PB-8** 12 V, 600 mAh NiCd for 5 W output • **PB-9** 7.2 V, 600 mAh NiCd with built-in charger • **BC-10** Compact charger • **BC-11** Rapid charger • **BT-6** AAA battery case • **DC-1/PG-2V** DC adapter • **HMC-2** Headset with VOX and PTT • **SC-14, 15, 16** Soft cases • **SMC-30/31** Speaker mics. • **TSU-6** CTCSS decode unit • **WR-1** Water resistant bag

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All New Compact HF!

"DX-citing!"

TS-440S Compact high performance HF transceiver with general coverage receiver

Kenwood's advanced digital know-how brings Amateurs world-wide "big-rig" performance in a compact package. We call it "Digital DX-citement"—that special feeling you get every time you turn the power on!

- **Covers All Amateur bands**
  General coverage receiver tunes from 100 kHz–30 MHz. Easily modified for HF MARS operation.
- **Direct keyboard entry of frequency**
- **All modes built-in**
  USB, LSB, CW, AM, FM, and AFSK. Mode selection is verified in Morse Code.
- **Built-in automatic antenna tuner (optional)**
  Covers 80-10 meters.
- **VS-1 voice synthesizer (optional)**
- **Superior receiver dynamic range**
  Kenwood DynaMix™ high sensitivity direct mixing system ensures true 102 dB receiver dynamic range. (500 Hz bandwidth on 20 m)
- **100% duty cycle transmitter**
  Super efficient cooling permits continuous key-down for periods exceeding one hour. RF input power is rated at 200 W PEP on SSB, 200 W DC on CW, AFSK, FM, and 110 W DC AM. (The PS-50 power supply is needed for continuous duty.)

- **Adjustable dial torque**
- **100 memory channels**
  Frequency and mode may be stored in 10 groups of 10 channels each. Split frequencies may be stored in 10 channels for repeater operation.
- **TU-8 CTCSS unit (optional)**
- **Superb interference reduction**
  IF shift, tuneable notch filter, noise blanker, all-mode squelch, RF attenuator, RIT/XIT, and optional filters fight QRM.
- **MC-43S UP/DOWN mic. included**
- **Computer interface port**
- **5 IF filter functions**
- **Dual SSB IF filtering**
  A built-in SSB filter is standard. When an optional SSB filter (YK-88S or YK-88SN) is installed, **dual** filtering is provided.
- **VOX, full or semi break-in CW**
- **AMTOR compatible**

Optional accessories:
- AT-440 internal auto. antenna tuner (80 m–10 m)
- AT-250 external auto. tuner (160 m–10 m)
- AT-130 compact mobile antenna tuner (160 m–10 m)
- IF-232C/IC-10 level translator and modem IC kit
- PS-50 heavy duty power supply
- PS-430/PS-30 DC power supply
- SP-430 external speaker
- MB-430 mobile mounting bracket
- YK-88C/88CN 500 Hz/270 Hz CW filters
- YK-88S/88SN 2.4 kHz/1.8 kHz SSB filters
- MC-60A/80/85 desk microphones
- MC-55 (8P) mobile microphone
- HS-5/6/7 headphones
- SP-40/50B mobile speakers
- MA-5/VP-1 HF 5 band mobile helical antenna and bumper mount
- TL-922A 2 kw PEP linear amplifier
- SM-220 station monitor
- VS-1 voice synthesizer
- SW-100A/200A/2000 SWR/power meters
- TU-8 CTCSS tone unit
- PG-2S extra DC cable.

Kenwood takes you from HF to OSCAR!

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

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Offices: 76 North Broadway, Hicksville, NY 11801. Telephone: 516 681-2922. FAX (516) 681-2926. CQ (ISSN 0007-893X) is published monthly by CQ Communications Inc. Second Class postage paid at Hicksville, NY and additional offices. Subscription prices: Domestic—one year $19.95, two years $38.00, three years $57.00; Canada/Mexico—one year $22.00, two years $42.00, three years $63.00; Foreign—one year $24.00, two years $46.00, three years $69.00; Foreign Air Mail—one year $77.00, two years $152.00, three years $228.00. Entire contents copyrighted CQ Communications Inc. 1988. CQ does not assume responsibility for unsolicited manuscripts. Allow six weeks for change of address. Printed in the United States of America.
Postmaster: Please send change of address to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

The Radio Amateur's Journal

ON THE COVER: Barbara Treasure, N5HJN and Fred Treasure, KE5CI get an early start on the 1988 Antenna Season. They are neighbors of W1ICP, so don't be surprised if you see this triband beam in an upcoming CQ Review. Photo by Larry Mulvehill, WB2ZPI.

AUGUST 1988 **VOL. 44, NO. 8**

FEATURES

DEPARTMENTS

Zero Bias AN EDITORIAL

Most of us can remember our first antenna. That antenna established our new world, complete with new frontiers and, of course, new boundaries. Mine was a 19 inch whip on top of a Gonset Communicator. What a world it opened up to a new amateur. It didn't take too long to notice that there were those ever-present boundaries putting limits on what I could hear and who could hear me. The next step up the ladder was a Kreco groundplane, a machinist's delight in brass. It also didn't hurt that the antenna was now mounted on top of the house instead of the rig. Well, the universe did expand, and those boundaries were pushed out quite a bit. Some time later a beam was added, and the concept of DX became a possibility. It was an additive process, antenna upon antenna. Over the years there have been many changes, some for the good and some just to satisfy my curiosity. We all have dreams of how much more we could work if only we had the *right* antenna. Right can be translated into bigger, higher, longer, or whatever your criteria happens to be. However, for most people this usually means MORE.

If we put aside the notion of operating ability for a moment, and the example of the ham we all love to hate—you know, the one who has worked everything in the world on every mode using converted surplus and a shortened wire antenna mounted three stories below ground—we come to the fact that just about everyone could use a better antenna. Whether it provides more motivation, operating ease, new bands, or just more RF in the right direction, a new antenna is generally worth the effort.

Perhaps this accounts for the popularity of antenna articles and antenna specials. Antennas represent the last frontier for amateurs to explore and experiment with. I don't mean that all of us (or even most of us) get bogged down with formulas and Smith Charts, but most of us are willing and eager to get out and try new ways of stringing wire. Whether we buy something or attempt to build something, it doesn't matter, as long as the effort is there. We read the magazines and books, we check out the ads, and we gather the "tribal lore" from club elders and on-the-air observations.

The scent is in the air. It's antenna season and everyone has plans and ideas. It may not get done, as it usually turns out, until the snow falls, but who cares? So, if you feel that underlying excitement, don't worry. It's just another antenna season.

This month we present a few antennas you can build and several reviews on others you can buy. We also present an interesting article on PRB-1 and a recently won court case. How big your dreams are depends on you and your available credit line. Everyone knows that wet string or the ever-popular wet noodle will truly radiate, but stacked beams really do shine. Almost all of us sort of "glow" somewhere in between, planning and dreaming of that ultimate array.

No matter what you have up at the moment or plan to put up, there's nothing like the satisfaction you get by tinkering with an antenna. At hamfests new amateurs and a lot of old timers (I won't name names) come up to our booth, pick up a copy of Bill Orr's *Wire Antenna Handbook*, and ask questions on how they can do it. My answer to them is simple. For about $25 you can pick up enough wire and insulators to keep you busy building and rebuilding antennas through several "antenna seasons," plus you can enjoy using each and every one of them. Of course, some of you might not want it generally known that you're actually having fun with this hobby, so if you're building antennas and having fun, we won't say a word. The rest of you can tell your friends, relatives, and those whom you meet on the air that you're using a home-brew antenna that you had a heck of a good time building.

This month we kept *CQ* author John Schultz quite busy enjoying both commercial and home-brew antennas. Most of you know John as W4FA, but he's been signing SV0DX for the last year or two, as his work transferred him to the island of Rhodes. If you've worked John recently, it's a better than even chance that he was using one of the antennas described in this issue.

I know that most of us would rather read and dream about antennas than actually build them, but why not give it a shot this year? You might even have a head start. Check out some of the "good stuff" you've been storing away for years, as you might find you have exactly what you need for that new antenna.

Travels With CQ

The Rochester Hamfest was a good one this year with plenty of stuff available from which to pick and choose. The rain held off until Saturday afternoon and then only lasted for a short while. The commercial exhibit area had a lot of stuff to see, touch, query, and hopefully buy. The outdoor fleamarket is one of the largest around outside of Dayton, and there were a number of bargains out there. Amazing as it may seem, I did manage to add to my collection of "stuff" with very little effort and a lot of walking.

Commercial exhibitors were treated to a box lunch by the hamfest committee (quite good), and the concession food looked like the typical hamfest fare—best ignored unless you like the sound of your arteries shutting down.

Dallas was also a good one, with attendance up from last year. It's still hard to figure out exactly the local economy in Texas, but it seemed as though everyone wanted to leave with something. This is a pretty well run affair and even includes carpeting in the commercial booths. It's not so much for aesthetics, but it certainly is easier on the exhibitors' legs and feet. Many thanks for the nice touch. Arnie, Peter, and I all managed to come home with some "good stuff" from this one. The food was comprised of two different items—sandwich platter and barbecue. I asked the woman in charge how the barbecue was, and she said pretty good, which was, after my official sampling, correct. The only problem was that they didn't have enough food to go around and ran out early in the day.

We stayed in Dallas an extra day in order to take in a quick tour of the Tandy (Radio Shack) facility in Forth Worth. Ed Juge, W5TOO, of Tandy even took us to two Radio Shack outlet stores where they sell their excess components and equipment. As these offer continually changing merchandise, I see why they can be a favorite hangout for local amateurs looking for that elusive bargain.

I had planned to be at the Hall of Science Fleamarket the following week, but it was a case of the mind was willing but the body was weak. I slept through the sound of the alarm clock and never made it.

In a couple of weeks we'll be heading to Atlanta for the annual hamfest there. This one is held at the Georgia World Congress Center, a facility just about as big as the name implies. In fact, the following week will see the national political conventions occupying the same complex.

There's still a lot of hamfest activity going on during the remainder of the year. Some of you might want to begin to think in terms of updating your station. I really know how much your Sky Buddy and Globe Scout mean to you, and that you can work what you hear, but the fact is that you may not be hearing all that's going on. Come on out and see what's become available since you brought home the Meisner Signal Shifter. You can always say that you're looking for a few replacement tubes. 73, Alan, K2EEK

6 Meter Version NOW Available

Handheld DX with the DX Handy™

The idea of handheld DX seems far-fetched, but it's actually very simple. The DX Handy is a battery powered (six penlight AA drycells included) SSB/CW transceiver with two watts output. DX Handy can also use nicad rechargeable batteries, or be powered with 9 VDC.

Two variable crystal oscillators (VXOs), each with 50 KHz range, can be selected with a top panel switch. Crystals for 28.250 to 28.300 and 28.300 to 28.350 Mhz are included, and other crystal ranges for the 10 meter band are also available at a nominal cost.

CW operation can be by either the built-in push button or with an external key or keyer. External speaker and microphone jacks are also provided, and the telescoping antenna is included. The DX Handy also has a top panel S-meter/ output power meter and an effective noise blanker circuit. DX Handy is housed in an attractive gray metal case comparing in size to popular VHF FM handhelds.

Ten meters is coming back strong. With DX Handy all amateurs, novice to extra class, can enjoy the thrill of working handheld DX.

Specifications

General
- Frequency Coverage: Any two 50 KHz segments in the 28.0–29.0 MHz Amateur Band (28.25–28.30 and 28.30–28.35 MHz supplied)
- Frequency Control: VXO provides 50 KHz of continuous tuning with a single crystal
- Frequency Stability: Within ±500 Hz from a cold start
- Antenna: 50 Ohms Unbalanced, BNC connector
- Power Requirement: 8.4–9.0 VDC
  (Included): 6-AA Dry Cells (1.5 volt/cell) = 9.0 VDC
  (Optional): 7-AA NiCads (1.2 Volt/cell) = 8.4 VDC
- Current Drain: Receiving - Approx. 70 mA
  Transmitting - Approx. 620 mA
- Dimensions: (W) 66mm × (H) 39mm × (D) 142mm
- Weight: 710 Grams (1 lb. 9 oz.) with batteries and antenna

Transmitter
- Output Power: 2 Watts at 9.0 VDC
- Emission modes: A3J (USB) and A1 (CW)
- Spurious Emissions: More than 40 dB down

Receiver
- Sensitivity: less than 0.5 uV for 15 dB S/N
- Intermediate Frequency: 11.2735 MHz

Controls and Indicators
- On/Off Volume control Top mounted Potentiometer
- Receiver Incremental Tuning (RIT): Top mounted Potentiometer with center off detent position
- Frequency: Top mounted 50 KHz VXO
- Frequency Range: Top mounted 2-position switch
- Noise Blanker: Top mounted On/Off switch
- S/RF meter: Top mounted S/RF meter
- Built in CW key: Top mounted momentary switch
- External Speaker output: Top mounted 1/16" phone jack
- External Microphone input: Top mounted 1/8" phone jack
- Antenna Connector: Top mounted Female BNC
- Transmit Indicator: Top mounted Transmit LED
- Push-To-Talk: Side mounted momentary switch
- External Power: Bottom mounted 2.1 mm coaxial
- External key input: Bottom mounted 1/8" phone jack
- Mode Selector Switch: Bottom mounted 2-position switch
- Charge/External Power: Bottom mounted 2-position switch selecting 12 VDC external power function

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Advanced Electronic Applications
P.O. Box C2160
Lynnwood, WA 98036-0918
(206) 775-7373

AEA Retail $379.95 **Amateur Net $319.95**

Specifications and prices subject to change without notice or obligation.

Announcing

• **WA7MBL Rocky Mountain Packet Radio Assn. Amateur of the Year 1987** - Jeff Jacobsen, WA7MBL, was recently named this Packet radio association's Amateur of the Year for his contributions to the worldwide growth and acceptance of Packet radio, which include being the first person to release a PBBS which operates on the MS-DOS standard.

• **Wellesley, Massachusetts ARS Exam Session** - The Wellesley ARS will sponsor an FCC exam session on August 20 at 10 a.m. at the Wellesley Red Cross Building. All classes of exams will be given. Contact Vern Valero, ND1Z, at 508-533-6822 by August 13. Candidates must bring a filled-in Form 610, original FCC license, clean copy of the license, picture ID, and check for $4.55 payable to "ARRL/VEC."

• **The following Special Events will take place during August:**

ZL6REC, from Reefton, South Island of New Zealand; Reefton Electrical Centenary, Branches 62, 49, 36, NZART; Aug. 1–6 throughout the day; on 80 or 40 meters as conditions permit, dipole antennas on 20 meters near 14.250 if possible, phone and possibly some CW. A special QSL will be sent via the bureau to all contacts logged (Inangahua County for County Hunters). Do not send QSL in reply. For more information, contact Dave Oates, ZL3MF, P.O. Box 20, Westport, New Zealand.

KW3Z, from Smith Island, Maryland; Nanticoke Amateur Radio Club; 1800Z Aug. 5 to 1800Z Aug. 7; 80 through 10 meters, CW around 040 kHz on each band, phone around 3860, 7260, 14260, 21360, 28460. QSL manager is K3TLG. SAE plus IRCs for DX and SASE for US gets direct returns; others via bureau.

WA3DFU, from Warminster, PA; Warminster ARC; 1400–2200Z on Aug. 6 and Aug. 7; 3.885, 7.26, 14.26, 21.335, 28.335, and 146.55 simplex. For certificate send QSL and SASE to WARC, 136 DeHaven Ave., Penndel, PA 19047.

K8ZFR, N8HHG, WB8N, from Twinsburg, OH; Cuyahoga ARS; 48 hours on Aug. 6–7; phone 7.230, 14.245, 28.450 (±10 kHz) and 146.22/82 repeater, CW on the lower General portion of the 20, 40, and 80 meter bands. For photo QSLs from each station worked and an additional certificate for working all three stations, send completed QSL for each station worked (SWL welcome) and one SASE to Paul Buescher, 1752 Stone Creek Lane, Twinsburg, OH 44087.

NK2K, from *USS Ling Submarine,* Hackensack, NJ; Bergen ARA; from 1400–2000Z Aug. 11–14; General portion of the 80–10 meter bands. For certificate send QSL and No. 10 SASE (for unfolded 9″ × 12″ SASE) to Warren P. Hager, K2UFM, 31 Forest Drive, Hillsdale, NJ 07642. (Plus work any club member under his own call after 2000Z and get a regular certificate. QSL and SASE to station worked via Callbook.)

NI3D, from Mount Davis, Somerset, PA; Somerset County ARC; from 1700Z Aug. 13 to 1900Z Aug. 14; lower 25 kHz of all General phone bands. For QSL send SASE to Ernest Gelpi, NI3D, RD 2 Box 71, Somerset, PA 15501.

KL7AA, from Prudhoe Bay, Alaska through 2nd, 3rd, and 4th Judicial Districts; Anchorage ARC; Alaska State Troopers Run for Special Olympic Mileage Event; Aug. 13–23; SSB 3.760–3.875, 7.175–7.230, 14.150–14.250, 21.250–21.320, 28.310–28.400, CW 3.510–3.535, 7.010–7.035, 14.010–14.035, 21.010–21.035, 28.050–28.150, six operators on all bands if conditions allow. QSL direct to KL7 Bureau or to John Bierman, KL7GNP. Certificate available for $5.00 donation and IRCs or SASE to cover postage.

W8VTD, from Warren, OH; Warren ARA; Aug. 14–21; all bands CW and SSB, and from Warren Hamfest on the 21st on 28.450, 21.350, and 14.250. For QSL send SASE to WARA, P.O. Box 809, Warren, OH 44482.

VE3CNE, from Canadian National Exhibition, Toronto, Ont., Canada; from 1000–2200Z daily from Aug. 17 through Sept. 5; demonstration of amateur radio including HF operation on all bands 10–80 meters and VHF on 2 meters, plus RTTY and Packet. For a special QSL write to VE3CNE, P.O. Box 307, Station "H," Toronto, Ont., Canada M4C 5J2.

KA9OIH, from Indianapolis, IN; Legion of Indianapolis DXers; 1500–2200Z Aug. 20 and 1700–2200Z Aug. 21; 3.988, 7.288, 14.288, 21.388, 28.388 (contacts with young amateurs encouraged, as this event is from a children's museum, where they will be listening to the contacts. Be prepared to share information about your home state, country, etc.). For certificate send QSL and 9″ × 12″ SASE to Ham Radio Exhibit, c/o Renee Henry, Indianapolis Children's Museum, P.O. Box 3000, Indianapolis, IN 46206.

W4RKC, from Winchester, VA; Shenandoah Valley ARC; 1300Z Aug. 20 to 1900Z Aug. 21; 80 through 10 meters CW and SSB and 2 meters FM. For special QSL, send QSL and SASE to SVARC, P.O. Box 139, Winchester, VA 22601, c/o George A. Stein, NJ3H.

GB2NTS, from Culzean Castle, south of Ayr, Scotland; Mid Lanark ARS; Aug. 20-21 *(no frequencies or times given).* QSL Manager is Paddy, GM3MTH. Mid Lanark ARS, P.O. Box 20, Motherwell, Scotland.

KØ-land, from 14,000 foot mountain peaks in the Colorado Rockies; Arapahoe Radio Club; from 1600–1800Z Aug. 21; near 14.060 CW and 14.285 SSB and will be calling "CQ 14" on CW and "CQ Fourteeners" on SSB: For certificate send QSL and legal-size SASE to K9AY, 7277 S. Clermont Dr., Littleton, CO 80122.

N2DTG, from Auburn, NY; Auburn ARA; 9 a.m. to 5 p.m. Aug. 27; lower portions of 20 and 40 meters both CW and phone bands. For QSL, send QSL and SASE to N2DTG, c/o Auburn ARA, P.O. Box 427, Auburn, NY 13021.

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

Aug. 5–7, **Austin Summerfest,** Austin Marriott Hotel, Austin, TX. Contact Austin Summerfest, P.O. Box 13473, Austin, TX 78711.

Aug. 6–7, **Greater Jacksonville Hamfest,** Osborn Convention Center, Jacksonville, FL. Contact Greater Jacksonville Hamfest, P.O. Box 10623, Jacksonville, FL 32207 (904-350-9193).

Aug. 7, **Winchester Hamfest,** Clarke County Ruritan Fairgrounds, west of Berryville, VA. Contact Joanne Blaker, WB2CMV, 703-869-4878, or write to SVARC, P.O. Box 139, Winchester, VA 22601.

Aug. 7, **Mid-Atlantic ARC Hamfest,** Bucks County Drive-in Theater, Warrington, PA. Contact John Bartholomew, 215-356-7197, or MARC, 203 Second Ave., Broomall, PA 19008.

Aug. 7, **Angola, Indiana Hamfest and FM Picnic,** Steuben County 4-H Park, Angola, IN. Contact Steuben County Radio Amateurs, P.O. Box 252, Angola, IN 46703.

Aug. 7, **Northwest Indiana Hamfest & Computer Fair,** Porter County Fairgrounds & Expo Center, east of Valparaiso, IN. Contact Jamie Veiner, NS9A, P.O. Box 1782, Valparaiso, IN 46384.

Aug. 12–14, **WIMU88 Hamfest,** Mack's Inn, Island Park area, Idaho. Contact WIMU88, P.O. Box 657, Salt Lake City, UT 84110.

Aug. 13, **Jackson County ARC Hamfest,** Ripley Middle School, Ripley, WV. Contact Robert DeHart, N8GKJ, RFD #3, Box 229, Ripley, WV 25271.

Aug. 13, **Rhinelander Swapfest,** Rhinelander Ice Arena, Rhinelander, WI. Contact K9RMN, 1312 Dorothy St., Rhinelander, WI 54501 (715-369-3296).

Aug. 13, **Burlington ARC Hamfest,** Champlain Valley Fairgrounds, Essex Junction, VT. Contact Bob Hall, W1DQO, General Greene Rd., Shelburne, VT 05482 (802-985-2235).

Aug. 13, **Brantford ARC Fleamarket,** Woodman Park Community Center, Brantford, Ont. Canada. Contact VE2MWF, P.O. Box 1661, Brantford, Ont. Canada (519-442-6298).

Aug. 13, **Hamfair 88,** Pacific Lutheran University, Tacoma, WA. Contact Bill Morgan, W7GRP, 206-531-3821.

Aug. 13–14, **SARA Hamfest,** Shreveport Civic Center, Shreveport, LA. Contact Shreveport ARA, P.O. Box 37632, Shreveport, LA 71133-7632.

Aug. 13–14, **Summerfest 88,** Teamsters Hall, Cedar Rapids, IA. Contact Bob Berridge, WA0SYQ, 2139 Randalph Rd., Marion, IA 52302.

Aug. 13–14, **Golden Spread Hamfest,** Camelot Inn, Amarillo, TX. Contact Golden Spread Hamfest, P.O. Box 1524, Armarillo, TX 79105-1524.

Aug. 14, **Central Kentucky ARRL Hamfest,** Scott County High School, Georgetown, KY. Contact Ed Bono, WA4ONE, 2077 Dogwood Dr., Lexington, KY 40504 (SASE).

Aug. 19–21, **Atlantic Hamfest 88,** University of New Brunswick, Fredericton, NB, Canada. Contact Fredericton ARC, P.O. Box 3567, Fredericton, NB Canada E3A 5J8.

Aug. 20, **Reno Hamfest 88,** California Bldg., Idlewild Park, Reno, NV. Contact Curley Silva, K7HRW, 3780 Hummingbird Dr., Reno, NV 89506 (SASE).

Aug. 20, **Finger Lakes Hamfest,** 4-H Acres, northeast of Ithaca, NY. Contact the Kings, N2GFW or N2GFX, Box 227, Etna, NY 13062 (607-347-4313).

Aug. 20–21, **Huntsville Hamfest,** Von Braun Civic Center, Huntsville, AL. Contact David L. Reasoner, N4KTY, 3103 Holly Hill Rd., Huntsville, AL 35802 (205-883-7629).

Aug. 20–21, **Computerfest 88,** Hara Arena, Dayton, OH. Contact Mark Hanslip, 143 Schloss Lane, Dayton, OH 45418 (513-263-FEST).

Aug. 21, **Delmarva Hamfest,** Del. Tech. Community College, Georgetown, DE. Contact Delmarva Hamfest, Rte 2, Box 244G, Georgetown, DE 19947.

Aug. 26–28, **Ham Fair 88,** New Hall of Tokyo International Trade Center, Harumi, Tokyo. Contact JARL, 14-2, Sugamo 1-chome, Toshima-ku, Tokyo 170, Japan.

Aug. 28, **Lebanon Hamfest,** Cedars of Lebanon State Park, south of Lebanon, TN. Contact Mary Alice Fanning, KA4GSB, 4936 Danby Dr., Nashville, TN 37211.

Aug. 28, **Hamfest 88,** Blanchette Park, St. Charles, MO. Contact Eric Koch, NF0Q, 2805 Westminster, St. Charles, MO 63301 (314-946-0948).

Aug. 29–30, **Melbourne Hamfest,** Melbourne Auditorium, Melbourne, FL. Contact PCARS, P.O. Box 1004, Melbourne, FL 32901.

Our Readers Say

In Our Own Backyards

Editor, *CQ*:

Wouldn't it be absolutely terrific to have an encyclopedia of ham radio available at your fingertips and for FREE! Well, most of us have something even better in our own backyards. Or at least we could.

Just imagine the volumes of knowledge that are compiled in the memories of your fellow radio operators. Tales of radio's beginning right through to the most modern technologies of today. Information on specific topics such as packet, DX, and RTTY, or general-interest subjects such as SWLing or astronomy. Yes, the ultimate ham radio journal (next to *CQ*) is right in the palm of your hand, or is it?

Fortunately, in Baltimore, Maryland we are privileged to have a local repeater club that features a wide variety of net topics, including all of the above and more. B.R.A.T.S. (the Baltimore Radio Amateur Television Society) is blessed with talented individuals who are willing to share a part of their wisdom (and time) for the benefit of their fellow amateur operators (and non-hams).

I urge all amateurs to share their wealth of knowledge over the VHF airwaves (remember those scanner listeners). You will be surprised at the talent out there at the end of the coax. You will be appreciated. I know they are in Baltimore.

Carroll Berl, KA3PXO
Baltimore, MD

Thanks For NCC Certificate

Editor, *CQ*:

Received my Novice Century Club award yesterday, and the calligraphy took my breath away. Fine job. Nice looking certificate, too. Would you please send word of my intense pleasure to the artist (fitting word) who did the job.

I would also like to thank you for offering the NCC. It's a good, positive reinforcement for Novices.

I upgraded to Tech recently and have completely used up the 2 meter band in the Rockies (*everyone* is furious with me) and have promised myself General this year.

Have had a good, active time this past year. Got an HT-37 from a kind uncle (WX5W) and went to town as best I could: 10-10, 3 watts on a converted SSB CB, 45 states, 14 countries, worked the Queen Mary and the Smithsonian, and Bill Orr, W6SAI. Not exactly a mover and a shaker, but considering the handicaps I have it's not too bad—a less than acceptable receiver, lots of electrical noise, dipole antenna, poor propagation. I did buy a used cubical quad, but no dollars for a mast and rotator, so it's not up yet.

Anyway, thanks again for the Novice Century Club award and also for having super contest and awards programs.

Rodney Johnson, Jr., KAØUSE
Denver, CO

**CQ encourages its readers to send in for publication letters expressing your opinions, ideas, etc. We will print them as space permits, and we reserve the right to choose material as we see fit. Please address all correspondence to "Our Readers Say" care of CQ.*

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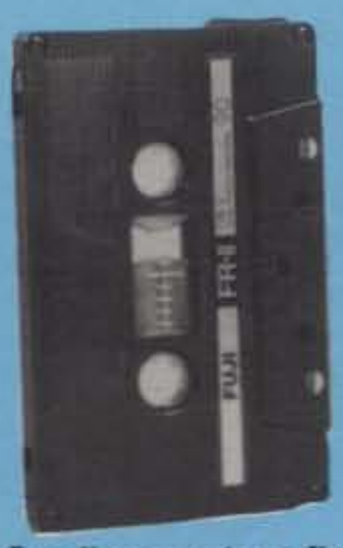

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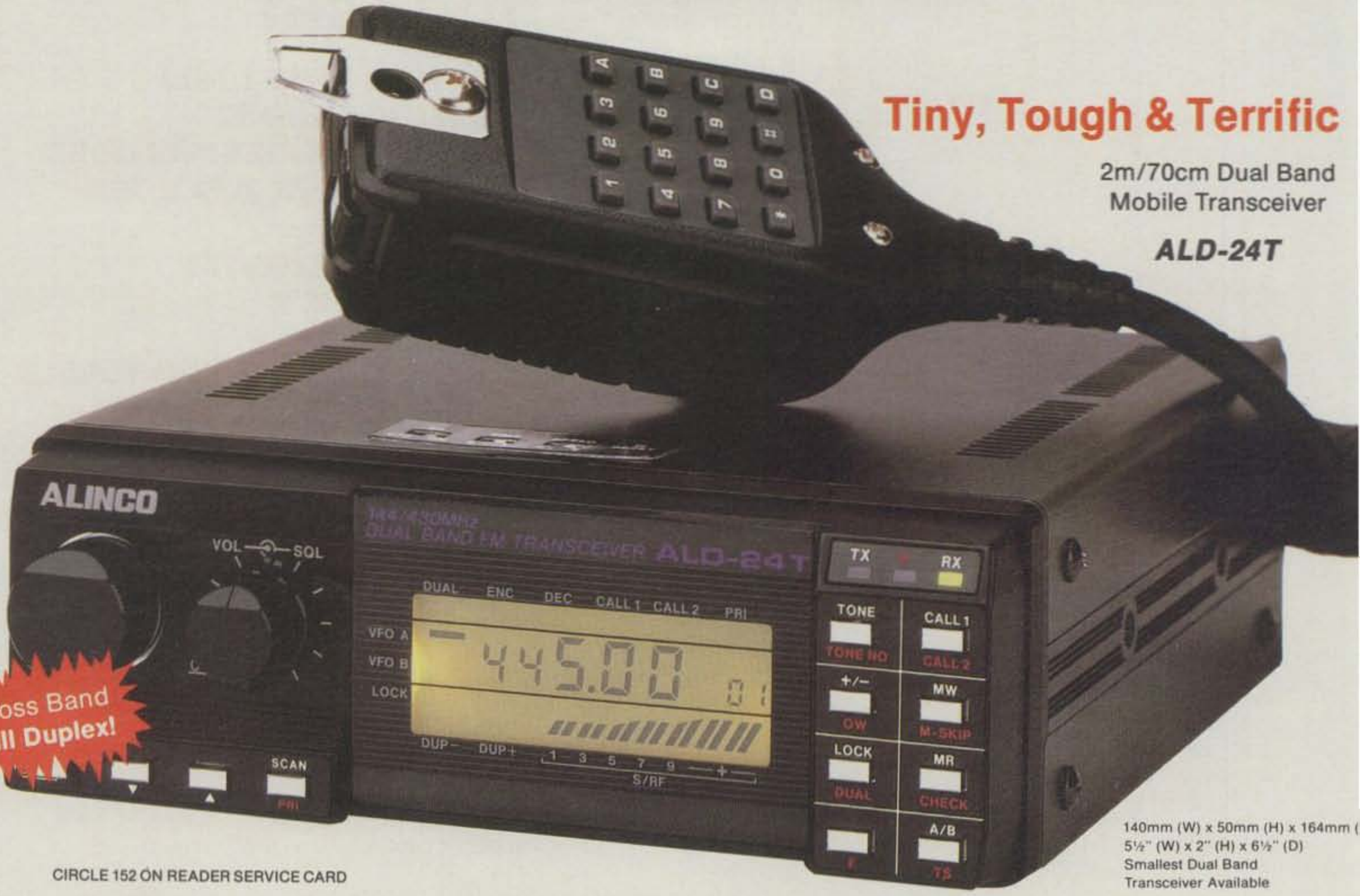

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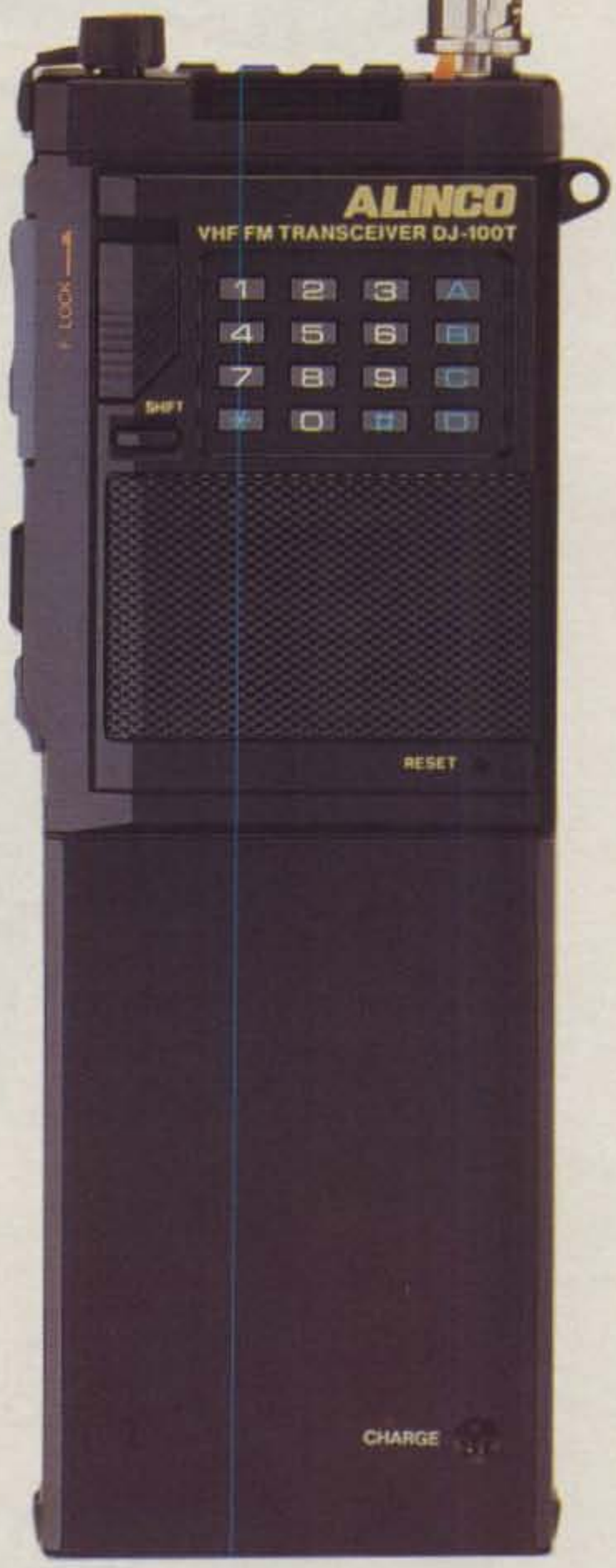

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The once popular phrase "The medium is the message" can translate to "The mast is the coax," as you'll find out by reading W4UW's article.

The Coax Mast

BY RICHARD A. GENAILLE*, W4UW

Are you one of the many amateurs who have a piece of property that lacks suitable trees on which to hang antennas? Do you have trees that you could use but which aren't located in the right place? If you fit into either of the above categories, you probably have to install a mast, tower, or other support from which to hang antennas. I have a solution that you might find interesting and practical, and at the same time you will construct not only an antenna support, but also your transmission line!

In my article entitled "Low Noise, Coaxial Link Antennas for HF Receiving," which appeared in the December 1987 edition of *CQ*, I suggested the possibility of fabricating a coaxial link antenna from 3 inch diameter aluminum irrigation tubing with a 12-gauge wire centered with spacers every few feet for support. Unhappily, the 15 foot square loop that I constructed did not live up to my expectations, but the fallout from the experimental work I did proved to be quite interesting and resulted in additional experimental work plus this article.

I didn't give it much thought at the time, but by inserting a conductor into the irrigation tubing, I had constructed a length of coaxial transmission line. When what I had done hit me, I decided to find out the surge impedance of the line that I had manufactured. It turned out to be about 214 ohms when measured electrically, and when calculated by formula it likewise turned out to be about 214 ohms. Son of a gun! I had made myself a section of rigid, 3 inch O.D. coaxial line! Now what could I do with my newly discovered capability?

I had been contemplating the replacement of my 40 meter, two half-waves in phase, wire antenna and decided to try a folded dipole constructed of ladder line using several sections of the rigid coax pipe as the center support and feedline. Two 15 foot sections of the rigid coax were spliced together to give me a support mast 30 feet in height. Since the surge impedance of the coax mast was 214 ohms, I had to provide line matching at the bottom of the mast. I used a 4:1 balun which I reconnected to give me a transformation from a 52 ohm unbalanced feedline to the unbalanced feedpoint at the bottom of the mast. (Close enough for non-government work!) Since the feedpoint impedance of the folded dipole was supposed to be approximately 200 ohms, I constructed a line transformer for the top to give me a 1:1 transformation at 200 ohms from the unbalanced top of the coax mast to the balanced 200 ohm feedpoint of the folded dipole. Again, "close enough for, etc." My coax mast is diagrammed in fig. 1.

Erecting the 30 foot long coax mast

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

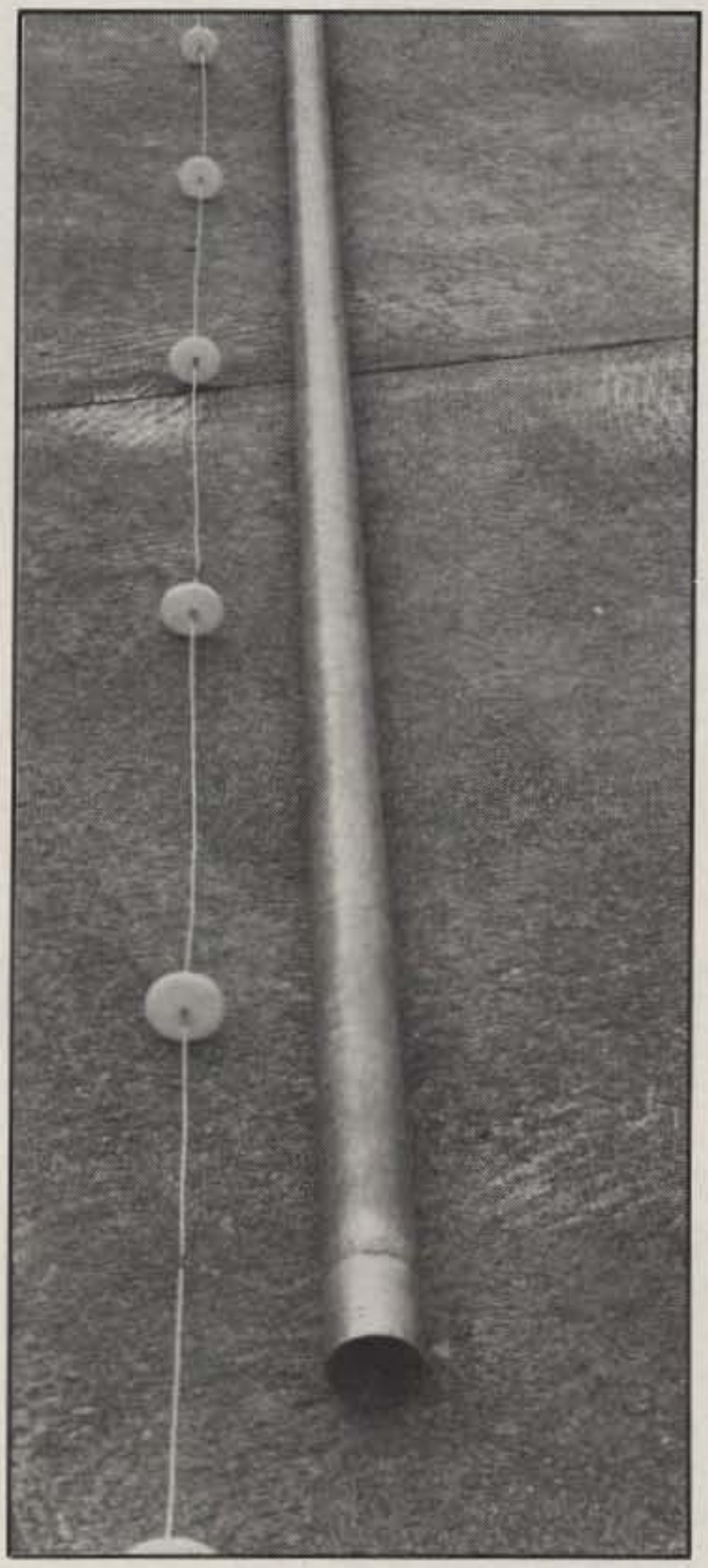

Photo 1– A portion of the 30 foot section of 3 inch irrigation tubing with the inner conductor consisting of No. 12 gauge insulated wire with polyethylene spacers ready to be pulled through the tubing.

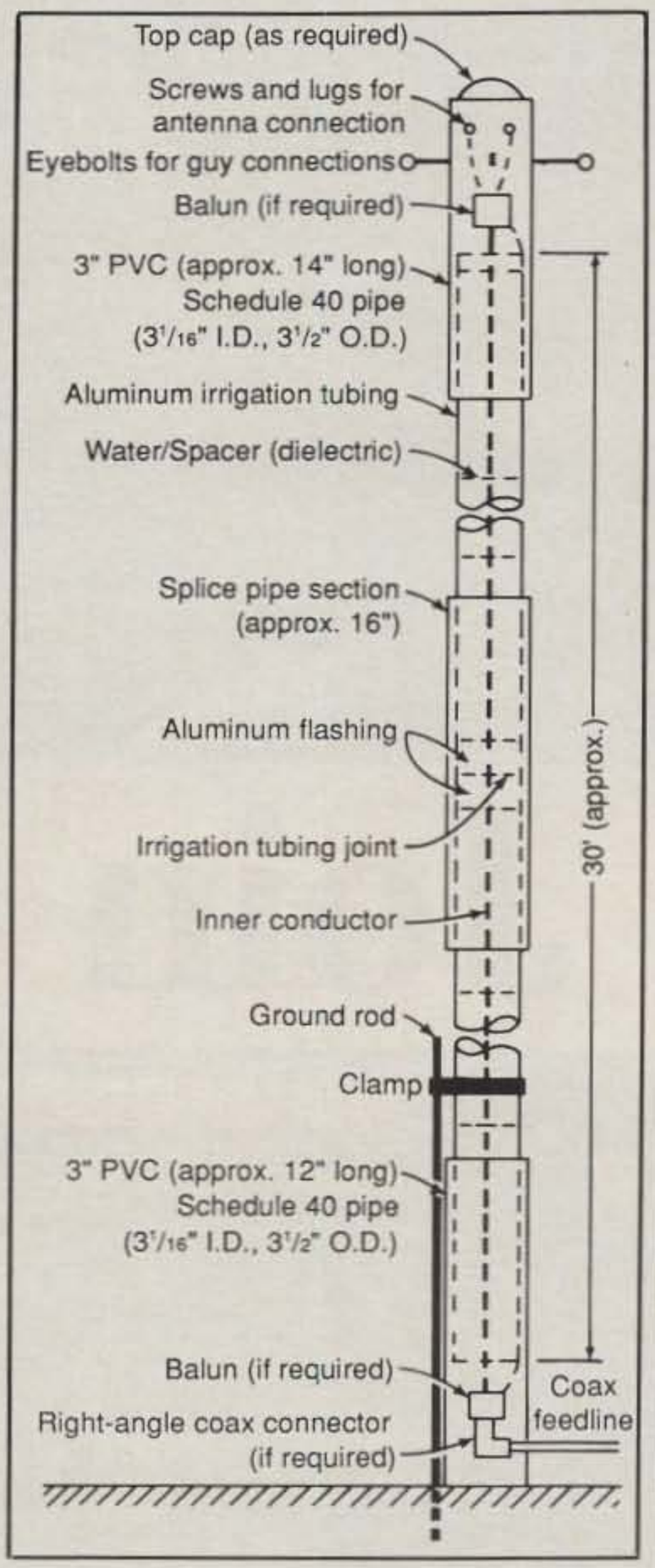

Fig. 1– Coax mast details.

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Multimode versatility. The FT-747GX is ready to go on LSB, USB, CW, and AM. With provision for the FM-747 FM unit—great for watching 10-meter repeaters.

You get 20 memories to store frequency and mode. Dual VFOs with split frequency operation for DX-pedition work. And manual band scan plus auto-resume memory scan via the microphone up/down buttons.

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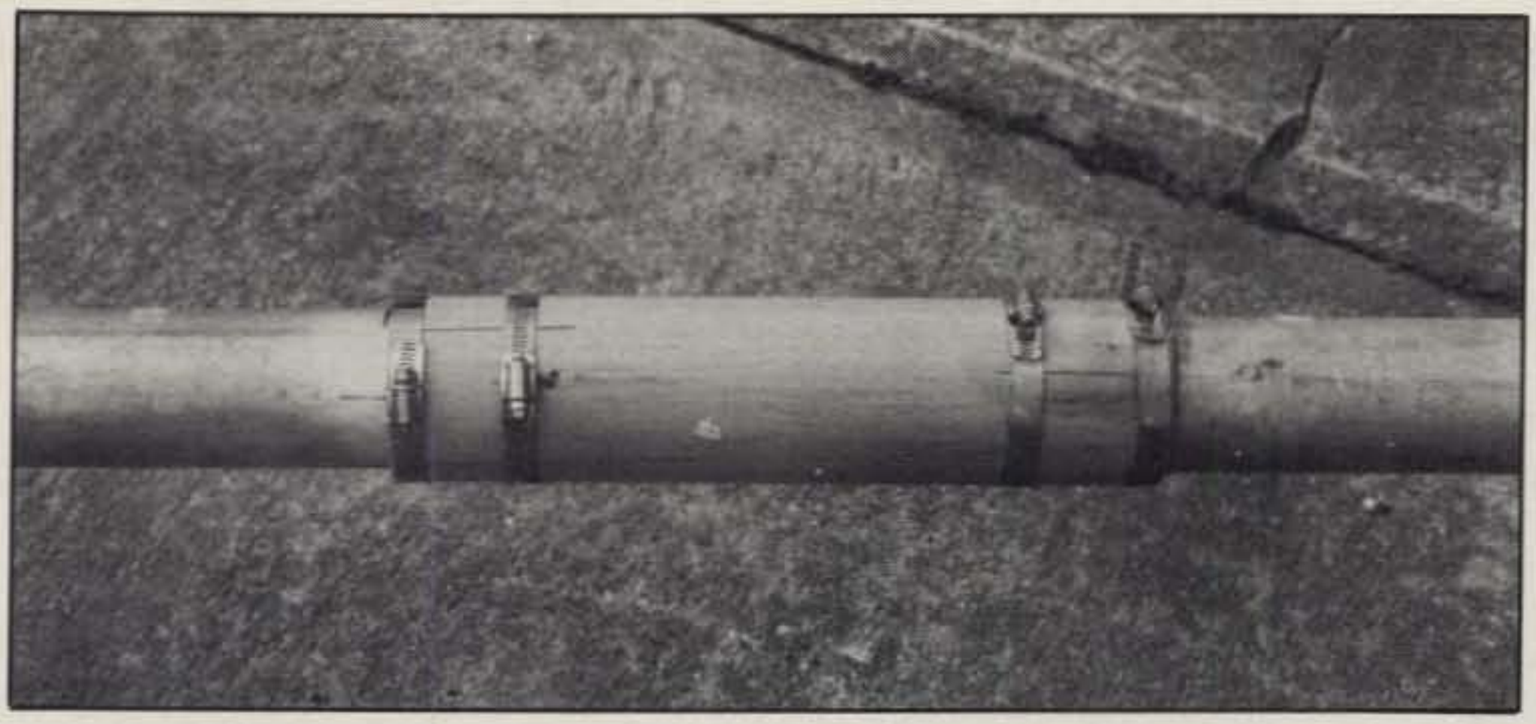


Photo 2– The method of splicing two sections of tubing together.

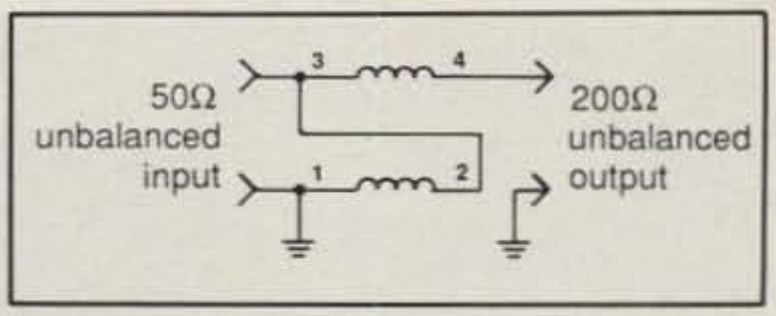


Fig. 2– Fifty-two ohm to 200 ohm unbalanced auto-transformer (bottom of mast). Eleven bifilar turns No. 14 enamel wire, close wound, on an Amidon R-61-050-400 rod. (Rod is 4 inches long, ½ inch in diameter with 125 permeability.) A standard 4:1 balun can be used, providing the windings are reconnected in the same configuration as shown in the diagram.

was almost a one-man task due to its light weight, but I had prepared some guy ropes and installed some stakes so that my wife could tie the guys at the stakes once I raised the coax mast to the vertical position. After the coax mast was secured, the ends of the folded dipole were raised and the antennna was checked out. The SWR was about 1.6 at the frequency to which the folded dipole was cut, but by lowering the dipole ends, to provide a slightly inverted-Vee configuration, the SWR went down to 1 at the operating frequency. The antenna performed superbly! However, this is not an article on antenna construction. These details have been provided only to tell you that the coax mast worked.

Now, let's get down to some details on fabricating your coax mast, and if some other unique uses for the coax mast haven't already occurred to you, I have some interesting suggestions later in the article. You don't necessarily have to construct a coax mast with a 214 ohm surge impedance! I just made use of what I had leftover from another project, but the surge impedance could have been made almost any value desired with material that is available almost everywhere.

Construction

First of all, let's talk about the aluminum irrigation tubing. Some time ago, when I first started to experiment with low-noise HF receiving antennas, I visited one of the local farm machinery and supply companies to see if they had any used irrigation tubing and what sizes were stocked. I found that they had abundant supplies of 5 inch and 3 inch tubing. I bought two 30 foot long sections of 3 inch tubing that were virtually free of any dents or other perturbations of the tubing at very little cost. The problem was getting it home, but the company that I bought it from delivered it for a nominal charge. If transportation is a problem, you could carry along a hacksaw and cut the 30 foot sections in half and lash them down to the top of your vehicle. Where there is a will there is a way. I had the 30 foot sections shipped because I wanted to construct a 60 foot mast with only one center splice. By the way, the aluminum tubing can be spliced easily both electrically and mechanically, but I will tell you more about that later. I have not gone higher than 60 feet, however.

The used irrigation tubing usually comes with couplings at each end, which can be cut off. Each of the two sections I bought had about a 3 foot piece of galvanized pipe fastened at one end upon which a rugged-duty "Rain-Bird" sprinkler was mounted. I still use those sprinklers for irrigating my lawn and garden!

For the purpose of this article we will assume that you want to make a 30 foot coax mast and that you had to cut the 30 foot length in half to get it home. This means that we will have to make a splice. Even if you don't have to splice, suggestions on how to splice might be of interest if you decide to make a 60 foot coax mast out of two 30s. Whatever! After removing the excess hardware from the irrigation tubing you should have two clean sections of tubing each approximately 15 feet long and of consistent inside diameter.

Before going any further, you must decide what impedance coax mast is required. That in turn is dependent upon what type of antenna the coax is going to feed, what the feedpoint impedance will be, and whether the feedpoint is bal-

Photo 3– Method of mounting the balun and transmission-line transformer at the bottom of the coax mast.

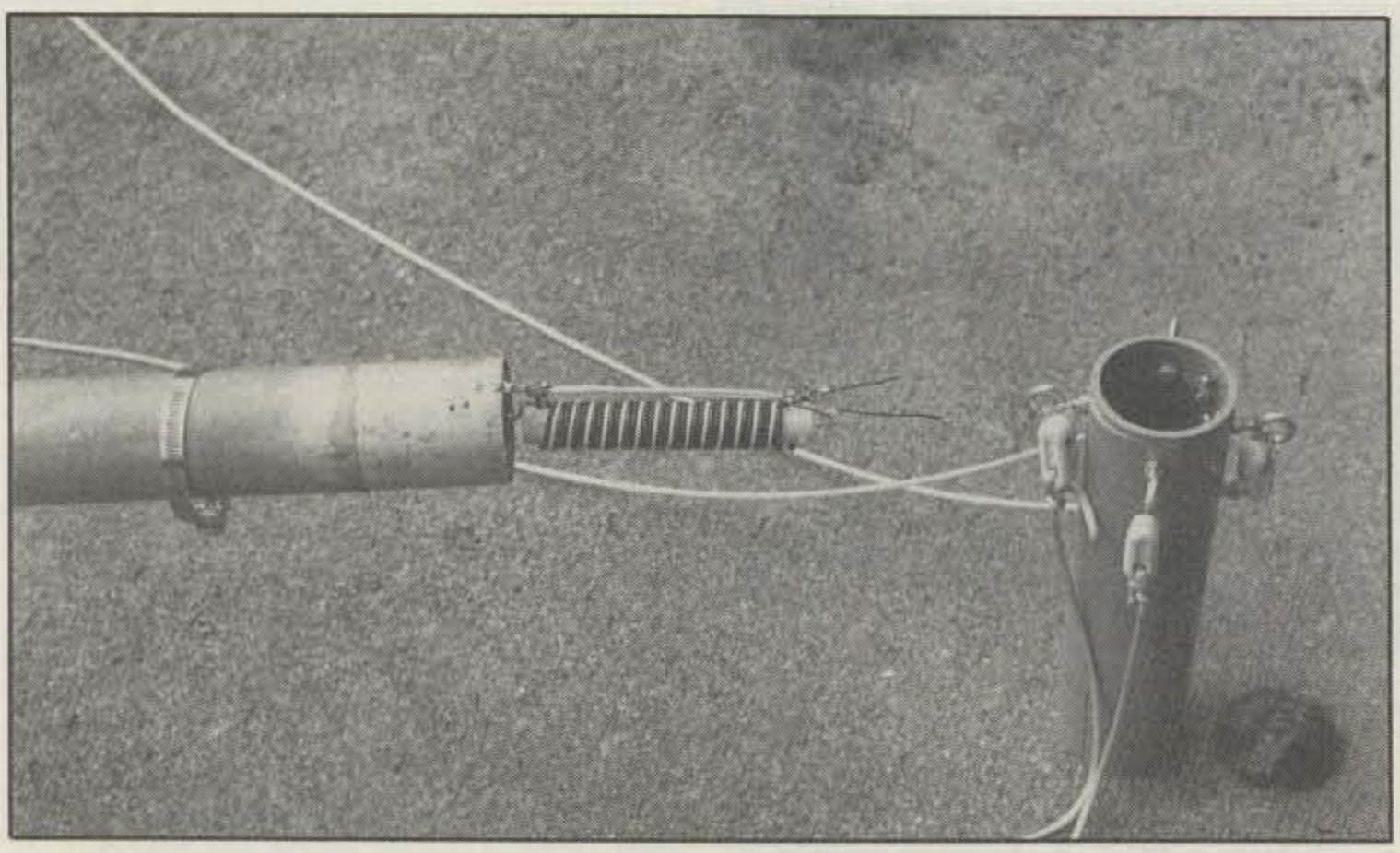


Photo 4– Mounting the balun and transmission-line transformer at the top of the coax mast.

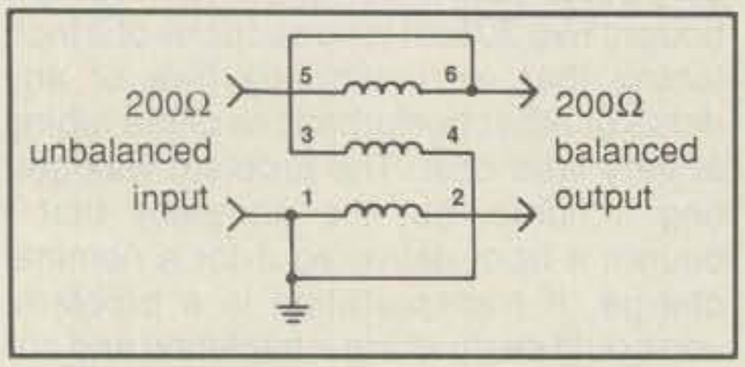


Fig. 3– Two-hundred ohm 1:1 balun (top of mast). Sixteen trifilar turns No. 12 insulated wire on ¾ inch PVC pipe form (⅞ inch O.D.) 7½ inches long. Wire type used was THHN/THWN and was close wound on the form. The insulation provides the necessary spacing between the conductors to obtain the 200 ohm (approximate) impedance.

anced or unbalanced. The point is, the surge impedance of the coax mast can be made almost anything that you desire. The basic formula for determining the surge impedance of a coax line using air as the dielectric is $Zo = 138 \log_{10} D1/D2$, where D1 is the inside diameter of the outer conductor and D2 is the outside diameter of the inner conductor. The various amateur handbooks contain information in chart form which, for example, shows that if the ratio of D1 to D2 is 2.38, then the coaxial line will have surge impedance of 52 ohms, 3.21 will produce a coax of 70 ohms surge inpedance, etc. If the line is filled with a dielectric other than air, then the characteristic impedance of the line will be reduced by a factor proportional to the dielectric constant of the material used as the dielectric within the line.

The homebrew coax mast uses dielectric wafers spaced every few feet to position the center conductor, which produces a very low loss line. I used ⅜ inch thick wafers of polyethylene that were sliced for me at a local plastics shop, but I see no reason why you could not make similar wafers of styrofoam using a tin can of suitable diameter as a "cookie cutter" to punch out the wafers. The dielectric support of the inner conductor within the tubing can be left to the ingenuity of the builder. Obviously, the spacers should be made of some sort of low-loss material.

Using 3 inch outside diameter irrigation tubing, which has an I.D. of 2⅞ inches, you could use 1⅛ inch O.D. tubing for the inner conductor, which would produce a coax mast with a surge impedance of 56 ohms. This coax mast could be fed with 52 ohm coax at the bottom without the need for a balun or line transformer. A 1:1 or 4:1 balun at the top of the coax mast would provide a transition to 52 ohms or 200 ohms balanced, respectively. The impedance possibilities are many. Not only are you getting a mast to support one end or the center of your antenna, but consider the power-handling capability of such a rigid coax mast!

A Pictorial Explanation

Photo No. 1. This photo shows a portion of my 30 foot section of 3 inch irrigation tubing with the inner conductor consisting of No. 12 gauge insulated wire with polyethylene spacers ready to be pulled through the tubing. A pulling wire, electrician's fish-tape, or plumber's snake can be used to pull the inner conductor in through the tubing. Just make sure that the dielectric wafer/spacers are small enough in diameter to be pulled easily through the tubing. They do not have to be a snug fit!

Photo No. 2. The method of splicing two sections of tubing together is shown in this photo. I used a section of 3 inch PVC, Schedule 40, Rigid Conduit about 16 inches long. The PVC splicing section has four equally spaced, 4 inch long slits at each end and is slid onto one of the tubes prior to assembly. The two sections of tubing are butted together, and a 6 inch wide piece of aluminum flashing is centered at the joint and wrapped around the tubes so as to make one thickness turn. The ends of the tubing should be cleaned with fine steel wool before applying the flashing wrap to ensure a good electrical joint. Pipe clamps can be used to temporarily secure the aluminum flashing while the PVC pipe is slid along the tubing to cover the joint and centered across the joint. When the PVC pipe is positioned,

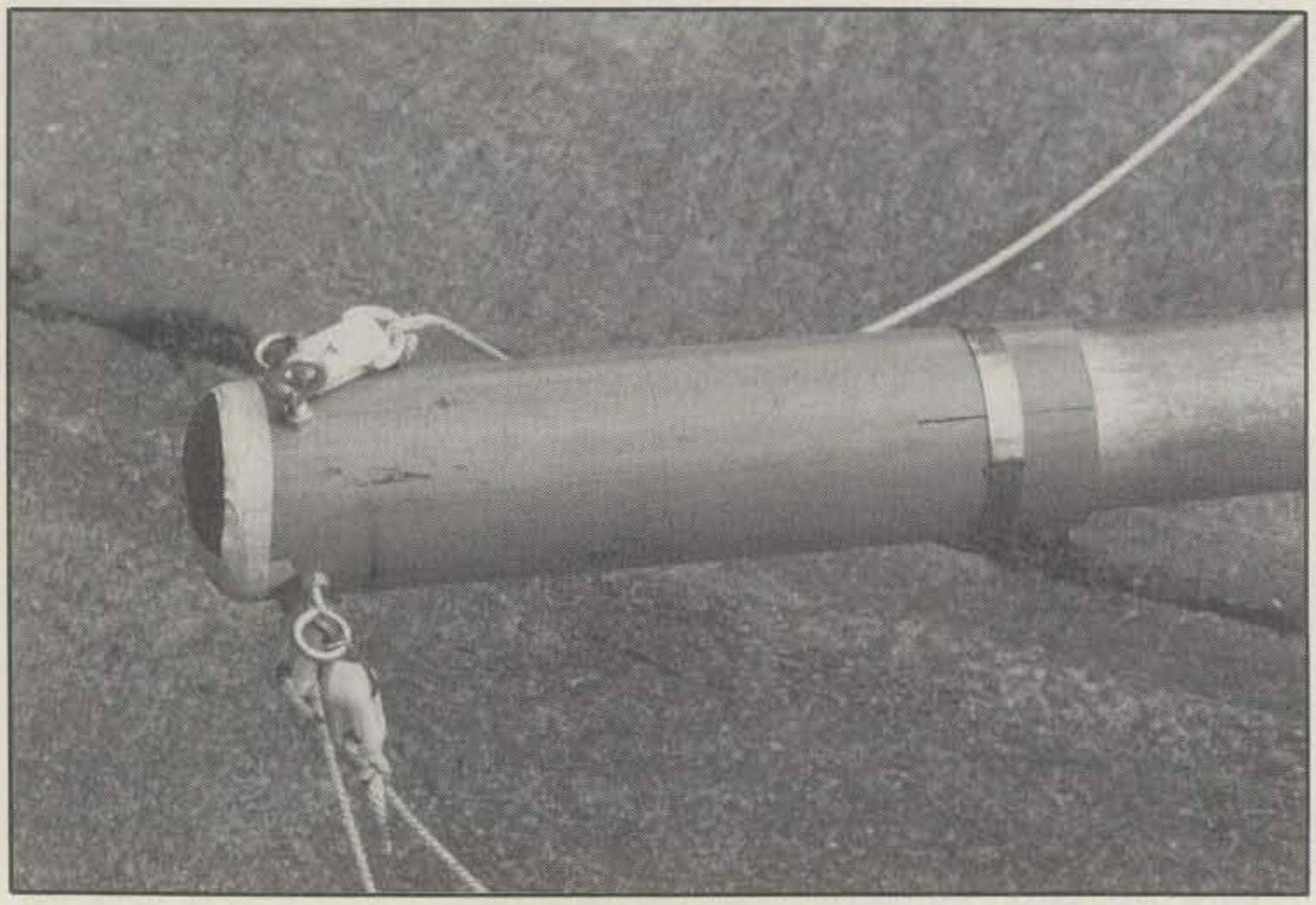


Photo 5– Upper protective pipe with a cap to keep out the elements and birds.

Photo 6– The completed mast with the guy ropes connected, is now ready to go.

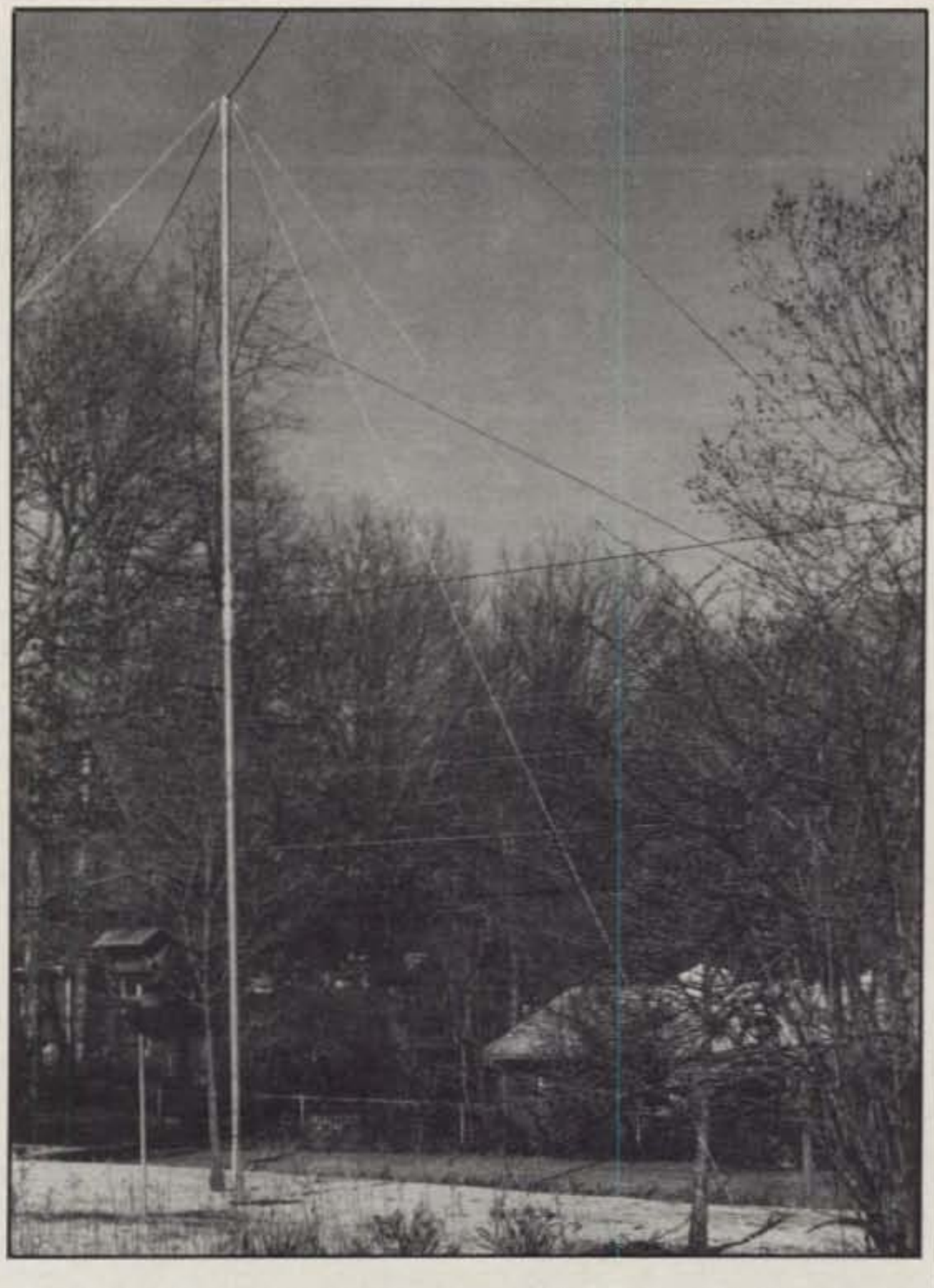


Photo 7– The erected coax mast, with guys and ladder line of the folded dipole shown in the upper left corner.

four pipe clamps are installed as shown, securing the pipe to the tubing and making a very mechanically secure, non-slip joint. The aluminum flashing, which fits snugly under the PVC pipe, maintains the electrical integrity at the joint. Silicone sealer can be used over the slits and at each end of the PVC pipe where it meets the irrigation tubing to keep moisture out.

Photos No. 3, 4, and 5. My method of mounting the balun and transmission-line transformer at the bottom and top ends of the coax mast are shown in photos 3 and 4, respectively. The balun is described in fig. 2; the matching transformer is shown in fig. 3. The protective covers made of PVC pipe are also shown. The one used at the top of the mast has four eye bolts mounted equidistant around the pipe for guying. Two screws with lugs on the inside and outside are run through the PVC pipe for connection between the transformer located inside the pipe and the outside world. The feedpoint of the antenna is connected to the lugs on the outside. The upper protective pipe is adorned with a cap, as shown in photo 5, to keep out the elements and birds that might find the top of the coax mast an attractive nesting area! Both the bottom and top protective pipes are slit and clamped with a single pipe clamp.

Photo No. 6. This photo shows my completed mast with guy ropes connected, ready to be erected.

Photo No. 7. The erected coax mast, with guys and the ladder line of the folded dipole just barely visible in the upper left corner, is shown here. As can be seen, I have no shortage of trees on which to hang antennas, but the center of my antenna was positioned where there was no tree or other support available in the middle of the yard. The coax mast was a natural in this situation, especially since the antenna became an inverted Vee.

Suggestions

As I mentioned previously, a coax mast or rigid coaxial transmission line fabricated in the manner described could provide you with a fairly inexpensive antenna support which would also serve as a transmission line capable of handling high power with relatively low loss. You could use the coax mast as the support for one end of a delta loop fed at one of the upper corners. It could be quickly assembled at site and used for portable or field-day operation, especially in areas devoid of trees or other supports for antennas. When using the coax mast for inverted Vees, the antenna wire elements rather than rope could be used as guys.

How about a disguised feedline in the form of a copper or aluminum downspout? No one ever said that a coaxial line had to be round. It would be interesting to run an inner conductor down the center of a rectangular downspout to see what the surge impedance might be! It would be interesting to build one about 45 feet high with an impedance of 50 ohms upon which an omnidirectional 2 meter antenna or a small rotator and a 2 meter beam are installed. I would think that this coax mast, being guyed properly, could support the weight of the antenna system and rotator. If you are careful in fabricating a rigid coaxial line, as described in this article, it should be possible to use it at UHF if you don't introduce impedance bumps due to significant mechanical variations such as dents and poorly constructed joints.

One last thing. Grounding! In my installation I drove two ground rods into the ground on each side of the coax mast and clamped them to the side of the irrigation tuibing near the bottom for safety. This also provides anchoring for the base of the coax mast.

I'll bet that someone reading this article right now has figured out a unique way to use a coax mast! Good luck! CQ

CQ REVIEWS:

The Telex/Hy-Gain TH2MK3-S

A 2-Element, 10/15/20 Meter Trap Beam

BY JOHN J. SCHULTZ*, W4FA/SV0DX

The TH-2 might be said to be the smallest brother of Hy-Gain's top-of-the-line TH7DXX antenna. In a sense, the comparison is valid. Both antennas are tribanders (10/15/20 meters), and the maximum element length for both antennas is roughly the same, but the boom length for the 2-element TH-2 is only 6 feet while the boom length for the 7-element TH-7 is 24 feet. Both antennas provide gain and directivity on 10, 15, and 20 meters, but in significantly different degrees. I would suggest that the following comparison, which is based upon actual operating results, might best illustrate the situation.

Assuming all other factors, such as transmitter power and antenna height, to be equal, you can be among the first to work DX or break through pileups using the TH-7 compared to stations using smaller "large size" beams. Using the TH-2 you will achieve similar results compared to stations using almost any form of simple wire antenna (e.g., a dipole), a multiband trap antenna, or a miniature beam. In fact, the results possible can equal or exceed those achieved using many compact three-element triband beams which have extremely close element spacings and extremely narrow SWR bandwidths.

I guess that the best introductory idea I can provide, before describing the TH-2 in detail, is that if you want to "move up" from some form of simpler antenna to the advantages of having a basic but full-size triband-beam antenna, the TH-2 might well be the ideal choice.

General

Table I lists the electrical and mechanical specifications for the TH-2. On the electrical side, the specifications are what one would expect from a 2-element Yagi-type antenna—some very useful forward gain and 15–20 dB of directivity. However, what the specifications do not indicate is the frequency range on each band over which the gain and directivity figures are maintained. In fact, the range is reasonably broad, and this is one of the factors which separates an antenna like the TH2 from miniature designs.

On the mechanical side, you can gather an impression of the size of the antenna from the boom length, element length, and turning radius figures. It can't be passed off as a large-size TV antenna, but neither will its dimensions look overpowering compared to those of an average house roof. It is interesting to note that although the boom length is only 6 feet, a hefty 2 inch diameter boom is used. Also, stainless-steel hardware is standard. The mechanical specifications of the TH2 are such that it would appear to be usable with very inexpensive rotators (rotators claiming a 5 square foot wind load capacity can be found for $50). However, I would stay away from coupling an antenna like the TH2 with an inexpensive rotator. You'll just end up throwing away such rotators. A quality rotator such as the CD45 is the minimum I would suggest.

Fig. 1 gives an overview of the dimensions and design of the TH2. The diagram is a bit "busy" with all sorts of dimensions since it is meant to be used during assembly of the antenna. Nonetheless, it illustrates the basic design of the antenna with a driven and reflector element, each having four traps. The spacing between the elements is fixed for all bands. This means that although the antenna will exhibit a unidirectional pattern with gain on all bands, there will be some variations from band to band with regard to bandwidth, and front-to-back and front-to-side directivity ratios. That is the nature of any triband beam of this type.

The transmission line coupling or matching system used with the TH2 is Hy-Gain's Beta Match as shown in fig. 2. Both sides of the driven element are actually insulated from the boom and the inner conductor of the coaxial transmis-

Electrical	
Forward gain	5.5 dBi
Front-to-back ratio	15-20 dB
Maximum power input	maximum legal
VSWR (at resonance)	less than 1.5:1
Frequency range	10, 15, and 20 meters
Lightning protection	DC ground
Nominal impedance	50 ohms
Mechanical	
Boom length	72 in. (1.87 m)
Boom diameter	2 in. (5.1 cm)
Longest element	27.3 ft. (8.32 m) (approximately)
Accepts mast	1¼"–2½" O.D. (32 mm–64 mm)
Maximum wind	80 mph (129 kmph)
Wind surface area	3.25 sq. ft. (3019.3 cm²)
Wind load (80 mph)	83.0 lbs. (37.6 kg)
Turning radius	14.3 ft. (4.35 m)
Net weight	20 lbs. (9.1 kg)
Element compression clamps	passivated stainless steel)
Hardware	stainless steel (except for 7 long boom-to-mast bolts)
Suitable rotators	Hy-Gain AR-22XL, AR-40, or CD45-II

Table I– Specifications of the TH2MK3-S.

*c/o CQ magazine

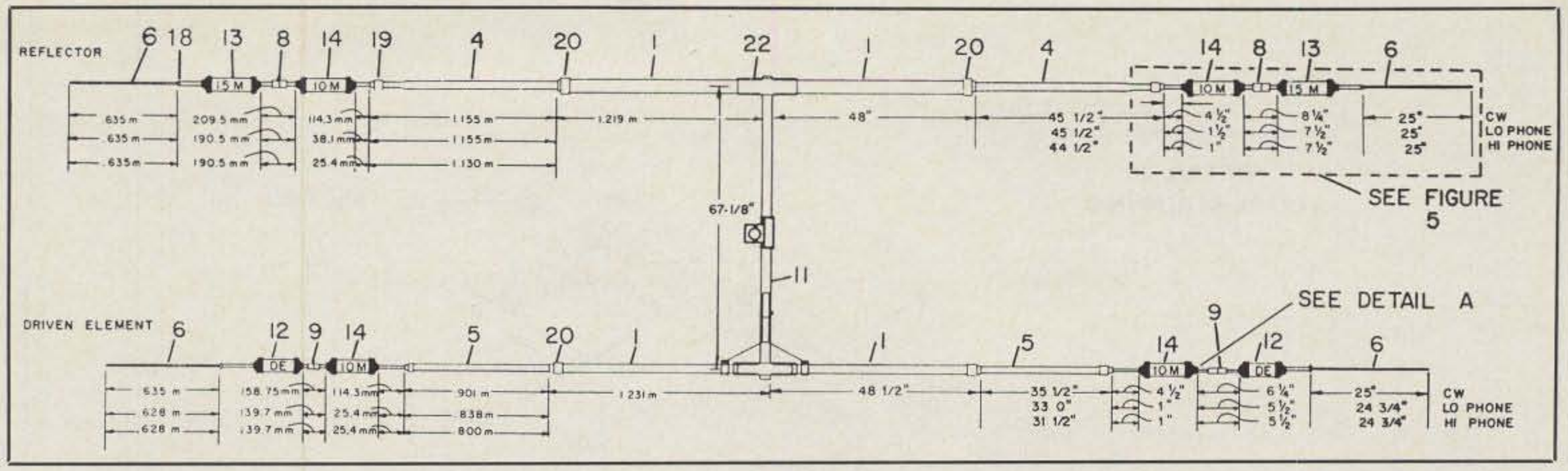
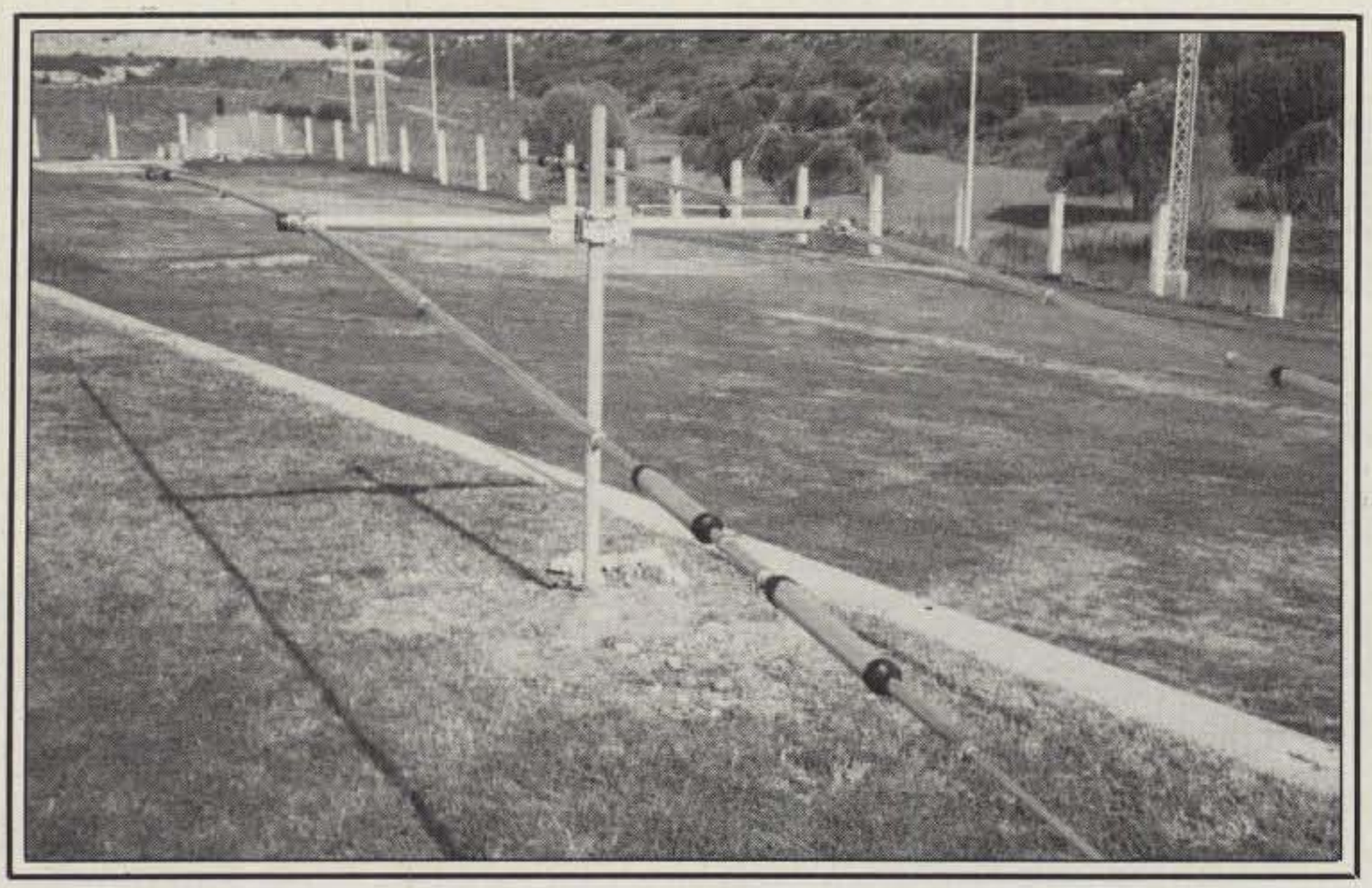


Fig. 1– Detailed dimensions for the TH2 (one side is in metric units and the other side is in English units). All the numbers above the parts refer to a parts list which is not shown.

sion line directly connected to one side and the cable shield directly connected to the other side. The ingenious part of the arrangement is the hairpin loop (**7** in fig. 2), the ends of which are connected to either side of the driven element and the middle of which is grounded to the boom. This arrangement places the driven element at DC ground, but simultaneously provides a compensating reactance across the driven-element terminals to maximize the SWR bandwidth. The loop may look small in fig. 2, but in reality it is a ⅛" × 63¼" circumference aluminum rod. No balun is used with the TH2, but Hy-Gain does recommend forming an RF choke with the transmission line (12 turns, 6 inch diameter) and taping it to the boom and mast at the boom-to-mast junction. A 50 ohm 1:1 balun can be used directly at the feedpoint connection point, in which case the transmission line RF choke is not necessary. However, as Hy-Gain cautions, a true 50 ohm balun should be used and not a 50/75 ohm compromise type (Hy-Gain will sell you their BN-86). Another approach if you are not going to run maximum power and are using small-diameter coaxial cable is to wind about 6 turns of the cable around a 2 inch ferrite core to form an RF choke.

CW or Phone

Before assembling the TH2 you do have to make a choice as to whether it should be dimensioned for the CW or phone portions of 10/15/20 meters. The choices possible are shown by the SWR curves in fig. 3. You cannot mix your choices by, for instance, having the antenna dimensioned for the CW band portion on 20 meters and the phone band portion on 15 meters. The same band portion must be chosen on all three bands. This doesn't mean that the antenna cannot be used, albeit with reduced performance, on band portions other than that for which it has been dimensioned. However, the high SWR on the other band portions may mean an antenna tuner is necessary if a solid-state transceiver is to deliver its full output power.



Although much of the TH2 can be assembled indoors, either the complete or just final assembly can be done using a pipe section temporarily driven into the ground and extending about 5 feet.

Assembly

The TH2 consists of some 30 to 40 basic parts if you don't count every single bolt, nut, and lockwasher. It comes in just one shipping container. I would describe the number of parts associated with the TH2 and the assembly required as being very manageable even for a newcomer who has never assembled any form of semi-kit antenna.

The instruction manual that comes with the antenna is extremely well done. There are plenty of illustrations, and they are very clearly presented (figs. 1 and 2 are examples). The text guides you easily from illustration to illustration and through the assembly process. Hy-Gain does recommend that you read through the manual several times before starting assembly, and I think this is an excellent idea. It's not that assembly is difficult at all; it's just so much easier to do the assembly once you have the overall "picture" in mind. Hy-Gain does state that all assembled dimensions should be within ⅛ inch. That may surprise some newcomers, and the advice may not be taken seriously. That would be a mistake. Multiband beams are very interreactive devices. If you become careless with the dimensions, the performance of the antenna can be affected on several bands. It's not that the antenna won't work at all, but the gain, SWR bandwidth, or directivity might not be the optimum values of which the antenna is capable.

I assembled the TH2 using an 8 foot pipe section driven into the ground as a temporary mast. You can easily assem-

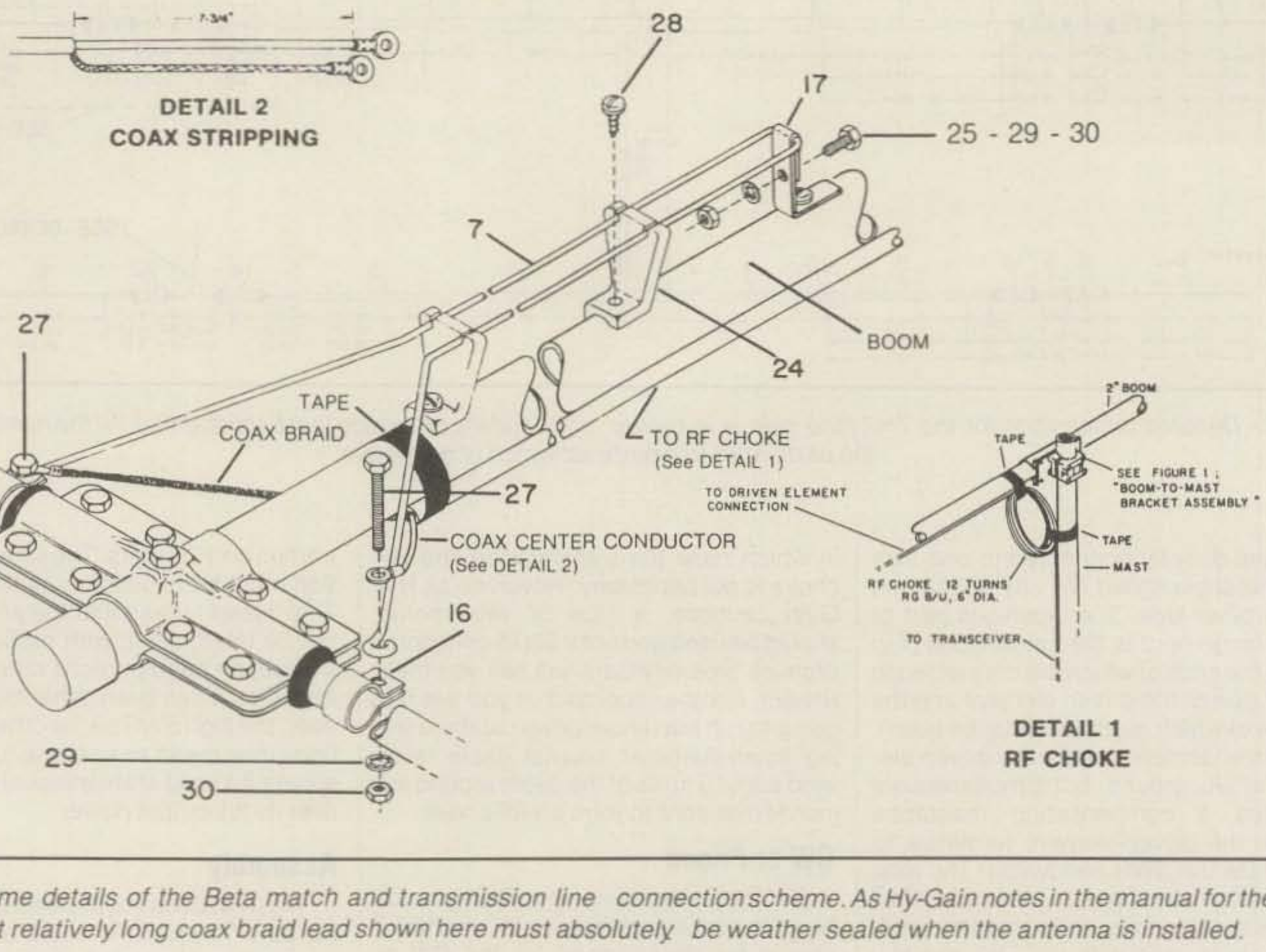
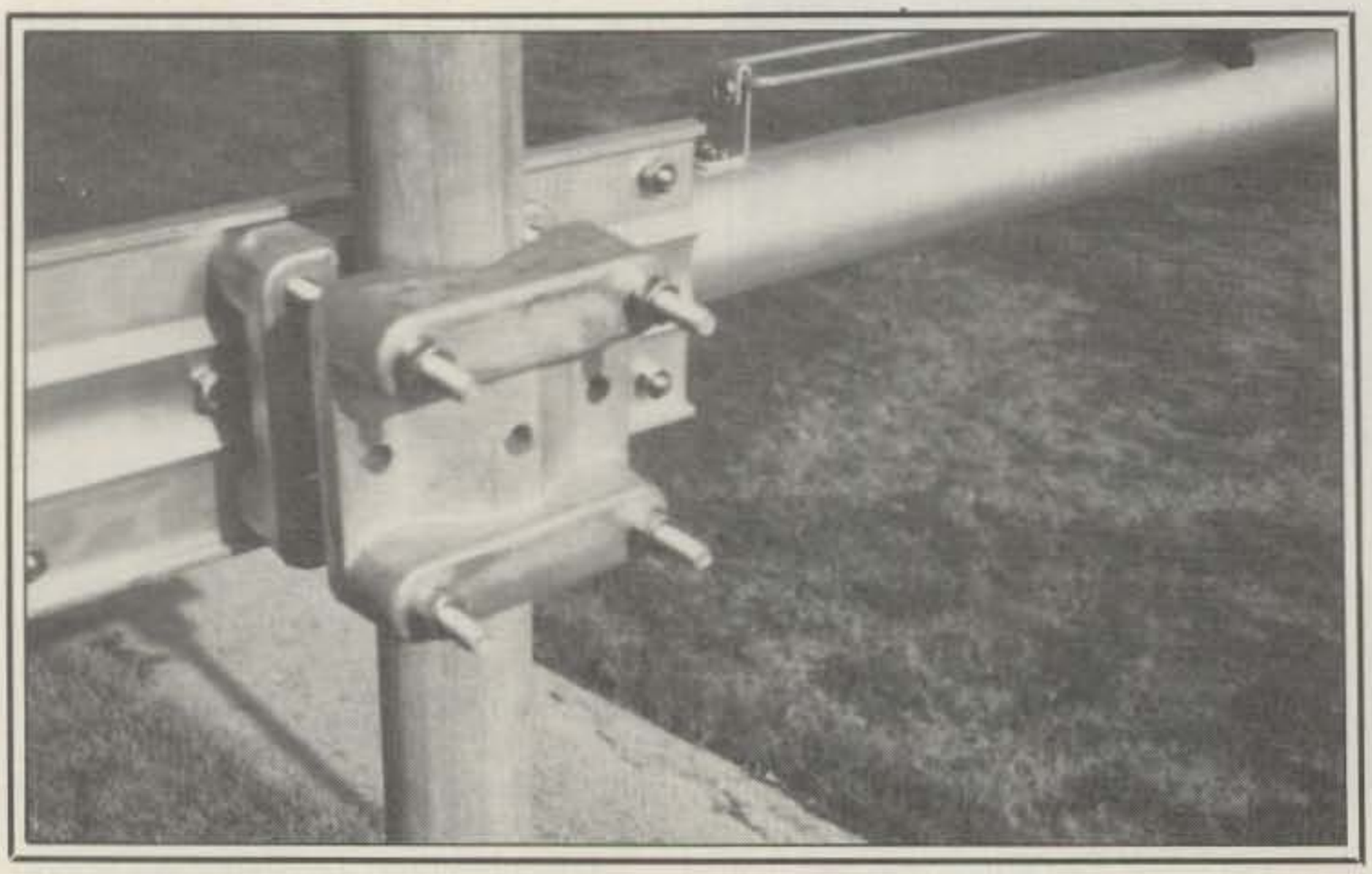


Fig. 2– Some details of the Beta match and transmission line connection scheme. As Hy-Gain notes in the manual for the TH2, that relatively long coax braid lead shown here must absolutely be weather sealed when the antenna is installed.

ble the antenna in one afternoon, but I stretched it out over a total of about 6 hours on 2 days because of various distractions. Only common hand tools were needed—an adjustable wrench, some nut drivers, pliers, and a long (12 foot) tape measure. Besides the diagrams in the instruction manual, a separate large-size diagram (similar to fig. 1) is supplied which you can use as a carry-around diagram or even mark up as a sort of checklist as the assembly steps are completed and as you double-check each dimension. If the weather is not too agreeable outside, at least 70% to 80% of the assembly of the TH2 can be done indoors in a garage space or even in a cellar area. The instruction manual doesn't highlight this sort of option, but if you read the manual a few times, it becomes quite clear that you can assembled the boom, Beta Match, and boom-to-element holders as one assembly. You can also preassemble the four element sections and telescope them together as much as possible. Bringing everything outdoors, you then only have to attach the element sections to the boom, adjust all dimensions, and tighten up the hardware.

As I keep repeating, assembly of the TH2 is not difficult. However, it pays to do it slowly and double-check *everything* rather than later on having to haul it up and down from a tower to correct what should have been an obvious mistake. Also, if the TH2 beam is the first beam you assemble, be careful to use the hardware that is specified. When the instructions call for hex nuts, that is what is needed and not square nuts which are used in other steps. And, although assembly is fun, be prepared to get your hands dirty. Aluminum tubing is a bit messy to handle.



The massive cast-aluminum mast-to-boom securing clamps. The TH2 is a relatively small antenna, but the hardware is quite impressive.

Hardware

The materials used for the construction of the TH2 are both of excellent quality and very sturdy. The clamps and other hardware are all of stainless steel. With just periodic inspection and cleaning, the

HF Equipment	Regular	SALE
IC-781 Xcvr/Rcvr/ps/tuner/scope ...	5995.00	

IC-761 Xcvr/Rcvr/ps/tuner	2699.00	**2369**
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SP-20 Ext. speaker w/audio filter ..	149.00	**139.95**
FL-101 250 Hz 1st IF CW filter	73.50	
FL-53A 250 Hz 2nd IF CW filter	115.00	**109.95**
FL-102 6 kHz AM filter	59.00	
EX-310 Voice synthesizer.....	59.00	

IC-751A 9-band xcvr/.1-30 MHz rcvr	1699.00	**1449**
PS-35 Internal power supply	219.00	**199.95**
FL-32A 500 Hz CW filter (1st IF)....	69.00	
FL-63A 250 Hz CW filter (1st IF)....	59.00	
FL-52A 500 Hz CW filter (2nd IF)...	115.00	**109.95**
FL-53A 250 Hz CW filter (2nd IF)...	115.00	**109.95**
FL-33 AM filter.....	49.00	
FL-70 2.8 kHz wide SSB filter	59.00	
RC-10 External frequency controller	49.00	

IC-735 HF transceiver/SW rcvr/mic	1099.00	**959.95**
PS-55 External power supply.....	219.00	**199.95**
AT-150 Automatic antenna tuner ...	445.00	**389.95**
FL-32A 500 Hz CW filter	69.00	
EX-243 Electronic keyer unit	64.50	
UT-30 Tone encoder	18.50	

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SP-3 External speaker	65.00	
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SM-8 Desk mic - two cables, Scan.....	89.00	
SM-10 Compressor/graph EQ, 8 pin mic	149.00	**139.95**
AT-100 100W 8-band auto. antenna tuner	445.00	**389.95**
AT-500 500W 9-band auto. antenna tuner	589.00	**519.95**
AH-2 8-band tuner w/mount & whip	659.00	**589.95**
AH-2A Antenna tuner system, only....	519.00	**449.95**
GC-5 World clock.....	91.95	**89.95**

VHF/UHF base multi-modes	Regular	SALE
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IC-475A 25W 440 FM/SSB/CW w/ps	1399.00	**1249**
IC-475H 75W 440 FM/SSB/CW.....	1599.00	**1429**
IC-575A 25W 6/10m xcvr w/ps	1399.00	**1249**

IC-471H 75W 430-450 ..... **Closeout**	1399.00	**989.95**
PS-35 Internal power supply	219.00	**199.95**
AG-35 Mast mounted preamp	99.95	
AG-35 (Purchased with IC-471H)	99.95	**9.95**
SM-6 Desk microphone	47.95	
EX-310 Voice synthesizer	59.00	
TS-32 CommSpec encode/decoder....	59.95	
UT-15 Encoder/decoder interface...	34.00	
UT-15S UT-15S w/TS-32 installed.....	96.00	

VHF/UHF/1.2 GHz Mobiles	Regular	SALE
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IC-27A 25w 2m FM/TTP mic **Closeout**	429.00	**349.95**
IC-37A 25w 220 FM/TTP mic **Closeout**	499.00	**399.95**
IC-47A 25w 440 FM/TTP mic **Closeout**	549.00	**469.95**
PS-45 Compact 8A power supply ...	145.00	**134.95**
UT-16/EX-388 Voice synthesizer ...	34.99	
SP-10 Slim-line external speaker ...	35.99	
IC-28A 25W 2m FM, regular mic.....	429.00	**349.95**
IC-28A 25W 2m FM, **TTP** mic	469.00	**409.95**
IC-28H 45W 2m FM, **TTP** mic	499.00	**439.95**
IC-38A 25W 220 FM, regular mic	459.00	**369.95**
IC-38A 25W 220 FM, **TTP** mic	489.00	**429.95**
IC-48A 25W 440-450 FM, regular mic	459.00	**369.95**
IC-48A 25W 440-450 FM, **TTP** mic....	509.00	**449.95**
HM-14 Extra TTP microphone	59.00	
UT-28 Digital code squelch.....	39.50	
UT-29 Tone squelch decoder	46.00	
HM-16 Speaker/microphone	34.00	
IC-228A 25W 2m FM/TTP scan mic...	509.00	**449.95**
IC-228H 45W 2m FM/TTP scan mic...	539.00	**479.95**
UT-40 Pocket beep function.....	45.00	
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UX-129A 1.2GHz 10W band unit ...	549.00	**499.95**
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AH-32 2m/440 Dual Band antenna ...	39.00	
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Larsen PO-K Roof mount.....	20.00	
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IC-03AT for 220 MHz	449.00	**389.95**
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MB-12 Mobile mount	25.99	
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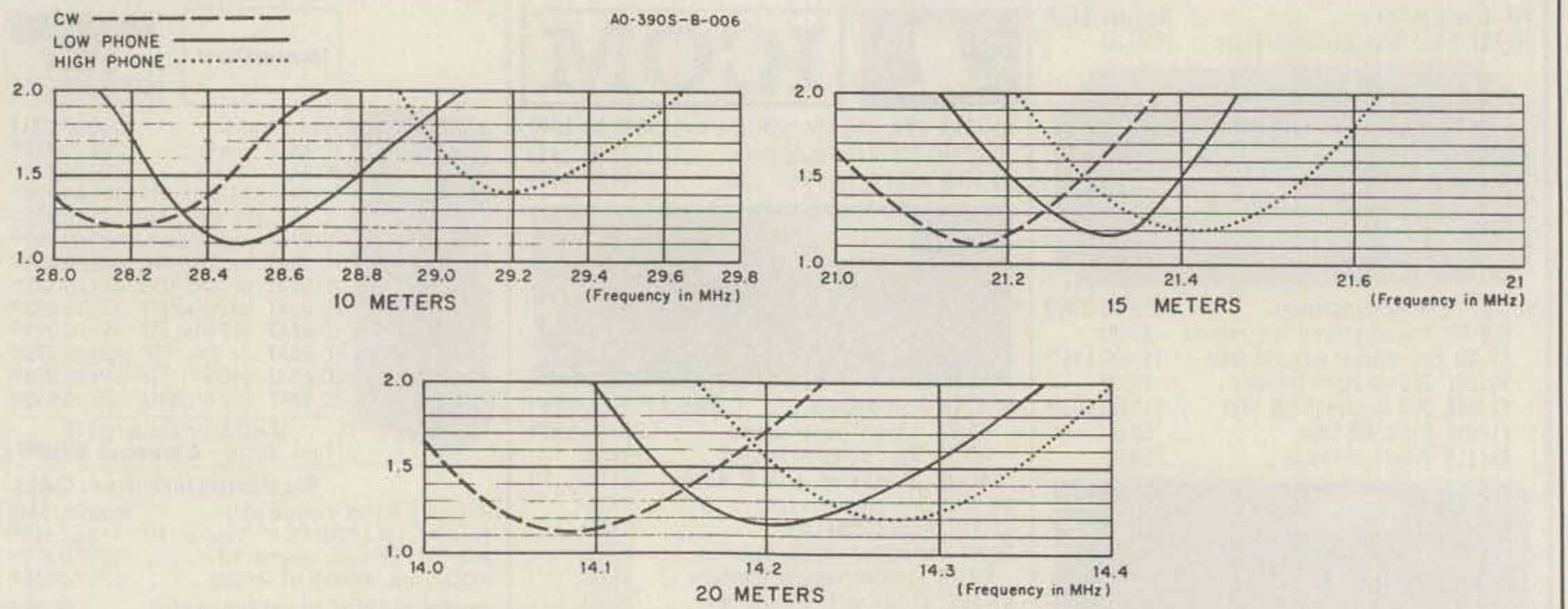


Fig. 3– Typical SWR curves for a TH2 elevated 30 to 100 feet over flat ground. The actual SWR curves obtained were identical for all practical purposes.

antenna structure should last for many years even in very harsh environments.

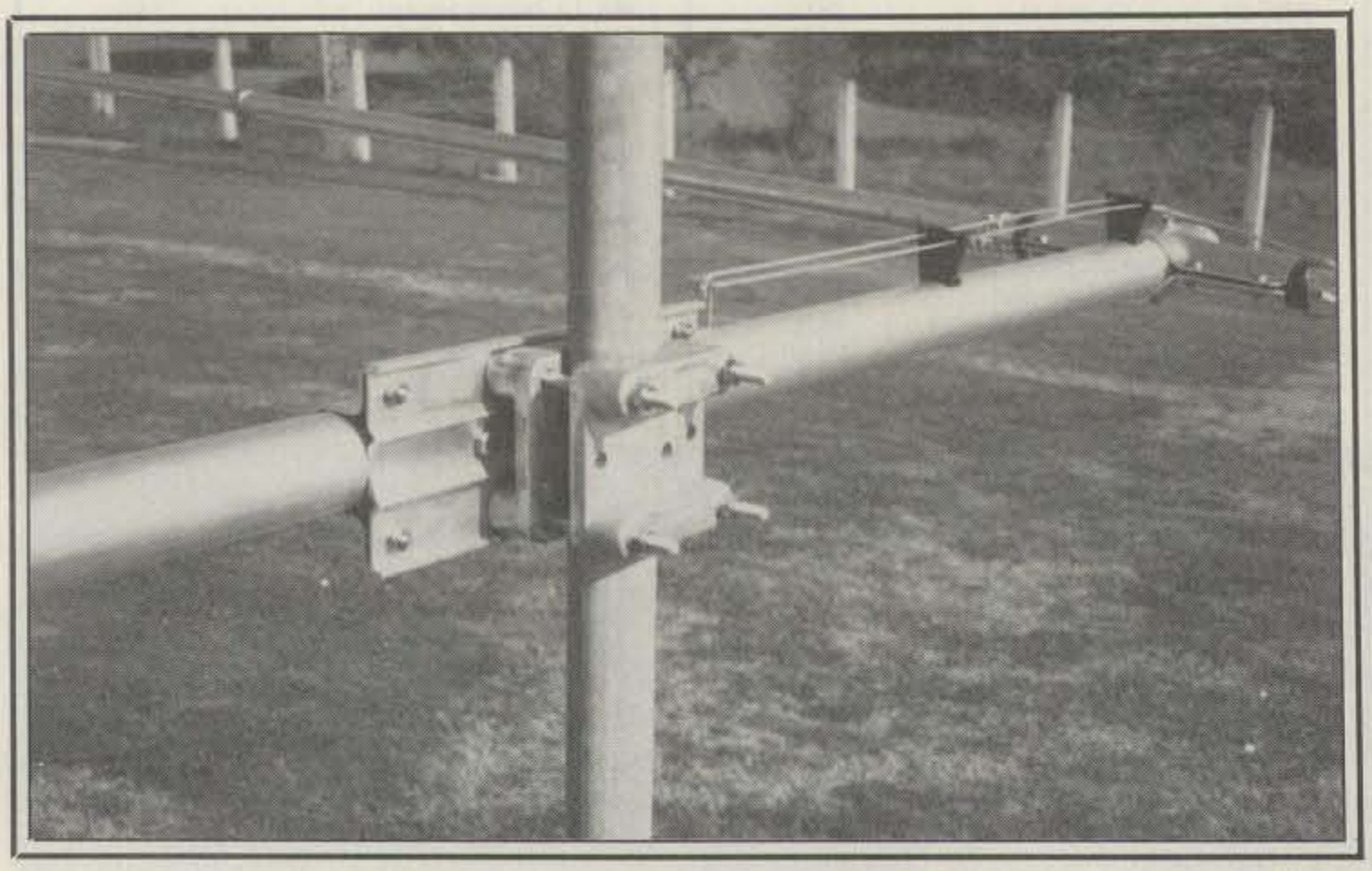
The TH2 has the same type of element-to-boom mounting system as on the most expensive of Hy-Gain's beams. A clamp assembly secures each individual half of each element to the boom. The assembly uses separate securing hardware for attachment to the boom and for attachment of the element halves. Besides being a very sturdy method of construction, it greatly facilitates repair/replacement should one side of an element become damaged for any reason.

The boom-to-mast assembly consists of two very heavy-duty cast aluminum brackets and various $\frac{5}{16}$ inch bolts. It's the same type of assembly Hy-Gain uses on their largest and heaviest antenna arrays. If assembled properly, you can be certain that the TH2 will never come loose from its mast.

Tests

The TH2 was mounted on a 60 foot tower which was in a relatively clear, flat area similar to that of a suburban housing area without any significantly high trees. The antenna was dimensioned for the phone portion of each band (solid line curves shown in fig. 3). Given some very minor variations, such as the 10 meter curve being a bit broader than that shown in fig. 3, the SWR curves that were obtained almost exactly duplicated those shown in fig. 3.

Comparisons were made with some other antennas and with other amateurs having rotary beams to get at least some feel for the gain and directivity performance of the TH2. My estimate is that the electrical specifications shown in Table I are absolutely correct and may even be slightly exceeded when the TH2 is operated within the band portion for which it is dimensioned.



The driven element, which is insulated from the boom, is in the background. The wire hairpin loop attached to it is the Beta match.

Operating Results

Actual operating results paralleled the observations made at the start of this article. If you're used to using a TH7, you'll quickly get the message that you'll have to work harder to get DX using the TH2. But, you will get the DX! And far ahead of stations with lesser antenna systems. Using the TH2 with a 100 watt output class transceiver a good variety of DX around the world was worked, and a Stateside sked on 15 meters was maintained even during marginal propagation periods.

Summary

By its very nature a triband, trap beam has to be something of a compromise. The TH2 would appear to have optimized as much performance as you can get out of a two-element, relatively closely spaced beam design. The antenna is undoubtedly rugged. Its ability to survive might well be worth a dB or two of gain as compared to some wire-type beam designs which fall apart during high winds or under conditions such as heavy ice loading. Personally, I'm a bit spoiled after having used larger beams. However, if space, money, aesthetics, environmental conditions, or whatnot made a two-element beam the best antenna to use, I wouldn't hesitate to choose the TH2. It is reasonably unobtrusive in appearance, yet will give a station that operating edge which can only be provided by a basic beam antenna. CQ

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Winning over a zoning board to allow you to erect a tower taller than the zoning rules allow is not a matter of waving PRB-1 in their faces. It takes time, professional legal assistance, and money, as is attested to in this article.

The Truth About PRB-1 And Support Antenna Structures

BY ROBERT B. CHERRY*, K2HBX, ATTORNEY AT LAW

The Amateur Radio Service in the United States operates under detailed rules and regulations[1] of the Federal Communications Commission enacted pursuant to Article 41 of the Radio Regulations of the International Telecommunications Union (Geneva 1979), to which the United States is a signatory, and the Communications Act of 1934, as amended, 47 U.S.C. Section 151, *et seq.* (1982). By early 1986, there were over 420,000 United States amateur radio operators licensed by the FCC.

An amateur station is, by definition, a radio station operated by a duly authorized person interested in radio technique solely with a personal aim and without pecuniary interest.—Communications Act of 1934, as amended, 47 U.S.C. Section 153(q) (1976). See also 47 C.F.R. Section 97.3. The basis and purpose of the Amateur Radio Service as defined by FCC rules (47 C.F.R. Section 97.1) is as follows:

> Section 97.1 Basis and purpose.—The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:
>
> (a) Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communication service, particularly with respect to providing emergency communications.
>
> (b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.
>
> (c) Encouragement and improvement of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art.
>
> (d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians and electronics experts.
>
> (e) Continuation and extension of the amateur's unique ability to enhance international good will.

*P.O. Box 476, Totowa, NJ 07512

Amateur radio operators are perhaps best known for providing communications for rescues at sea, communications with disaster-stricken areas when normal channels of communication are cut, and the handling of messages, especially "phone patches," for families of persons stationed in remote scientific or military outposts.[2] The Amateur Radio Service consistently fulfills its responsibility to provide public service communications, especially in emergency situations when other forms of communications are overloaded or nonexistent.[3] These services are provided locally, nationally, and internationally. The services and the value of the Amateur Radio Service is well known to virtually every city, county, and state emergency preparedness officer and agency. Amateurs in communications networks coordinate and provide services during bad weather, such as transportation for physicians, search and rescue, and radio/telephone interconnection for fast reporting of individual emergencies. Radio amateurs also contribute to the advancement of the radio art through technical innovation and advancement of communication skills. The radio amateurs' unique ability to enhance goodwill at home and abroad makes them special ambassadors of our country. These goals and duties are achieved by well-organized networks of privately owned, Federally licensed amateur radio stations assembled by those interested in radio as a source of public service and self-training, without pecuniary interest. The Federal Communications Commission in late December 1983 described the Amateur Radio Service as "a service that is a model of public responsiveness in times of emergency and distress and a service that is a model of self-enforcement and volunteerism."—*Report and Order*, FCC Docket 83-28, released December 23, 1983.

The U.S. Congress recently spoke of the benefits of a healthy, efficient Amateur Radio Service in the Conference Report to the Communications Amendments Act of 1982, Pub. Law 97-259 (1982), as follows:

> A. Amateur radio service—The amateur radio service is as old as radio itself. Every single one of the early radio pioneers, experimenters, and inventors was an amateur—commercial, military, and government radio was unknown. The zeal and dedication to the service of mankind of those early pioneers has provided the spiritual foundation for amateur radio over the years. The contributions of amateur radio operators to our present-day communication techniques, facilities, and emergency communications have been invaluable.
>
> * * * *
>
> Amateurs are pioneering still today. Space or satellite communications are a most important part of amateur radio. Through Program OSCAR (Orbiting Satellite Carrying Amateur Radio), amateurs have been utilizing advanced technology from their relatively simple, inexpensive ground stations. Seven amateur satellites have been built to date by amateurs at their expense. The amateur space activities are playing an important role in attracting the young people of America to scientific fields.
>
> Almost every nation has amateurs who communicate each day with fellow amateurs in other countries and on other continents passing vital emergency message traffic and acting as ambassadors of international goodwill. The modes of communication include Morse Code telegraphy, telephone or teleprinter, television and facsimile. Equipment ranges from home-built transmitters and receivers using parts from discarded radio and television receivers and costing only a few dollars, to the most sophisticated equipment manufactured for commercial government, and military use costing many hundreds of dollars.
>
> There are approximately 400,000 amateurs in the United States and almost 900,000 throughout the world. At any time of every day, thousands of amateurs scattered throughout the world are listening to and communicating with fellow amateurs over distances varying from only a few miles within a city to thousands of miles across the world. It is the large number of amateurs dispersed around the world

operating the five high frequency bands that has made it possible to provide the first, and for some time thereafter, the only communication links between areas devastated by natural disasters—earthquakes, tidal waves, hurricanes, tornadoes, blizzards and floods—and the outside world.

****

Every amateur has earned his license by having demonstrated his knowledge of radio theory and application, International Morse Code, the Communications Act, and the regulations of the Federal Communications Commission. Entry into amateur radio usually is through the Novice class. Amateurs are encouraged to increase their knowledge and skills by a series of five classes or grades of license, all but one with limited operating privileges.

The Amateur Radio Service has been praised for being self-regulated. The Commission has reported that less time has been devoted to monitoring and regulating the Amateur Service than to any other service because of its self-policing and discipline.

One primary purpose of the Conference Substitute is to provide the Federal Communications Commission with the authority to implement various programs which will result in improvements in administration of the amateur radio service and to cut the cost thereof. It will further allow the amateur radio service to continue its tradition as the most self-regulated radio service in the United States, and to become to some extent self-administered, requiring even less expenditure of government time and effort than in the past.

From the above, it is seen that there are three primary factors relating to the Federal interest in amateur radio communications which must be taken into consideration when the ability of an amateur to communicate is jeopardized by unreasonably restrictive local zoning or building code regulations: (1) the public service provided by amateurs, especially with regard to emergency communications; (2) advancement of the radio art; and (3) the foreign affairs power of the Federal govenment. The ability of an amateur operator to communicate on a worldwide basis represents far more than the pursuit of a hobby. Amateurs routinely volunteer their services, risking lives and equipment to provide emergency communications during disasters. To impair the amateur's ability to communicate by restricting unreasonably the height or characteristics of his antenna or operation of his station could therefore result in the unnecessary loss of lives or property.

A second area of concern deals with the advancement of the radio art. An amateur was the first individual to successfully transmit a radio signal overseas. A significant part of the Amateur Radio Service is devoted to state-of-the-art technological research and experimental uses of radio. Unreasonable local restrictions on antenna height employed for experimental use will preclude or seriously impair the effectiveness of research regularly carried on by amateurs.

Finally, by imposing unreasonable height limitations (i.e., those not necessary in order to ensure the safety of a proposed antenna installation *and* which probably inhibit effective communications), the amateur's ability to communicate with foreign stations is eliminated or impaired. Amateur radio has provided a relatively inexpensive, yet significant conduit for the exchange of ideas and information between United States citizens and citizens of foreign countries. The manner in which the Amateur Service has conducted its affairs in this respect has been a recognized, positive reflection upon the United States government. The United States has acknowledged this important contribution by the Amateur Radio Service and consistently fought to ensure that amateurs have sufficient frequencies for worldwide communications.[4]

Assumption of unlimited authority by a city council or zoning board to regulate the height, size, configuration, or location of antennas of amateur radio stations carries with it the potential of reducing the antennas to a size that they become unusable, or indeed to ban them altogether. Such restrictions silence or restrict amateur operators just as effectively as would local legislation cancelling or modifying licenses issued by the FCC. The power to regulate antennas to the point of uselessness is the power to invalidate authority granted pursuant to the Communications Act of 1934, and to frustrate express Federal goals and interests in effective, reliable performance of licensed amateur radio stations.

With that background in mind, let us explore just what has happened in the last several years. With all the recognition and plaudits that we as amateur radio people received, there was nothing official that we could hang a hat on, so to speak. We could not go to a local zoning board and say that now that the country knows of our value, the board *must* let us install antenna support structures sufficiently high to permit us to utilize our equipment to the fullest extent possible. Frankly, we couldn't do that because the neighbors didn't like those "ugly" towers in their yards. There have been claims that such structures would decrease the value of their properties (although there has never been a documented case of property devaluation that I know of attributable to an antenna support structure).

By now every amateur is familiar with the case of *Thernes vs. City of Lakeside Park*, 779 F. 2d 1187 (6 Cir. 1986), the first case decided after enactment of the now-famous memorandum and order, PRB-1 (which is now cited as 50 Fed. Reg. 38813). John Thernes filed his many applications prior to the issuance of PRB-1. PRB-1 became effective during the pendency of the *Thernes* case. Ultimately, John Thernes reached a *settlement* with the City of Lakeside Park that enabled him to erect a 67 foot tower and put whatever antennas he wanted at its peak. He was also granted some $13,000 in legal fees.

A panacea to the amateur community, right? WRONG! There are 51 states and 10 Circuit Courts of Appeal. The circuit decisions from one to another are not binding on each other. And so, when Anthony "Doc" Izzo, W2INW, wanted to erect a 40 foot antenna support structure in River Edge, New Jersey (which is governed by the Third Circuit), River Edge, through its Board, said, "NO!", among other things. Please note that River Edge has a 35 foot ordinance! As Doc's attorney, I filed a suit against the local zoning board and each of its members and Mayor and construction official individually. Incidentally, I can speak about this now, publicly, because Doc said I could, *and* the case is a matter of public record. United States District Judge Alfred J. Lechner, Jr., (United States District Court for the District of New Jersey) dismissed the case on the ground that there was no federal pre-emption, and that PRB-1 was not intended to deny the right of a local township to regulate the construction of things such as antenna support structures. We appealed to the Third Circuit Court of Appeals. Let me explain here, for the non-lawyers, the position of circuit court of appeals. Each circuit includes a certain prescribed area; they are of equal

Excerpt From PRB-1

Reprinted here is the essence of PRB-1 as it affects amateur radio operators. For the full text of the FCC's Memorandum and Order in PRB-1 see the *Federal Register*: 50 FR 38813; or The *FCC Rule Book*, pp. 183–189, available from the ARRL.

"...we recognize that there are certain general state and local interests which may, in their even-handed application, legitimately affect amateur radio facilities. Nonetheless, there is also a strong federal interest in promoting amateur communications. Evidence of this interest may be found in the comprehensive set of rules that the Commission has adopted to regulate the amateur service. Those rules set forth procedures for the licensing of stations and operators, frequency allocations, technical standards which amateur radio equipment must meet and operating practices which amateur operators must follow. We recognize the amateur radio service as a voluntary, noncommercial communications service, particularly with respect to providing emergency communications. Moreover, the amateur radio service provides a reservoir of trained operators, technicians and electronic experts who can be called on in times of national or local emergencies. By its nature, the Amateur Radio Service also provides the opportunity for individual operators to further international goodwill. Upon weighing these interests, we believe a limited preemption policy is warranted. State and local regulations that operate to preclude amateur communications in their communities are in direct conflict with federal objectives and must be preempted.

"Because amateur station communications are only as effective as the antennas employed, antenna height restrictions directly affect the effectiveness of amateur communications. Some amateur antenna configurations require more substantial installations than others if they are to provide the amateur operator with the communications that he/she desires to engage in. For example, an antenna array for international amateur communications will differ from an antenna used to contact other amateur operators at shorter distances. We will not, however, specify any particular height limitation below which a local government may not regulate, nor will we suggest the precise language that must be contained in local ordinances, such as mechanisms for special exceptions, variances, or conditional use permits. Nevertheless, local regulations which involve placement, screening, or height of antennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose.

"Obviously, we do not have the staff or financial resources to review all state and local laws that affect amateur operations. We are confident, however, that state and local governments will endeavor to legislate in a manner that affords appropriate recognition to the important federal interest at stake here and thereby avoid unnecessary conflicts with federal policy, as well as time-consuming and expensive litigation in this area. Amateur operators who believe that local or state governments have been overreaching and thereby have precluded accomplishment of their legitimate communications goals, may, in addition, use this document to bring our policies to the attention of local tribunals and forums."

jurisdiction and each is only one step below the United States Supreme Court. The Circuit Courts of Appeal hear and decide matters that have been tried in the United States District Court for those districts over which they preside.

In River Edge, New Jersey, Doc Izzo could have erected a 35 foot structure, because the ordinance existed for that height. He needed 40 feet to enable VHF communication with another local town for emergency and other communication purposes. The United States Court of Appeals for the Third Circuit heard argument and rendered its decision. It is now a reported case. That means that it is a case that has set precedent for others in the *Third Circuit* to follow. It is, also, the first case decided solely on PRB-1 (50 Fed. Reg. 38813). Importantly, the decision cites the fact that credit has to be given to the ARRL, "At the instance of the American Radio Relay League, and after notice and comment procedures, the FCC issued a declaratory ruling on September 25, 1985.—50 Fed. Reg. 38813. The Commission recognized the strong federal interest in promoting amateur radio operations, particularly with respect to providing emergency communications." *Izzo v. River Edge, et als., __F. 2d__(3 Cir. 1988).* The District Court Order of Dismissal was vacated and the matter sent back for trial.

Now, how long did it take us to get to this point? We made three appearances before the zoning board, the last one in January of 1987. Judge Lechner dismissed the case on July 15, 1987. The Third Circuit Court of Appeals heard argument on January 20, 1988. Its decision was filed on April 7, 1988. A "status conference" was ordered by Judge Lechner on April 21, 1988.

As a result of that conference, the town of River Edge has offered to settle this case on reasonable terms. They have agreed to compensate Doc Izzo for his counsel fees, to permit the variance that he sought, and to permit him to install the antennas which he required.

The interesting side note to this offer is that the Court, in discussion with both attorneys, felt that settlement was appropriate. The Judge indicated that he did not know how he would rule because he

would have had to listen to and review substantial testimony from the litigants and their respective experts, but he felt that even if the township won they would have spent significant monies and paid fees for further appeal work, and that if Doc won, counsel fees would probably have been awarded. We all agreed that, in this instance, a case settled is a case won.

Understand, that for us to be able to effectively win over every zoning board in the country by waving PRB-1 in their faces is just not going to help. The resolution of the many zoning problems in effect now is going to take many hours of legal argument. I cringe every time a call comes from an amateur who says, "Hey, tell me what cases I need and give me a copy of PRB-1. I'm going to show that zoning board that the FCC has granted me the right to a tower!" Every case to be presented before a zoning board must be done in a professional manner, together with expert testimony. It must be done in an atmosphere of sober and detailed thought. The worst thing you can do is to wave a paper in front of some local official and tell him or her what he or she can or can't do. You only arouse his/her competitive instinct. When the official (and the board) looks into the audience and notices a sea of "rubber ducks," hard hats with antennae implanted, and a couple of ratty-looking guys with their pants held up with hook-up wire, I can guarantee that you will probably not win.

Let me remind you, too, that the lawyer-ham is not usually happy to hear you say that he owes both you and ham radio a free effort to get you your tower. Ham radio is his *hobby*; law is his business—the means to feed his family. Don't try to con him for free. You'll likely get what you paid for. If he can get you your antenna support structure, be satisfied. If you come to him before you have turned the board against you, it will be that much easier and that much less costly.

In conclusion, let me just recount one experience with an amateur friend. My friend came to me before going to the board. We agreed upon a fee for my services. We took about a year to prepare the board and its attorney. We filed a request for interpretation of the zoning ordinance, during which time I filed briefs and technological data; we then filed for a zoning variance and presented expert witnesses and more briefs. There were serious objectors. The board hired its own expert to inspect the amateur's equipment, his *logs*, and report on whether or not the antennas sought were needed for the type of equipment and communication utilized by the requestor. My amateur friend now has an antenna system on a 110 foot structure; the main concessions to the board were agreement to return the structure to 62 feet when not in use, and planting of trees around the 5 foot high base to improve its aesthetics.

Sometimes we win without going to a high court. It only takes time and money.

Footnotes

1. 47 C.F.R. Section 97.1 *et seq.*

2. For example, amateur radio serves as the *only* way for persons stationed at Antarctica to contact their relatives back home for much of the year. See Frenaye, "Amateur Radio at the Bottom of the Earth, QST," April 1979, at 49.

3. A commendation for amateur radio operators appears at 129 Cong. Rec. §15216 (Daily Ed., November 2, 1983) in connection with amateurs' efforts during the United States invasion of Grenada:

> During the first 2 or 3 days during which our forces were conducting operations in Grenada, the island was virtually cut off from the outside world communications-wise. Yes, we have spent millions of dollars on communications for our military for use in crisis and wartime situations. However, on this particular occasion probably the most up to date accounts of what was happening in and around St. George's Medical College area were given by ham radio operators. Mark Barettella, KA2ORK/J3, and Don Atkinson, J37AH, maintained communications throughout a very critical situation and were, at times, the only sources of information coming from Grenada. Ham radio operators here in the United States monitored frequencies used by Mark and Don and stayed in contact with them night and day. Ham radio operators provided a great service, not only to their government, but also to the people of the United States. Like hams that have gone before them, they have a tradition of service in times of local and national emergencies.
>
> I think it is fitting today that we should honor these amateurs, and the amateur radio community in general, for also being a part of the finest traditions of this country. They are a national resource that we should be proud of and should appreciate.

4. See Schroeder, *The Radio Amateur in International Legislation and Administration*, 48 AM.J. Int'l L. 421, 421-24 (1954); Zegarac, *Local Regulation of Amateur Radio Antennae and the Doctrine of Federal Pre-emption: The Reaches of Federalism*, 9 Pacific L.J. 1041 *et seq.* (1978). CQ

CQ REVIEWS:

The Creative Design 730V-1

A Multiband V Dipole

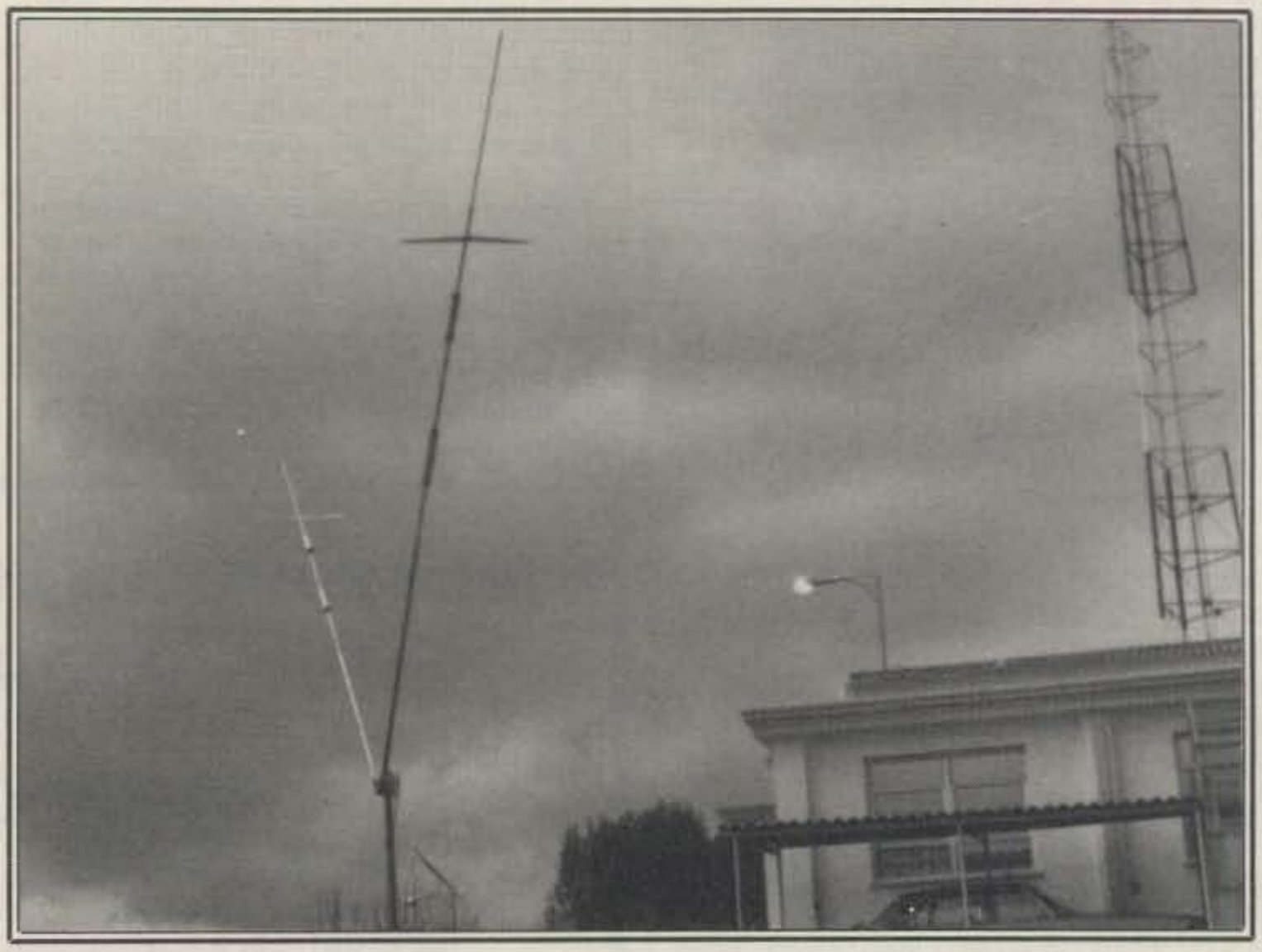
BY JOHN J. SCHULTZ*, W4FA/SV0DX

The Creative Design 730V-1 antenna distributed by Orion Hi-Tech is a trap-type dipole designed for operation on 10, 15, 20, and a portion of 40 meters. Its unique V-type construction allows it to be mounted on a single support mast.

I was particularly pleased to be able to review the 730V-1 because for a year or more I had the idea in mind to construct a similar antenna, although my design would only have covered 10, 15, and 20 meters. My idea evolved from a trap-type ground-plane antenna I was using, as shown in fig. 1, which had a single radial for each band. I achieved reasonably good results with this antenna, but I felt that much better results would be achieved if I replaced the three radials with a single trap element and then rotated the whole thing 45 degrees CCW. The resultant antenna would have predominantly horizontal polarization and a more or less omnidirectional radiation pattern.

Well, I don't know if Creative Design evolved the 730V-1 along my lines of thinking, but the antenna form they developed, as shown in fig. 2, is almost exactly what I envisioned. The only difference is that they extended the coverage of the antenna down to 40 meters by adding an extra pair of traps.

The specifications for the 730V-1 are listed in Table I. By the way, it is a complete antenna system in that it also includes a balun. The user has to supply only the mounting mast and a coaxial transmission line.



The 730V-1's appearance is accented by the two little "bat-wing" capacitance hats. The 730V-1 won't perform as well as a beam on a tower (that's a 200 foot self-supporting tower on the right), but it is a very good performer for its size.

Materials

When I unpacked the 730V-1, I was immediately impressed by the quality of the packing itself and the quality of the materials used. The aluminum tubing used is well formed and relatively thick-walled (2.2 mm for the base section on each side of the V). No worm clamps are used. The various aluminum tubing sections are swaged where necessary so they fit together and are held together by bolt and screw assemblies or a special collar-type clamp. The base-plate assembly (shown in one of the photographs) was formed of heavy-gauge (6 mm) plated steel. Two vinyl end plugs insulate the bottom section of the antenna from the base plate, and these in turn are held to the base plate by "U" clamps. Even the supplied balun (52 to 75 ohms) is completely metal enclosed except for its top cover.

*c/o CQ magazine

Assembly

The instruction manual supplied with the antenna provides plenty of diagrams so you can readily see how the antenna goes together. The English translation of the original Japanese text does *not* always flow too smoothly, but it gets the message across. Only simple hand tools such as a screw driver and an adjustable wrench (or a few box wrenches) are needed for assembly.

I laid out the various parts on the ground before assembly, and it was obvious that there was no way you could incorrectly put the various sections of the antenna together because of the different sizes of tubing involved and the different manners in which they fit together. The different sizes of tubing telescope into each other for at least several inches, which augured well for the stability of the assembly. The instruction manual doesn't

Specifications

Electrical

Frequency Coverage: 7/14/21/28 MHz
Power Handling kw (CW/PEP): 0.6/1 on 7 MHz, 1/2 other bands
Feed Point Impedance: 50 ohms

Mechanical:

Element Length: 2 × 5.8 meters
Element Height: 4.1 meters
Turning Radius: 4.15 meters
Weight: 5.3 kg
Wind Rating: 108 km/hour
Mast Acceptance: 38–50 mm O.D.

Table I–Specifications for the 730V-1.

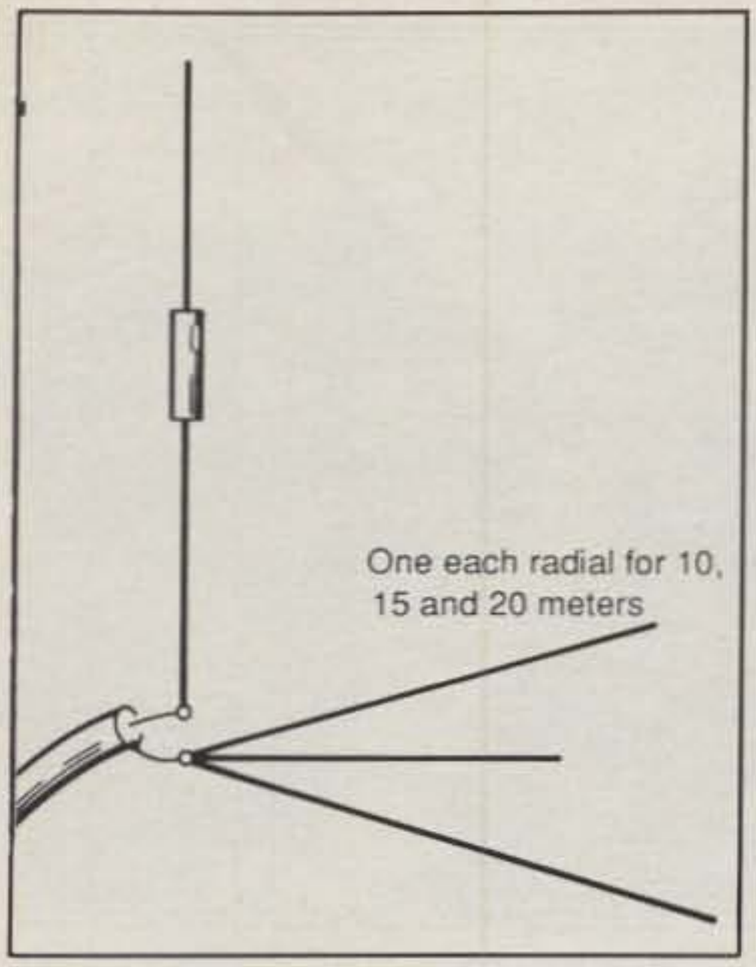
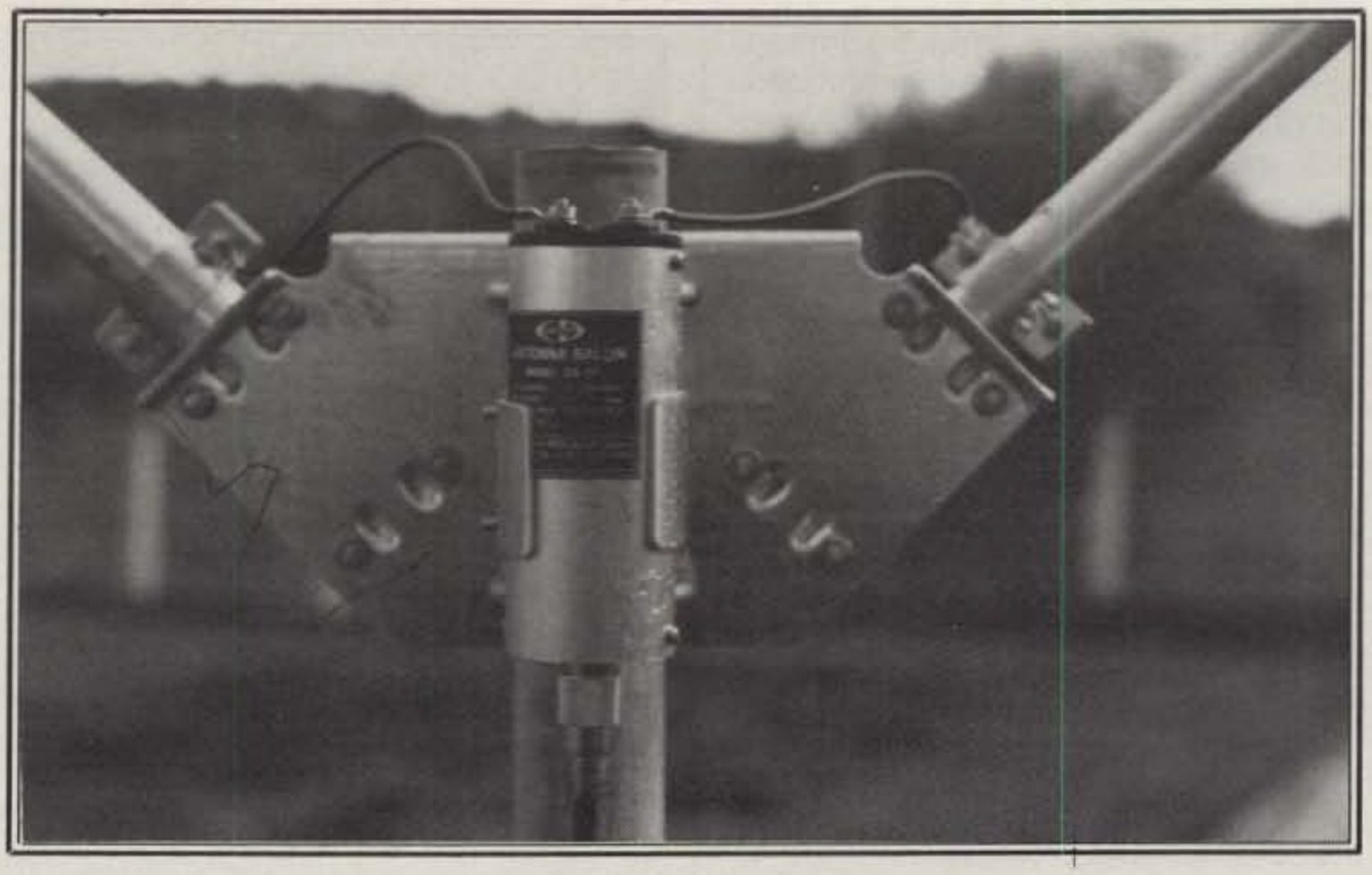


Fig. 1– Simple single-trap triband vertical I had been using.



The 730V-1 comes complete with a metal-enclosed balun which fastens separately on the antenna support mast.

call out any particular sequence of assembly steps, but it seemed most logical to assemble most of the base-plate assembly first and then the aluminum-tubing sides of the V, and finally bring everything together. The manual does, quite correctly, emphasize getting the drain holes on the traps positioned correctly and properly sealing the wire and coaxial cable connections to the balun. Once partly preassembled, the 730V-1 is a relatively easy antenna to move around for portable operation.

Tuning

No tuning of the antenna is required, and in fact, none is possible except on 40 meters. The end rods on the antenna can be slid in or out of the section containing the upper traps to vary resonance on 40 meters. Roughly, any 100 to 150 kHz segment on 40 meters can be favored. If you dimension the end sections for your nominal value, as indicated in the assembly diagram, the lowest SWR will take place around 7050 kHz. Shortening the end sections by 1 cm each will raise the resonance point by 10 kHz.

Siting

The 730V-1 manual suggests several installation possibilities for the antenna varying from slightly above ground mounting, to balcony, to roof-top installation. The "minimum" useful installation would be that shown in fig. 2, where the antenna is mounted on a mast protruding 10 feet from the ground level (e.g., in the lawn area around a wooden-frame house and as much in the clear as possible). For balcony installations the plane of the antenna should be at right angles to the metal balcony railings. The best installation of all, of course, would be if the antenna could be mounted in the clear on a roof-top using a 6–10 foot long mast or on the top of a simple ground-mounted telescoping-type TV mast. The old adage of having an antenna as high and as in the clear as possible, particularly away from metallic objects, certainly applies.

The 730V-1 tested used a ground-mounted installation, as seen in a photograph, and it was also temporarily tried on a 10 foot mast on the roof of a small apartment building. The SWR curves obtained for the near ground installation, as well as those for the roof-mounted installation, are shown in fig. 3. As you might expect, the SWR curves showed a somewhat broader bandwidth for the roof-mounted installation. However, I was rather surprised as to how great the SWR bandwidth was for even the ground-mounted installation, even on 20 meters. An antenna tuner is certainly not necessary, even when using a solid-state transceiver, on 10/15/20 meters. A tuner would also not be necessary on 40 meters if you are satisfied to operate within the lower, mid, or high portion of the band, depending upon how the 730V-1 was initially set up. The use of a simple

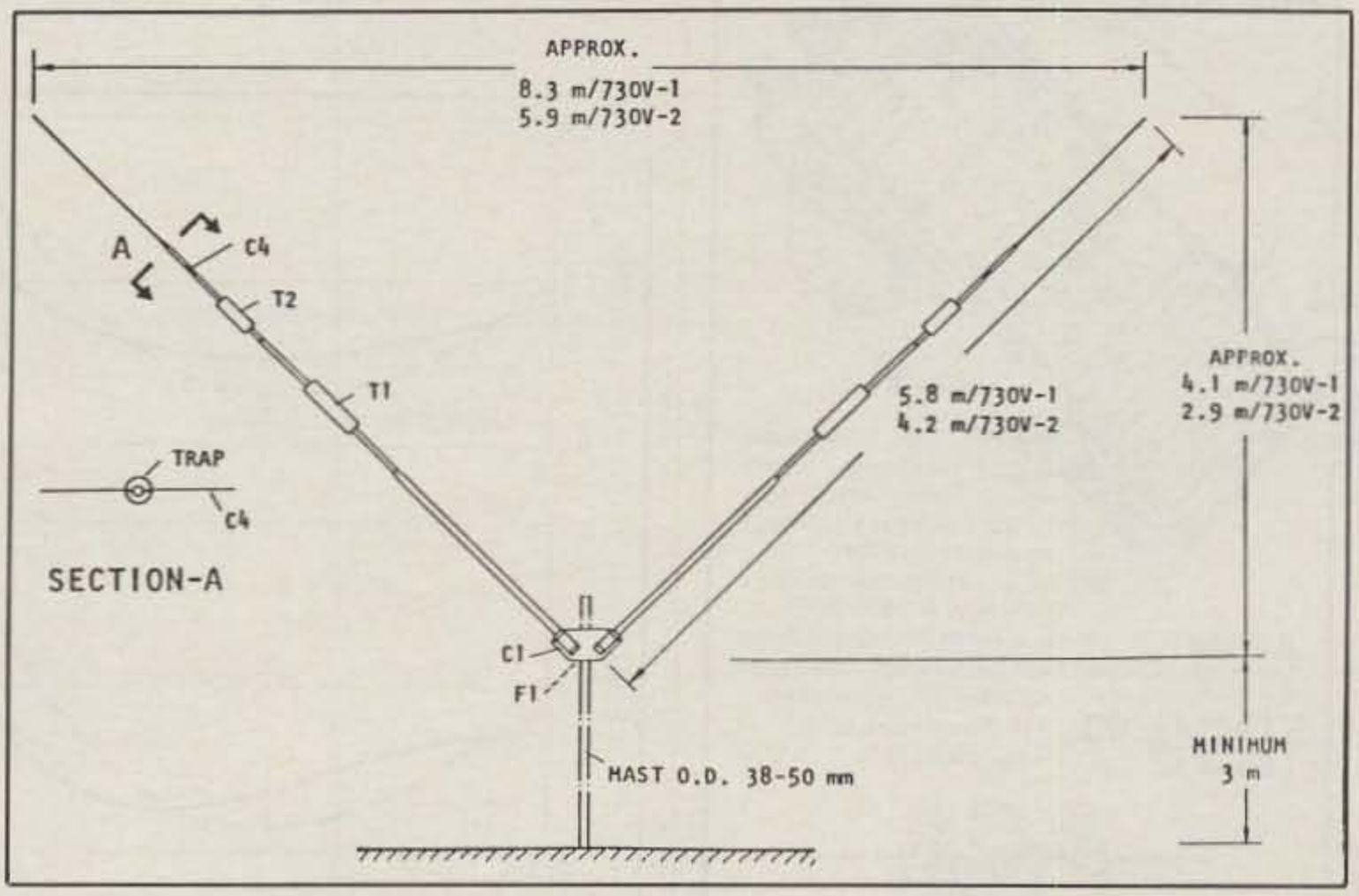


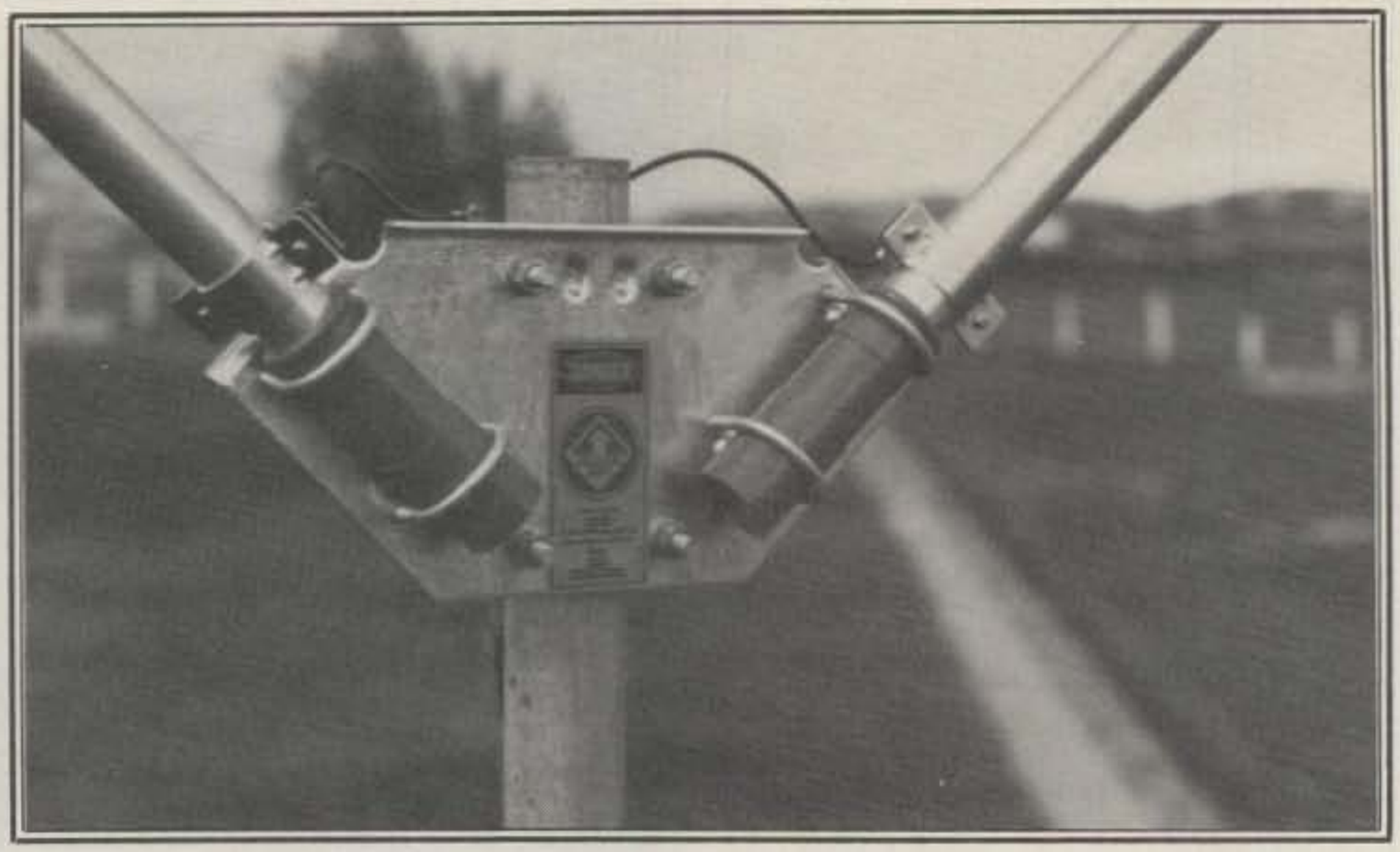
Fig. 2– Dimensions and a mounting suggestion for the 730V-1. Disregard the dimensions marked 730-2, as these are for a different version of the antenna which does not cover 20 meters.

tuner would, of course, allow the antenna to be useful over the entire 40 meter band and probably to radiate reasonably well on 30 meters also.

Results

As was just mentioned, the 730V-1 was tried both in ground-mounted and roof-mounted situations. In either case the antenna performed remarkably better, at the same elevation, than the vertical antenna idea of fig. 1. The roof-mounted installation provided far better results than the ground-mounted installation, but that was hardly surprising! After making various comparison checks, particularly in the roof-mounted installation where comparison dipoles were available, I would say that the 730V-1 performed equally as well as individual horizontal dipoles when the height of the individual dipoles was at the same level as the *base* of the 730V-1 except on 40 meters where the 730V-1 was "down" about an S-unit. Compared to dipoles elevated to a height equal to the tips of the 730V-1, the 730V-1 was "down" from about 1 S-unit on 10 meters to about 2½ S-units on 40 meters.

Before you draw any quick conclusions, I would hasten to add that I found the test results to be immensely favorable for the 730V-1. The 730V-1 is, after-all, a complete, compact multiband antenna requiring only a single mast support. Often, you can find a single elevated support point for an antenna like the 730V-1 in situations where it would be impossible to find *two* elevated supports for a bunch of dipoles for the individual bands or even for a multiband trap-type dipole antenna.



Looking at the front of the mounting plate for the antenna, you can see how each element is insulated from the plate by long vinyl cups which fit over the bottom of each element.

The power-handling capability of the 730V-1 is shown in Table I as going up to 2 kw PEP. I used the antenna with a linear amplifier producing 500 watts CW/PEP output and absolutely no problems were encountered with trap heating or stability. The wire used for the traps, however, is 2 mm diameter plated stock. I might be totally wrong, but I wouldn't feel comfortable putting 2 kw PEP into the antenna.

Summary

The 730V-1 impressed me as being a very good, quality product, both electrically and mechanically. I would say that it's almost the ideal antenna for someone who just enjoys casual operation on the entirety of 10/15/20 meters and a portion of 40 meters and who just wants to erect a simple but quite effective antenna with a minimum of fuss. Put it together slowly with proper weather sealing, erect it as high as possible, and then feed it via good-quality coaxial transmission line. I think you'll be very pleased with the results, and you will have an antenna that will last for many years. If you can get away with the story, you might even convince the neighbors that the antenna is just a giant pair of "rabbit ears" for your TV. CQ

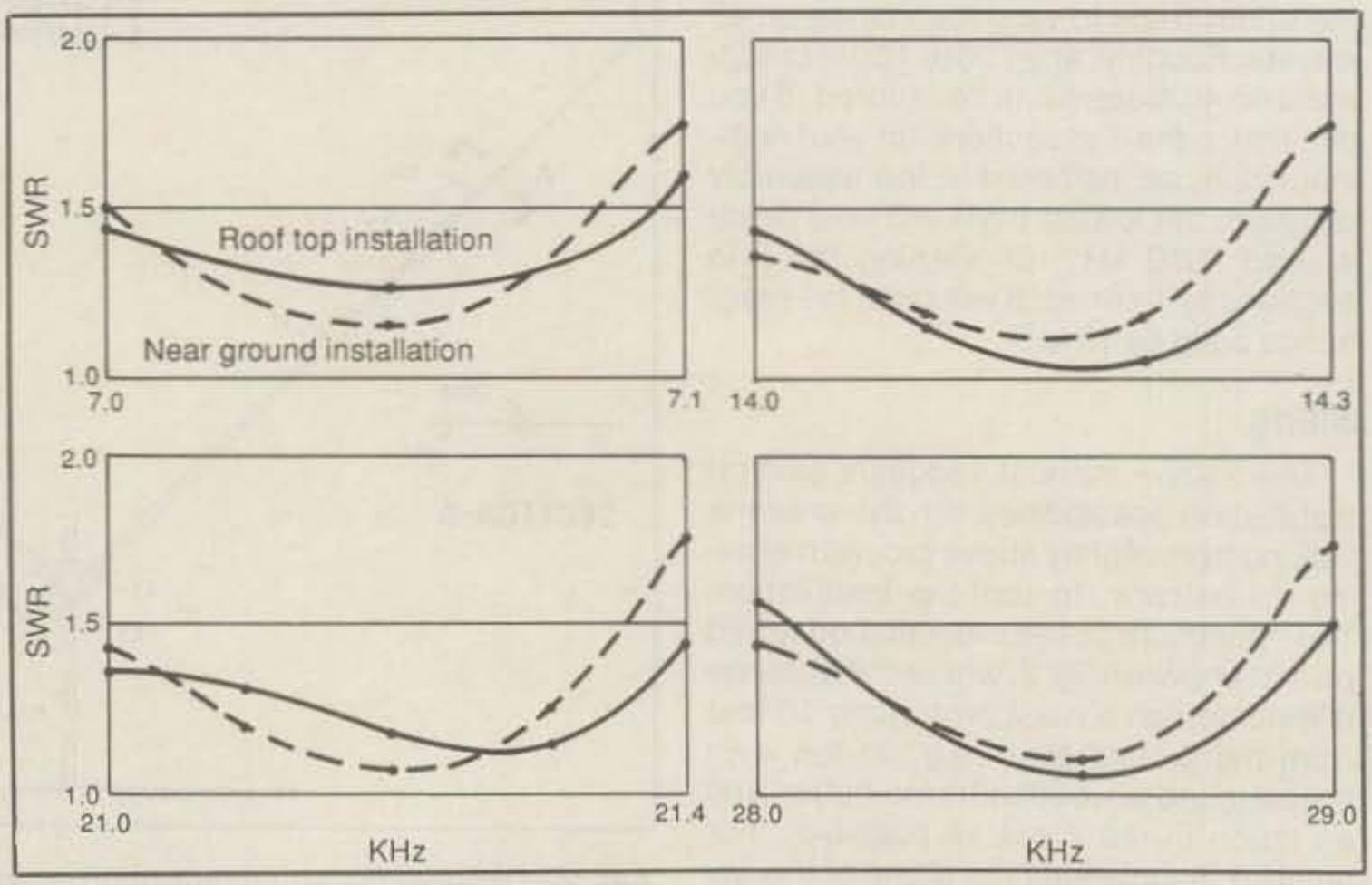


Fig. 3– SWR curves for the 730V-1. Note that the curves for 40 meters cover 100 kHz. Results should be similar for other 100 kHz portions of that band.

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The HAL ST-7000 modem is designed specifically for 300 baud HF-Packet. Techniques developed for our government and military ST-8000 (MD-1232/G) HF modem are now applied to the special problems of HF packet radio. All filters and detectors are optimized for 300 baud HF-Packet, NOT a "do-everything" compromise design.

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The ST-7000 has three different packet controller (TNC) interfaces: RS-232C, TTL, *and* TNC audio. The audio interface connects to *any* TNC VHF radio connector and converts the VHF tones to HAL HF standards. TNC audio is switched to a separate VHF radio connector when the ST-7000 is turned OFF.

Best of all the ST-7000 is completely manufactured in the United States by a company you've known and trusted for 20 years. We do radio data communications, and we do it extremely well!

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Somehow frugal sounds better than cheap, but cheap is where it's at. You might want to call these two projects "field expedients" or emergency communication preparedness tests, but they are simple, very inexpensive antenna projects that work and are easy to build.

The RV Wonder and Improv 2
Two Really Cheap Antenna Projects

BY LEW McCOY*, W1ICP

For years I have been known as the ham who knows how to squeeze a buck. And as I get older, I guess my squeeze gets tighter. My old compatriot, Doug De Maw, W1FB, who writes for *QST*, sent me a letter recently telling me I should write more construction articles. But everything costs so much these days, and the parts are so hard to find, that I am hesitant to do construction articles.

There is one place, however, where amateurs can build their own and do a good job, and that's antennas. It isn't as much know how as "know where," and that means where you get the parts. This article should be of interest to anyone who wants to save a buck. The two antennas described here came about because I needed antennas and I didn't have the materials—or at least I thought I didn't. First let's talk about the "Improv-2," and it's no joke.

The Improv-2
Or Making Do With Zilch

My wife likes to sell antiques and collectibles, so we recently spent three weeks in Quartzite, Arizona, the site of just about the largest fleamarket in the world. I have a 27 foot Coachman trailer pulled by a Suburban three-quarter ton. Mounted on the Suburban roof was my Larsen 2/70 (2 meters and 450 MHz) dual antenna. When I parked at Quartzite, I checked into the local net on 2 meters and everything was fine. (Several hundred amateurs congregate at Quartzite every year, so it is also a continuous hamfest.) The second day there we had a horrendous rain storm, and afterwards I threw a large tarp over the top of the Suburban to dry out the tarp. When I pulled the tarp off, you guessed it: I broke off the antenna. And, no matter how I tried, it was not repairable.

This is the Improv-2. It is easy to see the liberal use of duct tape in holding the assembly together and to the luggage carrier.

I went around the fleamarket looking for CB antennas I could modify, but no luck. So where was my inventive genius when I needed it? Well, I may be over the hill, but not quite that far. Two meters requires a 19 inch vertical radiator, and I realized I had a closet full of wire coat hangers in the trailer. I cut off 19 inches from a hanger and then contemplated how I could attach coax to it and then mount the thing on the roof of the Suburban.

In the junk box in my trailer I found some short lengths of PVC tubing I had saved for some unknown reason (in spite of my wife trying to throw out my junk box!). First I scraped the enamel covering off the end of the coat-hanger wire. Next I skinned back about 2 inches of coax outer conductor to expose the inner conductor. The outer braid was twisted into a lead of about 2 inches (these dimensions are not critical). I then tightly wound the inner conductor around the end of the 19 inch whip and taped the whip to the short piece of PVC using some duct tape (any kind of nonconducting tape will work).

Next I mounted the antenna assembly to the luggage carrier on the roof, again using duct tape. For a ground connection I chose a mounting space that had a screw for holding the carrier. I put the coax braid under the screw so the braid was grounded.

As one of the elder statesmen in amateur radio who is responsible for most of the fussing over SWR, I have to admit I didn't bother to check the darn thing. I simply got on, kerchunked the repeater (but I did sign my call!), and got an immediate return. I got very good reports from everyone, and after two months I am still using the stupid thing. Next time I'll carry a soldering iron with me—Hi! So there you have the Improv-2. See photographs for verification that I actually built the antenna!

The RV Wonder
Or I Wonder Why It Works!

On this same trip to Quartzite I was determined to experiment with some RV antennas of my own making. Everyone with RVs seems to stick pretty much with verticals because they are reasonable when it comes to mounting on bumpers. How-

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

Here is the RV Wonder installed at its full height. The antenna wire terminates just below the front awning of the trailer, at which point the coax is attached. Keep in mind that the coax is used as a tuned feeder.

ever, at the best, they are not the world's greatest radiators on 80 and 40. Also, the proximity of the vertical to a metal RV body knocks heck out of the antenna radiation. My idea was to mount a wire around the perimeter of the trailer roof—hopefully only a foot or so over the roof so that it would be possible to leave it in place while traveling.

At first I had a U-shaped antenna fed via a Transmatch and tuned feeders to the base of the U. My trailer is 8 feet wide and 27 feet long, so the U was that dimension. It was fed at the center of the 8 foot dimension.

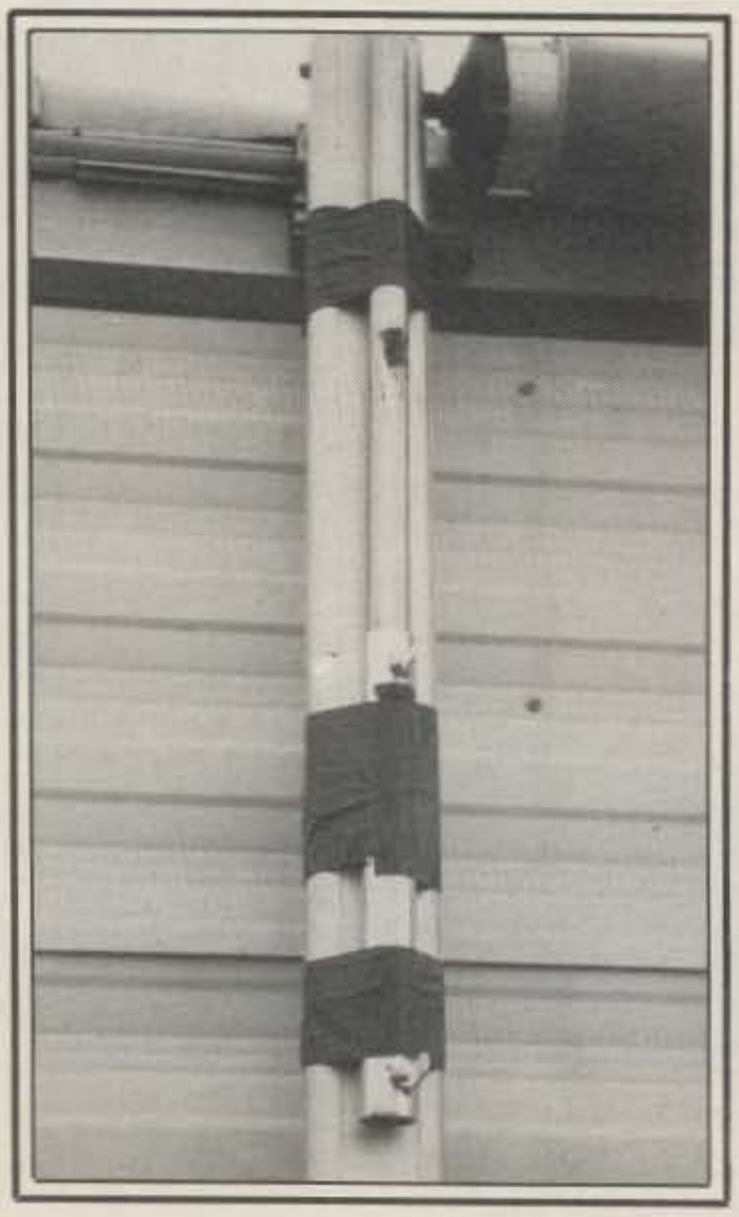
Several contacts were made, but it was obvious that the antenna was a very poor performer. The distance between the legs of the U was only 8 feet, and this is less than a tenth wavelength on both 80 and 40, so I figured I was getting signal cancellation and all kinds of other bad things. I then tried an L configuration, feeding the antenna at the end bottom of the L, which was 8′ × 27′. This worked much better but still was a lousy antenna. Total length of the L was about 35 feet or so, and the antenna *should* have been a better performer.

I came to the conclusion that the roof (all metal) of the trailer was knocking heck out of the antenna performance. How to raise the antenna easily and stay within the confines of my trailer? That was the question.

As it turns out, at Quartzite there are many exhibitors who use a metal framework with coverings for displaying their sale materials. There were also several dealers selling the metal frames and parts. I ended up buying two 10 foot long, ¾ inch O.D. pipes which were nothing more than electricians' heavy-wall pipe available for a few dollars a length at any electrical supplier. I also purchased two short (about 12 inches long) larger-diameter pipe joiners. I mounted these joiners on my awning support so that I could raise or lower the 10 foot lengths for testing. I used a couple of short lengths of PVC at the top of the pipes as insulators for the antenna. Everything was put together with duct tape, which did the job handsomely. I am sure that amateur ingenuity could come up with many different ways of mounting this antenna so it could be erected and taken down quickly.

My next step was to raise the antenna above the metal roof which I did in 1 foot increments, testing at each height. When I got to 4 feet above the metal roof, the antenna started to work like it should. Performance much below 4 feet seemed to be rather poor. I went up to 8 feet, my maximum height, as shown in the photos. And I can say for sure the performance was much better than at 4 feet. The rig I used was an ICOM 735 running 100 watts. I worked all up and down the west coast on 80 with good reports, and the same for 40 meters. On 20 I knocked off 25 countries and several on 15 and 10. Also, I made a few comparative contacts with amateurs from the Quartzite area who were using verticals (and I got better reports in 90 percent of the cases).

After I returned from Quartzite, I made a trip to Mexico, where I operated under my Mexican call, XE2VHT (Very Hot Tamale!). I used the same antenna, and



This is rear mast for the antenna. The extender mentioned in the text is clearly visible at the bottom, where it is taped to the awning support.

from there I worked all 50 states during the DX test.

The Transmatch I used was a simple T configuration using a 200 picoFarad variable capacitor on the input and output side of roller inductor. I did not use a balancing device to tune the feed line. The feed line in this case was an 8 foot length of RG-58/U. While I wouldn't normally recommend using coax as a tuned feed line, the short length of line could easily handle the power and mismatch without any appreciable losses.

I also found that on some bands I would get RF "bites" off the equipment. While it isn't technically sound, I tried grounding the braid to the trailer body, and somewhat surprisingly, it cleaned up the problem of RF bites.

For someone who is supposed to be savvy about antennas, I have to admit there is nothing very scientific about these tests. As we experts like to say when we really don't know what we are doing or what is happening, "The conclusions were arrived at empirically." I even violated one of my own rules in that I used a length of RG/58 to feed the end of the wire, plus grounded the shield of the coax (at the antenna end) to the trailer body. My conclusions are that this is a better antenna for RV work, although it doesn't have the convenience of being permanent as a vertical would be. In Mexico there was a tree nearby, and I managed to get one end of a wire antenna up in the tree. This antenna worked better than the RV-mounted job, but I expected that. However, I did use the RV antenna for working around the country and world. Also, while most readers know this, some don't. Your received signal strength always improves if you have a foreign call.

I worked all bands, 80 through 10 meters, with the same wire, so it was a multiband system. On 40 through 10 (on 40 meters it was one-quarter wavelength long), it was a very good performer. On 80 it was just so so, but it did work on 80. With zilch for cost, it would be well worth considering if you do trailering or drive an RV.

CQ

The operating position with the ICOM 735. At the right is a small Transmatch I use, and it easily handles the tuned coax feeder.

R4

NO GROUND RADIAL VERTICAL

10, 12, 15, 20 METERS

The R4 is a second generation electrical half wavelength vertical antenna. Developed from the very successful R3 it has many new design features for easier assembly and operation plus improved performance.

The half wave design gives optimum current distribution for best low angle radiation and excellent DX communications. R4 brings high performance antenna features to those living in apartments, condominiums or on small city lots. Even if you have plenty of space, R4's combination of neat appearance and DX capability make it ideal for your ham station.

The new R4 design has a broadband solid state impedance matching network for full coverage of all four bands. Frequency selection is completely automatic. There are no moving parts or remote tuner. The only connection required to the antenna is your 50 ohm coax. The unique counterpoise ground uses four 48" long by .100" diameter stainless steel rods. This system gives excellent RF decoupling for mounting in any location from ground level to roof top. Make R4 your compact choice for a full-performance no-compromise HF vertical antenna.

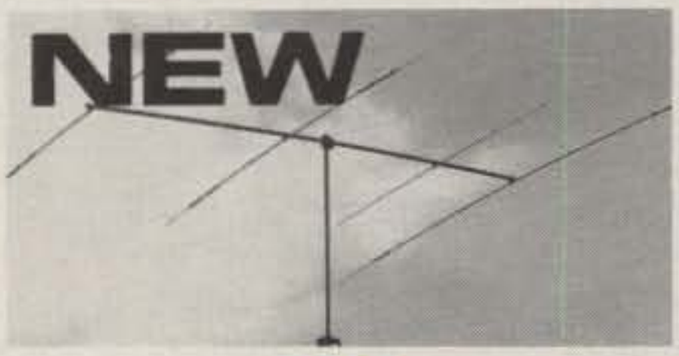
R4 FEATURES

Frequency: 10, 12, 15, 20 meters
Gain ref ¼λ whip: 3dB
Low angle radiation
360° radiation pattern
Broadband impedance matching
Hi Q frequency selecting traps
SWR: 1.2-1 typical
2:1 SWR bandwidth: 10M-1.7 MHz 12M-100 KHz
15M-450 KHz 20M-350 KHz
Power handling watts: 1800 PEP
Connector: UHF Female SO-239
Self-supporting
Height: 18 ft. 5.5 M
Weight: 8 lbs. 3.7 Kg
Mast mount, in (cm): Min.-Max. 1.5 (3.8)—1.75 (4.44)

12 METER 4 ELEMENT SKYWALKER

Enjoy the most popular WARC band. Whether your interest is friendly rag chewing or operating awards and DX-ing, the Cushcraft 12-4CD is designed to punch your signal through on this active new band.

Forward Gain	10.0 dBd
Front to Back Ratio	>30 dB
SWR	1.2:1
Boom Length	18 ft (5.5 m)
Longest Element	19 ft 10.5 in (6.1 m)
Turning Radius	15 ft (4.6 m)
Wind Surface Area	4 ft² (.46m²)
Weight	21 lb (9.5 kg)



A4S THE PREMIUM 10-15-20 METER BEAM

The A4S is the true high performance tribander. Precisely tuned high power traps, carefully selected element lengths and proper spacing combine to make A4S the preferred antenna. It has pinned boom sections and formed aluminum brackets to keep elements straight under all conditions. All hardware and clamps are stainless steel.

Forward Gain	8.9 dBd
Front to Back Ratio	25 dB
SWR	1.2:1
Boom Length	18 ft (5.5 m)
Longest Element	31 ft 4.5 in (9.6 m)
Turning Radius	18 ft (5.5 m)
Wind Surface Area	5.5 ft² (.51 m²)
Weight	37 lb (16.8 kg)

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CIRCLE 93 ON READER SERVICE CARD

CQ REVIEWS:

The MFJ-945C and MFJ-989B HF Antenna Tuners

BY JOHN J. SCHULTZ*, W4FA/SV0DX

MFJ antenna tuners have become virtually omnipresent in amateur radio stations, at least in the U.S. Over the years MFJ has modified, improved, and expanded their tuner line such that the models now range from compact, bare-bone designs to elaborate, full-feature designs. They all have their place depending upon intended placement (portable or fixed-station operation), power level to be used, extra features desired, cost, etc. It was thought worthwhile to review two MFJ tuners, the MFJ-989B and the MFJ-945C, since they represent the very latest top-of-the-line and middle-of-the-line models. One can scale down from the MFJ-989B and up or down from the MFJ-945C to gain an insight into the features on the whole line of MFJ tuners. Also, as we take a look at the MFJ tuners, homebrewers might pick up a few points of interest.

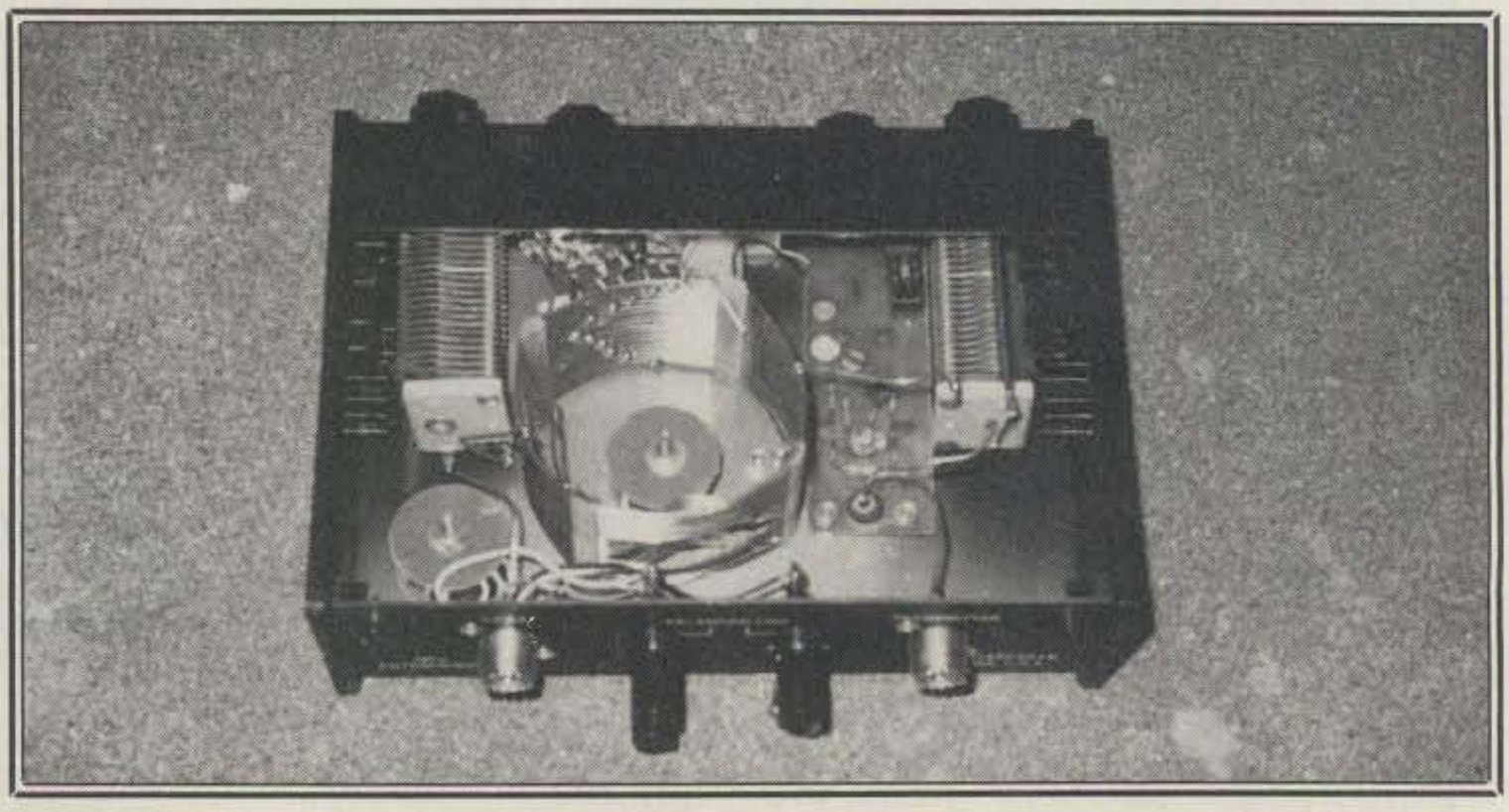
The MFJ-945C is a compact tuner well suited for portable/mobile application. The front panel measures 2″ × 8″.

The MFJ-945C

The MFJ-945C tuner measures 8″ × 6″ × 2″ and features quite dark styling in an all-black clamshell-type housing. The tuner has three variable elements—two variable capacitors and a tapped inductor—in the usual T-network configuration. Besides the basic T-network, the tuner contains an SWR/wattmeter and a balun transformer so balanced transmission lines can be accommodated. There is no provision for antenna switching. The tuner is rated to handle up to 300 watts transmitter output over the 160 to 10 meter range, feeding either unbalanced (coax) or balanced antenna loads.

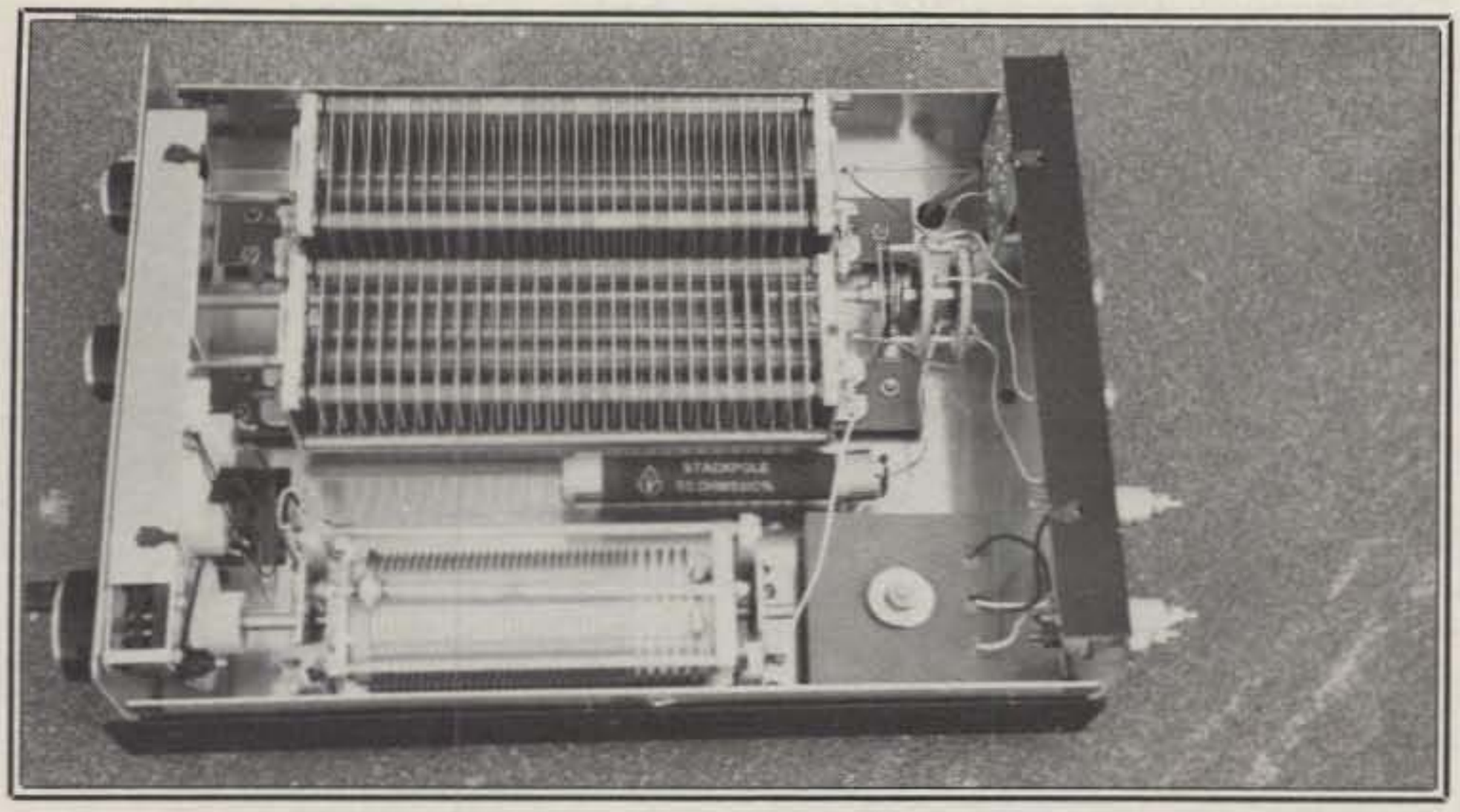
Looking inside the tuner (see photograph), some quite interesting constructional features are evident, especially considering the moderate price of the unit. The two air variable capacitors are very good quality units. I think MFJ rates them at 1 KV, but I think that rating is on the conservative side. Almost a third of the volume inside the tuner is taken up by the inductor, which is 3 inches in diameter and is 2 inches long. It has 12 tap points and an inductance of 11–12 μh. There is an additional coil which is actually a separate "booster" coil wound on a ferrite core in order to extend the matching range of the tuner on 80/160 meters. It can be seen in the middle of the 3 inch air wound coil. I didn't measure the booster coil, but I suspect it adds a few more microHenries to the total inductance. Another ferrite core is used for the balun transformer and it can be seen to the left of the 3 inch coil. A PC board next to one of the variable capacitors contains all of the circuitry for the SWR/wattmeter.

The rear panel of the unit contains two SO-239 coaxial connectors (mounted by rivets), three quality "5-way" binding posts, and a ground binding post using a



A look inside the MFJ-945C. The rear section of the top cover slides off easily for ready access to all components.

*c/o CQ magazine



The large cross-needle SWR/wattmeter dominates the front panel of the MFJ-989B.

wing nut. The three insulated "5-way" binding posts provide either for a wire antenna connection or for the connection of a balanced transmission line. The workmanship of the wiring inside the unit is excellent.

You may wonder, as I did, how the variable capacitors are insulated, since they have to be "floating" above ground. First of all, fiber shoulder washers are used to insulate the threaded metal shaft of the capacitors where they pass through the metal front panel of the housing. Then, the brass inserts normally present in the knobs were removed, and a plastic end cap was placed over the ¼ inch metal shaft of each capacitor so as to slightly increase its diameter (to compensate for the increased diameter acceptance of the knobs with their brass inserts removed). The normal set screws in the knob fasten it to the capacitor shaft. Overall, the scheme works very well. It is mechanically very stable, and there is no hint of hand capacitance effects as the variable capacitors are tuned.

The MFJ-945C tested worked extremely well. Not every type of load was tried, but a reasonably wide range of loads from mobile whips to random wires was tried on 80 to 10 meters with SWRs ranging up to 1:10. The tuner could handle all of the load conditions, although because of the tapped coil arrangement, an absolute 1:1 SWR could not be secured under all circumstances. In some cases the lowest SWR that could be achieved was 1:1.2 to 1:1.5. Those values were, of course, quite sufficient such that any solid-state transceiver would still deliver its full power output. All of the controls on the tuner operated quite smoothly. As MFJ suggests in its instruction sheet for the tuner, you can initially set the two variable capacitors and the coil tap switch at their mid-range setting, set the meter switch in its reflected power position, and then simply apply enough tune-up power (5 to 10 watts) to allow adjustment of the tuner for the lowest SWR. All of the controls have sufficient markings such that you can exactly log the knob settings.

The SWR bridge in the MFJ-945C is conventional, but it also is the basis of a very good wattmeter. Used conventionally, the SWR meter would be set for full deflection with a bit of tune-up power (5 to 10 watts) by having the **FWD/REF** pushbutton on the front panel set to **FWD** and adjusting the **SENS./POWER** control for full-scale meter deflection. The **FWD/REF** pushbutton would then be set to **REF** and the tuner adjusted for minimum SWR on the meter scale. However, it is quite possible with the MFJ-945C to simplify the procedure by setting the **SENS./POWER** control to the marked 30 or 300 watt power levels, the **FWD/REF** pushbutton to the **FWD** position, and then adjusting the tuner for maximum forward power on the meter as the tuner is adjusted and as the power output from a transceiver is increased.

The calibration of the SWR/wattmeter in the MFJ-945C was found to be extremely accurate considering the small size and scale divisions on the meter. For a true 100 watts (160–10 meters) of transceiver output, the MFJ-945C indicated between 95 and 110 watts of power. The 30 watt power scale setting on the tuner proved to be completely correct within ±3 watts, although its accuracy (as MFJ freely admits) is not intended to be correct at extreme QRP levels. For instance, the meter read 10 watts when the actual transmitter output was 7.5 watts. However, all things considered, the SWR/wattmeter is very good, although you may have to go through a one-time calibration procedure if accurate power-level readings are desired.

The MFJ-945C can be characterized as a very good all-around tuner for those who operate a 100 watt output class transceiver. The built-in SWR/wattmeter circuitry saves you the inconvenience of having to use a transceiver's SWR monitoring switch position. However, if you felt like foregoing the SWR/wattmeter feature, the MFJ-901B tuner offers essentially the same matching circuitry at a lower price. Upscaling, the MFJ-941D and MFJ-949C tuners offer the same matching circuitry as the MFJ-945C, but with additional features such as built-in antenna switching, a cross-needle SWR meter which requires no setting, and a built-in dummy load. I prefer the MFJ-945C on a features to size to price comparison basis, but for strictly fixed-station operation, I would recommend the MFJ-949C tuner. As long as tuner size is not a significant factor, the cross-needle SWR

A look inside the MFJ-989B is impressive. Those huge air variable capacitors are rated at 6 KV. The unit is about 15 inches in depth.

Rear panel of the MFJ-989B.

meter feature in the MFJ-949C is well worth the extra cost.

The MFJ-989B

The MFJ-989B is the "big daddy" of the MFJ tuner line. However, "big" is a relative term. The front panel of this 3 KW tuner is relatively small (4½" × 10¾"), and it blends in rather unobtrusively with other station gear as can be seen from the station photograph. However, if you take off the top cover of the unit, as shown in another photograph, you will be impressed immediately by the massive dimensions of the components. The 6 KV variable capacitors, for instance, look more like the components you would associate with a 20 KW broadcast transmitter!

The basic matching circuitry is that of a T-network, but a continuously variable roller inductor is used instead of a tapped coil arrangement. Switching is provided such that you can bypass the tuner or select one of two coaxial line outputs or a wire/balanced line output. Switching to an internal dummy load (300 watts) is also provided. The built-in SWR/wattmeter circuitry drives a cross-needle instrument. No "settling" of any sort is required. In the high-power setting for the meter, the forward-power scale reads 0–2,000 watts, while the reflected-power scale simultaneously reads 0–500 watts. In the low-power setting for the meter, the scales change to 200 and 50 watts, respectively. SWR is read directly from SWR lines on the meter scale where the two needles cross each other. For anyone who has not experienced using a cross-needle SWR meter, I can assure you it is very convenient to use, since you simultaneously can monitor the power delivered to an antenna load increasing as the reflected power decreases. Contrary to some advertising claims, by the way (not from MFJ), the cross-needle meter is not a modern idea. A German invented it in the 1930s.

Besides being just plain massive as far as the dimensioning of the circuit components is concerned, the construction of the MFJ-989B does reflect the price you have to pay for this top-of-the-line unit. The unit is constructed using a basic aluminum enclosure with rolled top and bottom covers and a sub-chassis. The sub-chassis allows for wiring from the SWR PC board, which is mounted on the rear panel of the tuner, to be routed underneath the RF components to the front-panel-mounted SWR meter and high/low-power range switch. The two air variable capacitors—which, of course, have to "float" above ground—are mounted on insulated rails (a bakelite-type material) and then secured to the aluminum chassis with metal hardware. Teflon shaft couplings are used to couple the shafts of the variable capacitors to their respective knobs. The variable inductor has 36 turns and an inductance of about 28 μh. It is very rugged in construction, and there are double ground straps at the ground end near the front panel.

A turns counter coupled to the shaft of the inductor via a pulley/belt arrangement indicates 0–99. Therefore, you can reset the inductor quite closely to within one-third of a turn. The inductor has a tapered winding at its low inductance setting —exactly where it is needed. The antenna selector switch uses a two-section switch wired in parallel. All of the internal wiring features heavy-gauge silver-plated wire. A locking-type varnish is used on all of the nuts and bolts which hold the capacitors, switches, etc., in place. It's a fine touch I don't recall seeing since using WW II surplus gear. The balun transformer utilizes two large-size ferrite toroids, and I would certainly estimate that the transformer could handle 1.5 KW RF with ease.

The rear panel of the MFJ-989B (see photograph) is simply but very well organized. There are no compromises. The SO-239 coaxial connectors are mounted with complete metal hardware. The wire/balanced line output connectors feature

fully insulated ceramic pillar insulators of a type that will easily handle several KVs of RF voltage. Complete adjustment provisions are provided on the rear panel such that the SWR/wattmeter circuitry can be recalibrated whenever desired. The MFJ-962B tuner is almost identical to the MFJ-989B except it has a 12-position tapped inductor and is rated at 1.5 KW. However, it retains the features such as a cross-needle SWR/wattmeter, 6-position antenna switch, and 6 KV air variable capacitors.

Using the MFJ-989B

The MFJ-989B is, if anything, a very conservatively rated unit. I used the tuner extensively with a Ten-Tec TITAN amplifier which develops 1.5 KW of carrier output, key down, without even breathing hard. The tuner matched perfectly at full power into a variety of antenna loads—dipoles, a triband beam, delta loop, and a variety of random-length wire antennas. No arcing or overheating was observed in the tuner **(the top cover was left off for test purposes, although such a practice would be dangerous under normal circumstances)**. The turns counter on the inductor and the calibration on the variable capacitors allow excellent resettability. The SWR/wattmeter calibration proved to be very accurate with the SWR readings "right on" up to a 1:3 SWR (the maximum value I simulated with dummy-load resistors). The power-scale calibration was off by no more than half of a scale division (e.g., a maximum error of no more than ± 5%.

Although the tuner operated perfectly, I should like to emphasize that one simply does not dump 1.5 KW of RF into a tuner and then start turning the control knobs. The preliminary control settings have to be determined at a low power level, especially since tuners utilizing T-networks can exhibit false resonances whereby the transmitter power dissipates itself in the tuner components rather than in the antenna load. MFJ recommends that the controls be first passively set in the receive mode for maximum noise and signals. Then, a small amount of power is used and the controls adjusted for the usual SWR minimum. Using this procedure, no false resonances were encountered.

Do You Need A Tuner?

Depending upon your station setup, a tuner becomes anything from a necessity to a convenience item. If you operate only one HF band segment all of the time, it probably would be more worthwhile to trim an antenna system for as perfect a match as possible before resorting to a tuner to effect the transfer of maximum power from a transmitter to an antenna load. However, if you operate various bands with different antennas, a tuner becomes more of a necessity.

On some bands where a random-length wire antenna might be used, a tuner becomes the only practical device to transfer power into the antenna. On other bands, a tuner may only be a convenience item to allow for switching between different antennas or to reduce the band-edge SWR of, say, a triband beam to a value which a solid-state transceiver requires for full power output.

Then, also, the SWR monitoring of an antenna system using a tuner is one of the best and quickest means to check the condition of the system. A sudden SWR increase would quickly indicate a severe antenna problem, while a slowly increasing SWR might well indicate an insulator problem or something like moisture getting into a trap on a trap dipole or beam. Lastly, a tuner provides a means to stay on the air in case a station's main antenna system should fail, since you can usually string up some sort of wire antenna. I haven't used tuners with all of my station setups, but I don't remember ever not having one available in my shack.

If you study the features available on the seven HF tuner models MFJ currently has available, a model to satisfy almost any requirement should be evident. If you're not sure, I guess the best thing to do is to take up MFJ on their 30-day "order and try it" moneyback guarantee.

The model MFJ-945C is priced at $79.95, and the MFJ-989B is $349.95. They are manufactured by MFJ Enterprises Inc., Box 494, Mississippi State, MS 39762. CQ

No - 41-42

CQ Showcase

Technician Class Course

Gordon West has proved himself to be ahead of the competition again. West is the first amateur radio educator to offer a complete training course that addresses itself to the Technician Class only. It consists of two audio theory cassettes plus the brand new West-written Technician class theory book. The book and tapes are housed in a white vinyl carrying case. The two audio cassettes parallel the book and give the "sounds" of RTTY, packet, repeater QSOs and other interest catching things mixed in among the questions and West's commentary. Since there is no additional code requirement for the Technician, West estimates that most Novices can prepare for the exam in two weeks. The *2-Week Technician* is priced in the $20 range. Additional information is available from Radio School, Inc., 2414 College Drive, Costa Mesa, CA 92626 or circle number 106 on the reader service card.

Handheld Scanner

Cobra, a relatively new entrant in the scanner market, has unveiled an impressive unit that offers 100 channels, five separate programmable scanning memory banks and other desireable features in a compact package. In addition to covering the common business/public service bands from 30 MHz through 512 MHz, the SR-15 covers the 29.0–29.7, 50–54, 144–148, and 420–450 MHz amateur bands. Measuring only 6″ × 2¾″ × 1″, the SR-15 is housed in an attractive case made of anodized aluminum and high-impact ABS plastic. For more information, call 1-800-COBRA22, write Marketing Services Department, Cobra Consumer Electronics, 6500 West Cortland St.,Chicago, IL 60635 or circle number 103 on the reader service card.

Light Duty Towers

Microflect now has available a catalog featuring its 700 Series light duty self-supporting towers available in heights from 10–160 ft. high. These towers are designed for VHF, UHF, and small microwave applications. A complete line of mounts and other accessories available for this line. For more information, contact Microflect, PO Box 12985, Salem, OR 97309-0985, or circle number 108.

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CIRCLE 3 ON READER SERVICE CARD

Here's a simple antenna project that can increase your operating ability. You may even have most of the material around the shack.

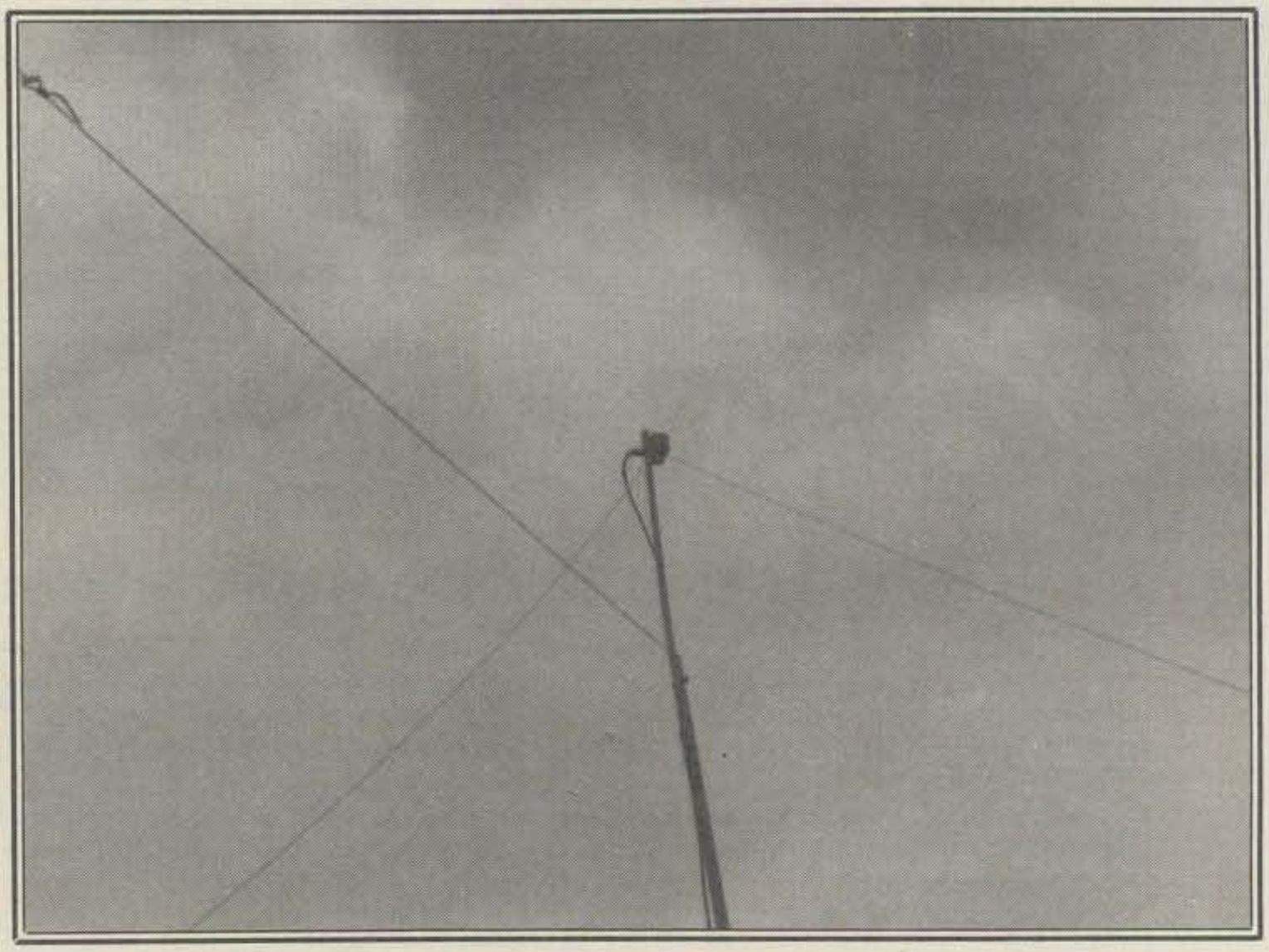
The MDS Antenna
(Multiband Delta Sloper)

BY JOHN J. SCHULTZ*, W4FA/SV0DX

How about a simple, inexpensive antenna system that will operate efficiently from 30 through 10 meters, requires only one elevated support, and even provides a touch of gain and directivity on 15 and 10 meters?

The little antenna system which I have dubbed the Multiband Delta Sloper (MDS) will do just that. It's not a sophisticated antenna. In fact, it's nothing more than a wire antenna that looks like an inverted-V dipole. However, note that it is an antenna "system" in that it includes a radiating element, transmission line, and antenna tuner.

Fig. 1 presents a diagram of the antenna. Although radio amateurs have spent countless hours trying to find magical combinations of wire-antenna and transmission-line lengths that would allow simple multiband operation, I must admit that the MDS came about by accident. I originally set out to replace a ½λ 10 meter vertical antenna with a horizontally polarized wire antenna that would have a bit of directivity on 10 meters and that could be fed directly with a coaxial transmission line. Only a single elevated support point was available. My first thought was to erect a center-supported ½λ dipole with sloping legs. However, such an antenna would not provide any directivity. In fact, it would be more or less omnidirectional. The study of various antenna manuals brought me back to the old V-antenna idea with legs sloping from the apex point towards ground. Such classic V antennas provide good gain and directivity but can be extremely long in terms of wavelengths per leg. As best as I could analyze the literature, it seemed that the "limit of compromise" would be to have each leg of the V antenna ¾λ long. Such a leg length would provide a modest bit of gain, roughly 2 dB, and simultaneously provide a low-impedance feed point at the center of the antenna. The antenna which evolved is shown in fig. 2. The center support point was about 20 feet higher than the ends of the legs, and the horizontal separation between the legs and the vertical separation of the legs from the mast supporting the apex point were roughly those shown in fig. 2.



The MDS is a relatively inconspicuous antenna. A plastic enclosure was used at the junction of the antenna legs and the transmission line to weatherproof the junction and as a means of attachment to the mast. The single wire going off to the left is a part of another antenna system, not the MDS.

The antenna worked very well on 10 meters. I found that by slightly moving the end points of the antenna legs either farther apart or nearer together (thus varying the 120 degree angle shown in fig. 2) I could "fine tune" the antenna's feedpoint impedance such that an almost exact 1:1 SWR was produced at 28.5 MHz. The antenna did show some directivity in a line bisecting the antenna legs (in and out of the page as you look at fig. 2). Low-angle radiation particularly seemed to be enhanced in the direction bisecting the antenna legs.

I was quite satisfied with the antenna considering the nominal investment involved. Being curious, however, I couldn't resist trying the antenna on bands other than 10 meters. Interestingly enough, the antenna didn't exhibit any wild SWR excursions on 30, 20, or 15 meters. In fact, the SWR never rose above 1:3. Of course, it would be impossible to say exactly what was taking place considering the impedance transformation effect of the coaxial transmission line on various bands, the effect of the 1:1 balun windings, etc. However, in spite of all these vagaries, the antenna worked reasonably well on bands other than 10 meters. Results on 15 and 20 meters indicated the antenna was only 1–2 S-units down from full-size dipoles cut for those bands. Some directivity was even apparent on 15 meters.

*c/o CQ magazine

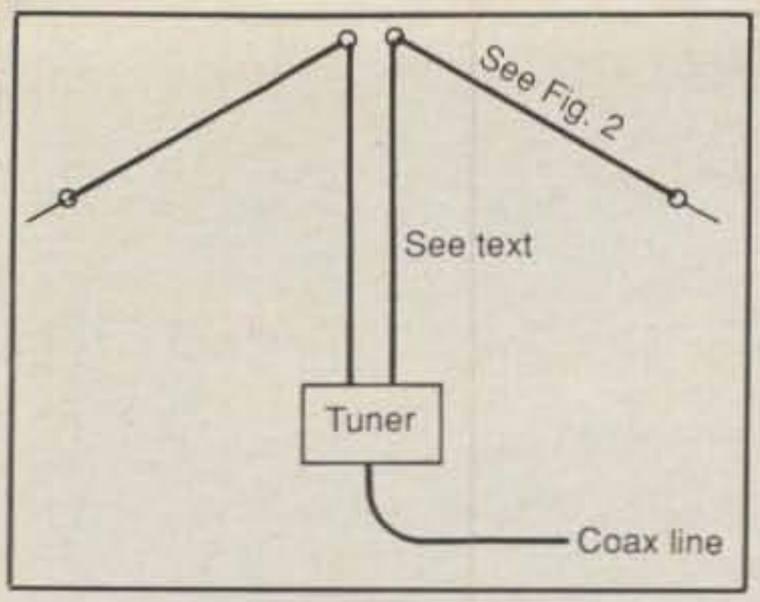


Fig. 1– The overall MDS antenna system.

Since the antenna was so close in performance to regular dipoles on the various bands, I felt the basic antenna form deserved a bit more attention as forming the basis of a multiband antenna. The only way to evaluate the situation was to disconnect the balun and coaxial transmission line from the antenna and to feed the antenna with a balanced transmission line using an antenna tuner at the transmitter end of transmission line. This was done, thus forming the antenna setup of fig. 1. The antenna "system," as then set up, performed remarkedly well. Using the antenna tuner an absolute 1:1 SWR could be presented to a transmitter across the entirety of any amateur band from 30 through 10 meters. More importantly, the antenna retained some gain and directivity on 10 and 15 meters and easily equaled the performance of full-size dipoles on 20 and 30 meters! I thought this was a reasonably good achievement for a simple antenna form that could be efficient, inexpensive, and constructed as ruggedly as needed to withstand any environmental condition.

I fed the antenna with good-quality TV-type 300 ohm twinlead which was about 50 feet long. I would estimate that such a setup will handle up to 300 watts of transmitter output power, but for higher power levels you should use transmitting-type 300 ohm twinlead, 450 ohm ladder-line, or open-wire transmission line. There are undoubtedly some transmission line lengths that would provide a minimum of impedance excursions on the various bands at the tuner end of the line, but I didn't have any need to experiment with different transmission line lengths. I would suggest that if you are going to try out this antenna do not worry about the transmission line length. Leave about 10 feet of extra line, and if an impedance situation is encountered on any band that the antenna tuner cannot handle, simply trim down the extra 10 feet, 1 foot at a time, until overall resonance is easily achieved on each band.

The antenna tuner used is shown in fig. 3. It's an old-fashioned, extremely simple type, but it's also quite efficient since only an air-core inductor is involved. Clip leads are used to tap the coil, and the tap points simply have to be found by experimentation for each band using an SWR meter between the tuner and a transceiver. The tuner really consists of nothing more than a 5 inch length of coil stock (1½ diameter, 8 turns/inch) and a dual

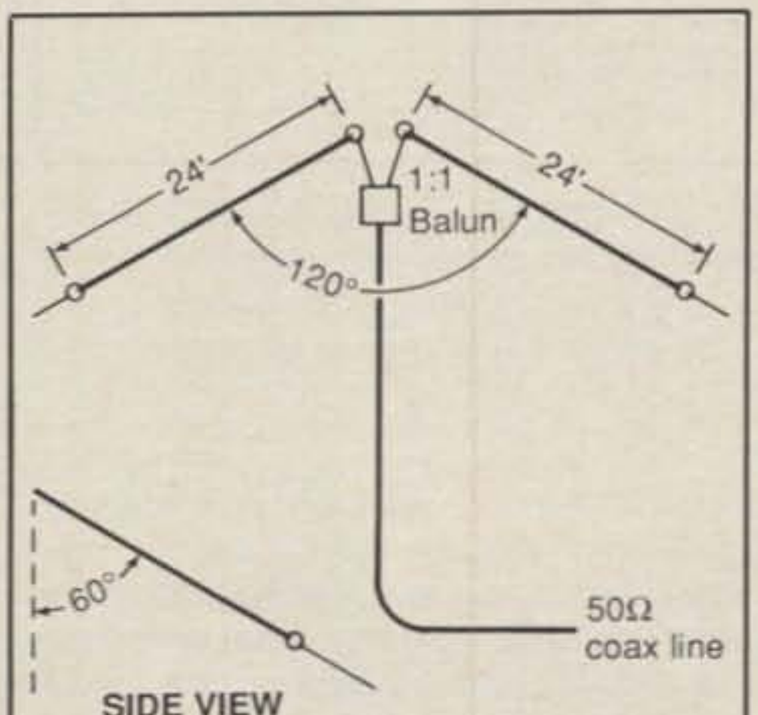
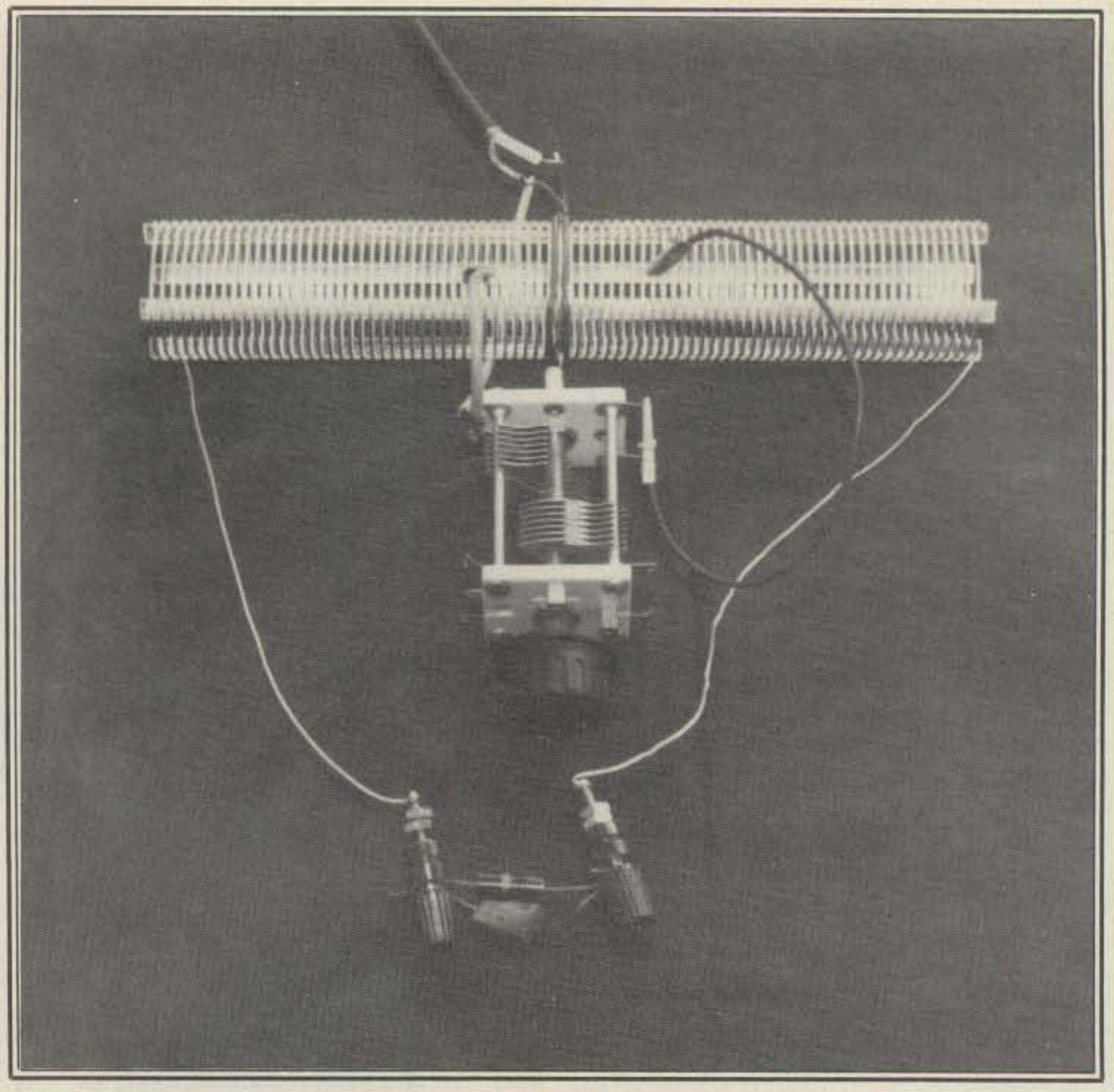


Fig. 2– The single-band antenna for 10 meters from which the MDS idea evolved.



Mockup of the antenna tuner developed for the MDS. See the text for details.

100 pF variable capacitor (800 to 1000 volt spacing for 100 watts output). The link in the center of the coil is just two turns of ordinary, insulated hook-up wire (16 AWG) wound tightly around the outside of the coil stock. I didn't make any exact measurements, but the tuner seemed capable of matching complex impedances over the 50 to 1500 ohm range from 30 through 10 meters. You can construct the tuner as simply or as elaborately as you wish. The simplest type of construction would be open breadboard style, while if you want to go "deluxe," the tuner could be put in an enclosure and switches could be used to bandswitch the tap points on the coil.

Overall, the MDS is an extremely simple wire antenna that will allow you to radiate a reasonable signal on 30–10 meters. Of course, as with any antenna, the high point of the MDS should be as high and as in the clear as possible. Referring to fig. 2, the 120-degree angle can be made greater, but it should not be less than 90 degrees or the antenna will become inefficient and very sharp to tune. The vertical angle, shown as 60 degrees, can be anything from 0 to 90 degrees. The antenna will easily resonate on 40 meters also, but I didn't make any comparison tests on that band. I would guess that the antenna is something on the order of 70–80% as efficient as a full-size dipole on 40 meters.

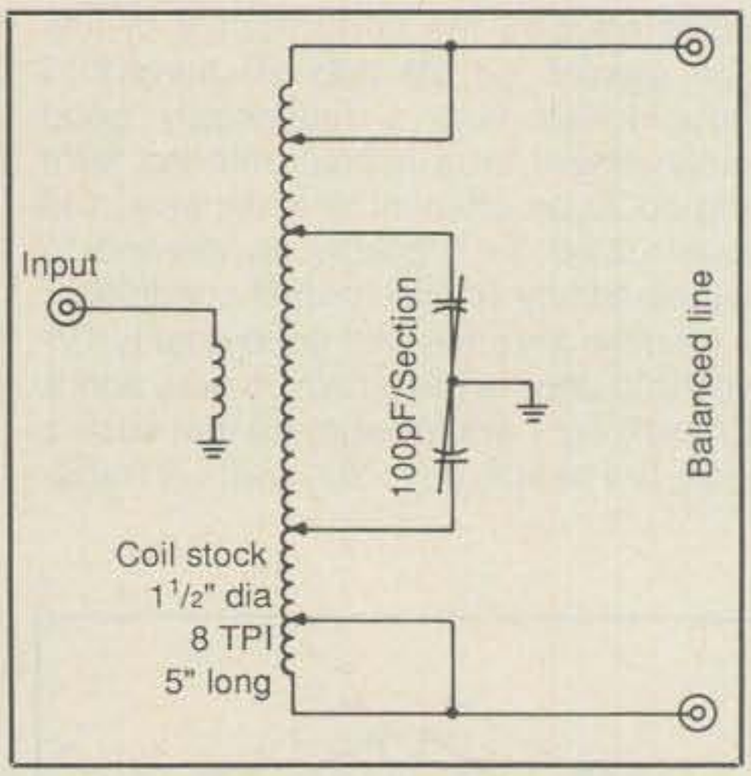


Fig. 3–Antenna tuner for the MDS. Some construction points are covered in the text. The coil taps for each band have to be established by experimentation.

Besides its use as a regular station antenna, the MDS lends itself easily for use as a portable antenna system or a standby antenna system that you can have in storage and ready to erect in case your regular antenna system becomes inoperative. CQ

MFJ TUNERS

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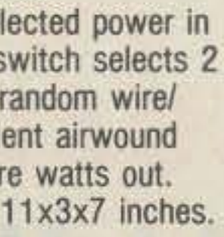

MFJ-1702, $19.95. 2-positions. 60 dB isolation at 450 MHz. Less than .2 dB loss. SWR below 1:1.2.

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6-position antenna switch handles 2 coax lines, direct or through tuner, wire and balanced lines. 4:1 balun, efficient airwound inductor with heavy duty ceramic switch, 6 KV capacitors. Flip-stand tilts tuner for easy viewing.

MFJ's Random Wire TUNER

MFJ-16010 $39.95

You can operate all bands anywhere with any transceiver when you let the MFJ-16010 turn any random wire into a transmitting antenna. Great for apartment, motel, camping operation. Tunes 1.8-30 MHz. Handles 200 watts. Ultra compact 2x3x4 in.

MFJ Artificial RF ground

$79.95 MFJ-931

You can create an artificial RF ground and eliminate RF "bites", feedback, TVI and RFI when you let the MFJ-931 resonate a random length of wire and turn it into a tuned counterpoise. The MFJ-931 also lets you electrically **place a far away RF ground directly at your rig** -- no matter how far away it is -- by tuning out the reactance of your ground connection wire.

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CIRCLE 9 ON READER SERVICE CARD

MFJ multi-mode data controller

MFJ *shatters* the 6 mode barrier *and* the price barrier with the MFJ-1278 and gives you . . . Packet, RTTY, ASCII, CW, WEFAX, SSTV and Contest Memory Keyer

. . . 7 digital modes . . . for an affordable $249.95

Amateur radio's newest multi-mode data controller -- the MFJ-1278 -- lets you join the fun on Packet, RTTY, ASCII, CW, Weather FAX, SSTV and gives you a full featured Contest Memory Keyer mode . . . you get 7 modes . . . for an affordable $249.95.

Plus you get high performance HF/VHF/CW modems, software selectable dual radio ports, precision tuning indicator, 32K RAM, AC power supply and more.

You'll find it *the most user friendly of all multi-modes.* It's menu driven for ease of use *and* command driven for speed.

A high resolution 20 LED tuning indicator lets you *tune in signals* ***fast*** *in any mode.* All you have to do is to center a single LED and *you're precisely tuned in to within 10 Hz* -- and it shows you which way to tune!

All you need to join the fun is an MFJ-1278, your rig and any computer with a serial port and terminal program.

You can use the MFJ Starter Pack to get on the air instantly. It includes computer interfacing cable, terminal software and friendly instructions . . . everything you need to get on the air fast. Order MFJ-1282 (disk)/MFJ-1283 (tape) for the C-64/128 and VIC-20 or MFJ-1284 for the IBM or compatible, $19.95 each.

Packet

Packet gives you the fastest and most reliable error-free communications of any amateur digital mode.

With MFJ's super clone of the industry standard -- the TAPR TNC-2 -- you get **genuine TAPR** software/hardware plus more -- not a "work-a-like" imitation.

Extensive tests published in *Packet Radio Magazine* ("HF Modem Performance Comparisons") prove the TAPR designed modem used in the MFJ-1278 gives better copy with proper DCD operation under all tested conditions than the other modems tested.

Hardware DCD gives you more QSOs because you get reliable carrier detection under busy, noisy or weak conditions.

A hardware HDLC gives you full duplex operation for satellite work or for use as a full duplex digipeater. And, it makes possible speeds in excess of 56K baud with a suitable external modem.

Good news for SYSOPs! New software lets the MFJ-1278 perform flawlessly as a WORLI/WA7MBL bulletin board TNC.

Baudot RTTY

You can copy all shifts and all standard speeds including 170, 425 and 800 Hz shifts and speeds from 45 to 300 baud. You can *copy not only amateur RTTY but also press, weather and other exciting traffic.*

A high performance modem lets you copy both mark and space for greatly improved copy under adverse conditions. It even tracks slightly drifting signals.

You can transmit both narrow and wide shifts. The wide shift is a standard 850 Hz shift with mark/space tones of 2125/2975 Hz. *This lets you operate MARS and standard VHF FM RTTY.*

You get both the American Western Union and the international CCITT character sets, Autostart for unattended reception and selectable "Diddle".

A receive Normal/Reverse software switch eliminates retuning and Unshift-On-Space reduces errors under poor receiving conditions.

ASCII

You can transmit and receive 7 bit ASCII using the same shifts and speeds as in the RTTY mode and using the same high performance modem. You also get Autostart and selectable "Diddle".

CW

You get a Super Morse Keyboard mode that lets you send perfect CW effortlessly from 5 to 99 WPM, including all prosigns -- it's tailor-made for traffic handlers.

A huge type ahead buffer lets you send smooth CW even if you "hunt and peck".

You can store entire QSOs in the message memories, if you wanted to! You can link and repeat any messages for automatic CQs and beaconing. Memories also work in RTTY and ASCII modes.

A *tone Modulated CW mode turns your VHF FM rig into a CW transceiver* for a new fun mode. It's perfect for transmitting code practice over VHF FM.

An AFSK CW mode lets you ID in CW.

The CW receive mode lets you copy from 1 to 99 WPM. Even with sloppy fists you'll be surprised at the copy you'll get with its powerful built-in software.

You also get a random code generator that'll help you copy CW faster.

Weather FAX

You'll *be fascinated as you watch WEFAX signals blossom into full fledged weather maps on your printer.* Other interesting FAX pictures can also be printed -- such as some news photographs from wire services.

Any Epson graphics compatible printer will print a wealth of interesting pictures and maps.

Automatic sync and stop lets you set it and leave it for no hassle printing.

You can save FAX pictures and WEFAX maps to disk if your terminal program lets you save ASCII files to disk.

Pictures and maps can be *printed to screen in real time or from disk* on IBM and compatibles with the MFJ-1284 Starter Pack.

You can transmit FAX pictures right off disk and have fun exchanging and collecting them.

Slow Scan TV

The MFJ-1278 introduces you to the exciting world of slow scan TV.

You'll not only enjoy receiving pictures from thousands of SSTVers all-over-the-world but you can send your own pictures to them, too.

You can print slow scan TV pictures on any Epson graphics compatible printer. If you have an IBM PC or compatible you can print to screen in near real time or from disk with the MFJ-1284 Starter Pack.

You can transmit slow scan pictures right off disk -- there's no need to set up lights and a camera for a casual contact.

You can save slow scan pictures on disk from over-the-air QSOs if your terminal program lets you save ASCII files.

The MFJ-1278 transmits and receives 8.5, 12, 24, and 36 second black and white format SSTV pictures using two levels.

Contest Memory Keyer

Nothing *beats the quick response of a memory keyer during a heated contest.*

You'll score valuable contest points by completing QSOs so fast you'll leave your competition behind. And you can snag rare DX by slipping in so quickly you'll catch everyone by surprise.

You get iambic operation with dot-dash memories, self-completing dots and dashes and jamproof spacing.

Message memories let you store contest RST, QTH, call, rig info -- everything you used to repeat over and over. You'll save precious time and work more QSOs.

You get automatic incrementing serial numbering. In a contest it can make the difference between winning and losing.

A weight control lets you penetrate QRM with a distinctive signal or lets your transmitter send perfect sounding CW.

More Features

Turn on your MFJ-1278 and it sets itself to match your computer baud rate. Select your operating mode and the correct modem is automatically selected.

Plus . . . printing in all modes, threshold control for varying band conditions, tune-up command, lithium battery backup, RS-232 and TTL level serial ports, watch dog timer, FSK and AFSK outputs, output level control, speaker jack for both radio ports, test and calibration software, Z-80 at 4.9 MHz, 32K EPROM, and socketed ICs. FCC approved. 9x1½x9½ inches. 12 VDC or 110 VAC.

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CIRCLE 2 ON READER SERVICE CARD

It doesn't always have to complicate or elaborate; it just has to work. W8DYF shares a simple idea that does work.

A Portable Vertical Antenna Support

BY JOSEPH M. PLESICH*, W8DYF

After being cooped up all winter and suffering from cabin fever, I like to get out and enjoy the warm weather when it arrives. And being an amateur, I also like to enjoy some operating outdoors. It's fun to take the rig out in the yard, to hilltops, and to the park to combine our hobby with sight-seeing, photography, camping, and just enjoying the sunshine.

Today almost all of us own small HF rigs that can be powered by car batteries, gel cells, or even electrical outlets that are available in our yards or many parks. After we have solved the power problem for our rigs, the next item on our list is what antenna to use for our portable operation. The answer to this is as varied as there are amateurs.

Wire antennas are always a good choice if you have the space and trees located in the right spot to cooperate with what you want to do. And you'll still spend some time with nylon cord, fishing poles, or rocks to get it erected just the way you want it.

Another option is to use a simple vertical antenna. This may not be your ultimate antenna either, but what I am about to describe does work and you can use it in places where you wouldn't have room for a wire antenna or available supports. This portable vertical is also simple to construct, cheap, and easy to transport, and it will complement your other portable antennas.

When I first thought of making a portable antenna, I thought of making one just for 20 meters. I felt I would just get some aluminum tubing of different diameters that would telescope into each other so that the antenna would fit into my car. This antenna would then mount on a little wooden platform. This wasn't a bad idea and will certainly work. But then I had a better idea.

I remembered I had a Hustler mobile mast with a few resonators just sitting in the garage gathering dust. I had obtained this antenna some time ago at a fleamarket when I had visions of going HF mobile. However, when I purchased a new car, I found that I hardly had room for a 2 meter rig, let alone an HF rig. Now I had a portable all-band vertical. Next I had to make a simple base to support it.

This photo shows the simple wooden base used to support the Hustler vertical.

I rummaged around in my junk wood box and came up with a ⅜ inch thick piece of plywood about 14 inches square. Anything near that size should do. Then I found a piece of dowel that was about an inch in diameter. I drilled a hole through the center of the piece of plywood and into one end of the dowel and fastened them together with a long wood screw and glue. Use a couple of stainless-steel hose clamps to hold the antenna to the dowel. Connect a piece of coax of a convenient length to reach your rig. Finally, you can also attach a few radials to the braid of the coax, and the portable vertical is complete. I even put some rubber feet on the bottom of the plywood so that I could set the antenna on top of a picnic table or car. Simple, huh?

Does it work? Sure it does. It's not as good as a full-size antenna, but you already know that. As soon as I completed the antenna, I, like all amateurs, had to try it out. It was too cold to go outside, so I set it down on the floor inside the house. I immediately jumped into a special-events pile-up and got a 5-5 from a station in Nebraska on 20 meters. Next I worked a station about 150 miles north of me on 75 meters and got another 5-5. This was at about 1:00 p.m. I was using an antenna tuner but no radials. Not bad! This could even be a good antenna for an apartment dweller.

I'm looking forward to having some fun with this antenna outside this summer. I hope you are, too. CQ

*554 Lovers Lane, Steubenville, OH 43952

1988 CQ WPX SSB Contest
High-Claimed Scores

The following are early-bird high claimed scores as of 5 June 1988. These are raw scores subject to verification.

U.S.A.
SINGLE OPERATOR
ALL BAND

NR5M	3,349,968
WX4G	2,938,848
K6HNZ	2,093,253
K3ZO	1,746,506
KY2J	1,381,097
KE7EQ	1,306,588
WB2Q	1,084,702
KI6CG	894,932
AI2C/4	864,224
KB0G	811,305
KI3L/5	805,374
NJ1F	802,196
KF2O	619,556
KV0I	617,684
N8BJQ	613,785
W9NSZ	554,472
K6EID	468,832
NT5V	462,609
WW6O	443,188
KS2M	419,616

28 MHz

KY5N	438,900
N4EJV	395,948
K6SVL	286,906
KH6DW/KS6	181,905
K5MK	114,595
K2OLG	69,030
KC5CP	68,796
WJ7S	62,075
WA7KLK	35,404
W7AYY	32,630
KA7WPD/T	32,060
N0HJQ/T	27,057
WB3CDX/N	23,040
WB6BRW/4	21,996
KR9G	20,736
W2KZE	20,090

21 MHz

AI4R	877,728
WA4FBH	762,280
WF5E	755,777
N9AG/8	514,960
KF4HK	389,487
K3IPK	387,828
W7JR	377,559
W7FP	336,396
K1TR	301,550
KE2BA	262,178
NI8L/1	226,980
WB8TLI	132,466
W8IMZ	108,432

14 MHz

KM6B	1,316,880
AI7B	1,071,798
KQ9L	773,685
WX6M	669,475
K1KJT	626,164
WF7B/4	521,807
W1BWS	388,648
W5FO	203,565
W4CYC	161,357
N9HCA	74,100

7 MHz

KV0Q	644,744
K5RR	276,650
AG9S	85,626
W0RXL	15,688

3.7 MHz

NO2I	69,136
WB5YLT	20,640
WB8ZRL/0	20,492

1.8 MHz

K5UR	28,462
W3BGN	22,468
AA4MM	12,636
W9RXJ/0	1,800
N6LL	990

QRP/p

WC7Q	A	418,544
WB6JMS	A	68,052
KB3TS	A	54,528
KB4IOS	28	988
N1AFC	21	66,588
W6CN	21	55,180
W6YVK	14	589
KH6CP/WW1	3.7	520

MULTI OPERATOR
SINGLE TRANSMITTER

WC4E	6,010,682
KI6P	5,799,409
N4WW	5,463,108
N3BB/5	3,419,577
KI1G	2,983,725
WC6H	2,284,659
NE8T	2,265,201
N7TT	1,577,600
NZ5I	1,246,225
KS3F	1,182,315

MULTI OPERATOR
MULTI TRANSMITTER

NB6L	2,471,752

SINGLE OPERATOR
ALL BAND
DX

P40V	12,384,320
VP2ML	7,609,665
HC1OT	7,281,560
N7NR/NH6	5,854,916
TU4BR/5U7	4,957,675
9J0A	4,380,985
K4YT/4D	4,311,770
VE6OU/3	4,106,793
YB0DPZ	3,920,336
TW5E	3,548,160
JL1BLW/KH2	3,452,905
GB2FXB	3,374,100
JT0NP	3,341,803
OK1RI	3,120,480
PP2ZDD	2,933,809
7P8DP	2,402,718
J45JG	2,309,034
HA0MM	2,267,643
OH1AF	2,004,504
YB3ASQ	1,920,932
JR6PGB	1,833,076
JH4UYB	1,831,423
K1BAZ/DV1	1,612,978
JA8RWU	1,447,600
W8KKF/WP2	1,347,438

28 MHz

LS1E	7,456,715
ZY5EG	7,409,214
CE3DNP	3,330,360
LU1LDS	2,720,850
ZY4OY	2,028,321
4X3M	1,559,691
YC0EAQ	1,491,815
YY1C	1,341,756
EA8VV	1,158,578
A25/ZS6P	1,154,941

21 MHz

ZP5Y	8,942,640
ZY5CC	8,120,202
NP4CC	3,770,688
ED8ACH	3,220,158
4Z5UX	2,586,551
VO1MP	2,564,617
VE3BVD	1,586,270
AT0Z	1,557,032
JA3YKC	1,470,116
OH5BM	1,249,680

14 MHz

ZZ5EG	8,219,627
CE6EZ	4,910,988
CE4FXY	4,396,197
YW5A	3,880,522
VO1QU	3,276,840
N7DF/WH2	3,187,048
CT3DL	2,870,672
NY6M/KH2	2,065,766
YU1KQ	1,744,618
IO2UIY	1,554,124
CI8C	1,512,318
4X6UL	1,242,571

7 MHz

HA9RE	1,087,320
TW4O	964,168
DL8PC	783,048
KH2F	751,688
YT7A	728,850
JA2BAY	601,200
OH2HE	399,454
JH7WKQ	370,332
F6EZV	366,120
OH3UU	248,082

3.5 MHz

VE2ZP	1,071,360
IO5MXX	891,330
DF8XC	636,750
AH6AZ	492,030
FV8NDX	264,966
FF1LQU	250,746
PA0IJM	236,848
VE1DX	169,974
OK2HI	126,636
YO6BKG	119,000

1.8 MHz

CT1AOZ	82,592
OK3CWQ	49,476
VE3PN	34,348
F6BVB	9,360
YO6AJI	8,466

QRP/p

4X6IF	A	879,860
YU2TV	A	312,244
FD1BEG	A	215,809
PY1ACV	28	75,740
JH9HXF/1	28	53,850
IK6ATS	21	83,700
JG4FAX	21	46,835
ZL1AXB	14	231,842
JA2JSF	14	67,626
IK8CHL	7	10,980
EA1DVY	3.7	80

MULTI OPERATOR
SINGLE TRANSMITTER

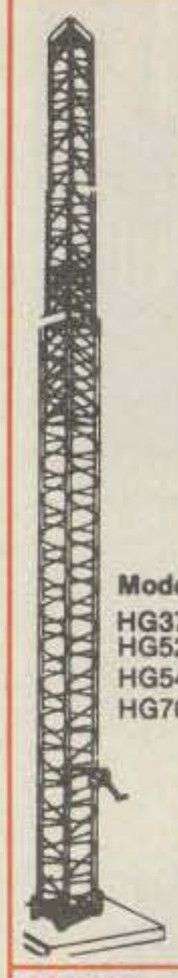
TX0A	17,166,329
YT2R	12,887,600
H22H	10,913,771
HD2A	8,211,084
YE4X	7,910,724
5H1HK	7,369,926
FJ0A	7,056,480
TW6A	6,670,165
XR4TA	6,015,636
DX1A	5,344,824
TD9G	5,288,764
4Z4YU	5,252,431
KX6DC	4,312,038
XO5FX	3,390,452
GB4CDX	3,261,440
OH7AB	3,227,484
YT3T	2,870,972
YB0AQL	2,743,704
I2EOW	2,704,286

MULTI OPERATOR
MULTI TRANSMITTER

KH6XX	25,293,520
LZ1KDP	9,976,707
WL7Y	9,558,690
KL7RA	6,996,600
AX9LZ	5,373,075
JA9YBA	3,986,164
ED4UPM	2,642,678
JA1YFG	2,032,990
PI4DEC	1,094,662

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

ANTENNA/TOWER SALE!



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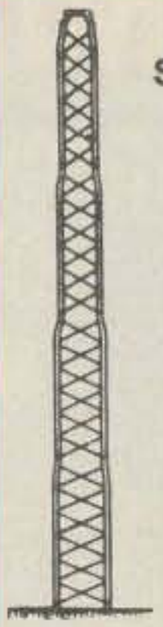
CRANKUP SALE!

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.!



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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	$379
HBX48	48 ft	10 sq ft	303	$489
HBX56	56 ft	10 sq ft	385	$569
HDBX40	40 ft	18 sq ft	281	$459
HDBX48	48 ft	18 sq ft	363	$559

***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'	$ 699	$1239	$1529
60'	769	1399	1719
70'	829	1539	1879
80'	989	1719	2079
90'	1069	1999	2249
100'	1149	2179	2439
110'	1359	2329	2839
120'	1429	2499	3039

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	$629
MA550 mast	22'	50'	10 sq ft	999
TX438	22'	38'	18 sq ft	919
TX455	22'	55'	18 sq ft	1385
TX472	23'	72'	18 sq ft	2279
HDX555	22'	55'	30 sq ft	2079
HDX572	23'	72'	30 sq ft	3559

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.
½" LDF4-50 Andrew Heliax®	$1.79/ft
⅞" 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	$25	$25	$33	$33
⅞" Heliax®	$29	$29	$29	$29
⅞" Heliax®	$55	$55	$55	$55

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 Gorden

1:1 Balun	$15	Center Insulator	$8
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	$259
A4S 4-el Tribander Beam w/S.S. Hdwre	$349
A743 & A744, 30/40 mtr KIT for the A3 & A4	$ 89
AP8 80-10 mtr Vertical	$139
AV5 80-10mtr Vertical	$119
D40 40mtr Dipole	$159
40-2CD 2-el 40 mtr Beam	$339
A50-5 5-el 6 mtr Beam	$ 98
215 WB NEW 15-el 2 mtr Beam	$ 89
230 WB NEW 30-el 2 mtr Beam	$229
4218 XL 18-el 2 mtr Beam	$129
3219 19-el 2 mtr Beam	$109
220B 17-el 220MHz Beam	$109
424B 24-el 432MHz Beam	$ 89
ARX2B 2 mtr Vertical	$ 45

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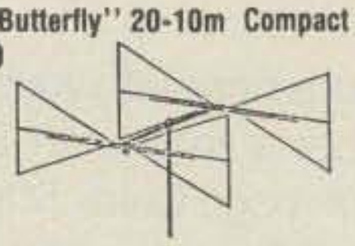

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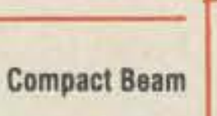

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RS20M	16	20	109
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CIRCLE 168 ON READER SERVICE CARD

World of Ideas

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

Portable Antennas For Summer Fun

A large number of friends continue to ask for details on the portable antennas I have briefly mentioned in various *CQ* articles and rig reviews. This month's column therefore describes those effective and easy-to-duplicate radiators. One of them is a "James Bond Special" designed for use at a vacation cottage or antenna-sensitive apartment complex. The other is a "super skywire" for radiating an attention-grabbing signal from the wilderness while using a battery-powered rig. The antennas will work any band of your choice and they are easy to carry, so give them a try. I'm sure you will like the results!

The Break-Down Rotary Dipole

Weekend jaunts to the beach and visits with relatives in nearby states created the need for a foolproof antenna that could be carried "knapsack style" in a corner of the car's trunk and erected in an impromptu manner. Several "gain-type" antennas were tried, and a few more were considered, but I ended up fiddling with the antennas more than doing on-the-air operating.

Finally, the idea of using a pair of Hustler mobile resonators in a rotary dipole arrangement captured my attention. One worked like gangbusters mobile, so a pair of them should really "get out" from a temporary site. After using the "Hustler Dipole" for several years, and in many off-the-wall locations, I can now honestly say it is a real gem. In nine out of ten cases it works at least as well as a full-size dipole. Possibly that's because some of my portable sites are better DX-ing spots than the home QTH, or maybe it's because the little dipole can be rotated for slight directivity. You can judge those points for yourself after assembling the antenna. Another good aspect of this dipole is you can add two Hustler multi-resonator brackets and work any three bands of your choice. Need a small rotary dipole for 80, 30, and 20 meters? This little marvel fills the bill in high style!

Basic details of the Break-Down Dipole are shown in fig. 1. Short lengths of concentric aluminum tubing are used for each side's 54 inch elements, screw-stock at their ends mates with Hustler mobile resonators, and plastic tubing is used as a center insulator/support. The antenna breaks apart on its sides rather than in the middle, making storage and reassembly a snap. Just insert the ends to their premarked points, screw on resonators, connect the coax, and you are ready for action!

Assembly of the dipole begins by force-fitting short lengths of the larger diameter aluminum tubing into an approximate 12 inch section of heavy (plumbing-type) plastic tubing until they are center-separated roughly 1 inch. Mounting holes are drilled through the tubing. Then self-tapping screws are used as connection points and stationary anchors for the antenna elements. Next a hacksaw is used to cut 1 inch slits in the aluminum tubing's ends, and small stainless-steel compression clamps are added at those ends.

Three or four inch sections of screw-stock are next force-fit into the smaller diameter aluminum tubing so Hustler "RM series" resonators can be added to the ends. Multiband spider-type adapters for accepting three resonators can be included here, if desired. The smaller end tubes are then inserted into the larger tubes until overall length is 54 inches. That point is marked for future reference, and clamps are tightened. We now have two simulated Hustler masts end-butted to create a mini-dipole.

A mast mounting bracket can be assembled using an old beam's boom-to-mast plate or home fabricated from a 5 inch square metal plate. Drill the plate to accept four U-bolts—two mounted vertically on one side for fitting to a mast, and two mounted horizontally on the other side for holding the dipole's center. Be sure the bolts do not short the antenna's connection point. If you need a quick and easy antenna-to-mast clip, incidentally, a few heavy rubber bands and a sponge can be substituted for the previous bracket. Once in place on the plastic tubing, you only need to pull them back and insert the mast—a 10 second maneuver. I carry a 5 foot piece of extra plastic pipe and a short length of rope with the antenna for deck or railing installation. I use one Hustler resonator removed from the car's mobile whip and another obtained from a hamfest fleamarket. Some amateurs damage a resonator by hitting an overhead obstruction. Those physically weak yet electrically perfect resonators are often available for less than a dollar in swap circles. Reworked with a nice layer of tape, they work great in this Break-Down Dipole.

Although the antenna can be directly connected to 50 ohm coax, adding a balun at the feedpoint produces noticeably

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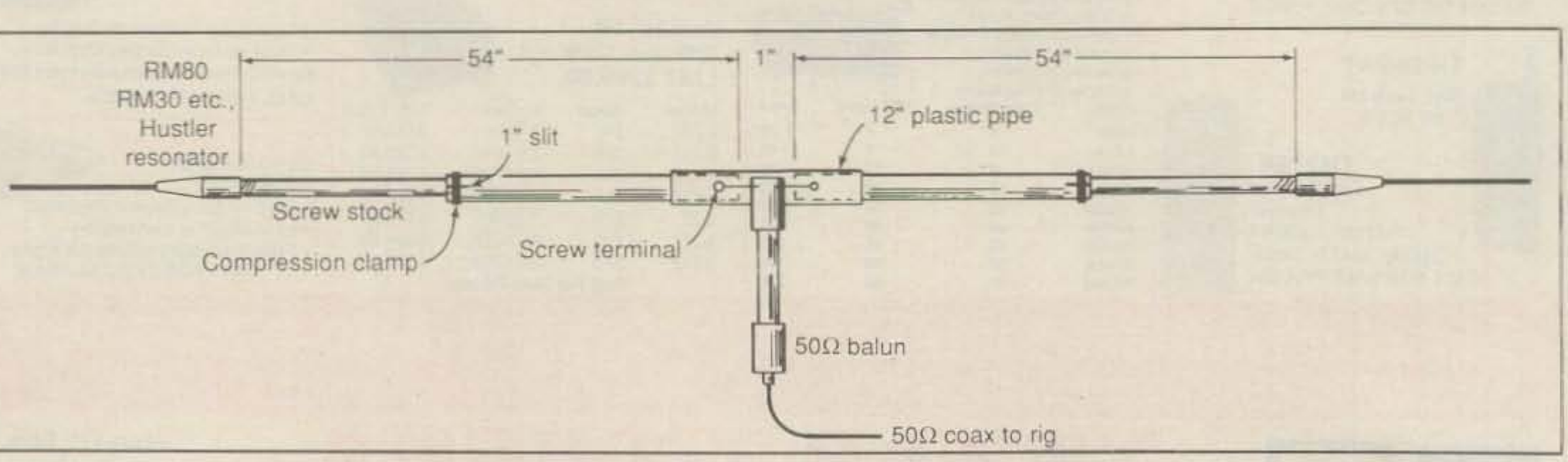


Fig. 1– The Break-Down Rotary Dipole. Antenna is assembled from small sections of aluminum tubing and uses Hustler mobile resonators at each end. Rubber bands or a boom-to-mast plate secures antenna to a plastic pipe for mounting and rotation.

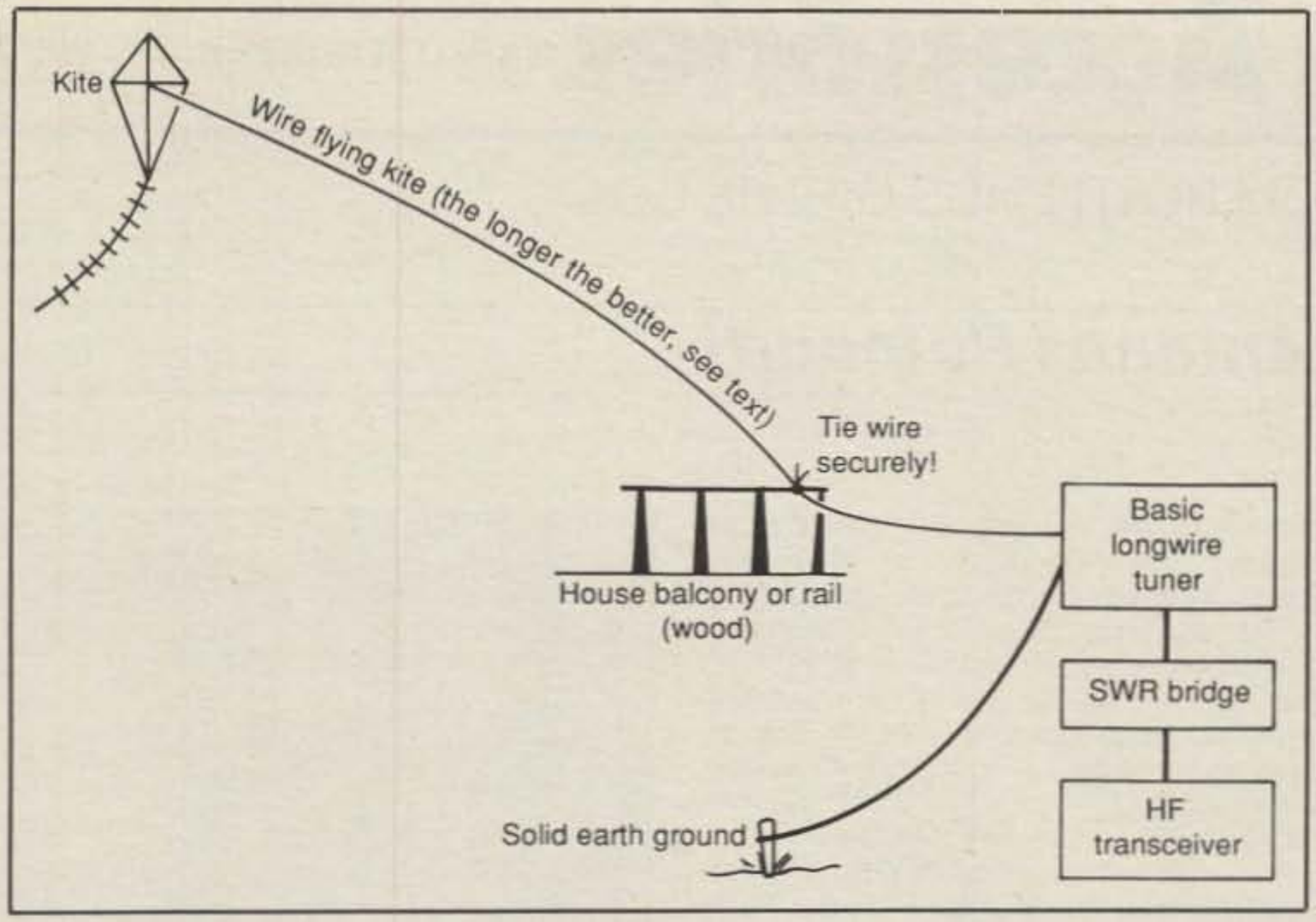


Fig. 2– The kite longwire. Antenna works like a champ, but it must only be flown when you are absolutely sure it cannot fall over power lines.

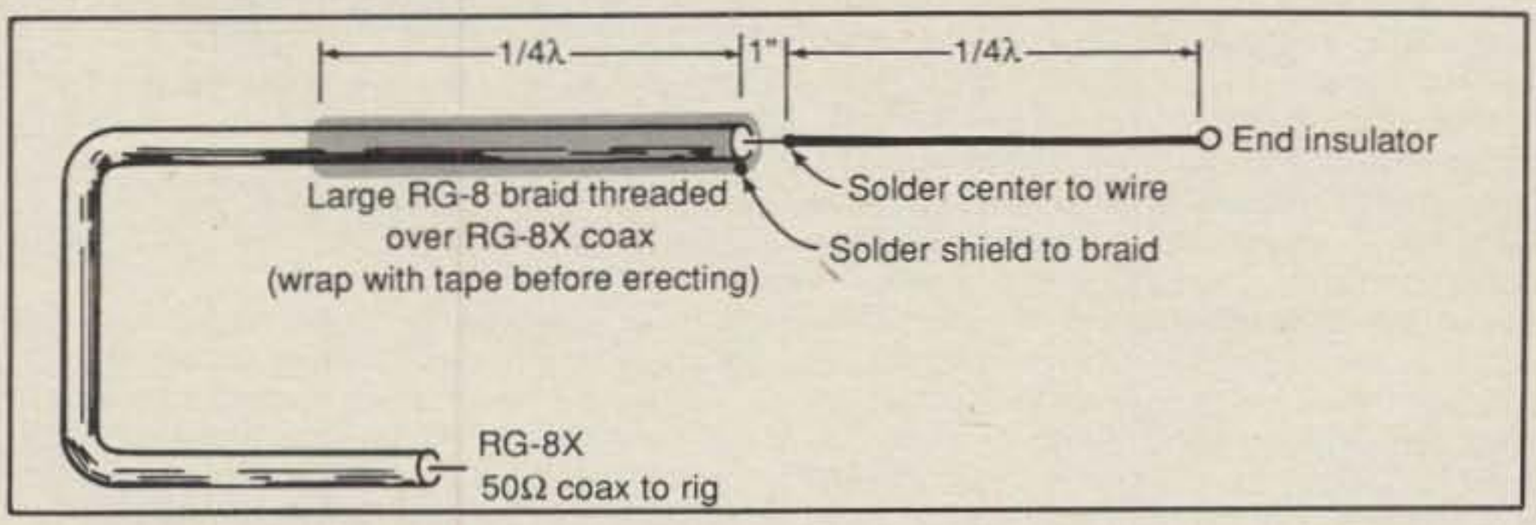


Fig. 3– The Roll-Up Coax Dipole. Antenna can be installed horizontally, vertically, or sloping. Transmission line extending from end makes it easy to install . . . and hide.

better results. A W2AU or Bencher balun works fine, but Palomar's little PB 1.5 seems slightly better for this application. I connect the antenna to my rig with a 34 foot length of RG-8X coax. Any convenient length can be used; I've simply found that the 34 foot length is "flat" and doesn't add SWR to its connected load.

Tuning the dipole is a snap. Adjust each resonator's tip rods in ⅛ inch steps just like you do on the car. Lengthening them lowers their resonant frequency. A little split marker on each resonator rod marks its "high end of band" setting. This little antenna is a surprisingly good performer. Try it. You'll like it!

The Kite Longwire

While visiting a remote southern beach several years ago, I flew a homemade kite using wire rather than string for its "feedline." Continuous winds quickly carried the kite aloft, and at least a mile of wire was soon airborne with the kite. I tied the wire to our cottage's wooden deck rail, ran it into a tuner, connected the rig, ran a ground down to the salt water, and worked DX like a bandit. A few days later the wire broke and the kite was lost, but those super DXing memories will last forever!

That same kite-flown longwire idea works great today, but modern considerations require some safety precautions—namely, **be sure to avoid power lines**. Never take that point lightly. Antennas hitting power lines, not high voltages in big RF linear amplifiers, are the leading cause of electrocution among today's amateurs. Always think safety first. If you enjoy camping in wooded and unpopulated areas, however, the super longwire will radiate a quite impressive signal.

Aside from the previous consideration, there are no set rules in this longwire. The longer it is, the better is works! Just use a good ground and an antenna tuner. Even the simplest "L network" or MFJ tuner is fine (see fig. 2). An SWR bridge is necessary for tuner adjustment, but it is included in many modern transceivers. Wire size depends on what you have available or can scrounge at hamfests. Many times, large half-full spools can be bargain-obtained for only a couple of dollars—a fair price indeed for super DXing! Kite size and style are also flexible; they only need to be capable of supporting the wire.

The Roll-Up Coax Dipole

Another portable antenna I've used quite successfully is an end-fed coaxial dipole (technically a misnomer; I simply could not figure out what to call it). As shown in fig. 3, the antenna consists of a quarter-wavelength of wire connected to the center conductor of RG-8X coax and a quarter-wavelength of shield/braid from old RG-8 threaded over the (smaller) RG-8X and connected to its shield. Since the antenna's feedline extends from one end rather than the center, it can easily and inconspicuously be installed in numerous ways. I've used it horizontally, sloping, and vertical, and I've made a miniature/roll-up version using RG-213 for "pocket use." They all work fine.

Whether operating from your patio, a weekend cottage, or a motel, summer is fun time for portable setups. If you live in an antenna-restricted condo, our ideas will at least encourage you to get on the air and join the fun. Good luck and good DXing!

73, Dave, K4TWJ

Antennas & Accessories

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

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

Antenna Potpourri

By the time this column appears in print, the ARRL will have completed its "call for papers" for *The ARRL Antenna Compendium, Volume 2*.

Many of us who have antennas as one of their favorite subjects were favorably impressed with the 1985 Volume 1 of the *Compendium*, which contained 31 previously unpublished papers. The topics ranged literally from "A" (antennas) to "Z" (impedance matching). A number of the papers presented information that was (and still isn't) covered in other sources.

Volume 1 has been quite popular, with more than 6000 copies being sold since it first hit the street in June, 1985. However, one of the drawbacks of the present volume is that it's computer-printed rather than being typeset, and the antenna drawings are prepared by duplicating the author's own drawings. According to the ARRL, the new volume will be typeset and the drawings will be professionally prepared.

While the new volume is just now being wrapped up, and the contents are not precisely known, it's a good bet that a variety of Quads, loops, Yagis, log periodics, and verticals will be covered, along with transmission lines, propagation effects, and measurement techniques. The book will contain all-new material.

We don't have a price yet for Volume 2, but Volume 1 contained 178 pages and was priced at $10. Watch for the ARRL to release the book later this year or early in 1989.

Bilal Isotrons: The Bilal Company is a small antenna manufacturing firm, active since 1975, which produces a single product line, the Isotron antennas.

According to Ralph Bilal, WD0EJA, its owner, he began marketing the compact Isotrons 13 years ago both for those with antenna space restrictions and for those who are looking for "something different" in their antenna systems.

According to Ralph, the small size and unusual shape of the Isotrons belies their performance, and performance is roughly equivalent to that of standard half-wave dipoles. Despite the small size (22" x 16" x 15" for a 40-meter version), the antennas have reasonably large areas and are made electrically resonant using large coils in series with the capacitive plates of the antennas.

Ralph indicates that his test measurements disclose that the Isotrons transmit as well as half-wave dipoles, and that there is somewhat less receiving noise when compared with standard dipoles. The radiation pattern is uniform in the horizontal plane, while the vertical pattern varies with the antenna's height above ground in a manner similar to that of the dipole.

The antennas are designed especially for portable and restricted space operation, and so would lend themselves to emergency, Field Day, motel, maritime, and similar use where larger antennas are problematical. Back-to-back mounting for multi-band use is possible. Construction is of tempered aluminum, PVC, cast acrylic, and stainless steel fasteners.

Six amateur single-band versions are available that cover 160, 80, 40, 20, 15, and 10 meters. Other models that cover the 11-meter CB band and MARS, CAP, and FAA frequencies also are available. Prices range from about $30 for the 10-meter model to $150 for the 160-meter Isotron. For more information, contact Ralph Bilal, WD0EJA, at the Bilal Company, 137 Manchester Drive, Florissant CO 80816.

I should point out that I've not had hands-on experience with the Isotrons, and so would be interested in readers' on-the-air experiences with them, especially in restricted space operation.

Com-Rad CR-4010R: Many SWLs (and amateurs, as well) who live in apartments or condos with severe antenna restrictions are always looking for a good, compact indoor antenna system. There are many indoor receiving antennas on the market to serve these needs. While it is most unlikely that an inexpensive indoor antenna will ever deliver the performance of a large, outdoor antenna that's mounted high and in the clear, many indoor antennas can produce usable results under what might otherwise be prohibitive conditions.

While the Isotrons are designed for small-space transmitting use, an interesting highly portable short-wave receiving antenna for SWLs is the Com-Rad CR-4010R, dubbed the "FUNtenna."

The one-pound antenna has a whip that's extendible to 42½". It's a table-top antenna that's designed to improve on the perform-

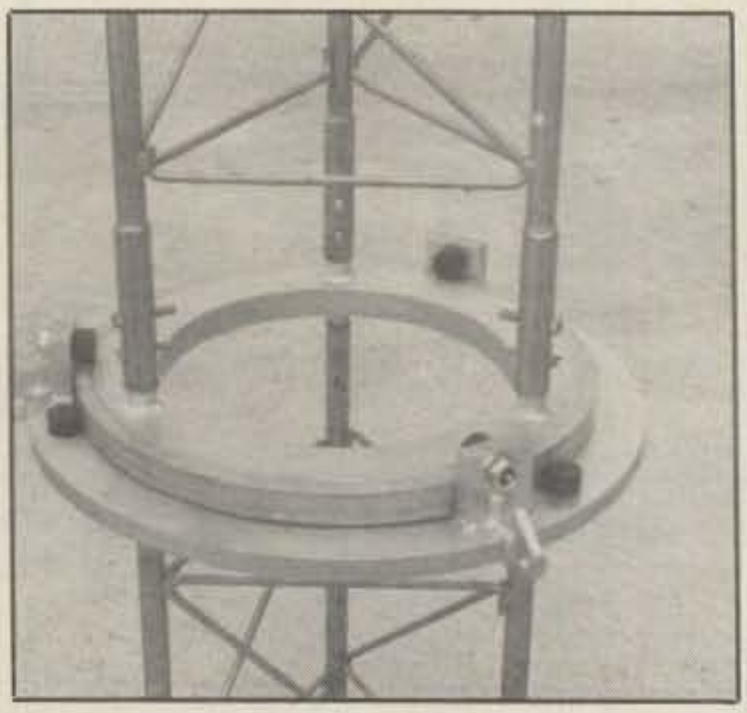
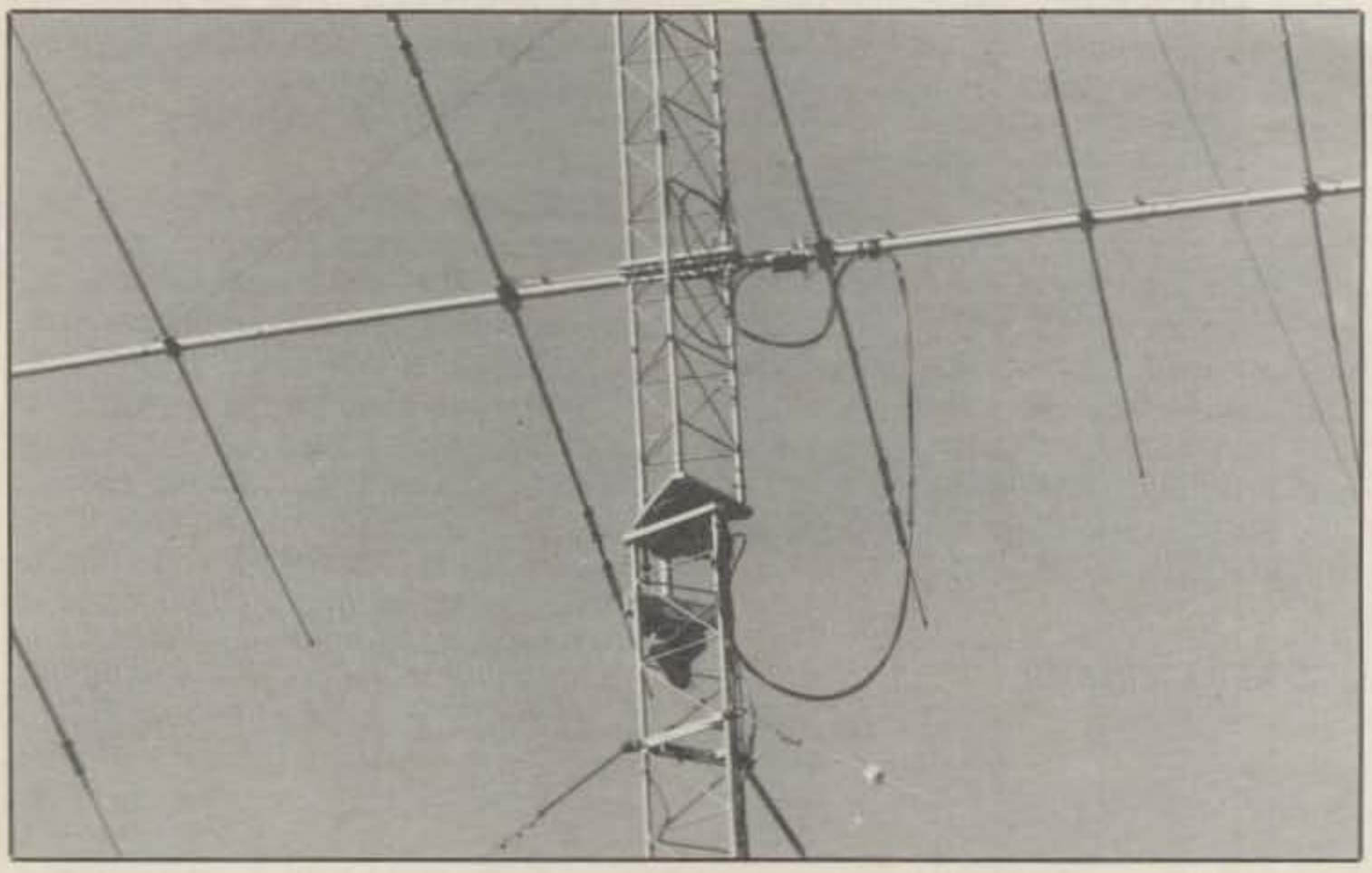


Photo shows the Rotating Tower Systems guy-wire bearing assembly. (Photo courtesy K5IU)



Shown here are the "guts" of K5IU's Rotating Tower Systems, the base assembly. The rotor also can be seen. A 2:1 chain drive on the HDR-300 rotor yields 10,000 inch-pounds of "turning torque." (Photo courtesy K5IU)

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(TILTED TERMINATED FOLDED DIPOLE)
    BY KC9YQ

ENTER FREQ. IN MHZ ? 7.150
LENGTH= 45.87  FEET
SEPERATON= 16.51  INCHES

MINIMUM TILT=20 DEGREES. (TERMINATING
OPTIMUM TILT=30 DEGREES. RESISTER=
MAXIMUM TILT=40 DEGREES. 390 OHMS)
TERMINATING RESISTOR MUST HANDLE 50%
OF THE XMIT. POWER.

FED WITH 50 OHM COAXIAL CABLE VIA 6:1
IMPEDANCE STEP UP BALUN.
WORKS ALL BANDS FROM DESIGN FREQ.
AND HIGHER.
AN OMNIDIRECTIONAL RADIATOR.
SWR=1.5 TO 1 ON ALL BANDS.

          HARDCOPY ? CONTINUE ?
```

Fig. 1—Shown here is a typical calculation printout from KC9YQ's Wire Antcalc program; the program also produces drawings of the antennas. The example used is the T2FD (Terminated Tilted Folded Dipole) antenna. Wire Antcalc and its sister program, Antcalc-64, run through the calculations for a variety of popular HF and VHF antennas. More on this program in this month's column.

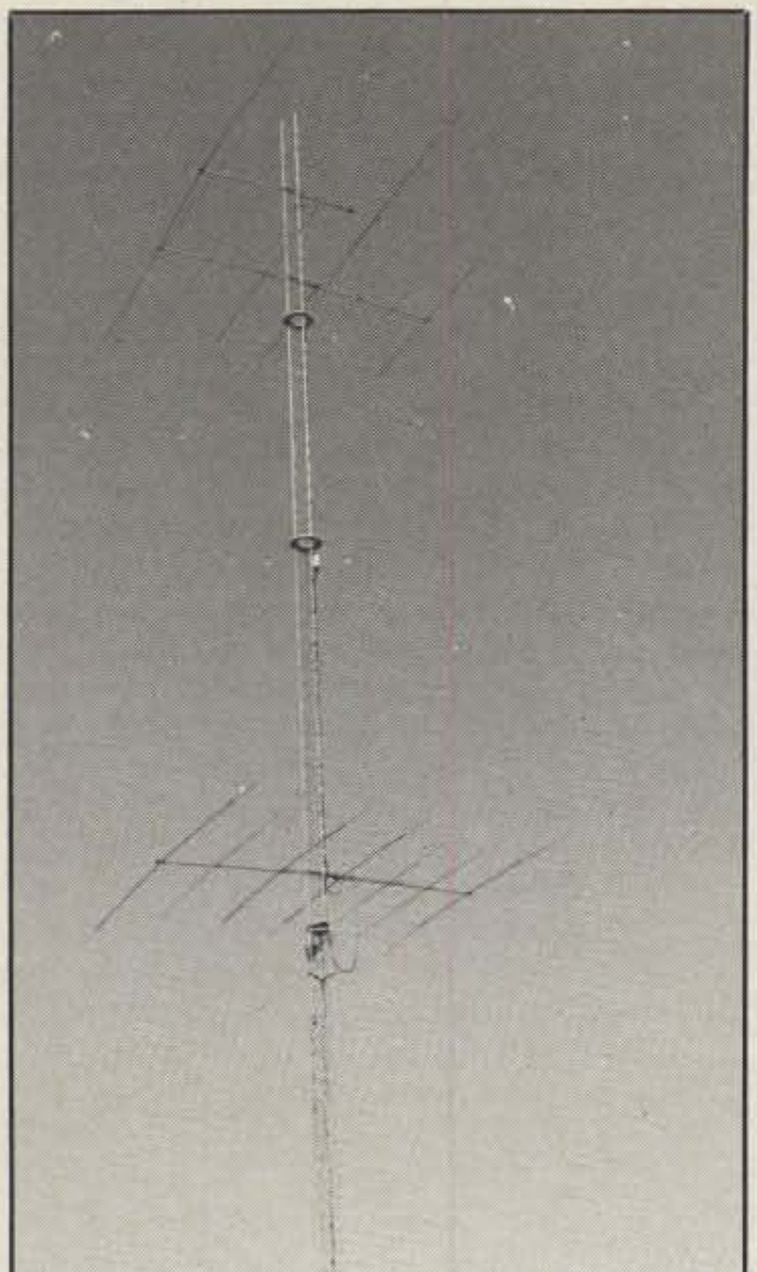

Photo shows a complete, in-place K5IU system. Note the base assembly below the lowest beam, and the two guy-wire bearing units higher on the tower. See this month's column for more information. (Photo courtesy K5IU)

ance offered by the typical short-wave receiver's built-in whip. The CR-4010R "does its thing" by means of a tuning network in the large 11" base, and does not include a preamplifier. (The oversize base is about 11" in diameter at the bottom, 7" in diameter at the top, and about 6" high.)

The FUNtenna has a 12-position selector switch which lets you "peak" signals from around 6.8 to beyond 50 MHZ; with the telescoping whip collapsed, the antenna works out to 90 MHZ. Fine-tuning is accomplished by adjusting the length of the whip.

We've not done a "hands on" evaluation of the CR-4010R. However, last year, Phil Ingraham, W2OSY, reviewed the antenna for our sister publication, *Popular Communications*, and found that while the manufacturer's claims for performance equaling that of a long-wire were perhaps a bit overstated, the antenna beat the built-in antenna of his Panasonic RF-2900 general-coverage receiver by a long shot. Also, while the antenna is not of the "active" type (one having a built-in preamp), the fact that it doesn't require batteries or other source of power is a plus for some applications. One of these would be in camping, where it's bad enough to have to worry about your radio's batteries going dead without also being concerned about batteries in the radio's accessories.

Contact Com-Rad Industries, PO Box 554, Grand Island NY 14072-0554 for more details and pricing.

ERD-1 Active Antenna: While we're on the subject of indoor receiving antennas, we should mention the Inline Components ERD-1 active antenna. This low-profile accessory consists of a black plastic case which houses the preamp and nine-volt battery, and which also serves as a mount for the unit's telescoping whip. The device is for "turn on and forget," broadbanded (150 KHZ to 30 MHZ) applications: there is neither a tuning adjustment nor a gain control. Several accessories include a "coupler" to use the antenna with receivers which have built-in ferrite loop rod antennas. The manufacturer claims the preamp has a 10 dB signal gain.

The unit is priced at about $90 from Inline Components, 4521 Campus Drive #113, Irvine CA 92715.

Electron Processing Signal Intensifiers: An unusually complete line of broadband receiving preamps for a variety of amateur, SWL, aviation, and scanner applications is offered by John Martin's Electron Processing, Inc.

EPI's product line includes at least five models that cover various frequency ranges from as low as 300 KHZ to 1000 MHZ. Most of the models offered sport about 13 dB gain and require 10-18 VDC for power; most are priced at $25-$30. A new high-performance preamp, the Model RFSP, covers 50 MHZ to 1000 MHZ with a reported 20 dB gain and a low 3.5 dB noise figure; it's priced at about $70.

By the time you read this, Electron Processing should have announced a line of mobile preamps and antennas. Another new product is a "brapper box," a handy packet TNC-to-transceiver interface for making simple, idiot-proof plug-in connections to most TNCs and rigs.

Contact Electron Processing, Inc., PO Box 708, Medford NY 11763.

Rotating Tower Systems Revisited

Thumbing through some previous columns for ideas to feature, I recalled our coverage of Dick Weber, K5IU's rotating tower systems assemblies which we described at length in the February 1987 column. I had to chuckle when I reviewed my own introduction to that column: sometimes, when viewing an especially large and impressive antenna installation, I'm inclined to conclude that it would be a great deal simpler to just rotate the *house* under the antenna, rather than rotate the antenna itself.

Of course, that half-in-jest thought won't do the trick, but as we're well into this year's antenna season it's not a bad idea to revisit Dick's novel approach to supporting and turning multiple rotatable arrays.

Dick's "rotating tower systems," which he markets through his firm of the same name, allow you to build a system to rotate all or part of a tower containing several antennas easier and with greater capability than using three or four static towers, and at a much lower investment. A rotating tower allows common rotation of HF stacked arrays, VHF and UHF arrays, and other antennas mounted at optimum heights. Dick's product, in effect, multiplies your "tower real estate" by means of a rotating base which can be installed at any height, and special guy-wire bearings. The accompanying photos provide an idea of how the towers are configured.

The rotating base can be installed at any height desired, being specifically designed for use with a Rohn 45 or 55 tower. The 2:1 chain drive on an HDR-300 rotor yields an impressive 10,000 inch-pounds turning torque.

According to Dick, all of the parts are designed to be at least twice as strong as the tower sections to which they mate. Importantly, the bearing and sprocket assembly can be replaced without de-installing the tower. The bearing which holds up the tower has a static thrust load rating of 17,000 lbs. and is a commercially available bearing. Thus, if necessary, it can be replaced. The "cam followers" that are used on the guy-wire bearing unit are rated at 11,000 lbs. each. They also are easily replaced, and are readily available at bearing supply stores. All of the bearings are sealed and can be lubricated with a grease gun. The sprockets are clear cadmium plated, and all hardware is hot-dip galvanized with the exception of a few parts which are of stainless steel or aluminum construction.

Dick has an interesting packet of information he can send you if you're intrigued with this "alternate method" of antenna rotation. Contact Rotating Tower Systems, Inc., Box 44, Prosper TX 75078.

Software Notes

Jersey City Keyer: David Minster, NW2D, of Alpine Consulting Associates (ACA) sent us a review copy of what turns out to be an excellent, truly state-of-the-art keyer for the IBM-PC and its many compatibles.

The *Jersey City Keyer* is a multipurpose product that takes into account the needs of the beginner as well as the advanced operator who specializes in contesting or traffic handling. The keyer has a number of features that are of special interest to those learning Morse for the first time on a self-teaching basis, as well as volunteer examiners (VEs) or teachers who would like to have at their command a completely automated testing facility, to include sending of the audio test and either hard-copy or screen exam generation.

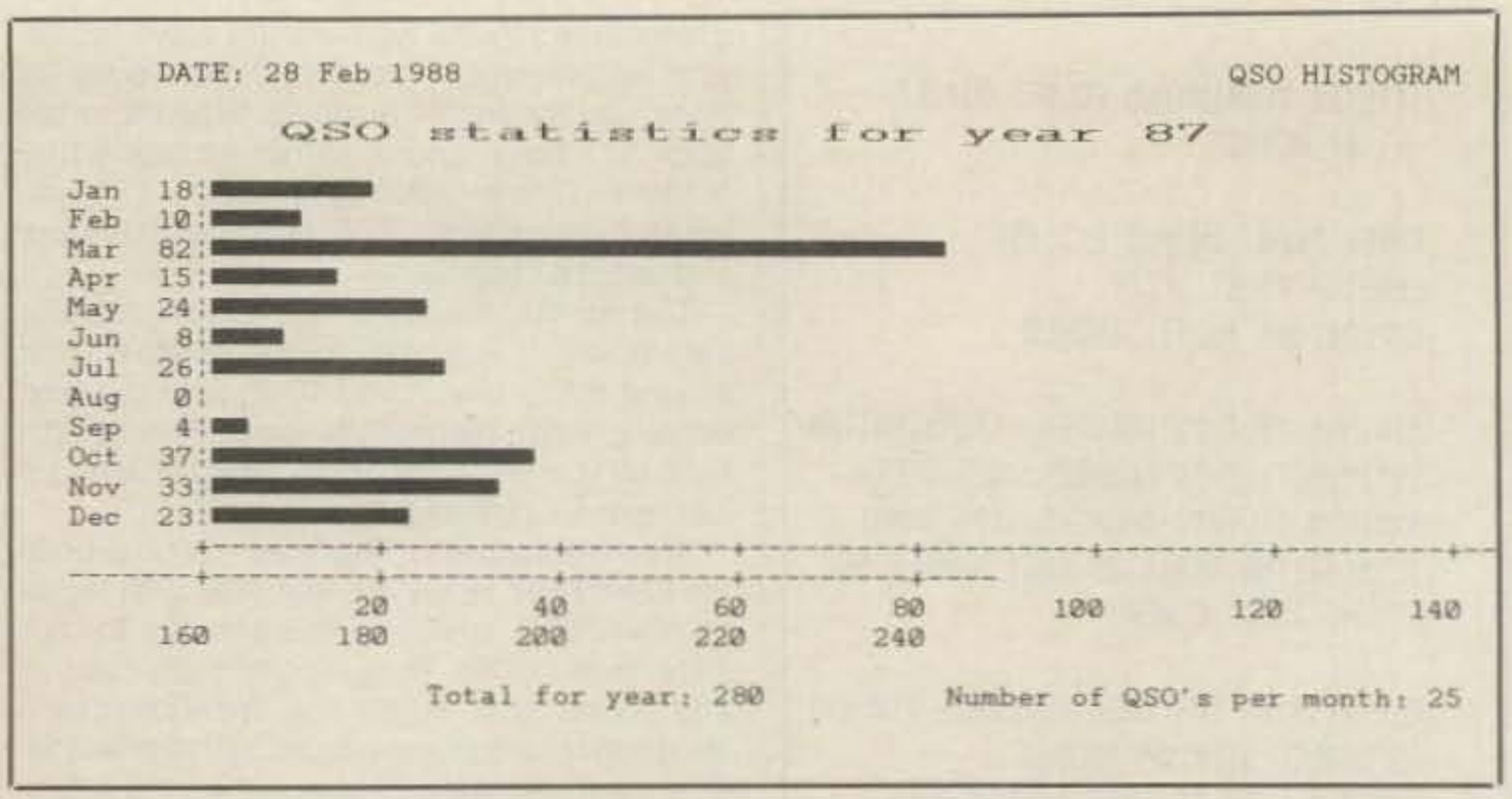

Fig.2—The QSO statistics histogram shown here is available as one of the menu options on the GEMRADIO reporting module, a portion of VE3NXQ's comprehensive GEMAIR RADIO SYSTEM *for the IBM-PC and compatibles. Details are in this month's column.*

The *Jersey City Keyer* has more features than we can possibly describe here, but let's briefly mention some of the more important ones. The keyer includes such fairly basic features as keyboard generation of Morse code, translating a disk file to Morse, random Morse generation for code practice, an interface to the computer's COM or cassette port, "lefty" or righty" manual keying, an interface to paddles for iambic keying, and fully adjustable speed (5-40 WPM) and audio tone.

Some of the more sophisticated keyer features that I liked were the on-line reference charts, the ten recallable memory registers, and the sophisticated built-in "macro language," used for programming the computer's ten definable function keys and programming of the memory banks to suit individual operating needs and tastes. The macro language is quite sophisticated: it even includes loops, GOTOs, if-then-else logic, on-screen prompting, and automatic QSO number incrementing, to name but a few of its capabilities.

I found the *Jersey City Keyer* to be very easy to use, and believe that the beginner would have little problem in using its basic and educational features. The advanced features are perhaps difficult for the rank beginner to understand, but are features which the operator can "grow into" as he or she gains experience. For the CW contester and heavy CW traffic handler, this program appears to have it all.

I should point out that the keyer lets you capitalize on its full range of capabilities only if you interface it to your transmitter or transceiver. It must be interfaced using either the computer's RS232 serial port or the cassette port on the original IBM-PC. Optional cables are available for this purpose.

The keyer is priced at $49.95. For more details, contact ACA, Inc., 103 Godwin Ave. #129, Midland Park NJ 07432.

Antenna Dabbler's Delight: John W. Daebelliehn, KC9YQ, offers a very inexpensive set of two antenna calculation aid programs for the Commodore 64 that will keep even the most active antenna experimenter busy for quite some time. The two-program set performs the necessary calculations for a multitude of antenna types, including some near-forgotten and obscure antennas in addition to more currently popular designs.

The first program is *Antcalc-64*. On HF, the program calculates requirements for various Quads, Yagis, Quagis, dipoles, and phased dipoles and verticals. The program also runs through various stacking and other gain calculations. On VHF, a similar set of routines are available, plus procedures for helixes, corner reflectors, and quarter-wave Q-sections. All calculations have the option of hardcopy output. As a toss-in bonus, the Antcalc-64 printer routines allow the printing of QSL cards, blank log sheets, and address labels. The program also has a decimal conversion capability.

The second program, *Wire Antcalc*, calculates requirements for Terminated Tilted Folded Dipoles (T2FDs), ZL specials, 8JKs, Sterba Curtains, Bobtail Curtains, Beverages, Marconis, and several others. There also are calculations for Q-matches, phasing stubs, and decimal conversion. All calculations have provision for hardcopy printout of results, including antenna drawings.

John offers each program for $5; both are available for $8. He also requests that you send him a SASE disk mailer and a blank disk with your request. Contact John W. Daebelliehn, KC9YQ, 1845 8th St., Moline IL 61265.

MacTrak (TM): We don't often see amateur radio programs for the Apple Macintosh. I'm not sure just why this is the case, but it probably has something to do with the computer's steep pricetag, which makes this very capable, graphics-oriented computer somewhat less than optimally cost-effective in the hamshack. Occasionally, however, a Mac program does cross our desk, and this one looks like a winner. It's MacTrak, and it incorporates several novel features not usually found in satellite tracking software.

For example, not only does *MacTrak* produce the expected tabular data and display satellite positions on a world map, but it also offers a choice of several map displays, including polar and great circle, and a unique "view mode" which presents the earth as seen from the satellite. This latter feature lets you use your Mac screen as a "window" and effectively ride along with the satellite.

The *MacTrak* program operates in real-time mode, presenting data as it actually changes. When used with the KLM/Mirage Tracking Interface (MTI) and compatible rotors, the pro-

gram will steer your antennas. The program can also track the sun and the moon, a feature of interest to the EME gang, and it will even calculate planetary positions.

Another feature, one that makes the program of interest even to those who aren't "into" satellite communications, is the built-in propagation prediction package. Randy indicates that it is primarily intended to search for "over the horizon" HF satellite signals, but the capability can also be used for general propagation purposes as well. With this feature, you can place a cursor over any location and see the current predicted Maximum Usable Frequency (MUF) to that point. With a click of the Mac's mouse, you have an hour-by-hour graphical presentation of MUF versus time. The MUF/Map display depicts the areas of the world that are open for a particular band.

The *MacTrak* program is priced at $49.95 and is sold direct by the author. Contact Randy Stegemeyer, W7HR, PO Box 1590, Port Orchard WA 98366.

KT5X Contest Logger: Fred Maas, KT5X, wrote us with news of the IBM-PC contest logging program that he's been perfecting for some time. Writes Fred:

"Over the past three years I have been enjoying developing a contest logging program for the IBM-PC and compatibles which has recently blossomed into something that I think is quite excellent; enclosed you will find a list of features. I would be delighted to share the fruits of my efforts with others, but I have too many hours (probably 1,500) in it to simply give it away, and I expect that the market is too small to warrant venture capital for colorful packaging and advertising. I would like to offer it as described on the features sheet: simply and direct."

Fred's logging program has a number of useful features, including: data entry without having to memorize function keys; instant dupe-checking; full access during the contest to amending any contact; extensive on-screen help; last four contacts remaining on the screen as new ones are entered; ability to toggle hardcopy at will; sophisticated multiplier options to allow the program to be used in practically any contest; instant access to target bearings and distance from both prefix and VHF grid squares; and a graph showing the QSO rate.

Fred offers the program in two ways. You can obtain a trial copy, which is limited to 50 QSOs, by sending a formatted 5-1/4" disk in an SASE disk mailer; include $25 for the program to be enabled. Or, you can have "the works" for $35 complete. Contact Frederick H. Maas, KT5X, Rt. 9, Box 86-H, Santa Fe NM 87505.

GEM RADIO SYSTEM: Dr. Antonio (Toni) Salvadori, VE3NXQ, a computer science faculty member at a major Canadian university, sent us a copy of his logging and "database system" for amateurs, the *GEM RADIO SYSTEM*. According to Toni, several of his friends who use it believe it to be the best logging and retrieval program that they have yet seen.

The program was originally written for the Apple II, but due to memory limitations on that machine, Toni expanded it to IBM-PC compatible machines. It consists of two major components, "GEMAIR", which is the main real-time entry portion, and "GEMRADIO", which is the reporting and utility module. The system is, indeed, a very sophisticated one, with powerful database reporting features. It includes distance to and other information on target prefixes and an optional label printing module.

The program is offered in two versions, one for floppy drives, and the other for hard disk equipped PCs. The two versions are virtually identical except that with the former, all files are maintained on floppies and therefore retrieval is slower. However, while you can get by with about 300KB memory with the floppy version, you need close to a full 640K available for the hard disk version to function. (Being limited to 512K, I was required to run up the floppy version.)

The VE3NXQ system contains two major programs, "GEMAIR" and "GEMRADIO". Some of the main module "GEMAIR" features can be seen by a quick look at the program's major menu functions. These include: adding a new contact (QSO) to the log; changing information about an amateur in the database; displaying a contact on the screen; searching and displaying contacts by frequency, state, location, and country; displaying all amateurs in the database; and summing the numbers of amateurs and contacts in the log.

"GEMRADIO," the reporting and utility module, has two main menus. The first offers a number of printout options, which include such functions as printing lists of confirmed US counties; various DXCC statistics; all amateurs worked; confirmed prefixes; all QSOs; all amateurs worked in a particular state; summary QSL information; WAZ countries worked; and more. The second menu allows you to obtain bearings and distances to locations (QTHs) around the world; display yearly QSL statistics; produce a listing of country, state, and provincial abbreviation codes; set up the QSL file for personal label generation; and take care of various housekeeping and utility functions.

Toni advises that he offers the program for $25 to cover his photocopying and duplicating expenses (hardcopy documentation is included). He also plans to issue new functions, corrections, and updates on a yearly basis, to be distributed at cost. As this is written, he's working on the "GEM CONTEST" module. This module logs and calculates the score for the major amateur contests and automatically integrates the contest data into the database; it may be available by the time you read this. A customized label production program that is integrated with the database is available for $10.

For further information, Contact Antonio Salvadori, VE3NXQ, 17 Colborn St., Guelph, Ontario, Canada N1G 2M4.

Short Bursts

Hello Amigas?: The Commodore Amiga computer seems to be gaining ground daily in its attempt to capture the home graphics-oriented computer market. However, we've not seen a great deal of amateur radio software for the Amiga, which is surprising since the computer has the potential to become the Commodore 64-style "volkscomputer" of the late 1980s and early 1990s. We'd like to hear of sources for good Amiga amateur software, both commercial and public domain. Share them with us, and we'll share these sources with our readers in turn.

According to information we've received, there is at least one on-the-air Amiga net in operation. It's called, appropriately, The Amiga-Net, and it meets each Tuesday evening at 2300Z on 3882 kHz. The net control is Doug Frie, NG2G, and its purpose is to exchange ideas and views about the Commodore Amiga.

Sorry, We're Closed! Everyone is chafing at the bit for *all* of the so-called WARC bands to be fully opened to amateur use, especially on an exclusive basis. It's going to be awhile before that happens, though. The 17-meter band, which lies between 18.068 and 18.168 MHZ, holds a great deal of promise as we start uphill on the current sunspot cycle. But the band has been plagued with several "false starts" as rumors have flown from time to time that the FCC had opened the band for amateur use. As this is written, the band is unfortunately **not** open, and it's not scheduled to be available for amateur use sooner than 1989—a full 10 years after the 1979 WARC. Hopefully, some band segments will be available sooner. Stay tuned and listen in, but don't operate there until "the word" comes down.

Overheard: Ah, yes, patience—a virtue that carries a lot of wait!

Next month more antennas and accessories subjects of current interest.

73, Karl, W8FX.

1988 CQ 160 Meter Contest High-Claimed Scores

Phone

Single or Multi	Call	Score
M	UG7GWO	365,794
S	4U1UN	301,125
		(K2GM Op.)
M	LZ9A	289,588
S	WB9HAD	267,189
M	OK7MM	226,560
S	VX3XN	207,391
S	UL7ACI	185,115
M	K5NA	165,376
M	N0XA	161,841
M	K3TUP	160,436
M	I4USC	155,304
S	WA2UUK	152,380
M	K3KG	141,911
S	W9UP	139,494
		(N0BSH Op.)
S	VE3PN	137,692
M	KR9S	136,206
M	N4RJ	118,512
M	VE3FKK	117,558
S	AF9Y	117,250
M	KY1H	106,605
S	W3BGN	103,822
S	WZ4F	102,672
M	YT2R	96,390
M	WA8DXG	96,064
S	KF4HK	96,000
M	KD0OZ	95,820
M	WD9INF	92,520
M	W9RE	92,235
S	WX4G	90,594
S	K8XR	86,196
M	WB4ZNH	85,866
M	WB2P	85,767
M	UP1BYL	85,684
M	W0CEM	83,404
S	W3TS	79,632
M	NK7U	78,624
M	KE8FX	77,691
S	YU2TW	75,411
S	YU4BR	74,816
M	UZ6AXE	72,972
M	I8CZW	71,830
M	KA7AUH	67,142
M	WD5R	66,600
S	K6HNZ	65,697
M	AA0A	65,664
S	UO5ONQ	65,340
S	N1CTD	64,902
S	W1UA	63,918
M	W5LTR	63,300
M	KA5DLM	62,415
S	HK4DUM	61,560
S	W3GM	61,537
M	W8SJU	61,152
S	RB5IOV	60,720
S	K7SS	60,480
M	WB8DIT	60,021
M	WB4GNT	59,767
S	UC2IDC	59,319
M	HB9CXZ	59,000
S	WB5KYK	55,385
S	WA4VDE	53,940
S	K4DLI	53,690
S	WA5NFC	52,974
S	K1IK	52,841
S	K8MJZ	51,688
S	WC7S	51,464
S	UA9AKO	51,034
S	OK1DFP	49,852
S	K8SVT	49,720
S	K2EK	49,228
S	W9NB	46,494
S	KD9SV	46,440
M	OE3XLA	46,440
S	AA4MM	46,172
S	RF6FIL	44,642

CW

Single or Multi	Call	Score
S	NP4A	896,292
		(K1ZM Op.)
S	ON4UN	453,572
S	VE6OU/3	416,420
S	KP2A	379,658
M	YT2R	373,584
S	KM1H	371,168
		(KQ2M Op.)
S	K2EK	362,670
M	I2UIY	358,344
M	HG9R	348,268
M	UR1RWX	338,856
S	AA1K	321,856
M	OK5TOP	318,648
S	W0ZV	314,364
S	K5NA	309,515
S	VE3BVD	290,680
M	W3BGN	273,972
M	OH0MB/OJ0	267,665
M	LZ9A	267,120
S	CT1AOZ	266,845
M	OK3KAP	265,512
M	OH2HE	265,188
M	PA0ERA	257,180
S	PJ9J	255,600
S	UG6GAW	252,005
S	W3LPL	249,500
		(KE9AB Op.)
S	OH1AF	248,472
		(OH1NOA Op.)
S	4X4NJ	248,048
S	K1TO	245,798
M	GM3IGW	240,394
S	VO1MP	229,410
M	YT3T	229,366
M	DL0KF	229,229
S	UQ2GM	227,848
M	N0XA	226,592
S	4N4Y	223,875
		(YU4CC Op.)
S	VE3INQ	221,760
S	NY2L	220,317
M	K2WI	219,456
S	Y33VL	219,065
M	W9AZ	217,234
M	UR1RYY	217,175
M	W0AIH	208,912
M	W0CD	208,171
M	KY1H	208,032
M	N4RJ	207,792
M	W9RE	207,176
S	W4RX	205,770
M	K8CC	202,680
S	KH6CC	202,154
S	VE3PN	193,824
S	UQ2PQ	193,546
S	K7QQ	189,343
S	G4BYG/A	189,012
S	UQ2GKL	187,460
M	W2GD	186,144
S	UR2RGN	186,091
M	KI1G	183,870
S	K4PI	182,745
S	OK3CQW	180,880
M	LZ1KVZ	179,530
M	KC5DX	177,156
S	VE5UF	174,330
S	G3XTT	172,611
S	K3ZO	172,604
M	K8LX	172,081
S	W3TS	170,232
S	N4XR	168,489
S	N4IN	168,096
S	K5MM/7	166,176
M	DL6RAI	165,393
S	WA2SRQ	161,910
M	LZ2KLW	160,461
S	SP2FAP	159,315
S	VE3KP	155,372
S	G4OBK	155,344
M	W3GM	150,499

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SuperSCAF is available assembled or in kit form. No adjustments, calibration, or test equipment are required. The kit can be completed by most builders in one or two evenings. SuperSCAF is available in kit form for $139.95 and assembled for $179.95. Please add $7.00 shipping and handling. Order from AFtronics, Inc., PO Box 785, Longwood, FL 32752-0785. Florida residents should include state sales tax.

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1691-LY	20 dB	$70.00
5 XY-137	7.8 dB	Ask

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Bill's Basics

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Esperanto

I hope you agree that it would be wonderful to have real conversations with amateurs in other countries without having to learn several foreign languages. That possibility exists. Esperanto was established in 1887 to make it easy for people of different countries to communicate with each other. It can be a great asset to our amateur radio service if a significant proportion of our worldwide fraternity will take the time to learn it. Esperanto embodies the best features of several languages. It is easy to learn. It requires just one-fourth as much time to learn Esperanto as is required to learn the next easiest language. Esperanto is a natural adjunct to amateur radio. Several amateur radio organizations have arrived at this decision, including our American Radio Relay League (ARRL), which adopted Esperanto during 1924, but has not implemented it. The ARRL conducted a study of possible uses of Esperanto about 30 years ago, but their board of directors did not recommend any action. It is probable that the ARRL would recommend positive action if a significant number of us demonstrated our interest in Esperanto by learning it and using it on the air, as well as in our written communications.

Part 97 of the FCC Rules and Regulations governs amateur radio in this country. It states that one of the reasons amateur radio exists is to promote international goodwill. It is difficult to significantly promote goodwill without being able to understand our fellow amateurs in other countries. We need to be able to really talk with each other, and using Esperanto can enable us to make our world friendlier.

English is the universal language on the air, but it is very difficult to learn. Only about ten percent of the Earth's inhabitants speak English, and many of them have very little knowledge of English. Those of ous who have travelled to other countries are well aware of how few people are fluent in English. Similarly, amateurs who frequently contact foreign amateurs on the air know that real conversations are rare. One of the side benefits related to acquiring Esperanto fluency for amateur radio contacts with foreign (DX) amateurs is that we can use it when we travel to foreign countries. We can talk directly with Esperantist representatives

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VE Merlin Griffin, WB5OSM, congratulates James Ergenbright, KB5FUJ/KT, for passing an FCC examination. Twenty-five Oklahoma State University students recently passed license tests. They took a code and theory course conducted by the Electronic/Computer Engineering Technology Department. (Photo via Associate Professor Neal Willison, N5MJH.

without having to make use of interpreters. These Esperantists can be a lot more helpful than tour guides.

Emerging countries hesitate to use any nationalistic language, such as English or Russian, due to the possibility of implied alignment. Esperanto is not nationalistic, which makes it acceptable to everyone. The use of Esperanto creates a spirit of brotherhood and understanding.

Esperanto was scientifically constructed to improve international communication. It has 16 firm grammar rules, with no exception allowed. It does not include irregular verbs. English alphabet letters Q, W, X, and Y are not included in the Esperanto alphabet, but six new letters are added to it. There is only one sound to each letter, which makes pronunciation easy and consistent. Accent is always applied to the next-to-last syllable. Prefixes, suffixes, and interchangeable endings are used to minimize the number of words required in the Esperanto vocabulary. Many base (root) Esperanto words are taken from other languages, making it easy to acquire an extensive vocabulary in Esperanto; examples of this are biologio (biology), matematiko (mathematics), and telefono (telephone). Ten to fifteen words can commonly be formed from one root word, and it is sometimes possible to form as many as fifty words from the same root word. It is possible to express the finest shades of meanings in Esperanto. Word familiarity makes it possible for people who do not know Esperanto to have a reasonably good understanding of material written in Esperanto. Try the following sentence; write down what you believe is stated, and then compare your interpretation with the translation.

ESPERANTO. Scio de Esperanto ebligas, ke amatorej radio-operatoroj el diversaj landoj povas interparoli, unu kun la aliaj, tiel helpante internacian bonvolon.

ENGLISH. Knowing Esperanto enables amateur radio operators of different countries to converse with each other, promoting international goodwill.

My initial exposure to Esperanto occurred about 30 years ago when a European amateur enclosed a letter with the QSL card he mailed to me. I did not realize I was translating Esperanto at the time, but I did understand what was requested and the correct information was sent in response to that letter.

I wrote an article about Esperanto a few years ago. That article was printed in an amateur radio club bulletin. It created continuing interest on the part of some amateurs. It also resulted in a few comments that Esperanto is an artificial language, which is true. However, artificial means manmade, and that applies to all languages spoken on Earth. The major difference between Esperanto and all other languages is that Esperanto did not evolve in a haphazard manner; it has been scientifically designed to provide true international communication. Esperanto is recognized as a major language; it is legal to use Esperanto on the air during amateur radio contacts. Esperanto is not intended to replace any national language; it simply provides a simple secondary language we can use to eliminate language barriers. It is a rationally constructed neutral language with no political overtone.

Esperanto is used in many ways worldwide. There are written publications (thousands of books, magazines, etc.), international shortwave broadcasts, and conventions in Esperanto. One source of information about shortwave broadcasts in Esperanto is Georges Largantier, 29 Boulevard Murat, F-75016 Paris, France. The *World Radio-TV Handbook (WRTVH)* also provides details of such broadcasts. Regularly scheduled international shortwave broadcasts (in Esperanto) total more than 1500 hours per year. They originate from many cities, including Pek-

Howard Campbell, KA0YXI, has been in and out of amateur radio since 1954. His previous call signs are KN6LSL, K6LSL, and KB6DPM. I worked Howard during this year's Novice Roundup. He lives in Englewood, Colorado.

ing, Rio de Janeiro, Rome, Valencia, Warsaw, and Zagreb. Esperanto promotes real understanding during international scientific, technical, and hobby conventions. A recent Esperanto conference was the largest ever held in China. Attendees enjoyed the interchange that resulted from lifting the language barrier. They found it pleasant and easy to exchange information in Esperanto. There are more than 125 technical dictionaries in Esperanto. More than 50 branches of avocations (hobbies), philosophy, science, and technology are well documented in Esperanto. Many novels, short stories, plays, and poems have been written in Esperanto, or have been translated into Esperanto. The British Esperanto Association lists approximately 30,000 literature items available in Esperanto. Esperanto magazines are published regularly in many countries, and they cover a wide range of subjects.

Esperanto is known and used by millions of people worldwide. Our shrinking world continues to increase the popularity of Esperanto. Hotels, restaurants, and vacation resorts welcome Esperantists. A few large firms use Esperanto in their international advertisements. Some school systems teach Esperanto as an elective language. One of my granddaughters (Amy Kuala) will learn Esperanto in Hawaiian schools.

An Esperanto office is located across the street from the United Nations to help minimize language problems. This office is manned by a professional linguist and several volunteers. The United Nations accepted a 1966 proposal to use Esperanto to reduce translation difficulties. This agreement was supported by 3843 organizations representing 71 million people. Five languagues are used by the United Nations, whereas UNESCO (U.N. Educational, Scientific, and Cultural Organization) uses 15 languages. The chief Esperanto organization is the Universala Esperanto Asocio (UEA—Universal Esperanto Association). Prior to the 1966 agreement with the United Nations, UEA and UNESCO recognized that they have many common objectives. This resulted in a resolution being passed at the December 1954 UNESCO general conference. That resolution recognized the results achieved by Esperanto in bringing peoples together and promoting intellectual exchanges.

UEA is headquartered in Rotterdam, the Netherlands. It has more than 3500 representatives in about 70 countries. It includes more than two dozen international professional associations for doctors, journalists, lawyers, scientists, and teachers. UEA sponsors international meetings, publishes journals, and generally coordinates activities which promote increased use of Esperanto throughout the world. UEA enjoys good working relationships with many religious orders, including Bahai, Buddhist, Catholic, Hebrew, Protestant, and Quaker. Some of the avocations using Esperanto internationally are amateur radio, chess, cycling, flying, and stamp collecting. UEA issues a yearbook which includes lists of Esperanto representatives and international Esperanto activities. Approximately 50 national Esperanto organizations are affiliated with UEA.

There are several Esperanto groups in North America. One of the most active is the Esperanto League for North America (ELNA), P.O. Box 1129, El Cerrito, CA 94530. Another is the Esperanto Society of New England, 231 Ashmont Street, Dorchester, MA 02124 (telephone 617-436-2572). Also, there is the Canadian Esperanto Association, P.O. Box 2067, Sidney, BC V8L 3S3, Canada. There is a free 10-lesson correspondence course which provides an easy introduction to Esperanto. There is little to lose, and possibly a lot to gain, from completing this free course. I hope you will give it a try. The Esperanto groups can provide a lot of information about Esperanto books, records, tapes, courses, organizations, and teachers. Such material is far too extensive to be covered in this article. If you live in an urban area, you could check your local telephone directory to determine whether or not Esperanto groups exist in your area.

Ten-year-old Darrel Craig, Jr., KB6RXF, of Fullerton, California shares this station with his father, W6TMD. He has worked all states and 52 countries.

Once you have acquired a basic knowledge of Esperanto, you can exercise your spelling ability by participating in weekend (Saturday and Sunday) Esperanto telegraph (telegrafio) nets. Code nets start at 1800 UTC on 7066 kHz (W2CIL/K8ZBN), at 1900 UTC on 21066 kHz (PY3ACE), and at 2200 UTC on 28485 kHz (CE4JLK). The summer schedule is listed in this article; during the winter these Esperanto nets start one hour later. All of these Esperanto nets are scheduled to be on the air at least 15 minutes. If a net frequency (frekvenco) is busy with other communications, look a few kiloHertz up or down from the regular net frequency. After you have learned how to spell the Esperanto words, you can practice pronouncing them by joining the Saturday and Sunday SSB voice nets. Voice nets start at 1830 UTC on 7266 kHz (W2CIL/K8ZBN), at 1930 UTC on 21266 kHz (PY3ACE), and at 2000 UTC on 14266 kHz (PT2CA). The stated times are for summer (daylight savings) time; these nets start one hour later during the winter. Simply subtract 4, 5, 6, or 7 from UTC to obtain the equivalent EDST, CDST, MDST, or PDST (daylight savings time), respectively, during the summer. During the winter subtract 5, 6, 7, or 8 hours from UTC to obtain the equivalent Eastern, Central, Mountain, or Pacific standard time, respectively. If you want to raise an Esperanto-speaking amateur on a Sunday, call on any Esperanto net frequency at 10 minutes past an hour between 0000 and 2400 UTC. Obviously, avoid interfering with Esperanto code nets that may be in operation.

The international ILERA contest is held the second weekend in November, with Esperanto net frequencies used for most contacts. There are many Esperanto nets active in several countries. The June 1985 issue of *QST* contains an article which details Esperanto activities on our amateur radio bands. The major amateur radio organization is the International League of Esperanto Radio Amateurs (ILERA, Internacia Ligode Esperantistaj Radio-Amatoroj), which was founded in 1970. ILERA publishes bulletins containing information that is of interest to amateur radio operators. A few American sources of amateur radio Esperanto information are W2CIL (Ed Lindberg, 113 Maple Drive, Bowmansville, NY 14026), W5IFH (Ken Thomson, 1802 Edgehill, Pasadena, TX 77502), KH6GT (Bunnie Chambers, 1740 Nakula Street, Wahiawa, HI 96786), WA6PSA (Gene Royer, 644 San Benito Avenue, Menlo Park, CA 94025), and KA7ORO (John Schilke, 184 Harding Boulevard, Oregon City, OR 97045). ILERA officers are Gennadij Jaskov (UW9YE, president), Hans Welling (DJ4PG, vice-president/treasurer), and Laszlo Matusinka (HA7PW, secretary).

Rami, 4Z4LX, conducts a 10 minute Esperanto lesson each week that is heard throughout Israel. His lessons originate on the Haifa repeater.

The Hungarian branch of ILERA has 68 members who have a net that starts at 1600 UTC on 3666 kHz, the first Wednesday of each month.

Chuck Mays, WB4TNC, and John Thomas, KK4JB, plan to start an Esperanto net that will meet a couple of times per week on 10 meters.

A few opportunities exist to practice Esperanto on the air, and it appears that many more Esperanto nets will be initiated. Some of the existing nets provide opportunities to converse with foreign (DX) amateurs in Esperanto. My wife (Marie, W6JEP) and I look forward to using Esperanto to become better acquainted with some of the DX amateurs with whom we now just exchange brief (signal report, name, QTH, weather, rig, and antenna) information. It will be nice to escape from that very limited type of exchange. We believe Esperanto provides a unique way to significantly enhance understanding between peoples of the world via amateur radio. Please join us. DX amateurs are urged to promote Esperanto among amateurs who are active in their countries. Let's really get to know each other. Let's communicate!

73, Bill, W6DDB

Printed Aids

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

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TM-221A Compact FM 45w	439.95	Call $
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TH-31BT FM, 220 MHz HT	299.95	Call $
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UHF		
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CIRCLE 135 ON READER SERVICE CARD

Washington Readout

a monthly feature by
FREDERICK O. MAIA, W5YI

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

VECs Meet With W3BE

Amateur Radio testing coordinators held their Fourth Annual VEC Conference recently in Dallas, Texas. Since 1985, all testing of amateur radio operators has been conducted by amateur radio operators holding senior licenses. Their efforts are coordinated by Volunteer Examiner Coordinators (VECs) who act as the administrative link between the amateur testing community and the FCC who issues the licenses.

History of Amateur Testing

Volunteer amateur self-testing started to take shape during the early 1980s when the FCC began abolishing most of its commercial radiotelephone licensing program. The government eventually turned their technician licensing program over to industry groups. A general trend towards privatization of many government functions developed.

In 1981 legislation was enacted to legally allow the public to voluntarily assist the government. The Novice examination, which had been administered by volunteers for decades, was determined to be illegal since federal rules forbid volunteer help from the public. As a taxpayer saving measure, the following year Senator Barry Goldwater, an amateur operator himself K7UGA, introduced legislation that laid the groundwork for all testing of amateur radio operators to be conducted by volunteers.

Amateur radio is authorized in nearly every country in the world. The fact that the same frequency bands are allocated worldwide allows hams of every nation to communicate with one another. Amateur radio is governed by the International Telecommunication Union (ITU). Article 32 of the International Radio Regulations (IRR) require that amateur operators must prove proficiency in the Morse code when operating on the high frequency bands. The IRR also requires each country to verify the operational and technical qualifications of any person wishing to operate a amateur radio station. (Section I, P.3.1, P.3.2)

Public Law 97.259, signed by President Reagan on September 13, 1982, carried Goldwater's amendment authorizing legal volunteer amateur radio operator test preparation and administration. The United States thus became the first nation to authorize amateur radio operators to verify their own qualifications. Previously the FCC had developed and administered all amateur radio operator code and theory examinations. Now the entire program would be carried on by the amateur community. During 1983 the FCC developed the guidelines for its Technician and higher class amateur self-testing system. The Novice testing program was basically already in place.

Prior to 1984, the examination questions on FCC administered amateur radio operator tests were supposedly not known. Word had a way of getting around, however. At least one amateur made a career of researching and publishing the exact questions and answers to all amateur radio operator examinations. Amateur radio operator test questions and answers were pretty well available to anyone that wanted to purchase them.

The FCC decided to try a different system. With help from the amateur community, the government developed and then released all possible verbatim questions that could be asked of amateur operators to the public. The FCC came up with ten times as many questions as would be needed in any one amateur radio operator examination. These lists, known as question pools, were released to the public in the form of "PR (for Private Radio) 1035 Bulletins." PR-1035A contained the Novice questions, PR-1035B covered the Technician class and so on.

Once the question pools were in place, the FCC began a search for a testing system administrator who would recruit examiners and further develop a program to test amateur radio operator applicants. The Commission also said that 1984 would be the last year that they would examine amateur radio operators. Initially it was thought that the American Radio Relay League would be the sole amateur testing administrator. The League still had not accepted the position, however, six months later and it began to appear that amateur testing opportunities might be very limited or even non-existent in the future. When it became apparent that the ARRL was undecided and apprehensive about agreeing to handle amateur radio operator testing on a national basis the FCC elected to go with smaller regional groups. They called these administrators Volunteer Examiner Coordinators . . . VECs.

The primary duty of a VEC is to select examiners and provide them with examination materials and testing guidelines. It was obvious that Goldwater envisioned that all amateur radio examinations would be handled similar to the Novice program by individual amateurs that would certify the qualifications of others. As a safeguard against cheating, however, the FCC elected to require testing teams rather than a single volunteer examiner (VE).

Several organizations applied to become a VEC all on a regional basis. The W5YI program was the first to apply to become a National Volunteer Examiner Coordinator. We set up a program which shifted many expenses to the volunteer examiners. Amateurs, interested in helping the service grow, had always volunteered their services to conduct Novice examinations. We figured they would come through for all other license classes as well. We were right! Once a provision was made for reimbursement of testing expenses, the ARRL also applied to become a VEC in all regions.

The early days of volunteer testing saw different answers to examination questions. The FCC released the questions but not the answers. It was left to the individual VECs to develop the answers and different VECs had different answers to the same questions! We solved the answer problem by filing a FOIA (Freedom of Information Act) request for the answers that the FCC had in their possession. Once received, we circulated them to other VECs and license preparation publishers. It was our first attempt at standardizing the answers. Once the ARRL became a VEC, their answers to the examination emerged as the de facto standard which most (but not all) VECs adopted and provided their volunteer examiners. At least one VEC used true/false answer formats to the written examinations.

VECs Agree to Standardize

The first VEC Conference was held at the FCC's licensing facility in Gettysburg, Pennsylvania. While the main objective of the conference was to observe the li-

National Volunteer Examiner Coordinator, P.O. Box #565101, Dallas, TX 75356-5101

cense issuance function, most VECs wanted to work towards further standardization of amateur testing. The VEC Conference in 1986 was held at the FCC in Washington, DC. Progress and cooperation among all VECs has now resulted in every VEC adopting the same answer format to examination questions. The rules now require that VECs agree on a single common question pool. At one point, different question pools among the VECs were envisioned by the FCC. Thus an applicant can now be assured that no matter where amateur radio operator examinations are held, the questions and answers will be the same. All commercially published license preparation study guides support the same material.

This year's VEC Conference was held at the ARRL West Gulf Convention in Dallas on June 3rd when VECs representing over 95% of all amateur testing and members of the amateur industry met with the FCC's Johnny Johnston, W3BE. Johnston is Chief of the Personal Radio Branch in Washington, DC.

Johnston expressed concern that examination cheating by applicants—and in some cases by volunteer examiners—is a growing problem and that VECs must be very alert and watchful. He said that, in some cases, innocent applicants are affected in that their examination results must be invalidated. The rules provide for license revocation, fines and imprisonment against those involved in fraudulent amateur radio operator examinations and the FCC is currently actively pursuing each of these punishments.

The VECs discussed the need to reduce all commonly asked questions and license requirements to examination questions in future pools and standardizing the code examinations. While it was suggested that the 5 and 13 word-per-minute code test be transmitted at 13 wpm spacing and the twenty word-per-minute code exam given at 20 wpm character spacing, no firm VEC position was adopted. The specifications and administration of the code test will remain the total responsibility of the VE team.

The responsibility for the answers to the written examination questions are also the total responsibility of the VE team. While volunteer examiners are allowed to change the answer format, a resolution was adopted by the VECs urging all VE's to use the multiple choice answer format as provided by the Question Pool Committee. No VEC was aware of any volunteer examining team that provided their own answers.

The FCC has proposed sweeping changes to the Part 97 rules. These changes, when adopted, will have a major impact on examination questions. Development and distribution of updated questions will be handled by the Question Pool Committee as soon as possible after adoption. Members of the current Question Pool Committee were re-elected for another year.

The Extra Class written examination will change to a new updated version on November 1, 1988. The Question Pool Committee is currently considering newly submitted questions to the Element 2 (Novice) and 3A (Technician) examinations which will be revised and implemented on November 1, 1989. The Fifth Annual VEC Conference is scheduled for next summer in the Gettysburg, PA, area.

Canadian No-Code License Update

From all indications, a No-Code entry level amateur license is coming to Canada. It was suggested by Communications Canada (CC)—the new name for Canada's telecommunications regulatory agency—nearly three years ago and has the basic support of their two national amateur radio societies, the Canadian Radio Relay League and Canadian Amateur Radio Federation. The lowest amateur lass, Certificate A, would authorize 250 watts on all VHF and higher frequency bands. Applicants would only have to pass a 100 question elementary written examination with a 60% pass mark.

A difference of opinion has developed between Communications Canada and CRRL/CARF on home brewing transmitting gear. The three lowest levels of amateurs (A, B, and C) would be required to use commercially designed and marketed transmitting equipment but would be allowed to build and use any other gear they wanted. There would be no such restriction on top level, Class D amateurs. The amateur groups feel that the "commercial gear only" concept runs counter to the basic premise that the Amateur Radio Service is also an experimental service. They say that all amateurs should be able to build and experiment with all gear of their own making provided it does not cause interference.

"Whether an amateur wants to be a communicator or an experimenter should be left to the individual to decide without being forced by Communications Canada and the Radio Regulations," they jointly say. It appears that CC is not flexible on this aspect. Now comes word that the joint CRRL/CARF working group has developed a compromise solution. They want CC to allow the lowest three level amateur classes to use:

- home designed and built transmitters up to 250 watts subject to their being checked out by a level D amateur.
- transmitters up to 250 watts built from commercial kits.
- home designed and built transmitters up to 10 watts without being checked out.
- commercially made transmitters up to 250 watts.

Petitions From The Amateur Community

The FCC has denied a number of amateur submitted petitions for rulemaking—but did accept one for public comment.

Shannon Cisco, WB4AZT, of Suffolk, VA, requests that the operator licenses of amateurs 65 years of age and older who have held Technician and higher amateur licenses for twenty of more years be upgraded one class. In denying the Cisco petition, the FCC said that amateur operator licenses are issued only to persons who demonstrate certain operational and technical skills including proficiency in the Morse code.

Larry Ballentine, N5BZB, Bryant, Arkansas, petitioned the government to reduce the number of amateur operator classes from 5 to 4 by merging the Technician Class with the General operator license. He also asks that the Morse code requirements for these four classes be reduced to 5 wpm and contain only letters and numbers. As an alternative, the petitioner suggests a written code recognition test be administered where only a knowledge of the sequence of dots and dashes that make up the alphabet letters and numbers 0-9 be required. Ballentine states

that operator license privileges should be based on technical ability and knowledge of the rules, not on telegraphy proficiency. He further argues that the amateur service must be modernized and deregulated so that its ranks will continue to grow.

The FCC denied and dismissed the petition. "We believe that operator privileges should continue to be based on telegraphy skills as well as on expertise in technical, operational and regulatory matters. The petition ignores the important role that telegraphy continues to play in the amateur service, particularly in emergency communications during natural disasters when communications may be affected by weather, poor propagation and interference."

Angelo J. Polvere, KA9CSO, of Inverness, Illinois, petitioned the government to provide for immediate operating privileges for examinees who had successfully passed the Novice Class operator license. Proposed was a sponsor holding a General Class or higher operator license who would issue a temporary call sign to the successful Novice examinee consisting of the sponsor's call sign and a unique designator.

The FCC said the instant licensing proposal would be contrary to international (ITU) regulations which provide that each country shall verify the operational and technical qualifications of any person who wishes to operate an amateur station. In addition, the application processing time is relatively short and the benefits of "instant Novice licensing" marginal when compared to the disadvantages that could occur.

Dr. Howard E. McKeathian, N6ELL, of San Bernardino, CA, filed a petition last November seeking to expand HF privileges available to the Technician Class. He argues this would allow Techs to participate more fully in emergency communications such as marine disasters and forest fires.

The FCC again denied the petition stating that amateur license structure, requirements and privileges had been considered previously in five major rulemakings. "The operator license classes and associated privileges were developed to provide motivation for amateur operators to advance their skills in both the communications and technical phases of the radio art," the FCC said.

Marvin T. Fricklas, W2FGD, of Freeport, New York, wants long term Advanced Class operators to be upgraded without examination if they:

- have 25 years of continuous amateur activity.
- submit evidence of rendering continuous public assistance in the amateur service.
- are honorably discharged from the Armed Forces.

The FCC denied the petition stating that while armed forces and public service activities as an amateur radio operator are commendable, "Such services are not sufficient reason to revise the Commission's policy of not granting preferential treatment to any group or individual. Amateur operator licenses are issued only to persons who demonstrate certain operational and technical skills."

Anthony J. Sivo, W2FJ, of Plainsboro, New Jersey, filed a petition for rulemaking seeking to allow voice privileges in the 30 meter amateur band. He requests amendment to Part 97.61(a) of the Amateur Radio Service rules to permit the use of SSB (J3E) emissions in the 10.10–10.15 MHz frequency ham band. Silvo argues that amateurs are not using the 30 meter band to its fullest extent. "The popularity of this band is dampened somewhat by regulations that permit only radio telegraphy (A1A, F1B) emissions." He says there is very little Amateur Radio activity above the lower 10 kHz portion of the band and "...teletype usage is practically non-existent."

The FCC has accepted the petition as having merit and is requesting public comment on the proposal. Refer to rulemaking file number: RM-6363.

Karl Victor Pagel, N6BVU, of Orange California, submitted a petition for rulemaking on April 19th, but the FCC has not yet decided on how it will be handled. Pagel, who is embroiled in a Southern California repeater coordination dispute, requests an "Amendment of the Amateur Radio Service Rules to change the definition of Frequency Coordinator as defined in Part 97.3(AA)."

The current definition of frequency coordinator is "an individual or organization recognized in a local or regional area by amateur operators whose stations are eligible to engage in repeater or auxiliary operation which recommends frequencies and, where necessary, associated operating and technical parameters for amateur repeater and auxiliary operation in order to avoid or minimize potential interference."

Pagel feels that recognition as a frequency coordinator should come solely from repeater/remote/auxiliary owners or trustees and not users. ". . . [U]sers don't care about the coordination process," he argues. "[repeater users]...are just like the average citizen who turns on his personal AM/FM radio. All he/she cares about is that there is a 'station' there to listen to, or in the case of an amateur, one to talk to."

He wants the FCC definition of a frequency coordinator changed to read, "An individual or organization selected in a regional area by owners or trustees of amateur repeaters, remote bases, and auxiliary links, which recommends frequencies and, where necessary, associated operating and technical parameters . . ."

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CIRCLE 141 ON READER SERVICE CARD

No -75-76

95

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

The recent guest editorials in this column by Randy Thompson, K5ZD/3, and Charles Fulp, K3MM, on the topic of technology now being used in amateur radio contesting created various pros and cons.

As Charlie put it, amateur radio by its very nature is a technological activity. The state of the art has progressed down through the years from spark to CW, followed by tubes making voice transmission possible, from AM to SSB, and to solid-state technology, making a change in the mode of operation inevitable.

Randy questioned if the advantage gained in the use of this advanced equipment would deemphasize operating skills. On the contrary. It will make contesting more competitive as advantage is taken of the many ways this advanced technology can be used.

Of course, it puts many of us who do not have the equipment or know how at a disadvantage. However, down through the years that the *CQ* World-Wide and other *CQ* contests have been in existence, we have modified the rules to meet these inequities.

A reminder: deadline for the November issue is August 15th, and September 15th for the December issue.

73 for this time, Frank, W1WY

ARRL UHF Contest

1800Z Sat. to 1800Z Sun., Aug. 6–7

Activity on this one starts at 220 MHz and goes all the way up to 2.3 GHz and higher.

Exchange: Grid square locator.

Points: Three for 220 or 432 MHz contacts. Six for 902 or 1296 MHz. And 12 for 2.3 GHz or higher.

Multiplier: Total number of different grid squares worked on each band.

Final Score: Total QSO points from all bands times the sum of the grid-square multiplier from each band.

Detailed rules were published in the July issue of *QST*. It is suggested you send a large SASE to the ARRL for official log and summary sheets.

Send to ARRL UHF Contest, 225 Main Street, Newington, CT 06111.

New York State QSO Party

1600Z Sat. to 1600Z Sun., Aug. 6–7

This is the fifth annual QSO Party sponsored by the Salt City DX Association. They specifically encourage portable and mobile operation from rare New York State counties during the peak camping and vacation season.

The same station may be worked on each band and each mode, and NY stations can make in-state contacts for QSO and multiplier credit. Mobiles in each county change.

Exchange: RS(T) and QTH. County for NY stations; state, VE province, or country for DX.

Scoring: One point for SSB contacts, 2 points for CW.

New York stations multiply total QSO points by (NY counties + states + VE provinces + DX countries) worked for their final score.

Others multiply total NY QSO points by the number of NY counties worked (maximum of 62).

Frequencies: 1815 and 40 kHz up from bottom of all other bands on CW. And 1880, 3880, 7280, 14280, 21380, and 28580 on SSB. (No WARC bands.)

Awards: Certificates to the top scoring stations in NY State, U.S., Canada, and DX entrants. Special awards for the highest scoring single operator, NY State club group operating from a rare NY county and NYS mobile.

Mailing deadline is September 27th to: George Hippisley, K2KIR, RD #1 Box 27A, Verona, NY 13478.

European DX Contest

CW: Aug. 13–14 SSB: Sept. 10–11
1200Z Saturday to 2400Z Sunday

This is the 33rd 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. (IARU Region I regulation of frequencies for contest operation.)

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

Classes: (a) 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 (see WAE country list).

Europeans will use the ARRL country list of non-European countries. A quick band change to work a new multiplier is permitted. However, activity on the origi-

Calendar of Events

*	July	30-31	Venezuelan CW Contest
*	July	30-31	FADCA HF Packet QSO Party
*	July	30-31	Florida QSO Party
*	Jul.30	-Aug.1	MARC County Hunters CW
*	Aug.	6	YLRL YL/OM SSB Sprint
	Aug.	6-7	ARRL UHF Contest
	Aug.	6-7	New York State QSO Party
	Aug.	13-14	European CW Contest
	Aug.	14	ARCI QRP SSB Sprint
	Aug.	20-21	SARTG RTTY Contest
	Aug.	20-22	New Jersey QSO Party
	Aug.	27-28	All Asian CW Contest
	Sept.	7-9	YLRL "Howdy Days"
	Sept.	10-11	European SSB Contest
	Sept.	10-12	ARRL VHF QSO Party
	Sept.	11	North American CW Sprint
	Sept.	18	North American SSB Sprint
	Sept.	**24-25**	**CQ WW DX RTTY Contest**
	Sept.	25-26	Classic Radio Exchange
	Oct.	1-2	VK/ZL/Oceania SSB Contest
	Oct.	1-2	Fernand Raoult F9AA Cup
	Oct.	8-9	VK/ZL/Oceania CW Contest
	Oct.	8-9	IRSA Radiosporting Contest
	Oct.	8-9	Pennsylvania QSO Party
	Oct.	9	RSGB 21/28 MHz Phone
	Oct.	16	RSGB 21 MHz CW Contest
	Oct.	**29-30**	**CQ WW DX SSB Contest**
	Nov.	11-13	Japan International DX
	Nov.	12-13	European RTTY Contest
	Nov.	12	ALARA (VK YL) Contest
	Nov.	**26-27**	**CQ WW DX CW Contest**

** Covered last month.*

Corrections: CQWW 1987 RTTY

The State/VE column in most cases is missing a digit.

The photos of JA1BWA and SV1UG on page 19 are reversed.

Top Score Africa Plaque was sponsored by not only George Hitz, W1DA, but also by Roy Gould, KT1N.

In the listing as they appear in order: KD4DM should read KD4OM; K9JNB should read K9JNB/7 and be listed in the 7th area; OE3HCS should have been in BOLD since he won Austria; IKØJOZ should read IKØJOS; LA4LM should read LA4LN; ISØVME should read ISØMVE; SM4JCY should read SM4CJY.

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nating band must not be interrupted for at least 15 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 may be used. The same call sign, European or non-European, may only be logged once per band. The log must contain both call signs and at least one of the control numbers. Each QSO logged counts 2 points, each complete QTC 1 point (maximum of 10 per station). Multiplier is determined by the DXCC and WAE country lists.

QTC Traffic: Additional point credit may be earned 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 by 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 third series of QTCs sent and that 7 are being reported.

If more than 100 QTCs are claimed, a check list must show that the maximum quota of 10 per station is not exceeded.

Awards: Certificates to the top scorers in each class in each country. Each participant with at least half the score of the continental leader will also receive a certificate. Plaques will go to continental winners in the single operator class.

Disqualification: Violation of the rules of the contest, or taking credit for excessive duplicate contacts, will be deemed cause for disqualification. Each duplicate QSO or QTC will result in a penalty of 3 QSO/QTC points.

Logs: It is suggested that you use the official DARC or equivalent log form. Figure 40 contacts to the page and use a separate sheet for each band. Submit a dupe sheet for each band with 200 or more contacts. A summary sheet showing the scoring and a signed declaration are also required. (Sample log forms are available—SASE or IRCs.)

WAE Country List: C31, CT1, CU, EA, EA6, EI, F, G, GD, GI, GJ, GM, GM Shetland, GU, GW, HA, HB, HB0, HV, I, IS, IT, JW Bear, JW Spitsbergen, JX, LA, LX, LZ, OE, OH, OH0, OJ0, OK, ON, OY, OZ, PA, SM, SP, SV, SV5 Rhodes, SV9 Crete, SY Athos, T7, TA1, TF, TK, UA1346, UA2/UZ2F, UA1 Franz-Josef-Land, UB, UC, UN/UA1N/UZ1N, UO, UP, UQ, UR, Y2, YO, YU, ZA, ZB2, 1A0, 3A, 4U1 Geneva, 4U1 Vienna, 9H1.

Mailing deadline is September 15th for CW entries and October 15th for SSB to: WAEDC Contest Committee, P.O. Box 1328, D-8950 Kaufbeuren, Fed. Rep. of Germany.

ARCI QRP SSB Sprint

2000Z to 2400Z Sunday, August 14

Here is another shorty by the ARCI QRP, the "Summer Daze Sprint."

Exchange: RS and state, province, or country. Members will include their membership number, non-members their power output.

Points: Contacts with a member 5 points, non-members same continent 2 points, but 4 points if on a different continent.

Multiplier: Total states, provinces, and countries worked on each band. (Same station may be worked on each band for QSO and multiplier credit.)

Power Multiplier:
4 to 5 watts output—×2
3 to 4 watts output—×4
2 to 3 watts output—×6
1 to 2 watts output—×8
Less than 1 watt out—×10
Over 5 watts out—check log.

Power Supply Multiplier: 1.5 if using battery; 2 if using solar/natural supply, or battery charged by solar/natural supply.

Final Score: Total QSO points × QTH × power × power supply if any.

Frequencies: 1810, 3985, 7285, 14285, 21285, 28385, 28885, and 50385.

Awards: Certificates to the top three scorers overall and to the top score in each state, province, and country in which two or more entries are received.

Use a separate log sheet for each and a summary sheet showing the scoring and other essential information. Sample log forms are available from K5VOL. Include a large SASE with your request, also if you desire results of the contest.

This year logs go to: Red Reynolds, K5VOL, 835 Surryse Road, Lake Zurich, IL 60047 USA.

SARTG RTTY Contest

Three Periods GMT
0000–0800 & 1600–2400 Sat., Aug. 20
0800–1600 Sun., Aug. 21

This is the 18th 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.

SWLs 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 Nykohing Sj, Denmark.

New Jersey QSO Party

2000Z Sat. to 0700Z Sun. Aug. 20–21
1300Z Sun. to 0200Z Mon. Aug. 21–22

This is the 29th annual party sponsored by the Englewood ARA. Phone and

1987 SARTG Results
North America

Single Op

KB2VO/4	198,000	W8LNK	13,250
AB0Y/4	150,100	KL7PG	13,200
W2FG	141,035	W6CN	12,615
WB5HBR	140,160	K8CV	11,475
AA5AU	137,020	K0BJ	8,800
K6WZ/0	82,935	K2PEQ/4	8,760
N6GG	73,060	WA6AHF	8,250
N9AW	67,575	VE2ARU	7,245
W3AOH	61,190	KA9NSD	5,120
W7MI	49,555	N0FMR	4,800
W2JGR	46,420	VE6ZX	4,200
W0LHS	32,175	VE7BDQ	960
W2KHQ	31,350	KD0CA	560
KD4OM	30,580	AG4T/KL	500
VE7YB	27,825	WA6OGO	160
WA8FLF	19,775		
KA1LMR	15,655		
K4JYS	13,860		

Multi-Op

WA7EGA	232,400

There were 34 North American entries out of a total of 114 worldwide, 102 single operator and 12 multi-operator. KB2VO/4 placed 10th, and WA7EGA placed 3rd, worldwide. There were 10 SWL entries, no North American.

CW are part of the same contest, the same station may be worked on each band and mode, and NJ stations may contact 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, 3950, 7035, 7135, 7235, 14035, 14285, 21100, 21355, 28100, 28400, 50–50.5, and 144–146. Suggest phone on even hours, 15/10 meters on odd hours, and 160 at 0500Z.

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/Tech. and mobile awards. There are four plaques donated by the section managers for NNJ and SNJ to the winning stations in those sections.

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. 17th and go to: Englewood ARA, P.O. Box 528, Englewood, NJ 07631-0528.

All Asian CW Contest

0000Z Sat. to 2400Z Sun., Aug. 27–28

The same rules as for the Phone Contest on June 18–19 apply here. See June Contest Calendar for complete rules. Logs for this one must be in the hands of the committee no later than November 30th. They go to: JARL, P.O. Box 377, Tokyo Central, Japan.

YLRL "Howdy Days"

1400Z Wed. to 0200Z Fri., Sept. 7–9

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

All bands and modes, 10 through 80 meters, may be used. A station may be worked once on each band and mode for QSO points. Crossband or 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, 28395 (plus or minus 15 kHz). Look for DX YLs in other parts of the bands, especially on 40 and 80 meters.

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.

1987 All Asian DX CW Contest
North American Results

U.S.A.	
3.5 MHz	
W6RJ	**9,282**
N1EE/6	8,346
WA6VNR	432
7 MHz	
KM6B	**30,480**
K6NA	29,840
W6KP	29,862
N6IG	26,937
N3BNA	**104**
14 MHz	
N2AA	**24,444**
NQ7M	**18,250**
KE2BM	16,401
K5MK	**8,512**
NX7K	7,650
W1XN	**4,888**
W0MHK/1	4,128
K9BG	**3,956**
W6UE	**3,939**
(Opr. WA6OTU)	
W1END	3,649
K1TO	3,276
K2SX	2,550
W1LQQ	2,484
W1FJ	2,210
N6JM	2,013
W1QV	1,479
W8EX	**1,320**
KC7V	816
K8CV	684
KW2J	580
KI8W	338
W5TVX	308
KA0MX	**261**
W4KMS	**204**
KA7FEF	132
WB3JRU	**56**
KA7ZAG	16
21 MHz	
N6ND	**23,870**
KA5W	**19,758**
WA6FGV	3,440
K7SS	**1,980**
All Band	
K6JYO	**302,192**
WN4KKN/5	**87,220**
N6EX	59,220
N6JV	40,119
K1ZM	**40,115**
K1ZZ	33,439
KY7M	**32,670**
W6OUL	24,479
K3IPK	**21,504**
K4RZ	**17,266**
W6HAL	16,254
K6BWX	16,128
K6DR	14,288
W1PL	13,024
W2HG	**10,595**
W7YF	9,030
KE1Y	8,288
W7CRT	7,276
K8PYD	**6,405**
KE9A/4	6,363
W7CB	5,487
N8BC	5,250
K1XM	5,000
NA2M	4,004
K4BAI	3,552
W1GIH	3,311
W5OB	3,300
W9HE	**3,010**
KA1DWX	2,418
N2AZS	1,372
W6HAL	1,323
KA2BBZ	1,290
W2KTF	726
K1CLN	390
K6LRN	342
W5NR	72
W1OPJ	63
Multi Opr.	
N6ADI	**204,754**
W0ZV	200,160
Alaska	
14 MHz	
AL7IJ	**28,275**
All Band	
NL7DU	**29,870**
Costa Rica	
14 MHz	
TI4SU	**2,304**
Canada	
14 MHz	
VO1SA	**14,766**
VE3XK	504
VO2AC	1
21 MHz	
VE2AEJ	792
All Band	
VE2UBC	22,184
(Opr. JM1CAX)	
VE1ASJ	9,504
VE2LJ	4,371
VO1AW	1,120

Certificate winners are listed in boldface.

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

You are expected to delete all duplicate contacts. There is a penalty of three additional and equal contacts for each duplicate contact that is removed from your score.

Logs must be received by October 10th and go to: Carol Shrader, WI4K, 4744 Thoroughgood Drive, Virginia Beach, VA 23455.

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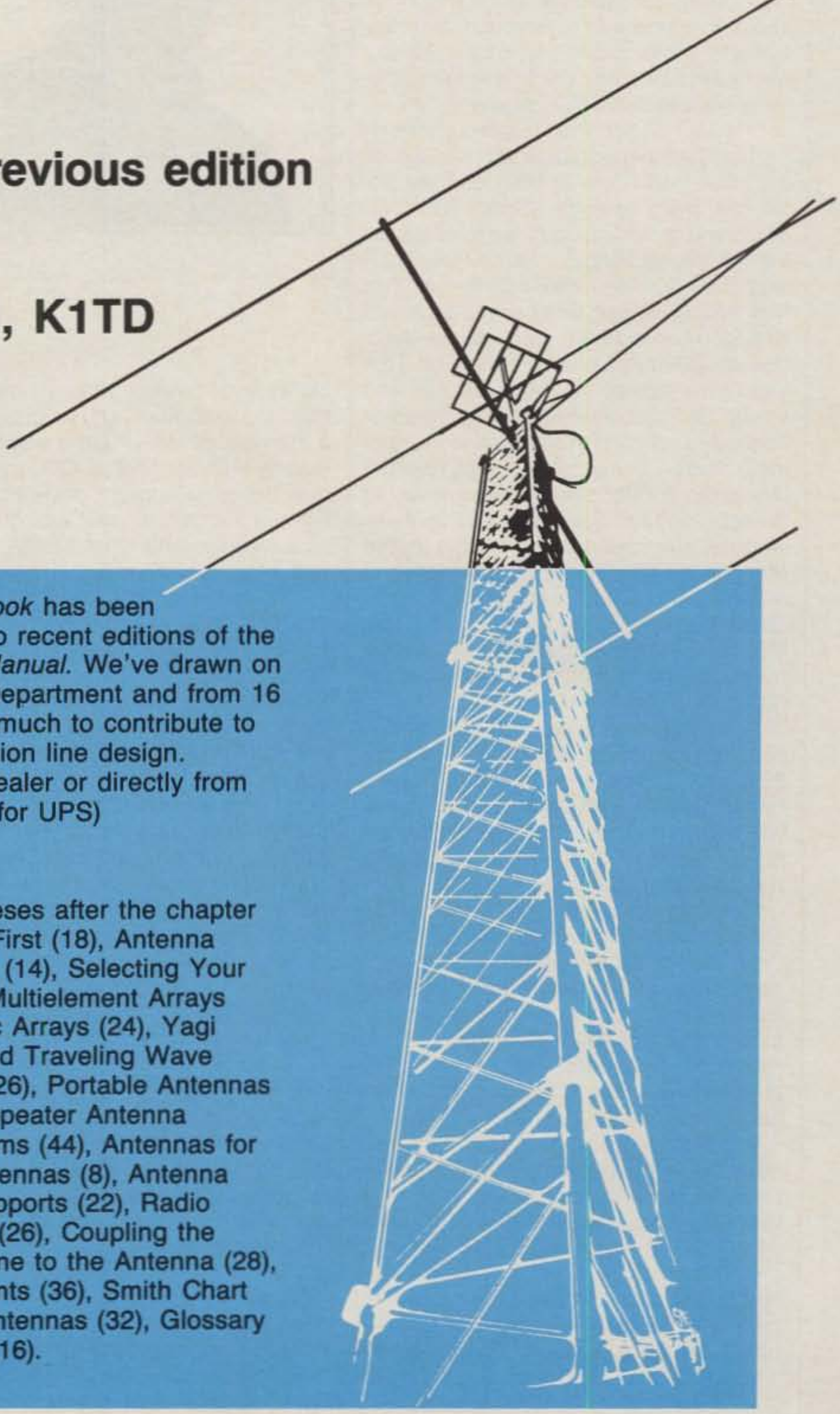
QST Associate
Technical Editor



Available in August

The 15th Edition of *The ARRL Antenna Book* has been dramatically expanded in a similar fashion to recent editions of the *ARRL Handbook* and the *ARRL Operating Manual*. We've drawn on material produced by the ARRL Technical Department and from 16 well-known outside authors who have done much to contribute to the state-of-the-art in antenna and transmission line design. Available in softcover only for $18 at your dealer or directly from ARRL (shipping and handling: $2.50, $3.50 for UPS)

CHAPTER LINEUP:

The number of pages appears in parentheses after the chapter title. Page counts may vary slightly. Safety First (18), Antenna Fundamentals (42), The Effects of the Earth (14), Selecting Your Antenna System (30), Loop-Antennas (16), Multielement Arrays (42), Broadband Antennas (12), Log Periodic Arrays (24), Yagi Arrays (26), Quad Arrays (14), Long Wire and Traveling Wave Antennas (18), Direction Finding Antennas (26), Portable Antennas (10), Mobile and Maritime Antennas (30), Repeater Antenna Systems (20), VHF and UHF Antenna Systems (44), Antennas for Space Communications (32), Spacecraft Antennas (8), Antenna Materials and Accessories (20), Antenna Supports (22), Radio Wave Propagation (26), Transmission Lines (26), Coupling the Transmitter to the Line (18), Coupling the Line to the Antenna (28), Antenna and Transmission-Line Measurements (36), Smith Chart Calculations (16), Topical Bibliography on Antennas (32), Glossary and Abbreviations (4), Contents, Index, etc (16).

ARRL 225 MAIN ST., NEWINGTON, CT 06111

CIRCLE 38 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:

Carl "Andy" Anderson, W3XE USA-CA All Counties #507, Mixed, 3-20-86

"County hunting as a hobby was born about 31 years ago in Bonita, California with the author being Cliff Evans, K6BX, who was to become the first Administrator of the award for *CQ* magazine.

"Now when Cliff tried this on a group of us, I thought this would be 'duck soup' for the basic certificate of 500 counties. After searching through about 1500 QSL cards and matching counties to cities using the Postal Guide, I found that I had less than 200 counties confirmed. The first station worked for county credit was KN6BBU, on 6-16-53, who was in Napa County, California on 80 meters CW. This was in the Novice band and my call was KN6BCG. Through the years I worked at collecting counties in between work, raising a family, doing other things in amateur radio like handling traffic, managing the MDD CW Section Traffic net, and serving as Communications Manager for the Maryland/D.C. ARRL Section for one term. I also used to enjoy contests—sweepstakes/*CQ* World-Wide DX Test, CW ARRL DX Contest—and have been a member of the Potomac Valley Radio Club for 26 years.

"I worked county number 3076, Grayson, Virginia, on 2-8-86. That's a span of 32 years, 7 months, and 22 days. I've heard it said on the bands that the county will always be there, but that's not quite so, as counties were added and subtracted during that time.

"While working toward USA-CA I've seen many changes in equipment, from the motor generator power supplies and homebrew transmitters with a frequency converter to put your car radio on the amateur bands, the TR-3 TR-4 along with the Heath Single-Bander Transceiver, to the present-day rig that's about as big as the old power supplies.

In 1979 at the Gaithersburg Hamfest I heard an announcement that anyone interested in county hunting should meet at the 'Hog Barn' immediately. Out in the 'Hog Barn' I met Bill, WA3ZMY, who told me all the virtues of the County Hunters Net (CHN) on 14.336 and how great the people were. One night in December I tuned up there, and for that evening's work I had 25 new counties on SSB. One thing led to another, and before long I was a member of MARAC and was using the County Hunters Mobile QSL Bureau. My first County Hunting Convention was in Denver. Doris and I met a large group of nice people, and it has been that way ever since.

Carl "Andy" Anderson, W3XE, USA-CA All Counties #507.

"When I was down to my last 25 counties, Bill, WA3ZMY, started getting on my case, but I would always plead a golf match or something else important when a county I needed might be on. One night over a small plate of crab legs, Bill asked me point blank why I didn't want to finish up. I couldn't think of a reason, let alone a good one, so I said okay if he would get me the last one *my* way. I think he thought he would have to stand on his head or some such nonsense, but he agreed. In the meantime, I found I needed one rework, and a request to Al, KG5J, sent him running to that Arkansas rework. On 2-8-86 Bill, WA3ZMY, took a short 8 hour drive to Grayson, Virginia, and at 2255 UMT I worked my last one on 80 CW, just 32 years, 7 months, and 22 days after the first county.

"I would like to thank all the people who have helped me through USA-CA, starting with KN6BBU, who was first on 80 meters CW; the 3074 in between; and WA3ZMY, who was last on 80 CW. Of course, the only rework I needed was provided at the last minute by Al, KG5J, from Arkansas. Then there is my driver who is also my wife, Doris, who puts up with these strange operations. Will all the mobile operators and Net Control Operators stand up and take a bow for the time and effort they spend in this team event. Of course, without a QSL or MRC how could you prove you worked 'em? So, my hat's off to W6CCM and Barbara and the team of N0COL, Gwen, and N0CKN, Jerry, who operate the Mobile QSL Bureau. Of course, MARAC was a great help. And last but not least, I thank Cliff Evans, K6BX, the originator of the award and first administrator, and Dorothy Johnson, WB9RCY, the present USA-CA Administrator for *CQ* magazine. Without my wife, Doris, the many mobiles, net control stations, the County Hunters QSL Bureau, and people of MARAC, as well as *CQ* magazine, this award wouldn't be possible. This is one award which took lots of cooperation by lots of people for me to hang the plaque on the wall.

"About myself, I have held calls KN6BCG, K6BCG, K3JYZ, W5TWT, and W3XE. I'm a life member of the ARRL, past Communication Manager of the Maryland/D.C. Section, as well as Net Manager of the MDD Section net. I've handled enough CW traffic to be awarded the B.P.L. Medallion, and earned WAS (48 states) as K6BCG and (49 states) as K3JYZ. I also hold DXCC for CW and phone. I'm a past president of the Potomac Valley Radio Club and at present am serving as treasurer. I worked for the Department of Defense for 35-plus years and now enjoy full retirement.

"I am going to get a CW endorsement, so if you want to work USA-CA #507, try 14.0667 MHz. I may go a second time around, but it will either be all CW or as net control on SSB—73 to all, and Good Hunting, Andy."

333 South Lincoln Ave., Mundelein, IL 60060

USA-CA Special Honor Roll

Stacey L. "Ace" Jansen, N3AHA
All Counties #566, Mixed, 4-3-88

William E. Blaine, W4UYC
All Counties #567, All SSB, 4-4-88

Joe Watson, W1WLW
All Counties #568, Mixed, 4-8-88

Awards Issued

Stacey L. "Ace" Jansen, N3AHA, filed his good application for a fully endorsed certificate and received USA-CA All Counties #566, and USA-CA 3000 #597, Mixed; along with USA-CA 2500 #671, USA-CA 2000 #741, USA-CA 1500 #828, USA-CA 1000 #1014, and USA-CA 500 #2248, All 20M/SSB/Mobile, all dated 4-3-88.

William E. Blaine, W4UYC, completed all of his paperwork and claimed USA-CA

USA-CA Honor Roll

3000			**1500**		
N3AHA		597	N3AHA		828
W4UYC		598	W4UYC		829
W1WLW		599	W1WLW		830
			DL3DD		831
2500			OE5KE		832
N3AHA		671			
W4UYC		672	**1000**		
W1WLW		673	N3AHA		1014
			W1WLW		1015
2000					
N3AHA		741	**500**		
W4UYC		742	N2GOI		2247
W1WLW		743	N3AHA		2248
			VE6BMX		2249
			UW9LA		2250
			HA8XX		2251

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.

All Counties #567, USA-CA 3000 #598, USA-CA 2500 #672, USA-CA 2000 #742, and USA-CA 1500 #829, All SSB, dated 4-4-88.

Joe Watson, W1WLW, filed his application and received endorsements for USA-CA All Counties #568, USA-CA 3000 #599, USA-CA 2500 #673, USA 2000 #743, USA-CA 1500 #830, and USA-CA 1000 #1015, Mixed, dated 4-8-88.

Lester W. Krute, K3LK, registered a proud achievement by adding an All CW endorsement to his USA-CA All Counties #228 (6-2-79), USA-CA 3000 #259 (6-2-79), USA-CA 2500 #322 (6-2-79), and USA-CA 2000 #367 (6-2-79), all endorsements dated 4-29-88.

Dr. Leopold Pomp, DL3DD, received USA-CA 1500 #831, All 2× CW, dated 4-13-88.

Adolph Kerschbaum, OE5KE, received USA-CA 1500 #832, Mixed, dated 4-29-88.

USA-CA 500 certificates went to:

William B. Kelly, N2GOI, USA-CA 500 #2247, All 20M/SSB, dated 4-2-88.

Stacey L. Jansen, N3AHA, USA-CA 500 #2248, All 20M/SSB/Mobile, dated 4-3-88.

Barry A. Ploof, VE6BMX, USA-CA 500 #2249, All 20M/CW, dated 4-13-88.

Eugene V. Pimenov, UW9LA, USA-CA 500 #2250, Mixed, dated 4-14-88.

Dr. Miklo Danko, HA8XX, USA-CA 500 #2251, Mixed, dated 4-30-88.

Awards Available

Classroom Net Award. The Classroom Net Award is issued by The Radio Club of Junior High School 22, New York City. The following recent press release headlined "Class Award from the Crew at the Core" describes the unique nature of the club's activities.

Elemer A. Bielek, HA9RE, USA-CA 1500 #805, No. 1 to Hungary. Note CQ awards including WAZ and USA-CA.

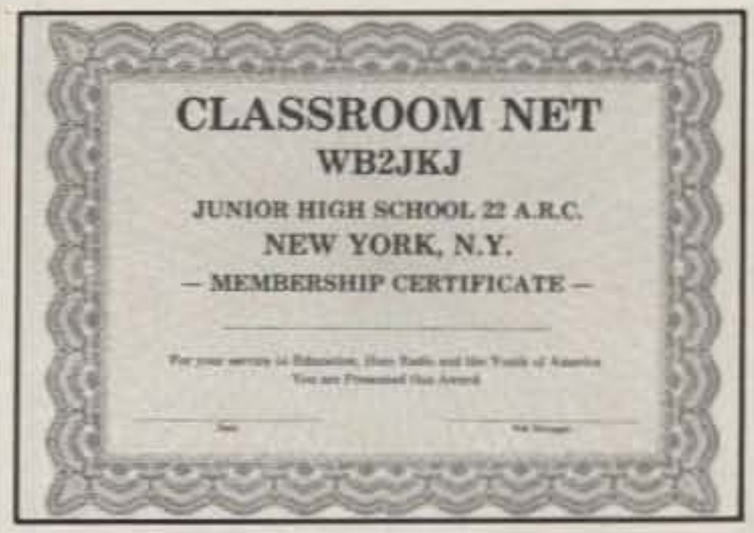
Robert Silva, KB2DGI, has seen drug dealers and prostitutes. He has watched undercover policemen beat criminals bloody. He has seen people walk into East River Park and never walk out. At night he hears gun shots outside his window—one block away on Avenue D. The 16-year-old and his friends call it Avenue Death. This is where Robert calls home: Manhattan's Lower East Side.

Recently, he came to Huntsville, Alabama—a city of engineers and computers and rockets. Before he ever saw the city, Steve Roberts, WA4QXH, introduced him to it on the Classroom Net.

Roberts is part of Education through Communication, a one-of-a-kind educational program sponsored by the Radio Club of Junior High School 22 in New York City which uses the theme of amateur radio as a learning tool, and the call is WB2JKJ.

The Huntsville Amateur Radio Club and Roberts decided to give Robert the chance of his life—three weeks in Huntsville and a trip to Space Camp. The club raised $1200 to pay for the trip and Space Camp, and Steve asked him to stay in his home.

All of this came about as a result of the Classroom Net, which meets daily on 7.238 MHz at 7 a.m. eastern time and



Classroom Net Award given by WB2JKJ to regular participants in the "Class" Net.

continues until 8:30 a.m. The net is the start of a full day of education based on communication involving well over 200 students who might never have come to class if it weren't for this unique program, the goal of which is to use the theme of amateur radio to further and enhance the education of young people.

The Classroom Net encourages check-ins by people in all walks of life who are interested in the incredible possibilities our wonderful service has to offer young people.

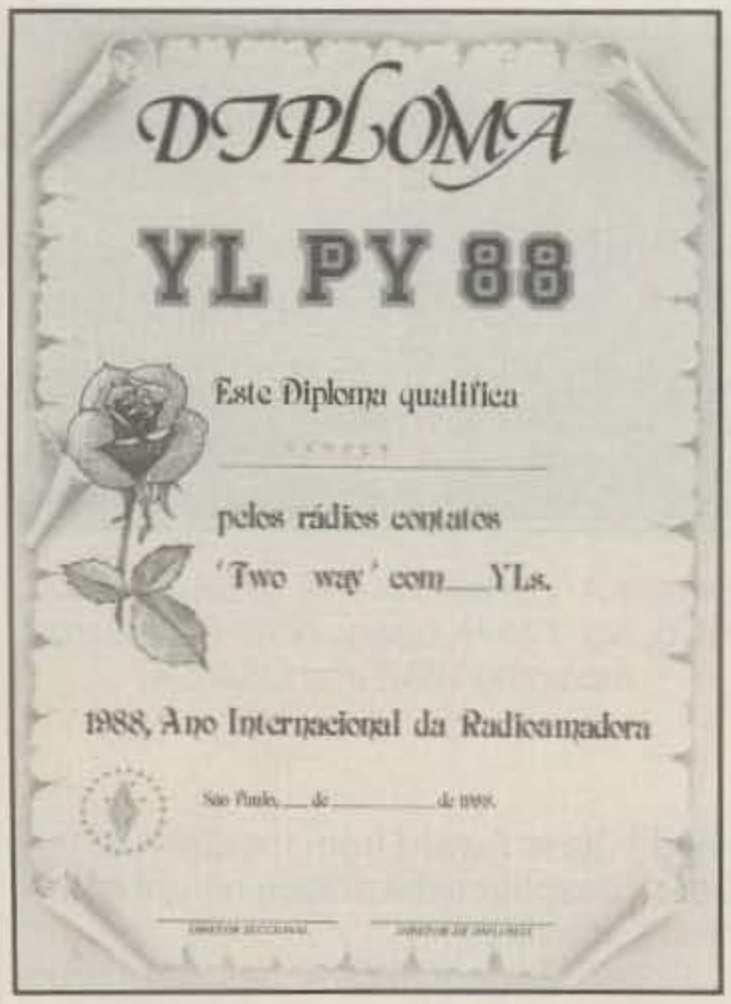
For those who come to class on a regular basis an award is granted. It signifies the recipient is truly concerned about the future of kids who may never have seen the inside of a classroom if it weren't for the interest and excitement that amateur radio provides. Truly a "class" award from the "Crew at the Core of the Big Apple" learning in a way that is as effective as it is thrilling.

Get up, tune up, fight the noise, c'mon to class and meet some of the most wonderful, active, and dedicated folks in amateur radio today. You'll be glad you did, and who knows, like Steve Roberts, you may have a lifelong effect on a youngster's future. Start earning a thoroughly "class" award today.

For more information, contact WB2JKJ, The Radio Club of JHS 22 NYC, Inc., 111 Columbia St., New York, NY 10002 (tele. 516-674-4072).

Bartolomeu Dias Award. The Bartolomeu Dias Award is offered by the Republic of South Africa/Portugal in commemoration of the 500th anniversary of the discovery of the Cape of Good Hope. Bartholomeu Dias, 1450(?)–1500, a Portuguese navigator and explorer, made the discovery in 1488.

Amateur radio stations outside the Republic of South Africa and Portugal can qualify for the award by making contact with five stations in ZS-land and five stations in CT-land. Contacts must be made during 1988.



YL PY 88 Award available from LABRE, Sao Paulo Section, Brazil.

Send applications to Johannesburg South Africa Radio League, ZS6TJ, Box 2327, Johannesburg 2000, South Africa, or to The CT Radio League. The cost of the award is $5.00 U.S. or 10 IRCs. Applications can be made up to 31 December 1990.

YL PY 88 Award. The YL PY 88 Award is offered by the LABRE Sao Paulo Section for working "YL" stations during the period January 1, 1988 through December 31, 1988.

To obtain the award it is necessary to accrue 88 points. CW contacts with PY "YL" stations are worth 11 points each. Phone contacts with PY "YL" stations are worth 8 points each.

All bands—CW or phone—are valid for this award. The award is also available to SWL stations. QSL cards are not required. Submit GCR log information showing date, call, time, mode, RS(T), and band.

Cost is 10 IRCs. Send application to LABRE DS/SP—YL PY Award, P.O. Box 22, Sao Paulo–CEP 01051, Brasil.

The Friendly Border Award offered by the Algoma ARC in Ontario, Canada.

Friendly Border Award. The Friendly Border Award is offered by the Algoma Amateur Radio Club to amateurs/SWLs who qualify by working/hearing amateurs in the provinces and states along the 3500 mile friendly border joining Canada and the United States of America.

The provinces and states adjacent to the common border are British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and New Brunswick; Washington, Idaho, Montana, North Dakota, Minnesota, Michigan, New York, Vermont, New Hampshire, and Maine.

An endorsement is available for working/hearing Alaska and the Yukon. Certificate endorsements for single-mode transmission and/or single band may be made.

Send certified log data (signed by an executive of your club or two fellow amateurs) with $3.00 or 10 IRCs to Awards Manager, Algoma Amateur Radio Club, Box 86, Sault Ste. Marie, Ontario, Canada P6A 5L3.

(Note: The Algoma Amateur Radio Club previously offered an award called "The Borderline Friendship Award." The award is again offered under the new name "The Friendly Border Award.")

Notes:

Have a nice summer. 73 and good hunting.

Dorothy, WB9RCY

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TM-221A, 321A, 421A

TH-215AT, 315A,
415A, TH-205AT

TH-25AT, 45AT

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IC-735, 761, 751A, 781

IC-32AT, IC-2GAT, IC-02AT,
O3AT, O4AT, IC-μ2

IC-228 A/H, IC-28H, 38A, 48A

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MFJ 1270B, 1274, 1278

DX

a monthly feature by
HUGH CASSIDY, WA6AUD

NEWS OF COMMUNICATION AROUND THE WORLD

I sing the hymn of the conquered,
who fell in the Battle of Bouvet.
The hymn of the wounded, the beaten,
who died overwhelmed in the fray . . .

One of the Locals came by not too long ago to ask just what is a "Mystery of the Ages." All we could say was repeat what the Old Timer had told us years back: "Those are the things in DXing that happened so long ago that most DXers have forgotten the reasons why they happened."

We did recall a recent meeting of the Deserving where the question was asked as to why certain areas are considered DXCC countries. The reply given was that the reason is unknown. Specifically, the question was asked about Scotland and Wales. Another chimed in to ask about Corsica and Sardinia. If you have never heard or thought of this question, you probably are among the newly minted DX types.

Again we thought of the words of the Old Timer on the subject and the possibility that a half-century has blurred the basis for the reasoning and thinking that went into the formation of the DX country list back before WW II. That led to thinking that it might be helpful to again pass in review some of the reasons and actions back when DX and the DXCC rose to displace the WAC award as the premier award for DXers.

There were some great thinkers back in those days. One has but to look and note how well they planned to appreciate that the DXing we know today and the DXCC is largely derived from their work. And deep into the thought and research on what might be considered a country was Clint DeSoto, then an assistant secretary of the ARRL in downtown Hartford. Freely admitting that he had struggled with the question for years and was not even sure that he had mastered it, in 1935 Clint came up with a first attempt to define a country. He simply said: "Each discrete geographical or political entity is considered to be a country." To add some perspective of things back then, it was not until 1934 that there was even an approved map of the world showing the continental boundaries for WAC. With that settled, the thinking turned to defining a country for DXing. It was not easy.

The definition offered in October 1935 was soon realized to be a bit impractical. The resulting list of "countries" could easily have run to several hundred. There were also protests that the question of call areas was being ignored, the Australians noting that a DXer in a small foreign country who worked one VK and got credit for a whole continent had an advantage and that was hardly fair. Some of the Ws —there were no Ks back then—also had the same thought. Some still do.

77 Coleman Drive, San Rafael, CA 94901

Some say a concerned parent should keep a child away from radio clubs. Look what happened in the Milhone family. Jim Milhone, KI9G, in the background, got licensed in 1977. The next year he talked father, Bob, into a license, and he is KB9LN. Then the pressure was on son, John, and XYL, Peggy, to conform and they are now N9GYT and N9GYS. Who's the big DXer now? Bob has a 20 meter WAZ on phone. The rest of the family is trying to keep up with him.

It is interesting to note the examples that Clint DeSoto gave, these being raised in consultations with DXers around the world. Clint noted that under the 1935 proposed definition of a country, Tasmania and Australia each would be a "country" because of geographical separation. The ZS/ZT/ZU prefix areas in South Africa would be counted as one country. Scotland and England would be "countries," as would be Northern Ireland and the Irish Free State. In summation, Clint said that the examples given would illustrate the working of the method quite effectively. And, if any questions arose, you could just drop a line to ARRL headquarters for a ruling. Apparently, a good many DXers were quick to accept the invitation.

In January 1937 it was acknowledged that the plan which they had hoped would be simple had turned out to be hardly that at all. The definition of a "country" was being shot full of holes by the DXers, and it was realized that there was a possibility of 700 DX "countries" being created, possibly even more. So thinking leaned toward a definite list of countries, boiling down the possibilities to a reasonable number, perhaps a couple of hundred, and use that for DX award purposes.

About this same time the ARRL was preparing the ARRL Map of the World, each country thereon being illuminated in one of the 60 shades of colors available to allow easy recognition of a country and its boundaries. At the bottom was an alphabetical listing of the countries on the map. As Clint wrote: " . . . the connection between this map list and an 'official list of countries, etc.' was obvious. It offered a perfect vehicle for the general popularization and appreciation of a suggested standard list . . . not a perfect list." It was freely admitted that possibly everyone would not be satisfied with such a list, and that there probably never would be anything generally accepted as a "perfect list." It nevertheless would bring to DXing a generally recognized standard to which everyone could refer and " . . . to use as a start for further argument."

The list was published in *QST* in January 1937. It was the start, and it might be noted that Corsica and Sardinia were included on this list. In the British Isles there was a listing of Great Britain to cover England, Scotland, and Wales, though Northern Ireland and the Irish Free State were shown as separate countries. The 1937 list ran to 251 countries and included most of the DXCC countries that are shown today. Back then they were just DX countries. DXCC did not show until later in 1937.

Apparently, the discussions continued even after the publication of the country list, and in January 1938 a second list was published. Twenty additional countries were listed, including Scotland, Wales, and the Isle of Man. With WW II developing, DXing went into a decline with restrictions placed on amateurs in many areas and eventually in the U.S. Amateurs returned to the air in the U.S. in 1945, and in February 1947 the post-war DXCC Country List was published.

In the decades after WW II there were continuing queries regarding just how it was determined that an area was a DXCC country. Several times the basic three-point criteria was published, these encompassing the points of (1) political independence, (2) separation by water, and (3) separation by foreign territory. It might be noted that when the DXCC Award was announced in 1937, it was flatly stated that the ARRL Country List as published in January 1937 *QST* would be used in determining what constitutes a country. In the post-WW II years the Country Criteria was stated and restated but was essentially unchanged until 1960 when mileage requirements were added to Part 2. Since those years it has been restated, redefined, and expanded, the last version coming as a result of the DXAC study ordered in 1986 and reported out in 1988.

To understand the list it is sometimes necessary to try to understand the thinking of years back. While the current country criteria makes no mention of ethnic factors, it does seem to have been a factor in other decisions. Also remember that the mileage requirement was not stated until 1960. You can even find it admitted freely that some of the present countries are carry-overs from pre-WW II lists. The mileage requirement often brings question—the Auckland and Campbell Islands, for example. They were pre-1960 countries, on the list before the requirement was made and they had amateur activity. Sardinia and Corsica were also on the list right from 1937, and this early listing, plus other significant factors, can be cited in their instances. You can study the recent restatements of the Country Criteria and readily note exceptions. But you will have to go back decades to when these areas were put on the country list to begin to understand

The WPX Program

Mixed

1337	DL6RAI	1341	DE0DAQ
1338	K1JIU	1342	JE2GMO
1339	JJ1JGI	1343	VE3NSZ
1340	K9EC		

SSB

1964	NK3U	1971	I4UJI
1965	EA3EXW	1972	I3VKW
1966	EA1DZA	1973	K9EC
1967	EA4DKZ	1974	K5HT
1968	JE1GZB	1975	JE2GMO
1969	DL6RAI	1976	W5EIJ
1970	KC4DY	1977	RB5**

CW

2510	OK2BP	2514	WA8YWK
2511	EA3FAG	2515	KS7V
2512	DL6RAI	2516	JE2GMO
2513	IK2ECP	2517	W5EIJ

WPNX

234	KA0ACN	235	WB3LOT

VPX

350	ONL-2169

Endorsements

Mixed: 450 DL6RAI, K9EC, VE3NSZ. 500 DL6RAI, K9EC, VE3NSZ. 550 DL6RAI, K9EC, VE3NSZ. 600 DL6RAI, K9EC. 650 DL6RAI. 700 DL6RAI, KC7EM. 750 DL6RAI, W4WKQ. 800 DL6RAI. 850 DL6RAI. 900 WB3DNA, DL6RAI. 950 DL6RAI. 1000 DL6RAI. 1050 W5AWT. 1100 W5AWT. 1150 I1EEW, W5AWT. 1250 SM6ID. 1300 SM6ID. 1350 SM6ID. 1650 SM3EVR.

S.S.B.: 350 EA1DZA, JE1GZB, DL6RAI, KC4DY, I4UJI, I3VKW, K9EC, Y81ZN, W5EIJ. 400 EA1DZA, DL6RAI, KC4DY, I4UJI, K9EC, Y81ZN. 450 DL6RAI, KC4DY, I4UJI, K9EC, DE0DAQ, KA0ZFX, Y81ZN. 500 DL6RAI, KC4DY, I4UJI, K9EC, Y81ZN, W5EIJ. 550 DL6RAI, KC4DY, K3ZPG, I4UJI, IK2AEQ, I3DUB, Y81ZN, W0CQN, W5EIJ, NG9L. 600 DL6RAI, KC4DY, W3IJT, I4UJI, W0CQN, NG9L. 650 KC4DY, I4UJI. 700 KC4DY, I4UJI, W4WKQ. 750 EA4CQT, IV3MJR. 800 EA4CQT. 850 KS3F, KD9OT. 900 KS3F. 1000 AC3T. 1100 I1EEW. 1150 AB90. 1200 K5RPC. 2050 F6DZU. 2100 F6DZU. 2150 F6DZU. 2200 F6DZU. 2250 F6DZU. 2300 F6DZU.

CW: 350 DL6RAI, IK2ECP, WA8YWK, KC7EM, JE2GMO, W5EIJ. 400 DL6RAI, IK2ECP, WA8YWK, JE2GMO, W5EIJ. 450 JG2LGM, DL6RAI, WA8YWK, JE2GMO, W5EIJ. 500 DL6RAI, WA8YWK, JE2GMO. 550 DL6RAI, WA8YWK. 600 DL6RAI, OZ4RS. 700 OK1CZ. 750 OK1CZ. 800 G3VQO, OK1CZ. 850 OK1CZ. 900 OK1CZ. 950 SP6FER, OK1CZ. 1000 SP6FER, OK1CZ. 1050 SP6FER. 1100 SP6FER. 1150 KL7AF. 2400 WA2HZR.

10 Meters: EA5AR, DL6RAI, WB3LOT
15 Meters: DL-14687, EA5AR, G3VQO, DL6RAI, JE2GMO
20 Meters: DL-14687, EA5AR, DL6RAI, WA8YWK, DE0DAQ, JE2GMO
40 Meters: DK5WQ, DL6RAI
80 Meters: DL6RAI, DE0DAQ
160 Meters: DL6RAI

Asia: EA5AR, DL6RAI, JE2GMO, OZ4RS
Africa: DL6RAI, KC7EM
No. America: EA5AR, DL6RAI, WA8YWK, K9EC
So. America: DL6RAI
Europe: OK2BQP, EA5AR, DL6RAI, DE0DAQ, JE2GMO
Oceania: SP6FER, DL6RAI, JE2GMO

Award of Excellence with 160 Meter Endorsement: K3UA, HA8UB

Award of Excellence Plaque Holders: W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2**, AB90, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8UB.

Award of Excellence Plaque Holders with 160 Meter Endorsement: W4CRW, N4MM, SM0AJU, KF2O, K5UR, OK1MP, N5TV, W8CNL, W1JR, W6OUL, W4BQY, W5UR, N4NO, W8RSW, N4KE, I2UIY, W8ILC, W1BWS, NN4Q, G4GUE, LU3YL/W4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB9O, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, W3ARK, HI8LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to CQ WPX Awards, P.O. Box 1351, Torrance, CA 90505-0351 U.S.A.

A DX team heard out of the Gambia, here is a good portion of the amateur population there. On the left is Friedel, C35CZ. At the operating position is OM Gurgen, C35CR. On the wall hangs the family treasure, a DXCC certificate. (DK7PE photo)

why they were. The ARRL DXCC Country List with its background information and criteria and rule listing is an invaluable aid to the questioning DXer.

Years back, and admittedly it is not possible to exactly nail down the instance in our memory, one speaker, when pressed with the never-ending question of "Tell me straight, why is Scotland considered a country on the DXCC List?" got a somewhat exasperated reply. "Because they think of themselves as a country and others do likewise!" Possibly that sums up the thinking in many instances, and if one digs a bit deeper, there does seem to be good reasons for such a stand.

Both Scotland and Wales, while being part of the United Kingdom, do have a large degree of autonomy in matters affecting their internal affairs. While there is a single parliament for the British Isles, Scotland has its own legal system and separate governmental agencies to handle its own internal affairs. Wales also gets specialized treatment, including a Secretary of State for Wales with a seat in the cabinet. There is also recognition extended to Cardiff as being the capital of Wales. Also, Northern Ireland has its own legislature and executive offices. These are recognized as political independence.

As for Corsica and Sardinia, both islands have a history that extends back to before the Christian era. Over the centuries the islands have been controlled by a number of outsiders. Corsica has been under the control of Spanish Aragon, France, England, the Italian city-states in fairly recent times, and under Carthage, Rome, and Byzantium in ancient times. Sardinia has a similar history, and though now a part of Italy, it operates under a semi-autonomous status granted by the Italian government. Again, one has to consider whether these are "DXCC countries" because the inhabitants consider themselves so because of history, ethnic, or other reasons, or because they are really just a part of another country. You can get some good arguments trying to tell a Corsican that he really is but a Frenchman living in one of the French Departments. Or mention to a Welshman that in truth he must be regarded as an Englishman. Both these, and others, have a history of disputing such assumptions. Thus, one has to consider whether these are countries because the inhabitants think of themselves as a country. Often you will find the inhabitants insisting on such a distinction.

The ethnic or nationalistic factor also exists in other areas. You may wonder, or have done so in the past, why there are 15 or so Russian countries. Just look at the names of the countries and you will note the ethnic factor. And if you wonder if it still exists, or even should be considered, remember the civil riots in Azerbaijan and Armenia earlier this year and remember that ethnic considerations are still important.

With all of this, one should not expect that arguments and questions on the DXCC Country Criteria will not continue to be heard. It will always be helpful for a DXer to study the criteria, perhaps to understand why some judgments were made in the past, perhaps to be prepared for future rulings that will come under the current criteria.

It has to be noted that there have been greater changes in the DXCC Country Criteria in the last quarter-century than there were in the first quarter-century of its existence. The criteria has gone from a map and a country list to an increasingly complex statement.

The DXCC Country Criteria, or even the Country List, was never intended to be set in stone. Anyone regularly working DX during the last quarter-century must certainly be aware of that. The current Country Criteria clearly states that meeting any one of the initial first three criteria parts will qualify an area as a DXCC country. It will remain to be seen if the expansion of the current criteria into detailing matters very finely will lessen, or will increase, the questions that will be asked in the future. Undoubtedly there will be questions raised on certain parts. Undoubtedly you will hear them as soon as they are raised.

DX definitely is not the same as it was back in 1937. Even a cursory examination of photos in the magazines will show that. A poll of DXers in 1937 brought the information that most were buying commercially built receivers but building their own transmitters. This was in the days of CW and AM phone. SSB when it came along brought even greater changes. In 1937 a W9er in "How's DX?" questioned in all seriousness the value of a rotatable beam on 20 and 10 meters. The point was made that the only reward from a rotatable beam was a gain of one or two "S" units and a better front-to-back ratio. It was all summed up by the writer saying " . . . but if the intent is to extend your operating time and work stations when no one else can, you'll probably need a fixed array with its greater gain." This was back when the dream of many DXers was to have a big piece of property with rhombics aimed in every direction.

The WAZ Program

20 Meter Phone

661	IKØFEW	665	VE2PJ
662	JF7TYA	666	KI4EZ
663	N3CWP	667	K3UA
664	WA8YTM		

15 Meter CW

127 JF1NCT

20 Meter CW

292	AK2H	294	OZ2UN
293	W2FV		

40 Meter CW

76 JR3GWZ

All Band WAZ
SSB

3198	LX1CW	3200	AE5E
3199	DL3NBL	3201	W6TUI

Phone/CW

6292	IK2CIH	6304	VE3NSZ
6293	WS5E	6305	OK3BA
6294	W6UQT	6306	NM3V
6295	AK2O	6307	JA8BAX
6296	WAØVBW	6308	F6HGB
6297	DL6DK	6309	PA3BWQ
6298	RT5UN	6310	HL4XM
6299	KA6TFC	6311	VE3AIA
6300	K6SIK	6312	EA7JA
6301	K9CC	6313	KA2AOT
6302	KØSR	6314	WB9NOV
6303	VE2ME		

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

Back then Dr. Yagi had not yet offered his theory of parasitic elements. The 1948 *Handbook* had no mention of such antennas, while the 1956 *Handbook* did. Articles on such Yagi antennas started to show in the early 50s. Today Yagi is a generic term for directional beams. And they do work.

In spite of everything, including the enduring questions asked, the DXCC administrators over the years have shown little hesitation in reversing their course or decisions. Clint DeSoto freely admitted that times and experience changed his viewpoint. After WW II there were many changes in the DXCC country list. One had to be diligent to keep up with the additions . . . and the deletions. Keep in mind that in the early days of DXing, and well beyond even WW II, a country was not a country until someone had operated from the area. And even if you were sure that it would be a counter, you could get no assurance until there was an actual operation. Some countries were short-lived. JD1 Okino-Torishima lasted just over four years on the DXCC country list, Geyser Reef lasted eleven, and Blenheim Reef just eight. 9U5 Ruanda-Urundi lasted but two years. Wrangel Island lasted quite a while for one which was never officially a country because no one ever operated from the island north of Siberia.

This year at the International DX Convention there was a question as to why deleted countries are still in the Honor Roll listings. What do you think the sentiment was for deleting the deleted countries? A call for a show of hands by Honor Roll members had a field of hands waving all over the auditorium. But when the question was asked as to how many on the Honor Roll were in favor of dropping the deleted countries from the Honor Roll lists, it was hard to spot a hand.

When you are in Senegal visiting Dakar during a DX Test, what do you find when you drop in at that QTH with the antennas? Nothing but W1s running up big contest scores. Clutching the key is K1MEM, Jim Dionne. Behind the shades is K1MM, Bill Poellmitz, while K1ST, Steve Tolf, anticipates his turn at the key. They were signing K1ST/6W1. Who took the picture? Rudolf Klos, DK7PE, who shows most everywhere that DX is spoken.

What should DXers do? Work them first and worry later! And keep in mind that there is a reason, often a good one, why certain countries are on the DXCC country list. Even the variants such as 4U1ITU, 4U1UN, or 1AØ are there for a good reason consistent with the thinking at the time they were put on the list. "Separate Administration" brought some that still seem a bit out of place. Kingman Reef and Kure can bring some questions, but often it is difficult to judge the list in the context of the present when the decisions in many cases were made a quarter-century or more in the past. And if there is a flaw in our research and memory, we would like to hear more about it.

Remember! The DXCC Country List is one of the true Mysteries of the Ages. But understanding is sure to come. It always does. And if now you do not understand, it may be because you are not yet ready.

VK Bicentenary

You will no doubt recall that Queen Elizabeth was in Australia to help celebrate the 200th anniversary of the country. You may have missed that, but possibly you noted some unusual callsigns on the frequencies. To mark the celebration, the Australian Department of Transport and Communication not only allowed the AX prefix to be used in lieu of the VK one normally heard, but one VI88-prefix callsign was authorized for each Australian State or Territory to mark the celebration and anniversary. There are ten of these calls, and if you worked any of them, the following should help: VI88NSW New South Wales, VI88VIC Victoria, VI88ACT Australian Capital Territory, VI88TAS Tasmania, VI88SA South Australia, VI88WA West Australia, VI88NT Northern Territory, VI88QLD Queensland, VI88ABC Polonia Radio Club Victoria, VI88XPO World Expo, Brisbane.

There will be an effort to have VK1s operate during the bicentenary. If you miss the QSL information, you can try the Wireless Institute of Australia, GPO Box 600, Canberra, Australian Capital Territory 2601 Australia.

Thailand

Tony Waltham, HS1AMH, recently wrote to advise of the changing situation in Thailand affecting amateur radio and the prospects of more activity out of the SEAsia area.

Tony notes that there has been an almost total lack of activity from Thailand for some years, but new amateur regulations were enacted in August 1987 and these became effective at the start of this year. The salient points of the new regulations include a minimum age of 15 years for license applicants and the stipulation that they be Thai nationals. Qualified foreign residents will be able to apply to operate under reciprocal privileges, the details to be worked out with corresponding agencies abroad.

A National Security Council or Police Clearance will be required before a license is issued. Applicants for such licenses should be members of the Radio Amateur Society of Thailand (RAST).

A novice license is offered, this for VHF only on 2 meters. A Secondary HF license requires some Morse code and better technical knowledge, and the First Class license requires Morse capability and even greater technical knowledge.

The Thai Ministry of Foreign Affairs will arrange for the reciprocal agreements. The Thai Post and Telegraph Department is very keen on such reciprocals, and this probably will be the only way that non-Thai nationals will be able to operate in Thailand in the future. Tom says that he understands that the U.S., Chile, and Spain moved immediately on the reciprocal licensing matter, and that other countries were expected to quickly join in.

RAST recently elected a new committee to handle the club activities. The new committee is headed by Sribhumi Sukhanetr, HS1SS, the

5 Band WAZ

As of May 1, 1988 179 stations have attained the 200 zone level.

New recipients of 5 Band WAZ with all 200 Zones worked:

OE2VEL	OA4OS
ZP5JCY	W4VQ
RT5UN	LZ2KK
K4CEB	

The top 8 contenders for 5 Band WAZ are:

1. N4WW, 199
2. W8UVZ, 199
3. K6YRA, 199
4. K9GX, 199
5. SP6JCY, 199
6. EA5AD, 199
7. W2YY, 198
8. W7UR, 198

467 Stations have attained the 150 Zone level.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4½ × 9½ to the W A Z Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is $4.00 for subscribers and $10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application.

Permanent Secretary to the Thai Communications Ministry. Several of the senior officials in the Thai Post and Telegraphs Department have also been named to the RAST Committee, these in either appointed or advisory positions. The situation that existed in the past where Thailand had legal amateur radio but no licensed operators is ending, and the newly appointed committee is in an excellent position to do the best for amateur radio in Thailand. Since 1982 there has been little amateur action in HS-land, and the newly authorized activity can be expected to first show from club stations.

This November 11–13 the SEANet Convention will be held in Thailand. You might check later developments as well as get information on the SEANet Convention by monitoring the SEANet meetings at 14320 kHz at 1200Z.

QSLs

A recently licensed VU amateur, whose name we will not mention, wrote to discuss some QSL information. Mostly it was what might have happened.

The writer noted that there have been instances noted of a lot of picture postcards for sale in Delhi in the old paper market. Actually, the cards were QSLs which the writer suspects came from a QSL Bureau. He noted that the policy of some VU QSL bureaus is not to forward cards to amateurs who are not members of the bureau, these incoming cards eventually hitting the old paper market.

So what should you do? The writer says you should not blame the VU DXer too hastily when your expected QSL does not come back. He may never have received yours. It can be a case of "Work 'em first, QSL direct!"

HI Dominican

There will be special activities to mark the 495th anniversary of the Discovery of the Americas. The Union Dominicana de Radiofi-cionados in Santiago will put on a number of efforts during the latter half of this year.

In June the group was signing HI2UD from the island reef of Saona, 18°S, 69°30'W. Next month the group will operate HI3UD/HI4 from Tuna Key at 19°20'N, 71°30'W, this effort being on September 24 and 25. They will sign HI5ØØUD on December 3–4 on all bands 10 through 80, SSB, CW, and RTTY. The UDRA group used the HI5ØØUD callsign last year. This year there will be a new QSL design and you can look for one every year all the way up to 1992, when they will go all out to mark the first voyage of Columbus which started in May of that year. Work HI5ØØUD this year and the next four efforts and you will receive a commemorative Diploma of the Fifth Centennial of the Discovery of the Americas in 1492.

Need any more information? Drop a line to UDRA, Radioaficion con Amor, Apartado Postal 449-3, Santiago, Dominican Republic.

WAZ Zone 2

We talked with one of the more mature Locals some years back and, naturally, discussed DX. We mentioned some of the DXCC countries which have not been on for years—Burma, Albania, Bouvet, to name a few—and all we got was disdain. Heavy disdain. "Who needs them?" was his scornful retort. "It's Zone 2 that I need for WAZ. How do you get that one?"

Realizing again that all things are relative, those who thirst for Zone 2 but have no need for Burma, Albania, and the others can look forward to the first weekend in October. Zone 2 (Quebec north of latitude 50°N) will be heard from Sept-Iles.

The Union Metropolitaine des San-Filistes de Montreal will operate for 48 hours over the first weekend in October (October 1–2). The call will be VE2UMS/VE2, and they will be on 10 through 80 CW and SSB. Primary action will be on 20 meters and modes will be alternated approximately every 2 hours. Also, modes will be alternated between bands—if 20 is on CW, look for phone on 15 or 40. The bands currently in use will be announced from time to time on 20 meters.

On the various bands, look for the operation at: 20 meters—14185 kHz phone, 14025 kHz CW; 40 meters 7085 kHz phone, 7025 kHz CW, 7185 phone to North America; 80 meters 3785 kHz phone, 3685 kHz CW; 15 meters 21185 kHz phone, 21025 kHz CW; 10 meters 28525 phone, 28025 kHz CW.

QSLs will go via the VE2 Bureau. If you need more information, drop a line to the club at: 7000, rue Marie-Victorin, Montreal, Quebec H1G 2J6, Canada.

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

3364	YU2AA	2047	W1NG	1549	IT9QDS	1278	3A2LF	1007	KSØZ
3310	F9RM	2032	N2AC	1541	W5PWG	1273	N8BJQ	1000	NV9S
2953	K2VV	2020	SM7TV	1515	N6JM	1269	K2OLG	998	SP5AA
2875	W2NC	2014	I6SF	1501	KL7AF	1246	YU1SZ	987	YU7DR
2726	K6JG	2006	PY1APS	1458	W8UMR	1227	WB8ZRL	958	WØJIE
2661	VE3XN	1945	W9NUF	1436	I1POR	1215	N2CIC	892	K9BQL
2539	YU2TW	1915	YT7DX	1429	K2POF	1188	K7CU	886	G4SDJ
2502	K6XP	1817	K9BG	1428	YU2NA	1179	I1EEW	883	I2EAY
2462	W4BQY	1809	IN3ANE	1415	G4FAM	1159	AI8S	872	W2XQ
2416	W9DWO	1802	WØSFU	1414	SMØAJU	1153	N2AIF	835	G4OBK
2401	N4NO	1799	CT1LN	1405	DK5AD	1150	YU1GR	791	YT7WW
2355	N4MM	1776	PY4OD	1374	W6OUL	1147	JA6GWU	750	F1HWB
2322	N6JV	1722	YU7SF	1373	YU2CQ	1102	VE5FX	740	YU1PJ
2159	YU7BPQ	1701	I2UIY	1350	AC2J	1096	HA8XX	726	KI8B
2123	N6CW	1675	N5TV	1345	YU7AJD	1083	DF6EX	719	KY3V
2123	I2PJA	1659	HAØDU	1340	KA5W	1080	WD9IIC	715	K6UXO
2104	N9AF	1631	N6AW	1309	YU2TY	1066	NE6I	714	KC7EM
2097	WA8YTM	1627	SM3EVR	1304	AB9O	1052	PY2DBU	697	N3KR
2077	YU1AB	1555	K8LJG	1286	W4UW	1044	IØAOF	648	IK2BHX
2070	EA2IA	1553	SM6DHU	1279	SM6CST	1016	W9IL	637	F6HMJ
2058	PAØSNG								

SSB

3235	F9RM	1681	WF4V	1303	KC8YM	1097	SMØAJU	792	YB3CEV
2694	IØZV	1660	WA8YTM	1288	W4UW	1050	F6BVB	790	K9BQL
2509	K2VV	1656	I4CSP	1258	W2NC	1042	I2EOW	781	KBØC
2442	ZL3NS	1655	CT1LN	1257	KKØL	1034	WØULU	769	KC2FC
2434	K6JG	1632	NJØC	1251	KL7AF	1029	KA5W	766	IØPSB
2334	K2POA	1587	WA8YTM	1249	EA8AKN	1020	I8WYD	755	IT9ONV
2310	CT1UA	1538	ZP5JCY	1247	K5RPC	1010	K8LJG	750	F1HWB
2268	K6XP	1533	W1NG	1239	CT4UW	997	HA8XX	726	NE6I
2238	IØAMU	1532	WA4QMQ	1207	I1POR	993	AG2K	713	IT9JKY
2124	N4MM	1516	W3ARK	1186	PY4OD	972	WA2FKF	694	AI6Z
2120	I2PJA	1510	EA2IA	1178	SM6DHU	962	W3GXK	691	W5ILR
2095	WØYDB	1507	W9NUF	1178	CT1BY	938	PY4OY	675	IK2DUU
2053	I2PHN	1457	CT1FL	1156	AB9O	863	G4SDJ	657	KE6KT
2024	VE1YX	1450	G4CPJ	1144	I5ZJK	859	KK5P	648	N6CGB
2007	I4ZSQ	1397	I2UIY	1144	IK5ACO	857	CT1AHU	631	YV1CP
2000	WD8MGQ	1387	XE1OX	1131	N6FX	854	KD9OT	630	IK8GCS
1870	W4BQY	1350	N5TV	1129	N2AC	848	K3IXD	622	SM6CST
1825	N4NO	1350	G4CHP	1110	EA4KK	828	W6OUL	618	CT1DIZ
1801	PAØSNG	1343	AC2J	1109	I1EEW	807	K8ZZU	611	HR1FC
1750	W9DWO	1305	I8KCI	1105	N2CIC	800	I3ZSX	600	KB4HU
1717	I8YZP	1305	EA3AQC	1100	PY4VX	799	NK2H	600	NM5Y

CW

2621	W2NC	1779	OZ5EV	1292	W1NG	1011	AK9Z	715	W2XQ
2415	K2VV	1762	I6SF	1224	N6FX	1010	KN7K	711	JA2GCW
2356	WA2HZR	1740	YU7SF	1220	K2POF	1008	YU2CQ	709	WØJIE
2303	N6JV	1659	LZ1XL	1151	SM6CST	1005	TI4SU	708	OZ5UR
2193	ON4QX	1658	EA2IA	1138	I2UIY	1004	VE1CK	707	WB8ZRL
2092	N4NO	1613	N4MM	1125	SM6DHU	975	KA5W	705	KA1CLV
2030	K6JG	1554	VO1AW	1117	I7PXV	969	G4FAM	702	G4SSH
2029	W3ARK	1519	PY4OD	1101	KL7AF	967	SM5DAC	659	AC5K
2014	W9DWO	1504	WA8YTM	1099	AK2H	948	LA9XG	651	G4UOL
2004	VE7CNE	1500	W9NUF	1082	K8LJG	940	W6OUL	649	HA8XX
1973	N6CW	1488	I1YRL	1077	W1WAI	849	CT1LN	639	KUØS
1927	K6XP	1365	KA7T	1065	W9PWM	821	KQ3S	622	LZ2VP
1926	W4BQY	1350	N5TV	1038	SMØAJU	799	G3VQO	609	ISØFIC
1922	G2GM	1309	I2DMK	1026	F6HKD	753	I2EAY	605	K7DBV
1801	N2AC	1309	IT9VDQ	1023	DJ1YH	743	NE6I		

DX Forums

There are some DXers who cling to the belief that you gain in knowledge, wisdom, acuity, and natural nobility the more DX stations you work, whether you need them or not. On another plane are those DXers who firmly believe that inner serenity and cosmic understanding will only come from attending DX Forums at conventions. "That is where you get the word," they will instruct you, "and always be sure to sit up front. Don't miss anything!" And should you be skeptical, we learned the truth early by noting that Don Wallace, W6AM, always sat in the front row. And these days you will always find the Colvins down front!

At a recent DX Forum we heard a figure on the numbers on the Honor Roll that was a bit startling. It was mentioned that the 1988 listing of the Honor Roll members would total an estimated 27–2800. We had to get out the June 87 *QST* to start counting. The figure is right. There are about 850 calls listed per page. In 1987 they were pushing a full three pages for the listing. However, there are some in the listing who hold position on more than one Honor Roll. K6GA, for example, holds a spot on the Mixed, Phone, and CW Honor Roll lists.

At the International DX Convention a few months ago the questions asked had a wide range. One in the audience asked about limiting the spectrum space for contests and contesters. This was joined, or was it amended, to restrict the spectrum space for ragchewers.

The question of the requirement that the country be on a QSL card was asked, and it was indicated that cards would be accepted as in the past where the country is clearly understood from the information on the card. Where some prefixes might cover a number of countries—PY0/VK9/FR, for example—the country must be shown on the QSL.

The operation by the National Union Group in the Karin State of Burma is not being recognized. Walvis Bay currently counts for nothing—a non-country, sort of. The Russian Woodpecker will be matched by the American Woodpecker, but an improved model. Spratly is hazardous, and Amboina Cay more so. There is developing talk of a Bouvet operation by the Peter I group, this during the coming winter. Signal reports are not absolutely necessary on a QSL, though it does help at times. And 599 signal reports on a card which indicates a phone QSO are generally credited to phone. A conflicting signal report is not an unusual thing.

While list operations are often questioned, there is no hesitancy when a valid two-way contact is shown. Prompting, fill-ins, and self-answering instructions by MCS can cause problems in acceptance. As examples, XX6XX call ZA1ZZ are thought to be marked with the bar sinister, while " . . . XX6XX call your station" has a better tone.

Antennas mean everything in DXing. There is a report of a Soviet station opening in Vietnam this fall, but the Hanoi government is still saying no on amateur operations.

On the importance of documentation, it is always best to have it, and in the case of some countries it is absolutely essential. Generally, the need depends on the situation. On the question of the use of portable calls, acceptance is guided by the policies of the country or countries involved. The question of the present status of ST0 was asked, it being noted that it was not then before the DXAC and some have wondered if it meets the current criteria.

The South African homelands technically are not considered separate countries, this mainly on the question of independence with the South African government still retaining and exercising controls.

On the question of permission to land on an island for operating, it was noted that Palmyra is not owned by one group, and while a portion of the island may be off limits, permission to land on the other portion can be obtained. Canton counts the same as Baker/Howland. W9WNV is reported to be currently located along the American River in Northern California working for the state facility that Johnny Cash sings about—something like "The Folsom Blues," or whatever it is.

There is another request to reconsider—and recalculate the distance—for Okino Torishima. This is similar to the Probilof Islands matter. Also, possibilities for country consideration for the Council of Europe and Tierra del Fuego keep being asked but with little optimism.

The Dream of DX Glory

Well, maybe just a bit of it. But who has not dreamed of coming on the bands from some exotic locale and wallowing in the pile-ups that result? There are some DXers who can operate no other way—from a DX spot or not at all. Really!

Jeffrey Rinehart, WB4PJW, of Churchville, Virginia had the dream and headed for Providenciales in the Turks and Caicos group. Things started off on arrival with the temperature in the 90s and the humidity a bit higher. Then there was no air-conditioning in their hotel room, nor in any part of the hotel at all.

But what the heck! A bit of DX operating and everything would fall into place. Except! Except that the District Commissioner who was to have the VP5 operating permit ready had closed his office, it being the weekend. And Monday was a local holiday and the Commissioner's office would be closed to observe the day.

Then Jeff got sick—high temperature, nausea, and chills. There was only one doctor on the island and a call to him brought the information that he could not get around to checking up on Jeff for two more days. By that time the temperature was down to 103, the chills had subsided, and things were looking up. So the District Commissioner was called. Son of a gun! He told Jeff politely that he had never heard of him—politely but firmly. He suggested that a call be put in to the magistrate on Grand Turk, a $4.00 toll call.

This helped. They had the application for the VP5 license on hand, but the clerk who handled the paperwork was on vacation and would not be back for a bit. And they were not too sure they would be able to help. They suggested that they be called again on the morrow.

Things were even better on Wednesday. The temperature was down to 101. The heat and humidity, however, were unabated. Jeff spent another $4.00 calling Grand Turk, and they advised they had the paperwork in hand and he could operate as WB4PJW/VP5. They even told him the license number on the permit and said that the verbal okay would be accepted by the Local District Commissioner pending the arrival of the permits in the mail.

So Jeff rigged a dipole on the porch in front of their rooms, heard a friendly voice from back home in Virginia, and things improved immensely. Even the heat was sufferable, though still high. The rest of the week Jeff got in 12, almost 13, hours of operation and made 490 QSOs in 44 states and 26 foreign countries using an antenna made of 22-gauge wire and 100 watts, mostly on the W7PHO Family Hour.

The great days finally ended. Jeff and XYL, KB4DJM, returned home, and his local doctor promptly put him into the hospital for another week, the elevated temperature persisting. Now the further Jeff gets from the DXpedition, the more fun it is to remember it. Those were some Great Days of DXing! Absolutely!

What does one learn? Maybe to remember what the Hero of Mafeking would often say: "Be Prepared!" You might also develop some caution when reading travel brochures. Try to check in advance and try to confirm everything in advance, every single step of the way. Never leave home on a DXpedition without it. Caution!

Ten years from now WB4PJW and KD4DJM will possibly get some delight in recalling their VP5 effort. Ten years is about the right span to realize just how much fun it was.

Some Short DX Notes

During the Mt. Everest DXpedition which you caught on TV in early May, BT0LS and BT0ZML were operating from a base camp in Tibet. The QSL card shows the effort was made by the Chinese Radio Sports Association and Chinese Mountaineering Association China, Japan, Nepal Friendship expedition to Qomolangma/Sagarmartha 1988. That's putting it briefly. If you worked any of these stations, QSL to P.O. Box 6106, Beijing, Peoples Republic of China.

Roger Corbin, ZF1RC, is the new president of the Cayman Amateur Radio Society. Bruce Miller, ZF2KN, does all the rest of the work, be-

CQ DX Awards Program

SSB

1603	IT9TQH	1607	JA6HBB
1604	IT9ZGY	1608	K9EC
1605	PA3AOS	1609	EA9NN
1606	WT6V	1610	KA2CHX

CW

726	IT9TQH	727	IT9ZGY

SSB Endorsements

310	K6WR/319	300	W2FGY/309
310	F9RM/318	300	NN4Q/308
310	VE1YX/318	300	K2JF/301
310	W4EEE/318	300	WA2MID/300
310	W9DWQ/318	300	WB6PSY/300
310	W9JT/318	300	IT9TQH/300
310	K6YRA/318	275	K4JLD/285
310	IT9ZGY/316	250	IK8GCS/259
310	W9SS/316	200	KC4MJ/200
310	K9BWQ/315	150	K9EC/168
310	W0SFU/315	3.5/7 MHz	IT9TQH
310	DL6KG/314	3.5/7 MHz	K3UA
310	PY2DBU/312	1.8 MHz	N4MM
310	K3UA/312	28 MHz	IT9TQH
310	W2CC/311	28 MHz	K4JLD
310	G4CHP/311	28 MHz	K3UA

CW Endorsements

310	K2FL/319	275	IT9TQH/283
310	W9DWQ/319	275	K9BWQ/294
310	K4CEB/318	275	K2OWE/287
310	N4MM/312	250	K4JLD/267
300	K3UA/305	3.5/7 MHz	IT9TQH
275	NN4Q/293	3.5/7 MHz	K4JLD
275	IT9ZGY/292	28 MHz	IT9TQH

Total number of active countries is 319. 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.

ing the secretary, the treasurer, and the QSL manager. Bruce notes that the 12, 17, and 30 meter bands are not authorized for use in the Cayman Islands, while 160 meters is limited to 75 watts for Class A operators and to 20 watts for Class B. Drop ZF2KN a note at Box 1029, Grand Cayman Island, if you need information on ZF2-land.

TQ6JUN was the callsign used by the Radio Amateurs de la Manche when they operated from Utah Beach to mark the 1944 D-Day in Normandy. Every year they make the pilgrimage with a special callsign. Look for them next year in the week before June 6th. QSL TQ6JUN to F5AM.

Marty Zimmerman, AG9Q, and Tony Utanga, ZK1CP, were on from the North Cooks signing ZK1QC in late June. QSL ZK1QC to K9QVB. Also in June there were a number of ZY0 stations heard from Trinidade Island on an effort sent out by the Natal DX Club. If you need a QSL, go to Karl Mesquita Leite, C.P. 385, 59001-Natan, R.N., Brasil.

GB400R will be heard from July 21st for a week to mark the Spanish Armada battle. It may be on for a week, maybe even more. N1AME is due for a tour on Diego Garcia and will be there until at least September. He may sign VQ9ZM.

The Lynx DX Group has indicated that is has plans for Angola and possibly Mozambique later this year. In last month's column there was a quick move to slip in the Yemen effort announced by this association at the International DX meeting. The Arabian Nights DX Net meets at 14251 kHz or thereabouts starting around 2300Z. If you thirst for that area, try listening. Sometimes Kuwait shows with 9K2DT. The Finnish amateurs are trying to arrange for amateur operation by neutrals working on the Afghanistan disengagement taking place. Hope still burns like the candle in the DX window for the return of YA and the Camel Drivers Radio Club. Tom, VU2TJW, who was heard from Nepal last spring, indicated that he would be in 5H3 Tanzania in late summer and hoped to be active. He was also thinking of trips to nearby spots such as 9U5, 7Q7, D68, and 9X5. Bing Crosby, VK2BCH, has been making a number of Pacific stops with more to come. 5W1, ZK3, and ZK1 were on his itinerary and he should still be active.

73, Cass, WA6AUD

DX Ten Years Back

In August 1978 Sam Hutson, K5YY, was in Khartoum and planning to head on to Comoro. 4U1UN was announced as being accepted for DXCC credit effective November 1st. Desecheo was approved for DXCC credit, and KP4AM was hustling to put the new one on the air. The Potomac Valley Club staked a claim on Curacao for the *CQ* WW DX Phone Test. K9RA, WA9EYY, W9UCW, K1PBW, and HK0BKX were aiming for a January Serrana Bank effort. If that country no longer sounds familiar, it was deleted in 1981.

Bob Walsh, WA8MOA, Nobs Itoh, JA1KSO, Harry Head, VK2BJL, and James Powell, VK2CK, were headed for Mellish Reef. The FCC came out with a ban on linear amplifiers —a mistake quickly corrected. They had two releases prepared and distributed the wrong one. P29JS noted that the VK9YS and VK9YL cards were in the mail. It may surprise some, but Jim Smith was DXing all about the Pacific even back then. Some DXers will remember when P29JS first showed from Papua. Bouvet

This is a view of the QTH of BT0ZML which operated during the Chinese/Japan/Nepal expedition to Mt. Everest this spring. This is not the familiar view of Everest. It was on that northeast ridge that Mallory and Evans disappeared on an attempt back in the twenties. Mallory? He was the one who replied to a query on why he wanted to climb Everest by saying: "Because it's there." Some Honor Rollers still say the same thing. (N6AW photo)

was rumored and Bopthutaswana was promised for October. The 8Z4 Neutral Zone was on but heard by only a handful of the Deserving W/Ks. No one hears it these days; it was also deleted. K1MM was planning a CE0 San Felix trip.

601FG was QRT from Somalia but said he would return in September. LU3ZY was on from South Sandwich, and even some HR types were noted as getting on the lists for this one. ZA1AB and ZA2RPT were on 20 SSB. Many worked them for the excitement but not for credit. It was Tirana Slim! Willy DeRoos was on a sailing vessel headed for the Antarctic and was looking to put Peter I Island on the air. It did not come off.

QSL Information

With postage rates slipping upwards, there have been a number of queries on QSL forwarding services. More are coming in, and if you are one of these, check with Dick Moen, N7RO, 2935 Plymouth Drive, Bellingham, WA 98225. Dick handles cards to foreign bureaus, QSL managers, and directly. The following comes with a lot of assistance from W9LNQ.

CE2LZN to LU9FFA
CI8YQ to VE3XN
EI1000 to EI Bureau
EK0AA to RW3AG
EK0DR to UA3DR
GB75USA to GB Bureau
H22H to 5B4MF
H25MF to 5B4MF
HL9EB to K0VZR
K5BLU/ST0 to K5BLU
K9AJ/KH5K to WA2MOE
KP2AH to WA2YMX
OH6XY/4U to OH3TY
OK1XC/JT to OK1XC
OX3KM to F6FNU
P29FG to W0GUD
PP8EE to PY1QN
PZ5ES to KX2O
SV1VH to KG7F
SV2AOH to SV Bureau
T22VU to DJ9ZB
TI2TEB to F6FNU
TR8CR to F6AYA
TU2TJW to KE3A
TY9SI to DJ6SI
VI88XPO to VK4SS
VK9YT to W7SW
VK9NKG to VK6NKG
VP2M to AA4NC
VP2MU to WB4QBB
VQ9MR to N5GU
WBRLX/KH5 to WA2MOE
YB1AQC to W4FRU
YB8ASX to K0IEA
YS1ESH to W3HNK
ZK1XV to VK2BCH
3Y2AV to LA7JO
4X6VV to WA7WOC
5B4XX to 5B4MF
5B4PG to 5B4MF
5B25MF to 5B4MF
5K7U to HK7II
8Q7VG to GW3WVG
9X5AA to W4FRU
K5BLU/9Y5 to K5BLU
EL1J to P.O. Box 39, Buthana, Liberia
J6L0E to B.P. 307, Vieux Fort, St. Lucia, West Indies
TE2D to Ted Evans, Box 2613, San Jose 1000, Costa Rica
YI10BGD to Box 7147, Baghdad, Iraq
5B4MF to Spyros Stavrinides, POB 9129, Nicosia, Cyprus
4S7WP to P.O. Box 80, Colombo, Sri Lanka
5H3RB to NM2R 87/88 CB only
9K2KW to P.O. Box 13296, 71953 Kaifan, Kuwait

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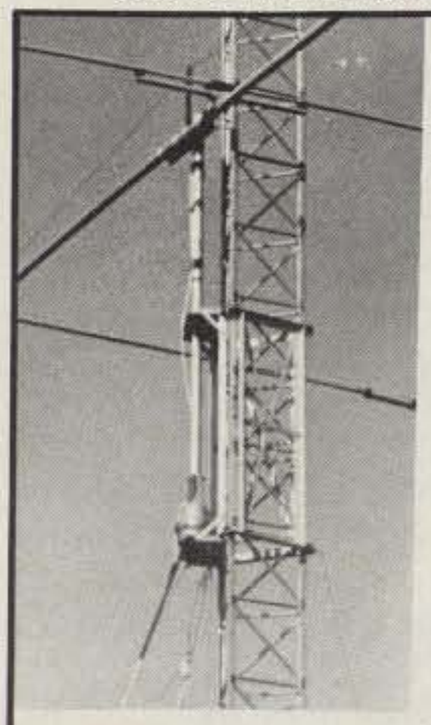

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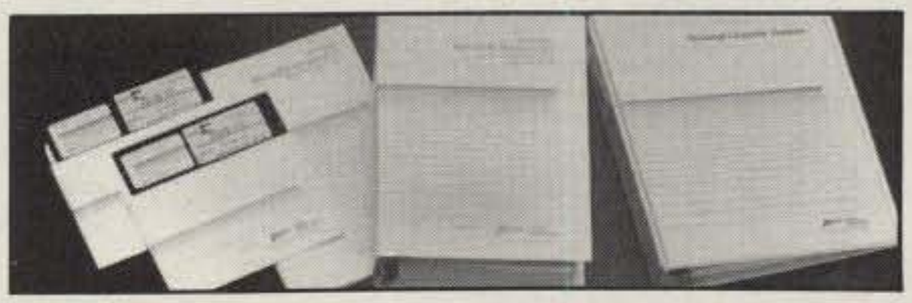

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Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar activity is continuing to increase at a rapid rate. The Royal Observatory of Belgium reports a monthly mean number of 88 for April 1988. Daily values ranged from a low of 30 on April 24th to a high of 148 on the 16th. Solar activity was above the 100 level from April 9th through the 19th. This results in a 12-month running smoothed sunspot number, upon which the cycle is gauged, of 44 centered on October 1987. The Solar-Terrestrial Physics Division of the National Geophysical Data Center, Boulder, Colorado is forecasting a smoothed sunspot number of 110 for August 1988 with a confidence factor of ±34. Other sources are forecasting a level for August in the mid-to-upper 80s range.

There was a corresponding increase in the 10.7 cm solar flux level during April. The Algonquin Radio Observatory at Ottawa, Canada reports a monthly mean level of 123.

An interesting article on the new solar cycle appeared in the "Science News Section" of *The New York Times* dated March 8, 1988. Check your library files for a copy. It makes good reading. Thanks to Josef Darmento, W4SXK, for this information.

Computer Program News

In my February 1988 column I mentioned that Jack Baldwin, VE7RG, had developed a small Basic computer program which he now calls *CQFCST*. It is ideal for rearranging the *CQ* DX Propagation Charts by bands and time of day, cutomizing the charts to meet specific operating habits. Jack had quite a response for the program, which he makes available either for IBM-type PCs or the TRS-80. Jack now informs me that he has modified the program to also include the *CQ* Short-Skip Propagation Chart. He will make written copies of the modified program available without charge, but you must send him a self-addressed envelope and an IRC. If you provide a formatted disk and IRCs for sufficient return postage, he will copy the program to disk for you. Jack's summertime address is: Jack Baldwin, VE7RG, Lakeshore Drive, Box 598, Kelowna, B.C., Canada V1Y 7P2.

A testimonial to the utility of *CQFCST* comes from Dr. Ralph Wier Grover, NS2S. Ralph writes that as an aging newcomer to amateur radio he had been confused by all the different presentations of propagation data that he has run into, until he received his copy of *CQFCST*. He found that VE7RG's program made things clear instantly, and he now knows at once where and when to look for all those foreign stations that had been eluding him!

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for August 1988

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 5, 8, 13, 31	A	A	B	C
High Normal: 2, 4, 6-7, 14, 21, 26, 29-30	A	B	C	C-D
Low Normal: 1, 3, 9, 12, 15-16, 18-20, 22-23, 25, 28	A-B	B-C	C-D	D-E
Below Normal: 10, 17, 24, 27	B-C	C-D	D-E	E
Disturbed: 11	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 S0 and S3, and with considerable fading and noise.

E—No opening expected.
3dB per S-Unit.

HOW TO USE THIS FORECAST

1. **Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.**
2. **With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good-to-fair (B-C) on August 1st, good (B) on the 2nd, good-to fair (B-C) on the 3rd, good (B) on the 4th, excellent (A) on the 5th, etc.**

IEEE Shortwave Issue

The summer 1988 issue of the *IEEE Transactions on Broadcasting* will be devoted entirely to the subject of international (shortwave) broadcasting. Two dozen specialized articles are planned covering antennas, propagation, equipment, frequency management, etc. Many of the articles may also be of interest to radio amateurs. You can write directly to The Institute of Electrical and Electronics Engineers, Inc., 345 East 47 Street, New York, NY 10017-2394 to check for availability of copies, or check with your local library.

August DX Conditions

From August to early September is perhaps the most difficult period of the year to make a shortwave propagation forecast. On many days typical summertime conditions will prevail, and the bands will sound much as they did during July. On other days, particularly as September approaches, conditions will begin to conform more to a winter pattern of higher daytime and lower nighttime usable frequencies. Since this is a period of transition, this month's DX Propagation Charts cover only a *one month* period, rather than the usual two month span. Short-Skip Charts for use during August apeared in last month's column.

Fairly frequent *10* meter openings are expected during the daylight hours in August towards Central and South America, Africa, and the South Pacific areas. By the end of the month some openings should also be possible to Europe and the Far East. These east-west openings should increase considerably during September.

Excellent daytime DX openings are forecast for *15* meters to Latin America, Africa, and the South Pacific areas. Some east-west openings to Europe and the Far East should also be possible, and these should increase considerably as September approaches. Exceptionally strong signal levels are expected during many openings this month, and *15* meters should be the best band for DX to many areas of the world from shortly after sunrise through the late afternoon hours.

Excellent world-wide propagation conditions are forecast for *20* meters during August. Peak conditions should occur, often with exceptionally strong signal levels, for a few hours after sunrise and again during the late afternoon and early evening hours. To many southern and tropical areas the band should remain open throughout much of the darkness period as well. As September approaches, the band will tend to close earlier than it did during June and July.

Static levels are expected to decrease considerably by mid-August, with a noticeable improvement in *40* meter DX conditions during the hours of darkness and the sunrise period. Fairly good *80* meter DX openings are also forecast for the nighttime hours, with conditions expected to peak just as the sun begins to rise on the "light" side of the path. By mid-August some *160* meter DX openings may also be possible during this same time period.

Short-Skip Conditions

For openings over distances ranging between 50 and 250 miles, use *80* meters during the day and *160* meters at night.

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, 1988 Time Zone: EDT (24-Hour Time) EASTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe & North Africa	10-12 (1) 14-17 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	18-19 (1) 19-20 (2) 20-00 (3) 00-02 (2) 02-04 (1)	20-21 (1) 21-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 21-22 (1)* 22-00 (2)* 00-02 (1)*
Northern Europe & European USSR	10-12 (1) 14-16 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	19-21 (1) 21-23 (2) 23-01 (3) 01-02 (2) 02-03 (1)	21-23 (1) 23-01 (2) 01-02 (1) 23-01 (1)*
Eastern Mediter-ranean & Middle East	11-13 (1) 13-15 (2) 15-16 (1)	07-08 (1) 08-09 (2) 09-14 (1) 14-15 (2) 15-16 (3) 16-17 (2) 17-18 (1) 22-00 (1)	19-21 (1) 21-23 (2) 23-00 (1)	22-00 (1)
Western Africa	14-16 (1)** 10-13 (1) 14-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	20-23 (1) 23-02 (2) 02-04 (1)	22-23 (1) 23-01 (2) 01-02 (1) 22-01 (1)*
Eastern & Central Africa	14-16 (1)	15-17 (1) 17-19 (2) 19-20 (1)	20-22 (1) 22-00 (2) 00-01 (1)	22-00 (1)
Southern Africa	12-14 (1)** 09-11 (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) 18-19 (1) 23-01 (1)	21-22 (1) 22-01 (2) 01-02 (1)	22-01 (1) 22-00 (1)*
Central & South Asia	*Nil*	08-11 (1) 20-23 (1)	06-08 (1) 18-21 (1)	07-08 (1) 17-21 (1)
South-east Asia	*Nil*	08-11 (1) 19-22 (1)	06-08 (1)	06-08 (1)
Far East	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-21 (2) 21-22 (1)	06-08 (1) 18-19 (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) 00-07 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1)	03-04 (1) 04-07 (2) 07-08 (1) 04-07 (1)*
Austral-asia	17-19 (1)** 16-17 (1) 17-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-01 (1)	03-04 (1) 04-07 (2) 07-08 (1)	04-05 (1) 05-06 (2) 06-07 (1) 05-06 (1)*
Carib-bean, Central America & Northern Countries of South America	12-14 (1)** 14-16 (2)** 16-17 (1)** 09-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (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) 22-00 (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) 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argen-tina & Uruguay	14-16 (1)** 16-17 (2)** 17-18 (1)** 09-10 (1) 10-12 (2) 12-15 (1) 15-16 (2) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-11 (2) 11-16 (1) 16-17 (2) 17-19 (4) 19-21 (2) 21-23 (1) 23-00 (2) 00-02 (1)	21-22 (1) 22-23 (2) 23-01 (3) 01-03 (2) 03-05 (3) 05-06 (2) 06-07 (1)	22-02 (1) 02-04 (2) 04-06 (1) 02-05 (1)*
McMurdo Sound, Antarctica	15-18 (1)	07-09 (1) 21-22 (1) 22-00 (2) 00-01 (1)	01-03 (1) 03-06 (2) 06-07 (1)	03-06 (1)

August 15 - September 15, 1988 Time Zones: CDT & MDT (24-Hour Time) CENTRAL USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe & North Africa	09-11 (1) 13-15 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	20-22 (1) 22-01 (2) 01-04 (1)	22-02 (1)
Northern Europe & European USSR	10-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-15 (2) 15-17 (1) 21-23 (1)	20-22 (1)	22-01 (1)
Eastern Mediter-ranean & Middle East	10-14 (1)	07-13 (1) 13-16 (2) 16-18 (1) 21-23 (1)	20-21 (1) 21-23 (2) 23-00 (1)	21-22 (1)
Western Africa	12-14 (1)** 10-12 (1) 12-14 (2) 14-15 (1)	07-09 (1) 13-15 (1) 15-16 (2) 16-18 (3) 18-19 (2) 19-21 (1)	20-22 (1) 22-01 (2) 01-02 (1)	22-23 (1) 23-00 (2) 00-01 (1)
Eastern & Central Africa	13-15 (1)	07-09 (1) 15-17 (1) 17-19 (2) 19-20 (1)	21-00 (1)	*Nil*
Southern Africa	12-14 (1)** 10-11 (1) 11-13 (2) 13-14 (1)	07-09 (1) 12-15 (1) 15-18 (2) 18-19 (1) 22-01 (1)	20-21 (1) 21-23 (2) 23-01 (1)	22-00 (1)
Central & South Asia	18-20 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-21 (1)	06-08 (1) 19-21 (1)	07-08 (1) 20-21 (1)
South-east Asia	17-20 (1)	07-08 (1) 08-10 (2) 10-12 (1) 20-23 (1)	06-08 (1)	06-08 (1)
Far East	16-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-22 (2) 22-00 (1)	03-06 (1) 06-07 (2) 07-08 (1)	05-07 (1)
South Pacific & New Zealand	16-18 (1)**	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-21 (2) 21-23 (3) 23-01 (2) 01-05 (1)	00-01 (1) 01-03 (2) 03-06 (3) 06-08 (2) 08-09 (1)	02-04 (1)
Austral-asia	17-19 (1)** 15-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-10 (2) 10-16 (1) 16-18 (2) 18-20 (1) 20-00 (2) 00-03 (1)	02-04 (1) 04-07 (2) 07-09 (1)	04-05 (1) 05-07 (2) 07-08 (1) 05-07 (1)*
Carib-bean, Central America & Northern Countries of South America	11-14 (1)** 14-16 (2)** 16-17 (1)** 08-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-01 (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) 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argen-tina & Uruguay	13-15 (1)** 15-16 (2)** 16-17 (1)** 08-09 (1) 09-11 (2) 11-15 (1) 15-16 (2) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	07-08 (1) 08-11 (2) 11-15 (1) 15-17 (2) 17-19 (4) 19-21 (2) 21-23 (1) 23-00 (2) 00-02 (1)	21-22 (1) 22-23 (2) 23-01 (3) 01-03 (2) 03-05 (3) 05-06 (2) 06-07 (1)	22-01 (1) 01-04 (2) 04-06 (1) 02-05 (1)*
McMurdo Sound, Antarctica	15-18 (1)	08-10 (1) 18-20 (1) 20-21 (2) 21-23 (3)	01-03 (1) 03-06 (2) 06-07 (1) 23-00 (1)	03-06 (1)

August 15 - September 15, 1988 Time Zone: PDT (24-Hour Time) WESTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	*Nil*	06-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-16 (1) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1)	22-23 (1)
Central & Northern Europe & Northern USSR	*Nil*	06-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (1) 21-23 (1)	19-20 (1) 20-22 (2) 22-23 (1)	21-23 (1)
Eastern Mediter-ranean & Middle East	*Nil*	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-15 (1) 20-22 (1)	20-23 (1) 06-08 (1)	21-22 (1)
Western Africa	12-14 (1)	07-08 (1) 08-09 (2) 09-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	21-01 (1)	21-23 (1)
Eastern & Central Africa	*Nil*	12-15 (1) 15-17 (2) 17-18 (1)	20-22 (1) 06-08 (1)	*Nil*
Southern Africa	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	17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 17-19 (1) 19-20 (2) 20-21 (1)	06-08 (1) 18-20 (1)	06-07 (1)
South-east Asia	16-20 (1)	08-09 (1) 09-11 (2) 11-13 (1) 18-21 (1) 21-23 (2) 23-00 (1)	02-05 (1)	06-07 (1)
Far East	17-19 (1)	07-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-18 (1) 18-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	01-02 (1) 02-06 (2) 06-07 (3) 07-08 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (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) 02-06 (2) 06-07 (1) 02-06 (1)*

Australasia	15-18 (1)** 14-16 (1) 16-17 (2) 17-19 (3) 19-20 (2)	17-19 (1) 19-20 (2) 20-23 (3) 23-01 (2) 01-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-13 (1)	00-02 (1) 02-03 (2) 03-05 (3) 05-07 (2) 07-08 (1)	02-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	11-13 (1)** 13-16 (2)** 16-17 (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) 07-10 (3) 10-15 (2) 15-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-02 (1)	18-21 (1) 21-22 (2) 22-01 (3) 01-04 (2) 04-07 (1)	20-22 (1) 22-02 (2) 02-05 (1) 23-03 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-13 (1)** 13-15 (2)** 15-16 (1)** 08-09 (1) 09-10 (2) 10-12 (1) 12-15 (2) 15-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-10 (2) 10-15 (1) 15-17 (2) 17-19 (4) 19-20 (3) 20-22 (2) 22-00 (1)	20-22 (1) 22-23 (2) 23-01 (3) 01-03 (2) 03-05 (3) 05-06 (2) 06-07 (1)	22-02 (1) 02-04 (2) 04-05 (1) 02-04 (1)*
McMurdo Sound, Antarctica	13-16 (1) 16-18 (2) 18-19 (1)	08-10 (1) 17-19 (1) 19-21 (2) 21-23 (3) 23-00 (2) 00-02 (1)	00-03 (1) 03-06 (2) 06-07 (1)	03-06 (1)

*Indicates best times for 160 Meter openings.
**Indicates best times for 10 Meter openings.

Between 250 and 750 miles the best bands should be *40* meters during the day and *80* meters during the hours of darkness. For openings between 750 and 1300 miles, best band should be *20* meters during the day, with some fairly good openings also possible on *15* meters. From sundown to midnight, try *40* meters, and from midnight to sunrise conditions should be best on *80* meters. Between 1300 and 2300 miles, best daytime band should be *20* meters, with some good openings also possible on *15* meters. Try *40* meters during the hours of darkness.

VHF Ionospheric Openings

While sporadic-*E* propagation is expected to taper off considerably by mid-August, some *6* meter openings should still be possible over distances of approximately 750 to 1300 miles. During periods of intense and widespread sporadic-*E* ionization, two-hop openings may be possible considerably beyond this range. Check the *2* meter band for an occasional sporadic-*E* type opening between approximately 1200 and 1400 miles. While these types of short-skip openings can take place at any time, as its name implies, during the late summer there is a tendency for it to peak between 8 a.m. and noon and again between 6 and 9 p.m. local daylight time. The occurrence of sporadic-*E* openings should decrease considerably by mid-September.

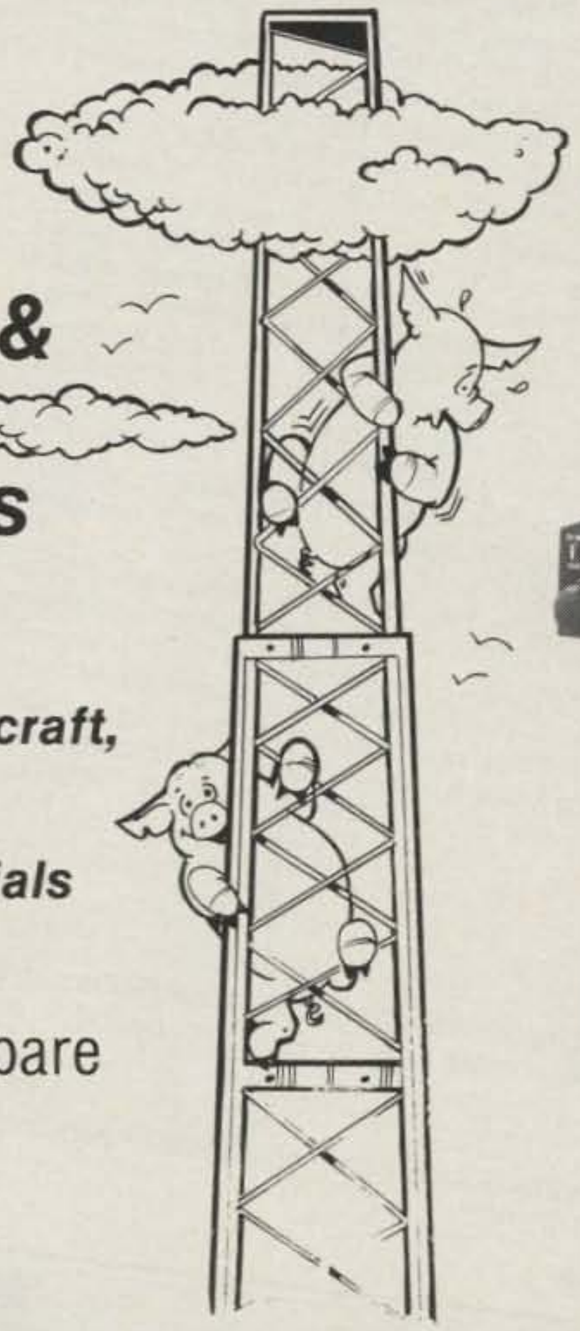
Trans-equatorial (TE) openings on *6* meters should begin to improve during August and become fairly frequent by the end of the month. The best time for these openings is between 8 and 11 p.m., local daylight time. This type of propagation favors considerably openings from the southern tier states into deep South America, but an occasional opening should also be possible from more northern states.

The *Perseids*, one of this year's major meteor showers, is expected to take place from August 10–14. It should peak at around noontime EDT on August 12, with an expected count of about 50 meteors an hour. Ionization produced by meteor showers, especially during the period of maximum intensity, is expected to make possible frequent meteor-scatter-type openings on the *6* and *2* meter bands over distances of several hundred miles.

Although August is usually not a very good month for auroral-type scatter propagation on the VHF bands, some openings may occur this August as a result of the higher incidence of solar flares now taking place on the sun. Auroras are most likely to occur when shortwave conditions are Below Normal or Disturbed. Check the Last Minute Forecast appearing at the beginning of this column for those days during August that are expected to be in these categories.

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 signals.

73, George, W3ASK



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VHF

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

Since we published the FT-736R review last month in lieu of our regular column, we can do some catching up this time.

I see that WB5LUA and W4ODW set a new 903 MHz tropo record in late March by working over a distance of 623 miles. W4ODW was running 10 watts to a single loop Yagi on his end, so as usual the record was set with ordinary equipment. With any luck, by the time this is printed the 623 mile record will be broken, possibly by mountaintoppers during the June contest. If not, in late July a couple of crazy people from both coasts plan an attempt to make the 2500 mile path from Hawaii to Los Angeles.

N6NB and I discussed this just yesterday on the telephone. Wayne had just purchased a new LT33S transverter and was building a Quagi for use in his June contest operation from 8000 foot Frazier Peak, and he revealed his plans for a Hawaiian vacation in late July. "It would be great if somebody could set up on 903 from Saddle Peak (in L.A.) while I'm in Hawaii, because this time of year has statistically produced the best tropo over the path," Wayne said. He tentatively planned to bring his 903 gear to a strategic spot on Mauna Loa, the 13680 foot volcanic peak which majestically overlooks central Hawaii (the Big Island). One thing led to another, and now I'm planning to make the trip to L.A. while Wayne's in KH6—and I'll be bringing my 903 MHz station. We may or may not actually pull this off, and even if we do set up at both ends, the propagation may not allow a contact. But if everything goes exactly right, we may set a new 33 cm tropo record. As with everything in life, it's a matter of timing. With my luck, there'll be no tropo for a week, and then just as I'm getting on the airplane to return to the east coast, the band will be wide open and folks will be making the path with handie-talkies.

153 Rodman Court, Eatontown, NJ 07724

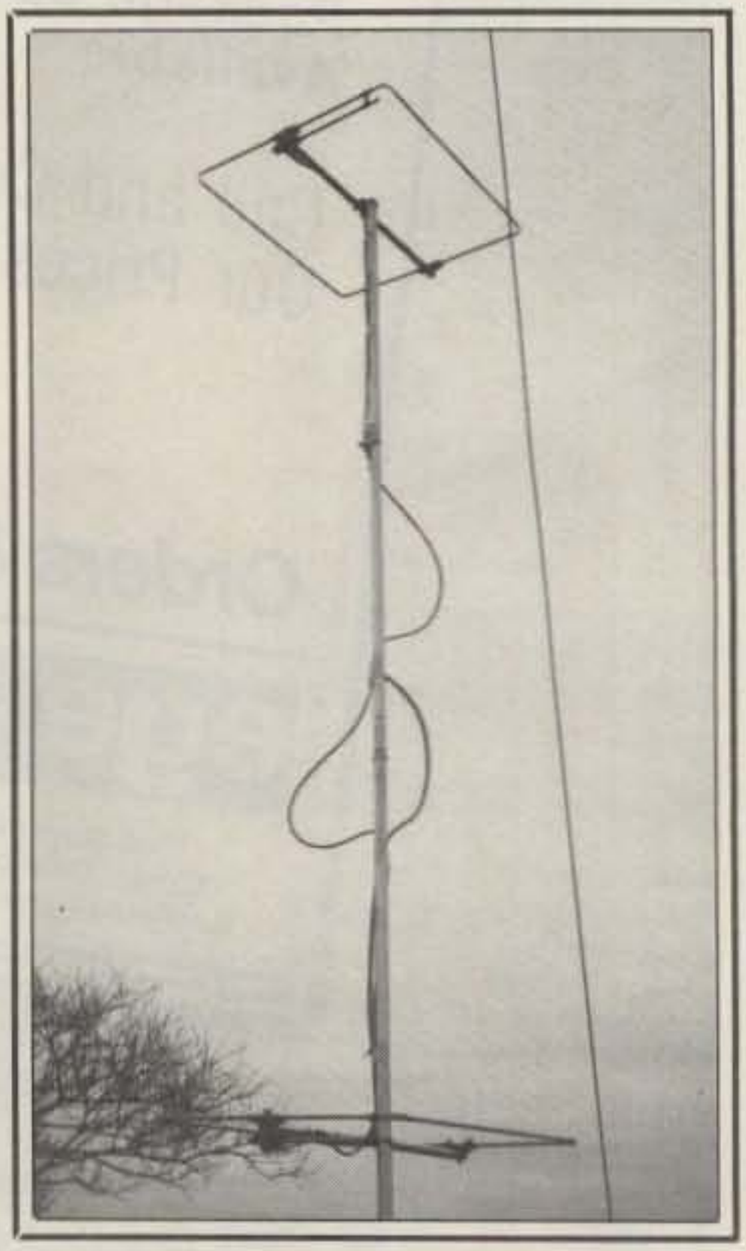
Speaking of VHFing in the Pacific, KX6DS advises he's up and operational on 6 meters from Kwajelein using a Microwave Modules transverter and 5-element Tonna Yagi. Dave called me on the telephone last month to advise he'd been working all over the Pacific and was tiring of JA QSOs (hundreds) and anxious for his first Stateside contact at that time. Of course, this was all before the peak E-skip season, and by now I'm sure he's made it. For those lucky enough to QSO KX6DS, he advises his Callbook address (via the North Alabama DX Club) is good.

Another Pacific 6 meter DXer, Joel Chambers, KG6DX, wrote to tell of his activities from Guam. ". . . I'm getting more southerly openings to VK4. I also have a pipeline into H44 with extremely loud signals from them nightly. Also into Hong Kong—I hear (their) cordless telephones 59+ on 49 MHz! The VS6 boys tell me that VS6SIX and VS6TEN beacons should be on (shortly)," says Joel in his letter to Harry Schools, KA3B. He goes on, "From comparing logs with the last (solar) cycle I think this cycle is on par or a little bit better than the last one. I didn't get the type of TE (transequatorial) openings I am having now until March 1978, or about 1½ years before the peak. TE is related to solar activity." I hope you're right, Joel. As this is written in late May, we've already heard numerous reports of TE in the Atlantic regions. Thanks to KA3B for this report.

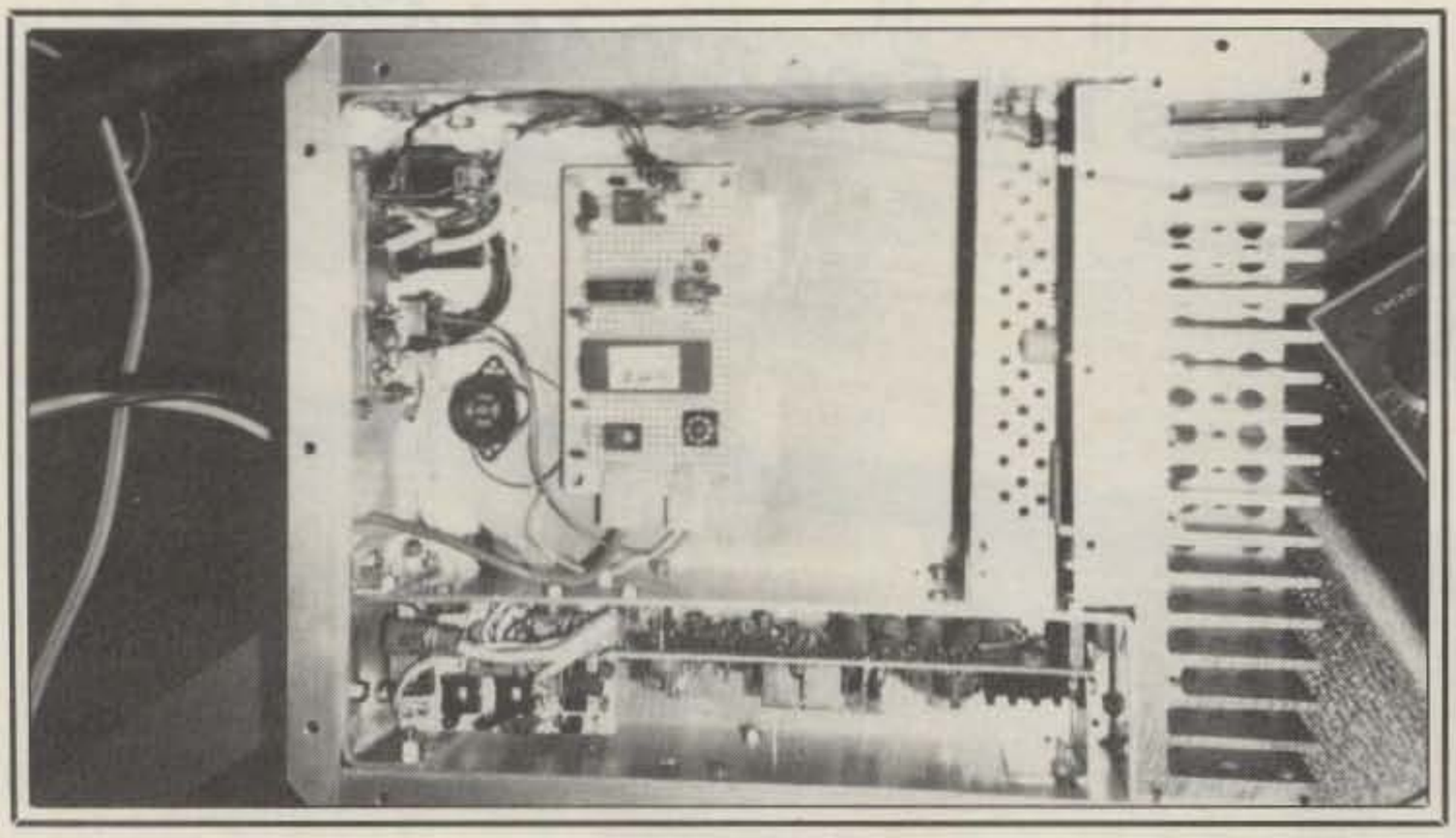
May 10 will be remembered as the day dozens of east coasters worked VP5D in British West Indies (Turks & Caicos Is.) on 2 meters and 70 cm, adding new ones to their countries lists. K2JNS wrote to say, "I was listening on 144.2 when VP5D was calling CQ. I worked him then switched to 432 and was lucky to catch him." John goes on to say that he'd previously worked Bob (VP5D) via Oscar 10, and also on 6 meters. He's now got VP5 confirmed on four bands and three modes, all VHF! K2JNS summarizes his feelings: "DX is not rare on VHF." How about *that*?

W9ALM wrote to advise of his plans for the *CQ* VHF WPX Contest, which is coincident with the release date for this issue, so maybe it hasn't passed yet. Bill planned to operate as W9ALM/4 from a 6000 foot elevation in the Smoky Mountains, grid EM85. He also had a small complaint: "They say that 144.100 is theoretically the calling frequency for CW, but

This is the antenna system used for the JE6ZIH 6 meter beacon—a pair of stacked horizontal "squalos." The beacon is heard throughout the Pacific when conditions permit.



Here's a shot of the beacon equipment used at JE6ZIH/B. A neat, professional-looking setup. (Tnx photos KG6DX)



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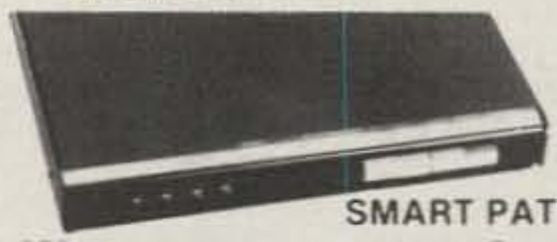

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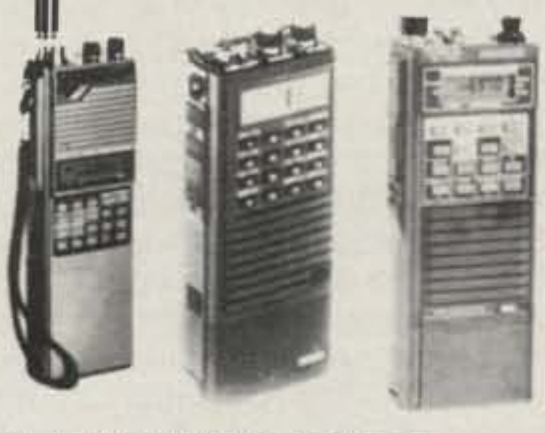

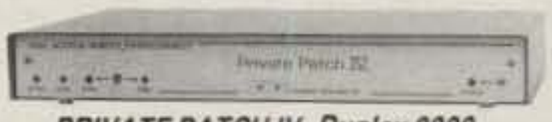

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no one uses it! They tell me it is quite acceptable to call CQ on 144.200 CW, then move off. In my travels in the Midwest and South, I've never heard anyone on 144.100 . . . . I think it would be a lost cause to call there unless you had a sked."

Good comments, Bill. Here in the Northeast, 144.100 goes almost totally unused except during aurora sessions, meteor showers, or contests. Back in the "AM" days (pre-1970), when the majority of real DX work was done on CW because of its obvious weak-signal advantages, 144.100 was very popular as a CW calling frequency. Now that SSB is here to stay—and has been for at least 15 years—the weak-signal advantage of CW is not nearly so pronounced. CW is still the mode of choice for most moonbounce work, and there's still lots of CW to be found on the higher bands where power amplifier linearity is difficult to achieve (23 cm and above). However, I agree with your conclusion and recommend that you stick with 144.200 for general calls. Please be courteous enough to QSY after a contact has been established, and everyone will be happy.

KA6CHJ wrote to announce his plans for a mobile gridpedition through several rare midwestern grids in mid-to-late June. Unfortunately, Paul's letter arrived too late for publication in the June issue, but I mention it now for two valid reasons. One, to belatedly wish Paul luck and success (how did it go?), and two, to remind readers that we need a *lot* of lead time to publish these kinds of announcements. Materials arriving by August 31 could be included in our *November* column, not before. Wish we could cut it closer.

WB4BVY is active from FM17 using a TS-711A with a TE Systems amplifier running 160 watts to a Cushcraft Jr. Boomer at 40 feet. Tom wrote a while back to say he's worked 22 stations in seven new grid squares during a spring aurora session, and accomplished this by keying the Kenwood hand mike to work CW while his keyer was out on loan! Good going, Tom. I hope you and Henry, N4HB, continue working the contests.

N6OC wrote to ask me to compare the Microwave Modules MMT144/28 with the Transverters Unlimited T144/28. Well, Cab, as far as I know, there really isn't any difference. The MMT products are built in the U.K. and backed by a long-established, multi-million dollar company with a large investment in the support of their equipment, while the Transverters Unlimited products are manufactured in Canada to similar if not identical specifications by a small proprietorship with limited investment in field support or distribution. As such, I believe the T144/28 costs a bit less. Either transverter will get you on the air, and I hope you have lots of fun when you get there! Let us know how you decided, and what you've been working.

WQ5S writes, "I am interested in building a 432 transverter but can't seem to find any information on it. I need the schematic and parts required . . . where can I get all the information I need to build my own 432 transverter?"

Brad, I'd not recommend such a project unless you have extensive experience in UHF design and construction and access to a well-equipped laboratory to evaluate the results. Back in the vacuum-tube era (deceased sometime in the 1970s, I suppose) such projects were actually easier. Tubes were readily available to be used as RF mixers and power amplifiers in the 1 to 20 watt range, and they were inexpensive, plug-in devices. Homebrew transverters offering very poor efficiency were commonplace and made thousands of contacts, and nobody cared about heating their shacks with the wasted power. Most of these units generated rather "dirty" signals, with spurious mixing products only a few dB below the level of the desired signal. Technically, such rigs would be unlawful to operate today because the owners were usually unaware of the transmitters' spectral purity (or lack of it!) and most probably don't meet Part 97 standards.

Nowadays, the designs are all solid state. This certainly makes the equipment more compact, and possibly even more reliable in the long term. However, it also makes construction a bit more difficult. "Lumped constant" (e.g., air-wound coils) components are dinosaurs by today's technology, so the tuned circuitry is printed on circuit boards and must be very precisely controlled. Active components (e.g., power transistors) are expensive and unforgiving, and cannot be plugged in like their thermionic ancestors. Due to difficulties in UHF testing of these devices, it is not unusual to find "brand new" and costly parts that just plain won't work.

I'd recommend instead the purchase of a commercially manufactured 70 cm transverter that will get you on the air quickly and allow you to get a feel for the band. There's still lots to be homebrewed. Antennas, power amplifiers, and RX preamps all make great projects with no shortage of available published information. Commercial transverters needn't be expensive. I've seen used MMT432/28 "boxes" at fleamarkets for $200 and consider these to be "best buys." Good luck, Brad, and by all means don't avoid 432 just because there aren't many transverter circuits around.

WB9MSV wrote back in April to ask my opinion of the FT-736R, which I offered in a private letter to Larry as well as a complete review in last month's *CQ*. The rig is impressive, folks and worthy of a spot on almost any operator's bench. WB9MSV was planning an expedition to Michigan's upper peninsula for the VHF WPX Contest and intended to give out EN56, 57, 66, and 67 (I guess you're a moving target!) during that weekend. How'd you do, Larry?

PA3BFM wrote a nice letter just last week to discuss his 6 meter activities from Holland: "About 50 PA stations are QRV on 6, practically all of them with transverters from the UK or homebrew. Most of them run 10 to 30 watts into dipoles or 3-element beams at most. Our PTT has issued about 250 licenses, but the CW-only license keeps a lot of stations QRT for the time being." Frank goes on to say, "We have had three aurora openings which lasted several hours. Countries worked are EI, LA, and all of the G-countries except GU and GD. We have also had three major E-skip openings, which brought QSOs with CT1WW, CT1LN, lots of French stations, 9H1BT, CG, FL, and EL. The CT0WW and 9H1SIX beacons were also heard during these openings. On May 16th the ZD8VHF beacon was heard via TEP in the UK. The ZD8 beacon produces real strong signals on 28 MHz when other African beacons cannot be found. The last opening (May 24) brought QSOs with LA6QBA, LA8OW, LA8KV, LA9UX, and LA9DL to the north, and three 9HIs to the south." Wow, Frank! All this after just three months.

"All in all we have a busy 50 MHz scene in Europe with more fun to come when on June 1 (now obviously passed), 50 OH amateurs will be allowed on the band. Further details are unknown here . . . restrictions for F stations have partly been lifted so that more Fs can be QRV with more power. I expect more countries to appear on the band soon." Great wrap up, Frank. PA3BFM is using an FT690RII with a small solid-state amplifier and should be active through the summer months, although he did say he'd be QRT for a while at the end of the year for a relocation.

KC5IJ wrote to ask if we publish the "SWOT (Sidewinders On Two) Net Schedules," updated May 1988. Len, I'd like to, but this would consume a lot of space. What I'll do instead is invite all readers who are active on 2 meters to join SWOT and thus get on the SWOT bulletin mailing list! SWOT is a 12-year-old organization of over 2900 members dedicated to furthering activity and fun on the 144 MHz band and publishes monthly newsletters which contain information of interest to all. For more information or to join SWOT, write to Secretary-Treasurer Howard Hallman, WD5DJT, 3230 Springfield, Lancaster, TX 75134.

The East Coast VHF Society's 22nd Annual Hamfest and Convention is scheduled for Sunday, July 31 at Trenton State College in Ewing Township, NJ. Activities will include a flea-market, antenna-gain measuring contest (220 MHz and up), and noise-figure measuring contest. Talk-in stations will be on 144.250 SSB and 146.67 (repeater) FM. If you live in the W2-W3 area, plan to attend this one. As K2SMN says, "Be there, or be square."

WA3FAE has developed a high-quality contest logging program which should be of interest to VHFers who are PC owners. The program written in compiled BASIC using Microsoft's QuickBASIC 4.0, handles 4000 QSOs per log, de-duping in less than 2 seconds. It is not designed for a particular contest and can be adapted for most any format. What makes the program unique is its special support for grid-square logging with an on-screen grid-square map of the U.S. A utility program (on the same disk) will print log files for submission as well as produce a manual dupe sheet.

Coincidentally, WA3FAE and I worked each other on the air (2 meters or 70 cm) just a few days before his sample of the conTESTLOGger arrived via mail. Forrest pointed out his program's advantages to VHFers and I promised him I'd try his sample diskette, which I've now done. It works! For a $20 registration fee (5.25 inch disk; $22 for 3.5 inch disk), he supplies a disk containing the latest version of all the programs, both program manuals on disk, permission to use the program for non-commercial purposes, and notification of any newer releases or bug problems for one year. To order his program, write to Forrest C. Hudspeth, WA3FAE, 5883 Woodbine Road, Woodbine, MD 21797.

Communication Software of Canandaigua, NY is also offering a "great new program that makes contest logging really fun!" Called VHFLOG, the program keeps your log, checks for dupes, cross-checks to "new" band's logs to see if you need each station or grid worked on other bands, and so forth. Copies of the VHFLOG program on diskette are available for $39.95 from Communications Software, 6011 Ketchum Road, Canandaigua, NY 14424.

There's lots more to write about, but we're out of space. Till next month . . . .

73, Steve, WB2WIK

The Packet User's Notebook

a feature by
BUCK ROGERS, K4ABT

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Part 4—Levels, MOVs and Protocols

I've known good times before, but this season's hamfests seem to be better and larger than those of recent years. I also notice good bargains in used TNCs now appearing. To me this means there are some folks upgrading to the multi-function Terminal Node Controllers (TNC). I also see some good deals being cut on these new controllers like the KAMs, 1278s, PK 232s, Pac-Comm, HAL, Heath and the list goes on.

Some of the older TNCs were not of the best quality when it came to processing the in-coming audio. If you are the proud owner of one of these oldies but goodies, you may enjoy this little add-on. In fig. 1, I have provided a means to clip noise spikes from the received audio and at the same time, include a means to monitor the incoming packets.

Many of you already know why such a device exists in a packet stations. When you plug the TNC receive audio lead into the 3.5mm jack on your transceiver, the radio becomes "mute." Unless you have the later models of the ICOMs, (IC-27a, IC-28a, IC-38a, IC-735, etc receive audio is found on pin 8 of the microphone plug) this is the only way you can get receive audio to the TNC.

The circuit shown in fig. 1 will allow the monitoring of packets and provides a small amount of noise suppression. The LEDs, (red, yellow, or green . . . color isn't important) should be as small as possible, to keep the package small. The capacitor and speaker should be chosen to give proper level while maintaining an impedance near that required for the radio and TNC. In any case, prevent loading the radio audio circuits too heavily. If you have the time and space, you can even develop this little circuit into an active filter that can roll off at either end of the audio pass-band. I used a 556 chip and 5 components to build such a circuit, but it never gave me enough return for the effort. So I stayed with the little "passive" circuit shown here. It is simple, and it works.

I use a 4-μF 20-V electrolytic capacitor and a small 8-ohm pillow speaker. The LEDs are from an assortment of LEDs I picked up at the local supply house for a buck and change.

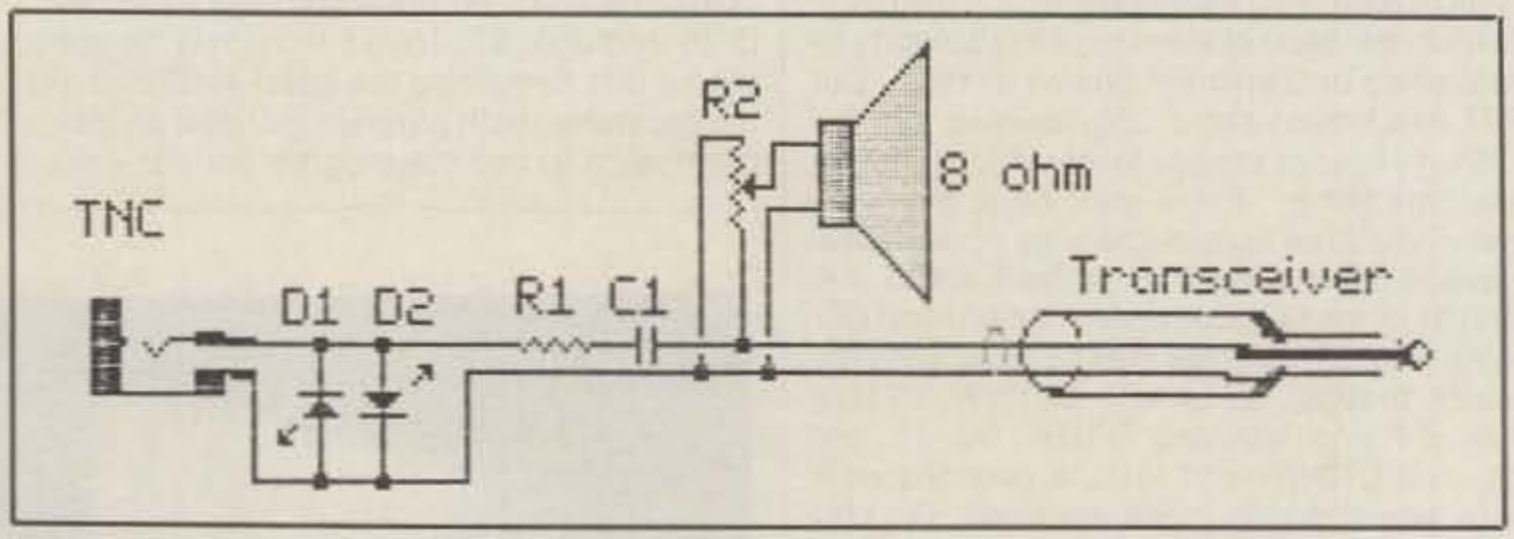

Fig. 1—Noise suppresser and monitor speaker for TNC. D1-2 can be any small LED, C1 is 4 μF at 20 VDC, R1 is 22 ohms 1/4 W and R2 is a 5K-ohm potentiometer.

If for some reason you have trouble with the "monitor/limiter" shown here, it can easily be by-passed, or even removed. There are some transceivers with output impedances ranging from 4 to 45 ohms.

These may exhibit a "loading" to the audio output and limit the audio beyond a useable level. I've found, by changing the value of the electrolytic coupling capacitor, we can control the amount of audio to the TNC and the external speaker.

The noise limiter LEDs can be omitted if you have a TNC of recent manufacture. Most of the TNCs which were built after 1985 had the noise clipper/limiter diodes built into the TNC input circuit. A quick look at the schematic of your TNC may save you some time and pocket change.

Another Kind Of Spike Suppressor

Many times we've had to go to the digipeater site to make a repair on a "dead digi," only to find everything was okay. All we had to do was a simple reset. This means turning the unit off and on again. This annoyance can be reduced by the addition of a single device know as a (MOV). Fig. 2 shows a drawing of a Metal Oxide Varistor (MOV) as used in the TNC. The MOV can be added to the circuitry of the TNC, and there should be a second one in the AC Supply line which provides power to the battery charger or wall transformer. The power line spikes that are sometimes induced into the microcircuits within the TNC can play havoc with some of the controller commands. For this reason, I strongly recommend the addition of these neat devices.

Please use extreme caution and protect any exposed leads when installing the components into the TNC. Above all, remove power from the devices while you are making the changes.

I won't go into the physics of the MOV, but I will drop this tid-bit in passing. "The MOV, is the cheapest insurance you can buy for your equipment." I have an MOV

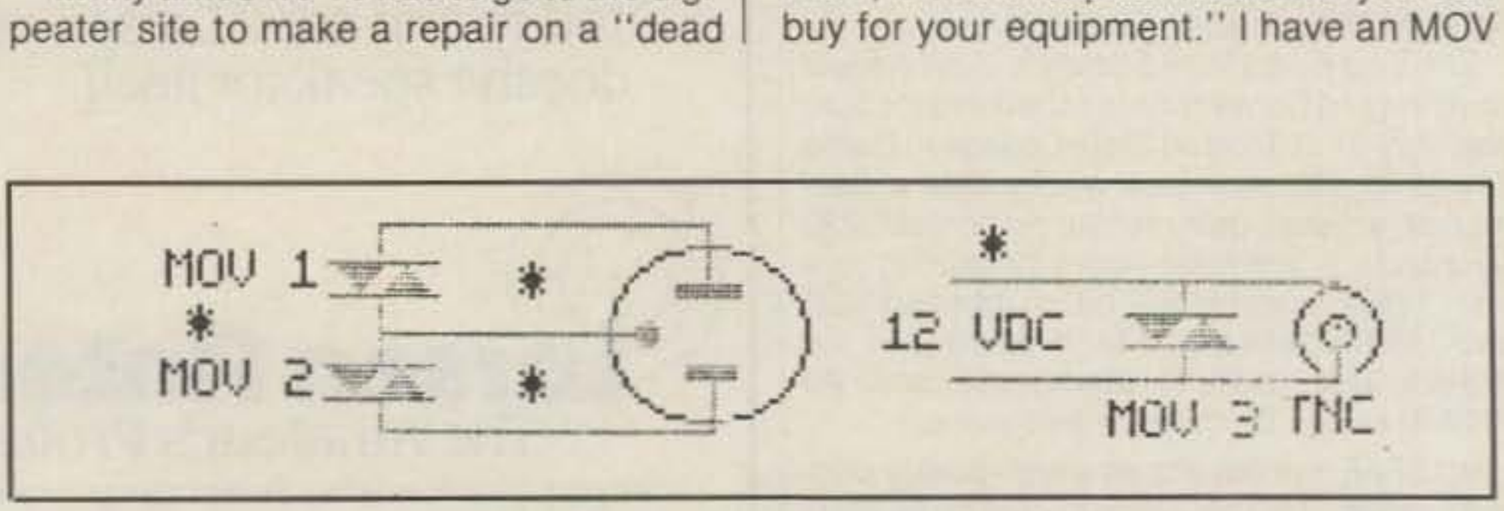

Fig. 2—Installation of MOVs. Remove AC power from the circuit at the breaker box before beginning installation. Also, turn the power off and unplug the 12VDC source before working on it. MOV 1-2 are GE type V130LA10A and MOV 3 is GE type V39ZA6 or ECG type 1VO17.

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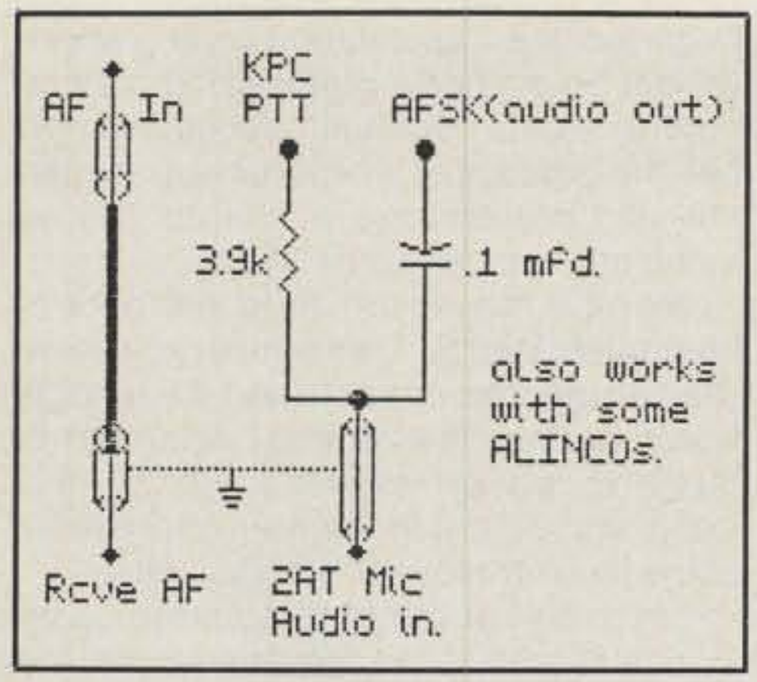

Fig. 3—Here's another method to interface an HT to TNC. Add this one to your Packet User's Notebook collection. Additional interfaces will be added each month.

on every outlet in my home and on every AC plug in my computer room. I have not had a loss of any amateur equipment due to power spikes or lightning in 5 years of MOV use. An MOV is not a cure-all, but it sure helps.

Before we installed the MOVs at the digi site on the hill, we had to make a trip to the hill twice or three times a month. Now we go once a month to check the battery water, and "routine" the equipment.

Using "AX" Dot 25

A few months back, in part one of this column, I said we would learn about the many levels and facets of packet radio. I feel we have now moved to the point in our "Introduction to packet" where we can unravel the mystery and madness of the AX.25 protocol.

It's time to begin understanding how the seven levels of packet control work and how they compliment the next step.

In the present state, AX.25 is diagrammed as a staircase with the various steps described in the following manner: *Level one = Physical Control.* Level one is described as the physical layer. It specifically calls out the heirachy of the three functional characteristics. These layers are the electrical, mechanical, and functional features of the physical link between the terminal and the data communications equipment. Level one could be related to the pin-out of the present RS-232C arrangement which was set out as a standard by the Electronics Industries Association (EIA). While we are considering "level one" interfacing, we should include the RS-422/423. For our current interest and explanation, we will only be concerned with the RS-232C standard and DB-25 connectors and connecting cable.

Level two = Link Control. We define level two as the "link layer." As soon as a connection is made at level one, the second level assumes its responsibility by adding the addresses and control protocol to the information, outgoing and incoming. The link layer also establishes an error detection, correction method, and controls the data flow through the physical level. This is where the link-level standards of High Level Data Link Control (HDLC) and Synchronous Data Link Control (SDLC), enter the systems architecture.

Level three = Network Control. Here we arrive at the network level. We have heard about this level, and now we are about to learn something about its personality. Level three controls "networking." It has, in some ways, a crude but reliable intelligence. It can specify the route a packet is to take, it can address the packet from the "node" to an alternate path, it can reassemble a packet from broken bits of previous packets, and it can control errors. At this level, we can see the beginning of a way to make our packeting easier. This will become more apparent in the following level four.

Level four = The Network Interface. The transport layer, as it is sometime referred to, allows different computer systems to connect over different network

systems in an almost routine manner. We now get the first glimpse of a "transmission control" protocol (nodes). Level four makes the network path more reliable by doing a system search for any missed or lost bits of information, and it does so from "end to end." If a check sum is incorrect at the destination, the "search" will be made for the missing "bit" all the way back to the first node if necessary. The search will examine the originator only if the bit is not found at the "node" level.

Level five = Session Control and Management. Technically, this is the dividing line between applications and networking. In short, this is the "session layer." A session is the exchange of data between two terminals, PBBSes, or a station and a BBS.

Level six = Virtual Terminal Control (file transfer protocol). Enter inter-net protocol. This translation layer will allow various machine codes, assembly languages, formats, and databases to be transformed into each others format. This is one of the tasks currently under construction. It is nearing completion, and may soon give us the "ultimate language interpreter" for computers.

Level seven = Putting them together! Here then is the goal of all the preceding levels of packet. This is where all the applications come together. Level seven becomes the "application layer" where we get an overview of the world of computerized data communications. We now see the processes which receive, generate, and interpret the languages passed in the other six levels or layers.

We have moved rapidly in this mode of communications. I am sure you have read all the many papers and documents which profess the various beginnings of the X.25 packet systems. Some fill a need, and others are written to preserve some limelight for each of the writers.

Let's look at the truth as close as we can research it. In the mid-sixties and early seventies, a lot of government funds were allocated for the purpose of finding a better and faster way to send, store, and retrieve information. The Rand Corporation developed an information distribution system but didn't put a label to it. The information of those days did not display many of the "personality traits" of today's. At best, it was a primitive slow, store and forward method.

Canada claims a lot of the credit for the packet systems that we now use. Even today we hear some dialogue which makes reference to "the Vancouver protocol." The Canadian role in the creation of packet began with the networking experts from the United Kingdom, the United States, and Canada meeting in Canada in October of 1975. This is where the groundwork for the emerging packet networks began. The symposium was partly sponsored by the IEEE and some other prominent organizations.

Here at this conference, a "standard" was being developed which would change the world of communications as we then knew it. The framework of this standard is still part of the X.25 packet-switched network.

ARPANET was the first packet network in the US, and it continues in use today. (ARPA, the Advanced Research Projects Agency, is a division of the Department of Defense.) In todays packet-network environment, we can't begin to list the many packet-switching networks.

So we must learn as much about the AX.25 packet-switched system which we use. Although many changes to the basic protocol have evolved, we continue to cling quietly to the X.25. There may be some reason for this and so be it, so long as we progress and develop more and better ways to utilize this wonderful mode of communications. It would seem then, AX.25 and packet have become synonymous. Packet will soon become a household word.

To bring AX.25 into perspective, and give you something to think about before the next installment of the Packet Users Notebook, please consider this. There are other packet-switched network standards. To name a few: X.1, X.21, X.32, X.38, X.92, X.96, and the list goes on.

Good packeting de BucK4ABT

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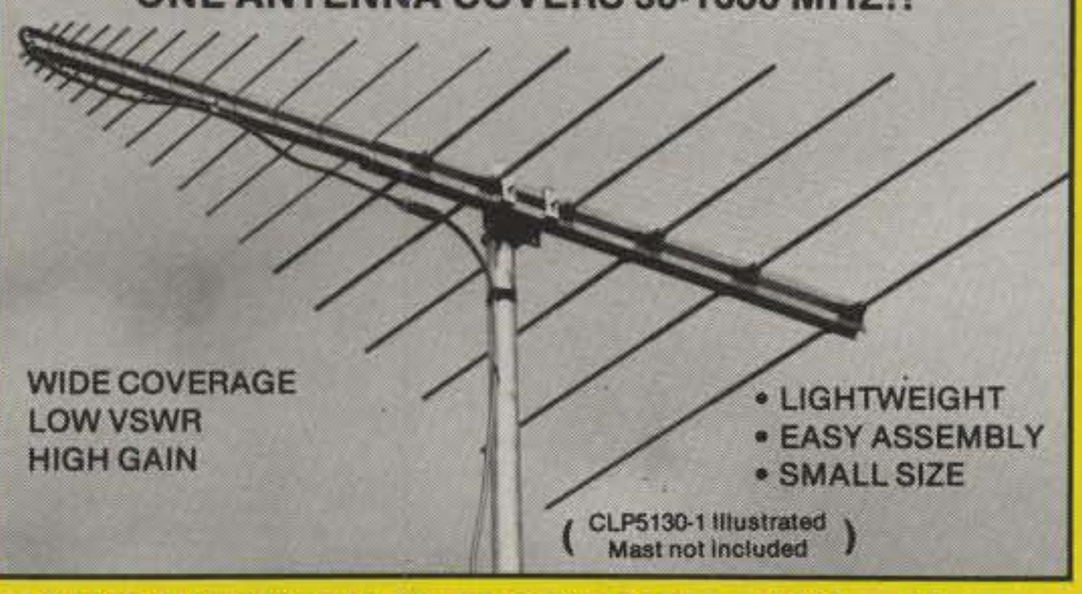

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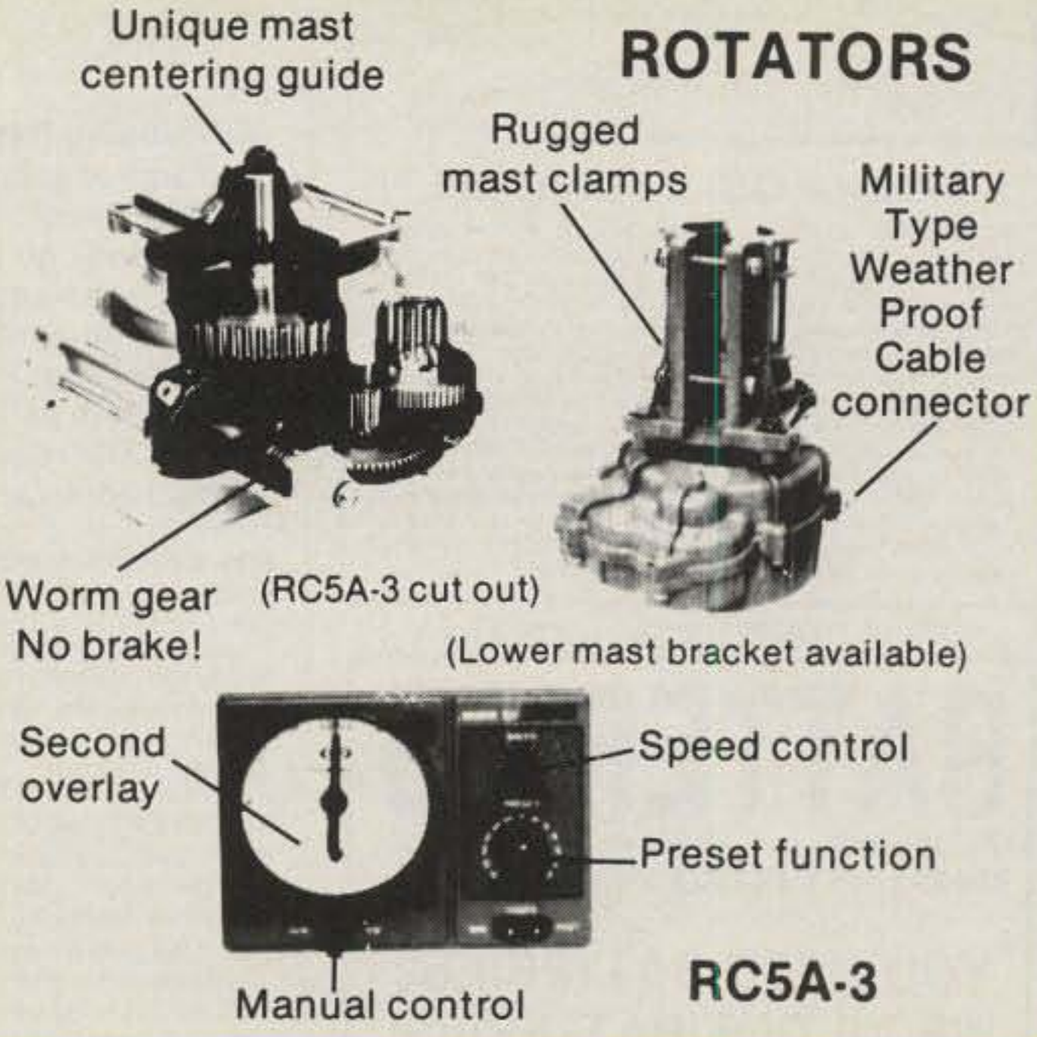

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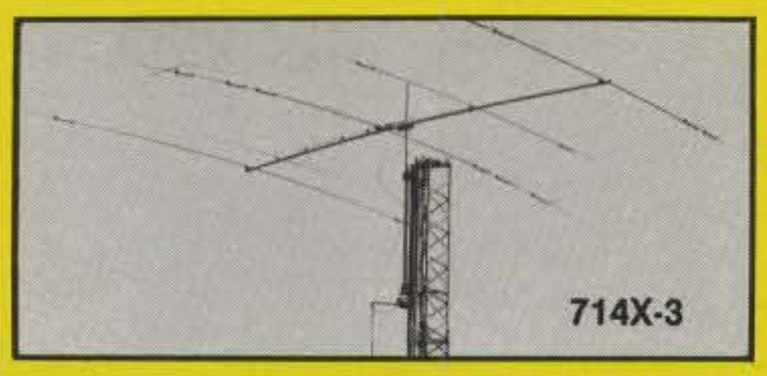

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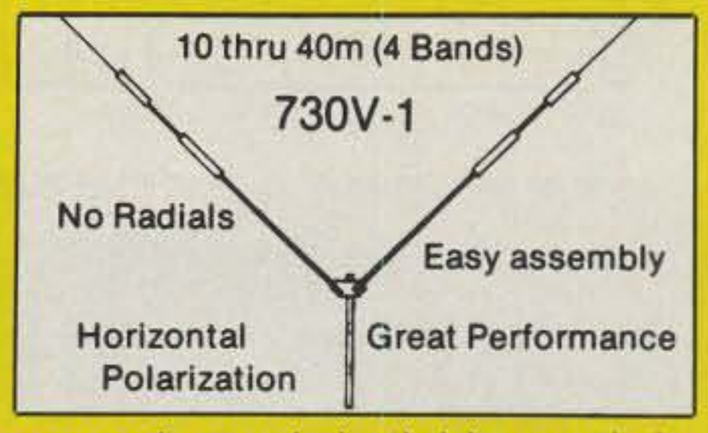

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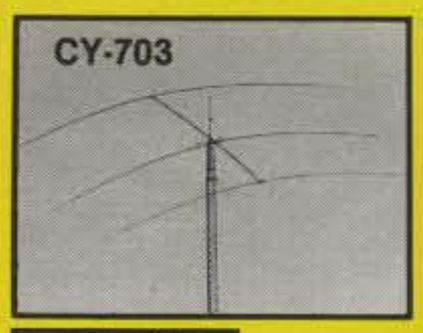

Mono Bander Data

Model	Freq MHz	El.	Boom Length	Longest El.	Turning Radius	Wgt. Lbs.	Power	Price
CY104	28.0	4	18′8″	18′4″	12′11″	19	2 kw	$185.
CL10DX	28.00	6	30′6″	18′½″	16′1″	33	2 kw	$310.
CY154	21.00	4	40′8″	24′3″	24′3″	58	3 kw	$205.
CL15DX	21.00	6	18′8″	24′5″	15′5″	21	2 kw	$559.
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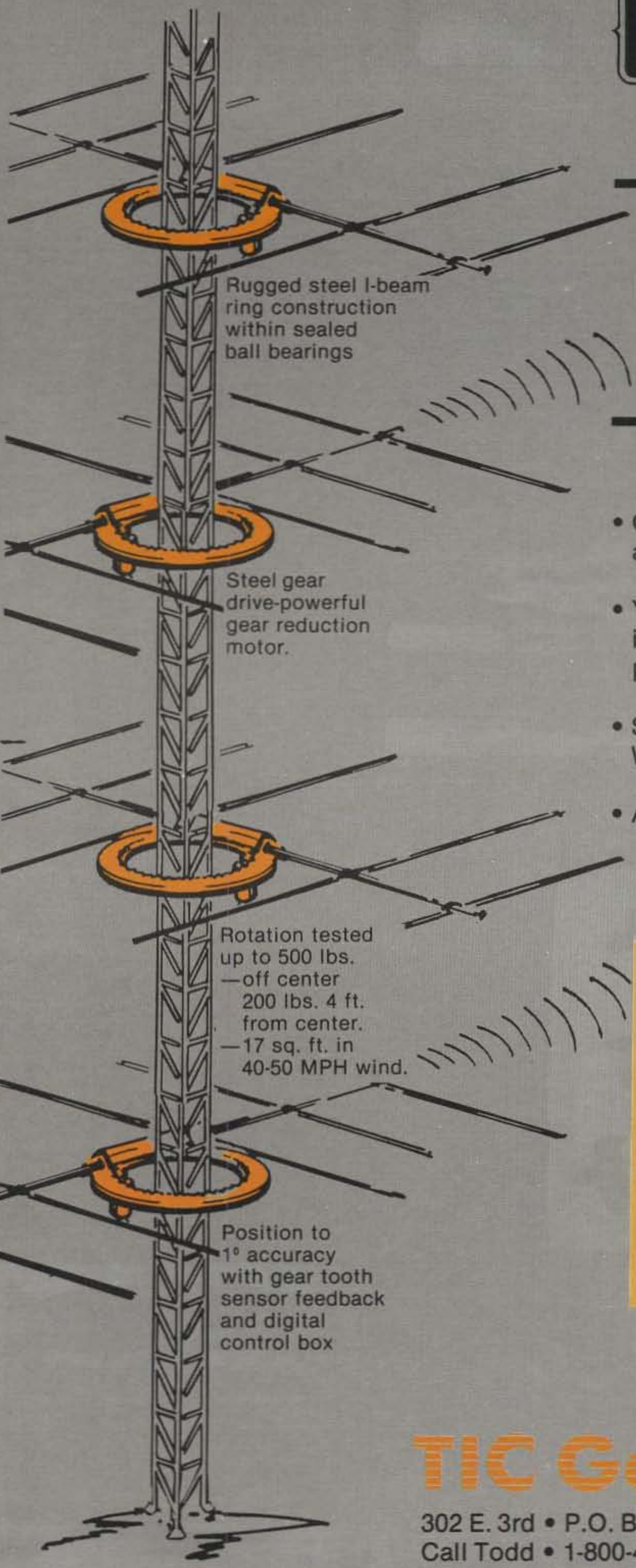

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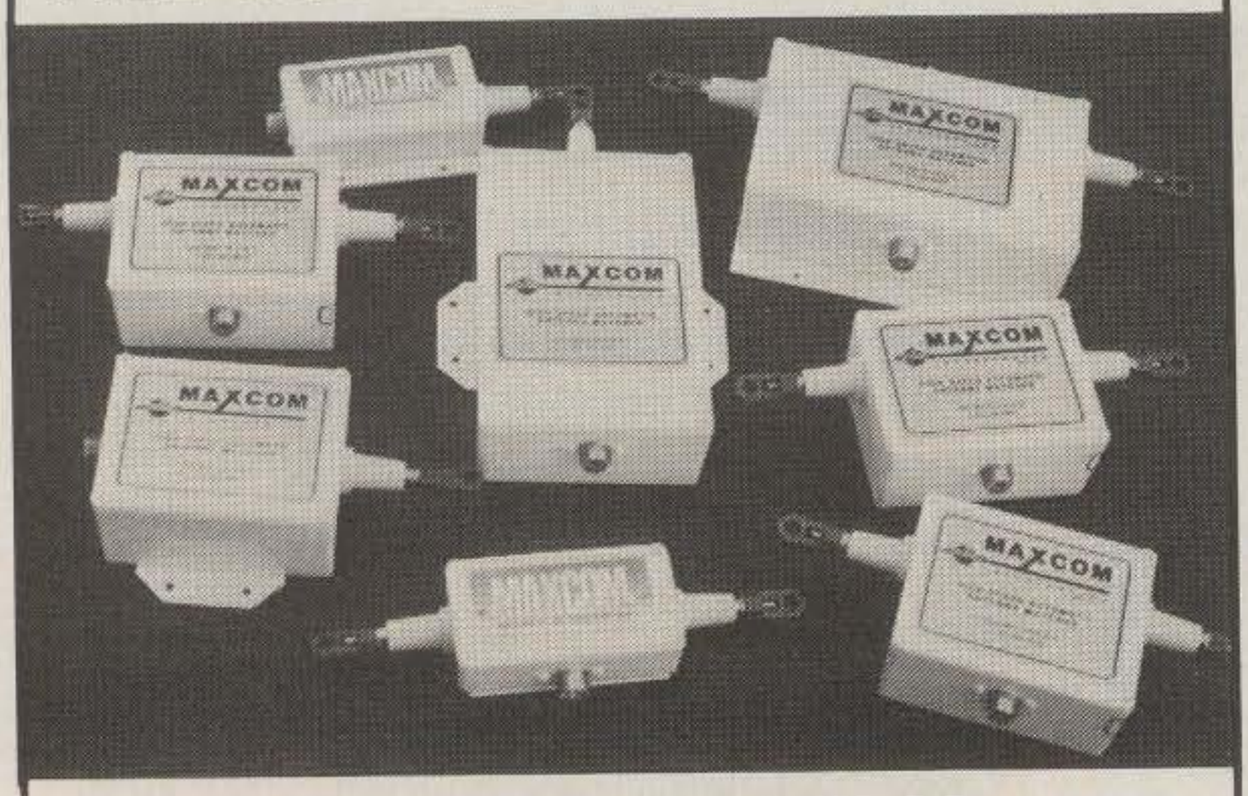

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AN/PRC-64 military radio wanted: Will pay top dollar for a unit in very good condition. KC1EZ, Tim McInerney, 316 West 75th Street, New York, NY 10023 (212-874-3333).

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WANTED: Copy of *Computer Programs for Amateur Radio* by Steffen and Overbeck. Need book only. Contact NS9L, 506 Melody Lane, Verona, Wisconsin 53593.

INSTRUCTION MANUAL NEEDED for Dentron Jr. Monitor antenna tuner. N7JIT, 4609 E. Halifax, Mesa, AZ 85205.

HELP! TS-440 needed. I've tried for 3 months to buy one thru these ads, but all have been sold before they reach my P.O. here in the Arctic. *Please* call before you place an ad (collect ok). Bob, N7HER/KL7, Kobuk, Alaska 99751 (907/948-2225 let ring long time).

WANTED: Mini Prod Multibank Hy-brid Quad Antenna. Write Al, KB2DCD, P.O. Box 1130, Hackensack, NJ 07602.

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NCL-2000 SPECIAL LOW PRICE spare parts. Also National Radio equipment manuals. SASE for complete listings. Maxmillian J. Fuchs, 11 Plymouth Lane, Swampscott, MA 01907.

WANTED: Vacuum capacitors, vacuum relays and Eimac power tubes, sockets, and chimneys. A. Emerald, 8956 Swallow, Fountain Valley, CA 92708.

WANTED: ICOM 280 control head, have main section. Vince, K6TEN, 20129 Suisun Dr., Cupertino, CA 95014 (408-252-6551). Call or write.

I NEED A PHOTOCOPY of the book and schematic for a Tempo One transceiver. Also need to know how to wire a mic to a Johnson 2 CB. I will pay copy expenses and postage. Tony Eurum, 2009 W. 5th, Ottumwa, IA 52501.

WANTED: EICO 710 grid dip meter coils, SW-3 coils or forms, and National NC-101-X speaker. George Marts, W0TDH, 5022 Pennsylvania, St. Louis, MO 63111-2041.

SELL: Kenwood 2200A, 2 meter H/T with cables, charger, batteries, crystals, manual, $65. Sanyo closed circuit TV camera, 16 mm–1.6 lens, good for ATV, $35. Joseph Schwartz, 11 Windham Loop, Staten Island, NY 10314 (718-698-8069).

SELL: Tennatest ant noise bridge $25. Other items. Free list. W2EZM, 431 Oakland Ave., Maple Shade, NJ 08052.

WANTED: FL-2000B for Yaesu FT-901 DM. State quality and price. Dick Ber, 9617 Vista View, Austin, TX 78750 (512-258-7128).

DE K3UKW: Alpha 78 amplifier, $2150. Ten-Tec Triton 540 xcvr with P/S, $395. Kenwood R-1000 gen. cov. rcvr, $275; TS-830S xcvr, $650; TS-430S xcvr, $670. Collins R/E312B4, 32S3, 75S3B, 516F2, $850. Drake SPR4, $275; R4B rcvr, $170; 2B/O-Multi, $150. Tony Musero, 215-271-8898 (K3UKW).

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HEATHKIT SIG. GEN. $29 and VTVM $34; Elco Sig. Tracer $29; Ameco CW prac. osc. $12; DX-150A rec. $75. K7QAK, 3543 W. Hazelwood, Phoenix, AZ 85019.

WANT to exchange Commodore 64 software (ham and general type). Will Roberts, Rt. 6 Box 64, Apex, NC 27502 (919-779-0005).

FOR SALE: Over 500 used TV-Radio Tubes. All checked for shorts and emission, $2.00 ea. Will pay shipping on 5 or more. Telex cushioned stereo headphones, separate vol. controls, mint, $7.00 pair inc. ship. Bob Bradley, W9WGD, 1002 Forest Road, La Grange Park, IL 60525.

CIPHER machines wanted (M-209, M-94, others), books, manuals, any items related to secret writing. Lou, WB2EZK, 17 Alfred Rd., Merrick, NY 11566 (516-378-0263).

WANTED: Defective/basket-case amateur radio equipment. State condition/price. Joe Bedlovies, 241 Dover Street, Bridgeport, CT 06610.

FT-901DM in excellent condition, $600. SP-901P, $25. Free shipping within continental US. Matt, K4KIU, 2240 Trafalgar, Riverside, CA 92506 (714-788-3899).

WANTED: "MARSTEXT," "MBATOR" Software for AEA CP-1. R. Cook, 6326 NE Barrett Dr., Poulsbo, WA 98370 (206-598-4916).

WANTED: Drake MN2700 Transmatch, mint, unmodified. D. Klimaj, W4JVN, 5637 Heming, Springfield, VA 22151 (703-569-4681).

WANTED: Heath HG-10B VFO and used 80–10M vertical. Call Denny, 412-745-4847.

YAESU FT-101ZD w/CW filter, fan, 12V mobile supply, excellent, $425. Sp-901 matching speaker $35. Matching desk mike $25. ICOM IC-720 w/CW and AM filters, dual VFO, general coverage, PS-15 (20 amp. continuous), w/desk mike, excellent, $515. TS-820 digital, w/MC-50, excellent, $450. All plus shipping. KD5ZE, 501-856-3784.

TRADE FOR TRANSCEIVER; Mint Robot Model 70 Monitor and Model 80 camera (needs tube). W4PRC, 305-434-4245.

TEACHERS AND STUDENTS interested in talking to other teachers and student via ham radio, please contact Karen, KB6DDQ, at P.O. Box 925, Frazier Park, CA 93225.

WANTED: Manual for Swan 350. Copy OK. Jim Grazulis, KA3KSP, 1360 Henderson Ave., Washington, PA 15301 (412-228-7583).

KENWOOD OWNERS: Gone QRO? I will trade my mint Ten-Tec 3 kw tuner for your AT-250. Steve Webster, KK1W, 3515 Victoria Dr., Stevensville, MD 21666 (301-643-6731).

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XCVRS: Ten-Tec Omni-D with P.S., all filters and remote VFO, $550. Alda-103 (80, 40, and 20 mtrs) nice mobile rig, $175. I prepay freight. James R. Shank, 21 Terrace Lane, Elizabethtown, PA 17022 (717-367-3149).

WANTED: Vacuum capacitors, vacuum relays, and Eimac power tubes, sockets and chimneys. A. Emerald, 8956 Swallow, Fountain Valley, CA 92708.

COMMODORE 64 program wanted, on a 5¼" disk, for a QSO record. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

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WANTED: Manual or schematic for DX-20. Hallicrafters PM-23 speaker. Q.R. Galbraith, K5TVC, 4303 Kingsway, Farmington, NM 87401.

SELL: Drake TV5200LP filter $18; KLM 10-70BL 2m linear $75. Wanted: Kenwood SW-2000, HC-10; W2DU-HF Balun, W2VS/Reyco KW-80F traps. K0MK 218-865-6541.

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NATIONAL RADIO manuals and NCL-2000 parts lists, SASE. Maximilian Fuchs, 11 Plymouth Lane, Swampscott, MA 01907.

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DRAKE TR-3, AC-4, Heath SWR meter, external spkr., Shure 444 mic. Mint condition with manuals. Will ship, $250.00. KE8JH, 616-327-2142 nights.

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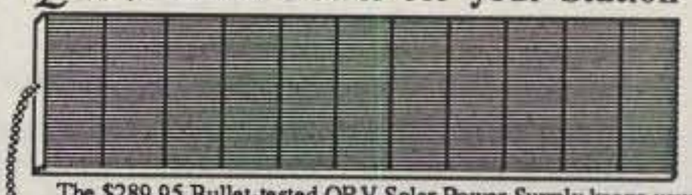

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WANTED: Two 8874 tubes. K4NBN, "No Bad News," 1946 Sweetbriar Lane, Jacksonville, FL 32217.

WANTED: Knight T-50, Hammarlund HQ-145, C64/128 Ham Programs, Kelsey 3×5 or 5×8 Printing Press/Type. Don Trayes, WB4CVH, 38 Elmwood Place, Goose Creek, SC 29445 (803-797-5185).

RAILFANS wanted for 40M SSB net. Sell Busch Pressman 4 × 5 camera, holders SASE for list. Also Canon AT-1, motor drive. T.N. Colbert, Burton, OH 44021.

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WANTED: Defective/good/basketcase amateur radio equipment, lowest price. Joe Bedlovies, 241 Dover Street, Bridgeport, CT 06610.

CIPHER machines wanted (M-209, M-94, etc.), books, manuals, any items related to secret writing. Lou, WB2EZK, 17 Alfred Rd., Merrick, NY 11566 (516-378-0263).

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- Zinc-Aluminum Alloy Case
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CIRCLE 34 ON READER SERVICE CARD

Yaesu's mini HTs. The smallest, smartest, toughest radios. Anywhere.

Whether you're a Novice or Extra class operator, you're sure to appreciate the high power, durability and size of Yaesu's FT-23R Series mini-HTs.

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But perhaps best of all, each radio blends sophisticated, microprocessor-controlled performance with surprisingly simple operation. In fact, it takes only minutes to master all these features:

Ten memories that store frequency, offset and PL tone. Memory scan at 2 frequencies per second. Tx offset storage. Priority channel scan. Channel selection via tuning knob or up/down buttons. PL tone board (optional). PL display. Independent PL memory per channel. PL encode and decode. LCD power output and "S"-meter display. Battery-saver circuit. Push-button squelch override. Eight-key control pad. Keypad lock. High/low power switch.

The FT-23R comes with a 7.2-volt, 2.5-watt battery pack. The FT-73R with a 7.2-volt, 2-watt pack. And the FT-33R with a powerful 12-volt, 5-watt pack.

You can choose the miniature 7.2-volt, 2-watt pack shown in the photo below. And all battery packs are interchangeable, too.

And consider these options: Dry cell battery case for 6 AAA-size cells. Dry cell battery case for 6 AA-size cells. DC car adapter/charger. Programmable CTCSS (PL tone) encoder/decoder. DTMF keypad encoder. Mobile hanger bracket. External speaker/microphone. And more.

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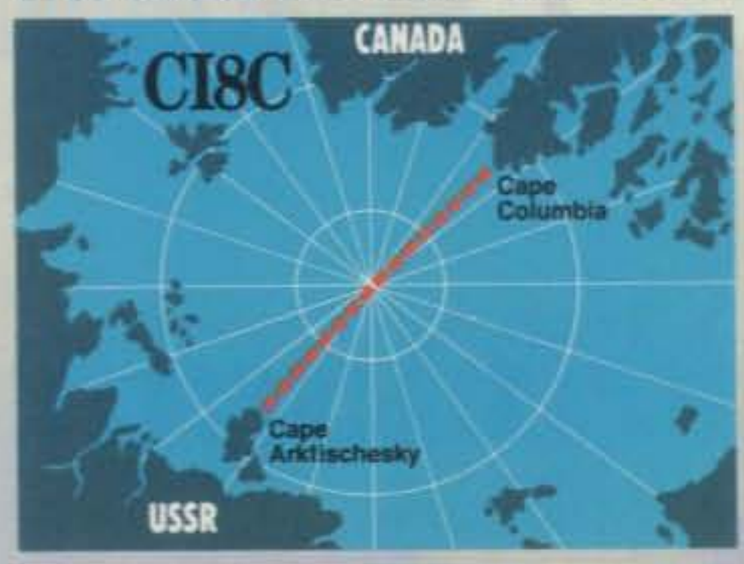
Prices and specifications subject to change without notice. PL is a registered trademark of Motorola, Inc. FT-33R shown with optional FNB-9 battery pack.

CIRCLE 58 ON READER SERVICE CARD

ICOM

IC-761 HF Transceiver

1988 Canada/USSR Trans Polar Ski Trek



"For more than three months, under the most exacting conditions, the Icom equipment performed superbly in support of the Polar Bridge Expedition. . . Icom equipment was our first choice."

— Barry Garratt VE3CDX/VE8CDX/4K0DX, Chief Operator/North Pole 28
1988 Canada/USSR Trans Polar Ski Trek

ICOM IC-761 ON TOP OF THE WORLD

The Canada/USSR Trans Polar Ski Trek did not include leeway for second best. That's why they chose Icom's IC-761 HF transceiver. With amateur radio as the sole means of communication in their 1,240 mile venture across the frozen Arctic, exceptional performance and dependability were vital to their mission. Just as they are to your globe-spanning home station activities.

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CIRCLE 125 ON READER SERVICE CARD

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