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Amateur Radio

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CQ



Season's Greetings

THE RADIO AMATEUR'S JOURNAL



KENWOOD

TM-731A/631A 144/450 and 144/220 MHz FM Dual Banders

- **Extended receiver range** (136.000 – 173.995 MHz) on 2 m; 70 cm coverage is 438.000 – 449.995 MHz; 1-1/4 m coverage is 215 – 229.995 MHz. (Specifications guaranteed on Amateur bands only. Two meter transmit range is 144 – 148 MHz. Modifiable for MARS/CAP. Permits required.)
- **Separate frequency display** for “main” and “sub-band.”
- **Versatile scanning functions.** Dual scan, and carrier and time operated scan stop.
- **30 memory channels.** Stores everything you need to make operating easier. Two channels for “odd splits.”
- **50 Watts on 2 m, 35 watts on 70 cm, 25 watts on 1-1/4 m.** Approx. 5 watts low power.
- **Automatic offset selection.**
- **Dual antenna ports.**
- **Automatic Band Change (A.B.C.)** Automatically changes between main and sub-band when a signal is present.
- **Dual watch function allows VHF and UHF receive simultaneously.**
- **CTCSS encode/decode selectable from front panel or UP/DWN keys on microphone.** (Encode built-in, optional TSU-6 needed for decode.)
- **Balance control and separate squelch controls for each band.**

- **Full duplex operation.**
- **Dimmer switch.**
- **16 key DTMF/control mic. included.**
- **Frequency (dial) lock.**

Optional Accessories:

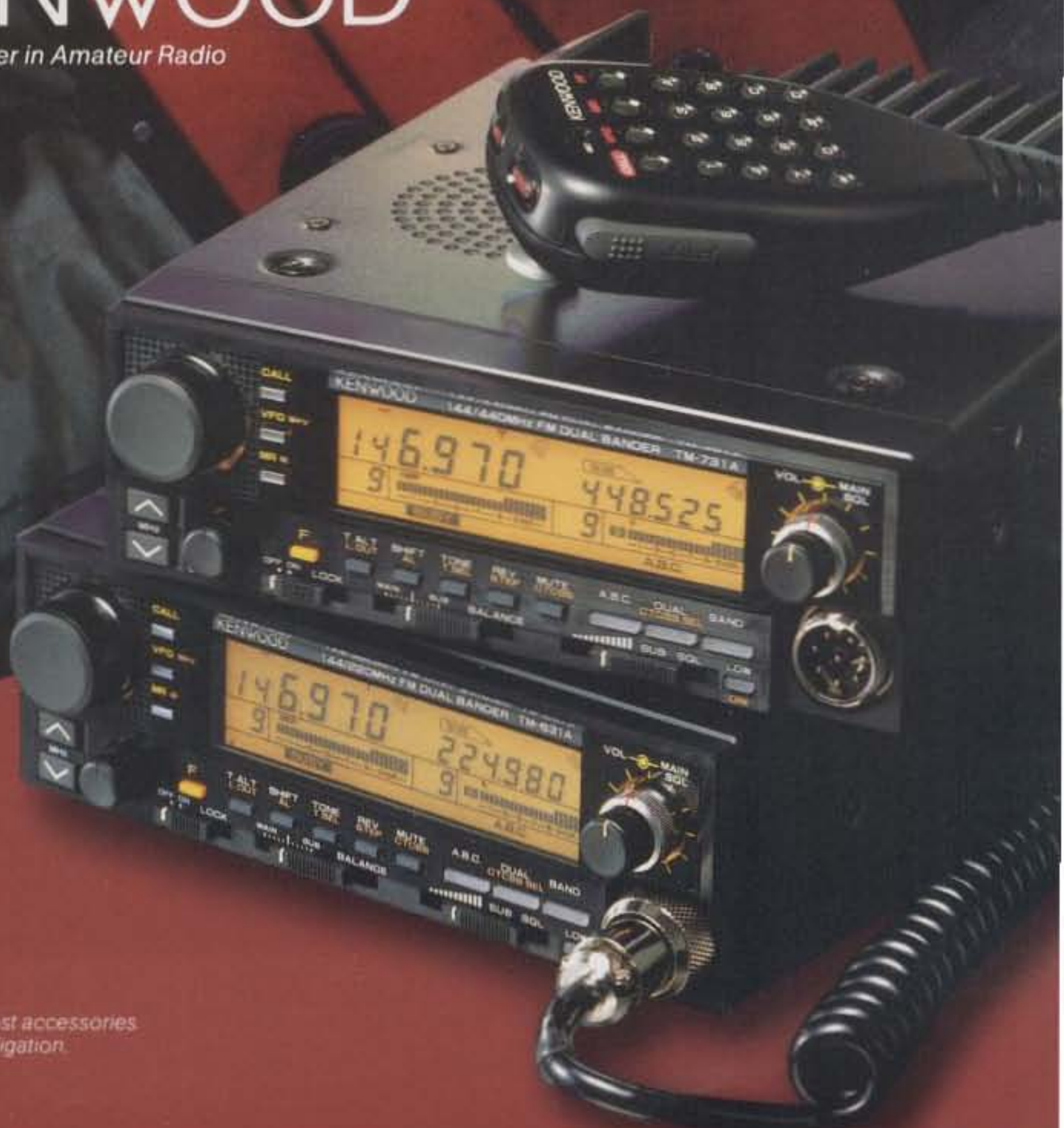
- **PG-4H** Extra interface cable for IF-20 (for three to four radios)
- **PG-4J** Extension cable kit for IF-20 DC and audio
- **PS-430** Power supply
- **TSU-6** CTCSS decode unit
- **SWT-1** 2 m antenna tuner
- **SWT-2** 70 cm antenna tuner
- **SP-41** Compact mobile speaker
- **SP-50B** Deluxe mobile speaker
- **PG-2N** DC cable
- **PG-3B** DC line noise filter
- **MC-60A, MC-80, MC-85** Base station mics.
- **MA-700** Dual band 2 m/70 cm mobile antenna (mount not supplied)
- **MB-11** Mobile bracket
- **MC-43S** UP/DWN hand mic.
- **MC-48B** 16-key DTMF hand mic.

KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
P.O. BOX 22745, 2201 E. Dominguez Street
Long Beach, CA 90801-5745
KENWOOD ELECTRONICS CANADA INC.
P.O. BOX 1075, 959 Gana Court
Mississauga, Ontario, Canada L4T 4C2

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“Dynamic Duals”



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

KENWOOD

Stacked in your favor!

TM-231A/ 331A/431A/531A

FM Mobile Transceiver

Looking for a compact transceiver for your mobile VHF and UHF operations? KENWOOD has a compact rig for each of the most popular VHF/UHF bands.

- 20 multi-function memory channels.
- High performance — high power! 50W (TM-231A), 35W (TM-431A) with a 3 position power switch.
- Optional full-function remote controller (RC-20).

A full-function remote controller can be mounted in any convenient location. Using the IF-20 interface the RC-20 may be connected to four mobile transceivers. (TM-231A/431A/531A or the TM-701A).

- Multi-function microphone supplied. Various controls are provided on the mic. for increased utility.
- Auto repeater offset on 144 and 220 MHz.
- Built-in digital VFO allows selection of the frequency step. (5, 10, 15, 20, 12.5, 25kHz; TM-531A: 10, 20, 12.5, 25kHz.)
- Selectable CTCSS tone built-in.
- Tone alert system — for true "quiet monitoring"! When enabled this function will activate a tone when squelch opens.
- DRS (Digital recording system). The optional DRU-1 can store received and transmitted messages for up to 32 seconds, allowing the operator to check or return any call using the tone alert system.
- Automatic lock tuning function (TM-531A).
- Repeater reverse switch.

Optional Accessories:

- RC-20 Full-function remote controller
- RC-10 Handset
- IF-20 Interface unit handset
- DRU-1 Digital recording unit
- MC-44 Multi-function hand mic.
- MC-44DM Multi-function hand mic. with auto-patch
- MC-48B 16-key DTMF hand mic.
- MC-55 8-pin mobile mic.
- MC-60A/80/85 Desktop mics.
- MA-700 Dual band (2m/70cm) mobile antenna (mount not supplied)
- SP-41 Compact mobile speaker
- SP-50B Mobile speaker
- PS-430 Power supply
- MB-201 Mobile mount
- PG-2N Power cable
- PG-3B DC line noise filter

- PG-4H Interface connecting cable
- PG-4J Extension cable kit
- TSU-6 CTCSS unit

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TS-950SD

"DX-clusive" HF Transceiver

The new TS-950SD is the first Amateur Radio transceiver to utilize Digital Signal Processing (DSP), a high voltage final amplifier, dual fluorescent tube digital display and digital meter with a peak-hold function.

• **Dual Frequency Receive Function.**

The TS-950SD can receive two frequencies simultaneously. The sub-receiver has independent controls for frequency step size, noise blanker, and AF gain and its own digital display!

• **New! Digital AF filter.** Synchronized with SSB IF slope tuning, the digital AF filter provides sharp characteristics for optimum filter response.

• **New high voltage final amplifier.** 50 V power transistors in the 150-watt final section, results in minimum distortion and higher efficiency. Full-power key-down time exceeds one hour.

• **New! Built-in microprocessor controlled automatic antenna tuner.** The new antenna tuner is faster and you can store the settings in memory! (Manual override is also possible.)

• **Outstanding general coverage receiver performance and sensitivity.** Kenwood's Dyna-Mix™ high sensitivity direct mixing system provides from 100 kHz to 30 MHz. The Intermodulation dynamic range is 105 dB.

Optional Accessories

- VS-2 Voice synthesizer
- SP-950 External speaker w/AF filter
- SM-230 Sta-

- tion monitor w/pan display
- SW-2100 SWR/power meter
- TL-922A Linear amplifier (not for QSK)

The Ultimate Signal.



• **Digital Signal Processor.** DSP is a state-of-the-art technique that maximizes your transmitted RF energy. Your signal stands out because it is much more pure than your competition! You can even tailor your transmitted CW or voice signal waveshape!

• **High performance IF filters built-in.** Select various filter combinations from the front panel. For CW: 250 and 500 Hz, 2.4 kHz for SSB, and 6 kHz for AM. Filter selections can be stored in memory!

- **Multi-Drive Band Pass Filter (BPF) circuitry.** Fifteen band pass filters are available in the front end to enhance performance.
 - **Famous Kenwood interference reduction circuits.** SSB Slope Tuning, CW VBT (Variable Bandwidth Tuning), CW AF tune, IF notch filter, dual-mode noise blanker with level control, 4-step RF attenuator (10, 20, or 30 dB), switchable AGC circuit, and all-mode squelch.
 - **Built-in TCXO for highest stability.**
 - **Built-in electronic keyer circuit.**
 - **100 memory channels.** Store independent transmit and receive frequencies, mode, filter data, auto-tuner data and CTCSS frequency.
 - **Digital bar meter.**
- Additional Features:** • Built-in interface for computer control • Programmable tone encoder • Optional VS-2 voice synthesizer • Built-in heavy duty AC power supply and speaker • Adjustable VFO tuning torque • Multiple scanning functions • MC-43S hand microphone supplied

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MASTHEAD

EDITORIAL STAFF

Alan M. Dorhoffer, K2EEK, Editor
 Gail M. Schieber, Associate Editor
 Lew McCoy, W1ICP, Technical Representative
 Peter O'Dell, WB2D, Special Projects Editor

CONTRIBUTING STAFF

John Dorr, K1AR, Contest Calendar
 Chod Harris, VP2ML, DX
 Dave Ingram, K4TWJ, OSCAR & Antiques
 George Jacobs, W3ASK, Propagation
 Dorothy H. Johnson, WB9RCY, Awards & USA-CA
 Frederick O. Maia, W5YI, FCC Correspondent
 Buck Rogers, K4ABT, Packet Radio
 Karl T. Thurber, Jr., W8FX, Antennas & Software
 Adrian Weiss, K8EEG/0, QRPp
 Bill Welsh, W6DDB, Novice

AWARD MANAGEMENT

Leo Haljsman, W4KA, WAZ Award
 Dorothy H. Johnson, WB9RCY, USA-CA Award
 Norman Koch, K6ZDL, WPX Award
 Billy Williams, N4UF, CQ DX Award

CONTEST MANAGEMENT

Frank Anzalone, W1WY, Contest Advisor
 Steve Bolia, N8BJQ, WPX Contest Director
 Larry Brockman, N6AR, WW DX Contest Director
 Robert Cox, K3EST, WW DX Contest Director
 John Dorr, K1AR, WW DX Trophies & Certificates
 Roy Gould, KT1N, RTTY Contest Director
 Donald McClenon, N4IN, 160 M Contest Director

BUSINESS STAFF

Richard A. Ross, K2MGA, Publisher
 Dorothy Kehrwieler, General Manager
 Arnie Sposato, N2IQO, Advertising Manager
 Emily Kreutz, Sales Assistant
 Frank V. Fuzia, Controller
 Catherine Ross, Circulation Director
 Melissa Kehrwieler, Data Processing
 Kathleen Bell, Customer Service

PRODUCTION STAFF

Dorothy Kehrwieler, Production Manager
 Elizabeth Ryan, Art Director
 Barbara Terzo, Artist
 Pat Le Blanc, Phototypographer
 Florence V. Martin, Phototypographer
 Hal Keith, Illustrator
 Larry Mulvehill, WB2ZPI/VK5AAY, Photographer

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The Radio Amateur's Journal

ON THE COVER: Ever wonder what Mrs. Claus gets Santa for Xmas? It looks as though Santa was very good this year, and now he should break the pileups easily. (Photo taken at Spauldings Christmas Gallery in Miami, FL by Larry Mulvehill, WB2ZPI.)



DECEMBER 1989

VOL. 45, NO. 12

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Zero Bias

AN EDITORIAL

This morning while watching the news on TV, there was a feature segment on the current issue of *Life* magazine which had chronicled the 1980s. The decade of the 80s will end this month, and apparently we have new milestones to look forward to in the '90s. One of the milestones of the '80s decade which probably didn't get covered in *Life* was the rebirth of *CQ* magazine. This issue celebrates the 10th anniversary of *CQ* under new ownership and our move to beautiful downtown Hicksville.

Our growth and whatever success we enjoy is due not only to our staff here at the offices, but also in large measure is a result of our writers and contributing staff's efforts and dedication. The past ten years have literally flown by, being mostly pleasant and enjoyable. There were also a couple of hundred hamfests attended during this period and countless grease-dogs consumed. In the past 10 years we've crisscrossed the country many times, meeting what seems like hundreds of thousands of amateurs, and most of them still are thrilled with the hobby and enjoy amateur radio. The minority of amateurs who seem unhappy about this or that will in all likelihood remain unhappy throughout the '90s.

Monday morning, January 1, 1990 starts a new decade for amateur radio and *CQ*. The best is yet to come.

Holiday Gifts

Since this is the end of a monumental decade, perhaps it's time to hint for a monumental gift this season. *CQ's 1990 Amateur Radio Buyer's Guide* is now out, and just about everything you could want is listed along with just about every place to buy it. All you need to supply is some means of marking the page, and then leave the book in a conspicuous place. Even if a monumental gift isn't in order, there are plenty of things to wish and hope for on a more practical and reasonable level.

Two items to consider as gifts (you might even want to buy them for yourself) are books. The first is the second edition of Bob Locher's funny and very informative book *The Complete DXer*. Bob, W9KNI, has updated this classic which is must reading for any active amateur. If you have just started on the road to DX or even if you've been on that highway for some time, this book is full of tips, hints, and know-how that will help you out. Be careful, however. While you may think this is just a funny book (which it is), it is also a textbook written by the man who

made it to the Honor Roll. Learning can be fun and entertaining. The book is available from *CQ's* Book Shop.

The second book is published by Doubleday and is called the *The Cuckoo's Egg*. This book relates the actual incidents involved with tracking a spy who has gained access to a computer network at Lawrence Berkeley Laboratory in California. This network was infiltrated in a most ingenious manner, placing a lot of very sensitive material in jeopardy. The author, Dr. Clifford Stoll, becomes the lead player in unmasking this spy on his very first day of work at the laboratory. This story, which made headlines in *The New York Times* and *Time* magazine earlier this year, is an exciting adventure into the world of computer espionage. Dr. Stoll, an astrophysicist as well as a spy catcher, can also be found on the ham bands signing Cliff, K7TA.

Food Reviews

I have to admit that I've been remiss in my duty as hamfest food critic in that I left out one of the best hamfests this year. Dick and Cathy flew the *CQ* banner at the Virginia Beach Hamfest in mid-September, and Dick reported that they had (available to all) hefty, hearty, and very delicious roast beef sandwiches cut to order. This sounds like a hamfest to be taken seriously next year.

Contest Fever

As we end the year, the *CQ* World-Wide DX Contests are history. However, as this is being written, they haven't yet taken place. It's a strange position to be in, trying to comment or report on an event waiting to happen. If last year is any indication, however, the turnout this year should be monumental. There should be scads of new *CQ*-DX and DXCC applications and endorsements in the mails by now along with tons of QSL cards, racking up new WPX totals as well. Checking the bulletins and newsletters to date, it would seem that there will not be a barren spot on this globe for the contest period. Every exotic piece of real estate, rock, shoal, or island is covered by some group or another, each with a special call to add to the excitement. I expect that there will be a lot of testers and DXers very happy this holiday season as the QSLs begin to arrive.

For the people who hate contests and complain bitterly about printing contest results, the only thing we can offer is probably a lot more to hate and complain

about. Maybe having enough to complain about is a form of happiness, too. However, if you don't like the idea of all this activity "spoiling" the bands, then try to avoid working some of those rare ones and certainly don't send and refuse to accept QSLs.

To top it off, the ARRL has their 10 Meter Contest this month which is a boon to Novices and Technicians. Whatever was missed in the *CQ* World-Wide plus a few new ones should show up for this one. This one is ideal to use as "bait" for a prospective new amateur. Even if you don't plan to be in this one for the long haul, you can invite a prospective amateur over to hear what can await him or her in the way of excitement and fun. Listening as the world opens up before you, ever changing hour by hour as the sun, is far more impressive and lasting than reading about it.

Once Again

If Hurricane Hugo wasn't enough, the October earthquake in California provided a setting for amateur radio to show its stuff. It is a sad commentary that tragedy showcases amateur radio, but in those times of need and desperation, we as amateurs come forth, whether as organized groups or just as individuals who see the need and fill the void to help our fellow man. Once again the TV networks looked to amateur radio, in this case to supply information on the extent of damage in the San Francisco area when other means of communication were not possible. It's a job we're getting all too good at in recent months, but a job we can all take infinite pride in.

What's Up In 1990

Besides breaking a few New Year's resolutions, we do have a few new surprises for you starting in January. We are going to try to start off the decade of the '90s by making amateur radio more exciting and interesting for you, plus adding a lot more fun to your operating time.

Some of the New Year's resolutions we should try to keep this coming year are not to tune up on the other guy's frequency, answer QSL card requests (especially from SWLs), and listen more. You might want to add another one—show your shack to a prospective amateur and help him or her get a license.

All of us here at *CQ* want to wish all of you the happiest and warmest Season's Greetings, and all the very best for 1990.

73, Alan, K2EEK

The Morse Machine™

The Ultimate Keyer from AEA



The Morse Machine has all the features you've been asking for in a high performance keyer like 2-99 WPM speed selection and over 8,000 characters of memory that can be stored in 20 memories. The 20 memories are soft partitioned so that your stored messages may be as short or long as you like. Memory can be expanded to hold up to 36,000 characters. Of course, all memory is backed up by an internal lithium battery so that once a message is loaded, it will stay there until you write over it.

Whether you're an expert or a novice, The Morse Machine has three ways to help you improve your code:

- A proficiency trainer, the same as the one used in the MorseMatic, allows random code group practice with steadily increasing speed.
- A random word generator that randomly generates 4-letter words for a more realistic practice session.
- Dr. QSO (tm) QSO simulator based on our program for the Commodore 64 computer. You can call other stations, answer a CQ, or just sit back and listen to realistic QSOs very much like those you would hear on-the-air.

The Morse Machine is a full featured keyer for the serious contester, with automatic serial

number insertion and incrementing in any memory message. You can use the front panel knob to adjust your sending speed or enter a precise speed with the keypad, toggling between the two at any time. Exchanges can be speeded up by having parts of your message sent at a higher speed. You can also add remote switches for 4 of the memories so that you can instantly send your responses or call CQ.

A computer can be interfaced to The Morse Machine through its RS-232 compatible I/O. Any front panel function may be programmed by the computer. This makes loading memories as simple as typing them in from your keyboard. The Morse Machine can display your random code, or Dr. QSO practice sessions on the computer screen.

The Morse Machine can be programmed to be an automatic beacon. This can be used to automatically repeat a Morse (or RS-232 ASCII) message at a programmed interval of 1 to 999 seconds.

See your AEA dealer today for a demonstration of The Morse Machine or contact:

Advanced Electronic Applications, Inc.

P.O. Box C-2160 Lynnwood, WA 98036
206-775-7373

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PKT



Performance. Yours and your radio's. They go hand in hand. To be a truly world-class competitor, you've got to have a truly world-class rig. And it's here, now. The versatile new FT-1000 from Yaesu.

Designed for the elite global contest and DX operators. With state-of-the-art design including **direct digital synthesis (DDS)** for low noise and fast lock-up time. The FT-1000 will blow away your competition with a spectacular combination of power and operating flexibility. This HF transceiver boasts a list of

Performance.



features and options that other manufacturers still have on their drawing boards: Like **200 watts RF power output**; **Built-in TCXO**, for superior frequency stability; **Independent filter selection**; **Dual receive with balance control** and **two tuning knobs** for simultaneous reception in tough pile-up situations. Using **BPF-1** allows cross-band dual receive.

And the FT-1000 options such as **digital voice-recording system (DVS-2)** for storing and playback "CQ Contest" messages. On RX the DVS-2 has a 16-second running memory for playing back garbled calls. There's also a **CW spot control**, so you can align your frequency to that of an incoming signal without having to transmit; Plus **direct keyboard frequency entry**; **Front panel RX antenna selector**; **Built-in cascaded filters**;

*The Best
of the
Best*

Dual-mode noise blanker. And the receiver front-end uses a **four JFET up-conversion mixer**, for high dynamic range.

This HF rig is the product of three years of intensive research and design. These efforts show in Yaesu's scrupulous attention to detail with features and options ergonomically designed to allow you to achieve a position of competitive dominance. To hear and be heard... Like never before.

See the exciting new FT-1000 at your Yaesu dealer today. It's the best of the best.

YAESU
Performance without compromise.

Announcing

•**Florida Repeater Directories** - Free 1989-90 2 meter repeater directories will no longer be available at Welcome Centers along the Interstate routes in Florida. They can now be obtained by sending your request and an SASE to: Repeater Directory, Hernando County ARA, P.O. Box 1721, Brooksville, FL 34605-1721.

•**Bethlehem, Connecticut Special Event** - W1FHP, The Hen House Gang ARC, will be on the air throughout December on suggested frequencies 80-10 meters, plus Novice band on 10 meter SSB. For special card and info on Worked All Bethlehem Award, send No. 10 SASE and QSL to W1FHP, Robert J. O'Neil, Hard Hill Rd. N., Bethlehem, CT 06751.

•**N4KVF from North Carolina Transportation Museum** - Station N4KVF will be on the air on December 2 from the North Carolina Transportation Museum Historic Spencer Shops from 1400-2200Z alternating CW and phone on 7050, 14050, 14240, and 28480 repeating every 2 hours. Christmas message will be taken. For certificate send No. 10 SASE to Walter Bastow, 484 High Rock Rd., Gold Hill, NC 28071.

•**W6AK from Sacramento, California** - The Sacramento ARC will operate W6AK from Sutter's Fort from 1730Z Dec. 2 until 2330Z Dec. 3 to celebrate Sacramento's Sesquicentennial. Suggested frequencies: SSB 14.300, 21.400, 28.450 days; 3.962, 7.270, 14.300 at night; and CW 14.050. For QSL send SASE to Sacramento ARC, P.O. Box 161903, Sacramento, CA 95816.

•**W4SVI from Everglades National Park, Florida** - The Everglades ARC will operate W4SVI from 1400Z Dec. 2 to 1900Z Dec. 3 to celebrate the 42nd anniversary of Everglades National Park. Suggested frequencies: SSB 7.230, 14.240, 21.330, 28.375; CW 7.030, 14.030, 21.130. Send QSL and two units of postage for an unfolded certificate to Everglades ARC, P.O. Box 113, Homestead, FL 33090-0113.

•**K2CT from Albany, New York** - The tenth annual Number One Christmas Carol (N1CC) operation will be on Christmas Eve and Christmas Day (Dec. 24-25), and Albany ARA members and club station K2CC will also be on using frequencies close to N1CC: 3.907, 7.238, 14.280,

21.365, 28.480 MHz. Special QSL for contacting N1CC, and credit for the Worked Albany Members Award. QSLs with SASE to John Yodis, K2VV, P.O. Box 460, Hagaman, NY 12086.

•**WA2VJL from South Texas** - The San Benito ARC will operate WA2VJL from Dec. 26-31 from the Lower Rio Grande Valley of south Texas to celebrate the "R&R of Santa and Rudolph." Times of operation will depend on band conditions with weekdays 1500-0200Z and all day weekends. Suggested frequencies SSB 21.350 and 28.325. For certificate send SASE with QSL to Santa Claus, c/o San Benito ARC, P.O. Box 1382, San Benito, TX 78586-1382.

•**KE6PE from Pasadena, California** - The Relay Repeater ARC will operate KE6PE Dec. 30 to Jan. 1 from 1600-n-0400Z each day to commemorate the 101th anniversary of the Tournament of Roses and 76 years of the Rose Bowl game. Suggested frequencies: 14.260, 21.335, and 28.450 Novice/Tech frequencies. For certificate send QSL and 9 x 12 SASE to Relay Repeater Club, P.O. Box 81, Arcadia, CA 91006-5019.

PLUG INTO PACKET!

Simple and Easy.

Here's the easiest packet radio yet, you don't even have to buy a TNC to join the digital revolution. Just let your PC do the work. Plug a PC Packet Adapter into any expansion slot and get on the air in minutes, just like an expert. And you'll still be able to use the PC for other work! The complete VHF system is only \$139.95!

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When you've mastered the basics, use the PC*Packet Adapter for simultaneous dual-band HF/VHF, multiconnect, BBS, TCP/IP, DXer's PacketCluster, 2400 baud (and higher). Even use the Developer's Package to write your own packet application.

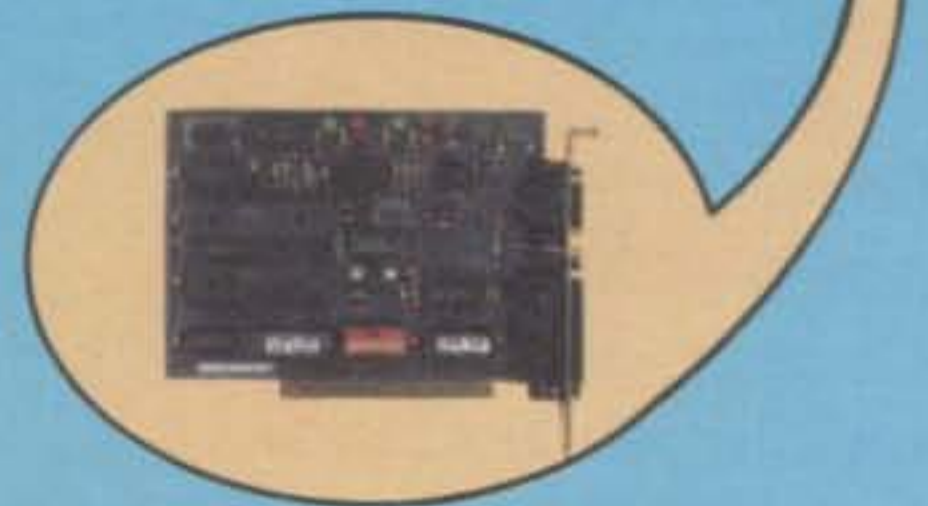
Software Included.

Unlike others, DRSI includes all the software you need. The THS terminal package has split screen, file save/send, binary file transfer, print, scroll, review and more.

2400 BAUD

Many areas are upgrading their packet nets to this higher speed. DRSI's M-24 modem for 2400 baud connects simply with no modifications to your rig and lets you operate both 1200 and 2400 simultaneously with your present radio. Step up to this new speed for just \$79.95, today!

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Grounding Article Correction

Editor, CQ:

Despite my proofreading, I slipped up on the formula in the grounding article published this September ("Tips For Good Grounding," p. 48). A ham wrote me stating the formula was lacking a "2" as a denominator for the equation, and upon referring to my notes, he was right!

The equation should have been $[(X+Y) + (X+Z) - (Y+Z)]/2 = X$'s resistance instead! Would you please pass this along to the readers of CQ?

Michael Simmons, WB9CWE
Charleston, IL

More Postage Info

Editor, CQ:

The letter from VE6BLI in the July issue seemed a bit garbled. It seemed to imply that American postage can be used on mail originating from Canada. As far as I can tell, it doesn't work.

Sending an SASE with your country's stamp to another country doesn't really make a lot of sense. What does make sense is to send a self-addressed envelope, so at least some of the trouble is taken care of.

If you can get them (a reasonably easy task for people in North America), put the right amount of stamps from the foreign country on the return envelope.

If you can't get their stamps, include your own country's first-class postage, but don't stick them to anything. Attach them with a paperclip, and put a small piece of wax paper or such under them so humidity doesn't make them stick to the paper. What's the purpose of this? Well, you're giving them something to offset the cost of the return postage, without having to pay the overhead of the IRCs. In effect, you are paying them with postage that they can put on SASEs that they are sending to your own country. That's one way of getting foreign stamps to put on SASEs.

By the way, as far as I know it takes a 30 cent stamp to get a letter from the US to Canada. It's interesting to note the amount of mail that can get through with a 25 cent stamp. Postage from Canada to the US, as least until the next increase, is 44 cents.

Michael Black, VE2BVW
Montreal, Quebec, Canada

Thank you, Senator Goldwater

Editor, CQ:

I would like to take the time to publicly thank Senator Barry Goldwater for his help. After explaining to Senator Goldwater that the Amateur Radio Society at Arizona State University had no working equipment for 30 very dedicated members, he was kind enough to donate a transceiver and a receiver to the club. Every member would like to express their gratitude to this fine man. With luck, the club should be on the air in a week. Ham radio will have a very rewarding future with support like what we've seen from Senator Goldwater. The club thanks him very much.

Matthew Horbund, KB7HYF
President
Amateur Radio Society at ASU
Tempe, AZ

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5 7/8" (W) x 2" (H) x 8 1/2" (D)

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- **EXTENDED RECEIVER RANGE**

(130-169.995 MHz) on 2M, 144-147.995 MHz transmit. 440-449.995 MHz on 70 cm. (transmit and receive)

(Specifications guaranteed on amateur bands only. Modifiable for MARS/CAP permits required)

- **SIMULTANEOUS**

Receiving on both bands at the same time
Scanning: intermix scan modes on both bands at the same time

- **INDEPENDENT**

The volume, squelch and control dial are independently adjustable on both bands. You can store the following information on both bands at the same time. Priority function, choice of 37 encoding/decoding sub-tone frequencies, call channel, scan function (program, memory channel, VFO or unique open channel scan), memory skip, bell function, + or - repeater shift.

FULL FEATURES

- **FULL DUPLEX CROSS BAND OPERATION**
Transmit on one band while receiving on the other band -- telephone style.

- **AUTOMATIC BAND EXCHANGE (A.B.X.)**

When in the ABX function is active, an incoming signal on the sub-band will activate an automatic exchange between the main band and the sub-band.

- **PRIORITY**

The VFO frequency is monitored for 5 seconds and then shifts for one second to the selected priority channel (In both bands at the same time).

- **DUAL SPLIT SHIFT OPERATION**

Operates odd offset operation

- **BELL FUNCTION**

- **REPEATER REVERSE FUNCTION**

- **CALL CHANNEL FUNCTION**

- **BEEP FUNCTION**

- **20 MEMORIES (10 FOR EACH BAND)**

Each memory channel can store frequency, repeater offset, encode/decode frequency.

- **4 SCANNING MODES**

Program scan, memory scan, band scan and unique open channel scan (opposite to normal busy scan). Scan stops on a busy (or open channel) channel and then resumes approximately 5 seconds after stopping even if the signal is still present.

- **REPEATER OPERATION**

The DR-570T can be used as a cross band repeater.

EASY TO OPERATE FUNCTION

- **LARGE AMBER MULTI-FUNCTION LCD DISPLAY**

Visible in all conditions, it indicates main and sub-band frequencies, frequency step, "on air", "call", "CTCSS", "PRI", "REV", "-", "+", "*", "T" (tone), tone frequency, "MUTE", "LOCK", "ABX", "BUSY", "F", "S/RF meter", "REV"

- **MHz FUNCTION FOR BOTH BANDS**

One MHz is increased or decreased per touch

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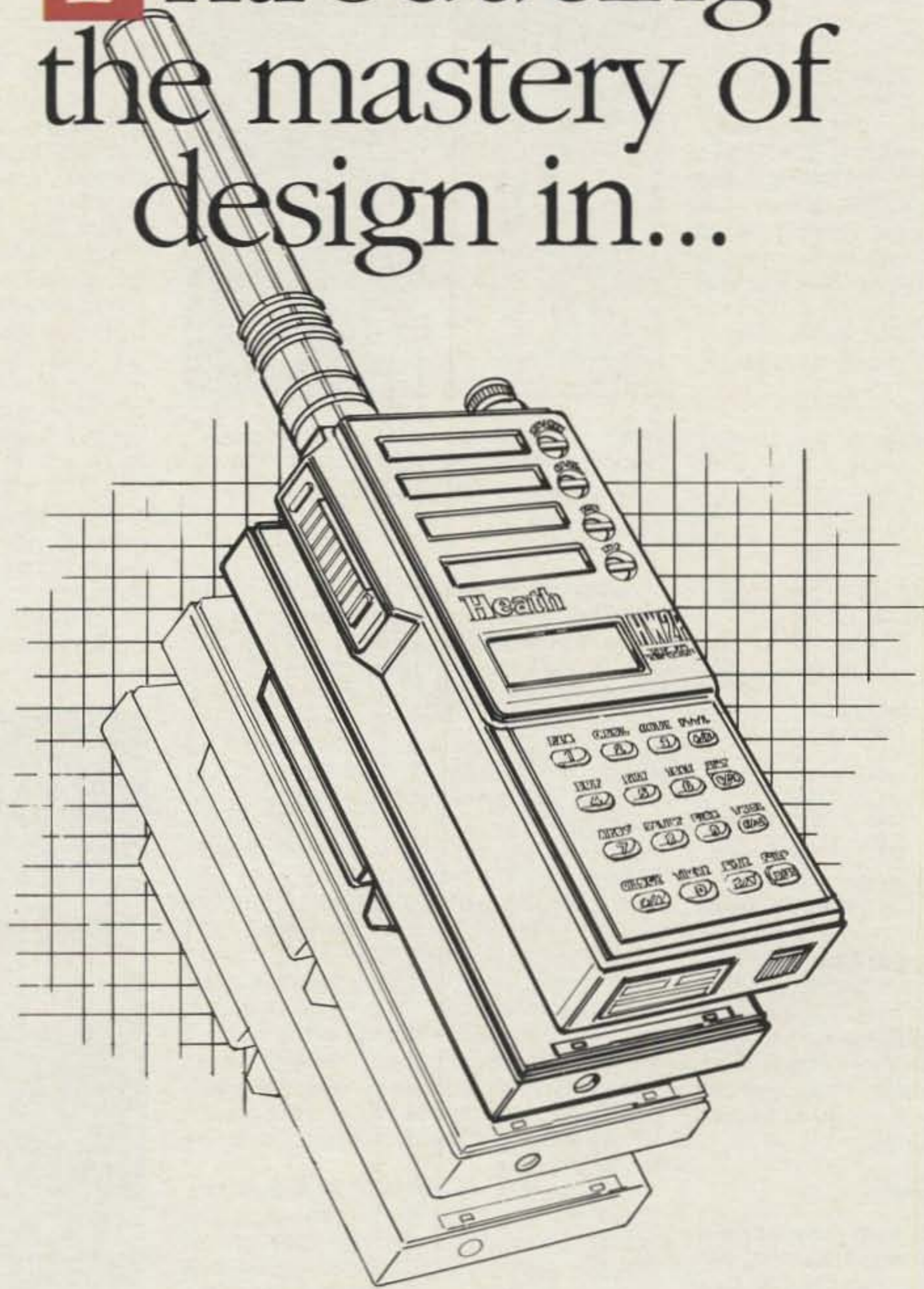
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Results of the 1989 CQ 160 Meter CW and Phone DX Contests

BY DONALD McCLENON*, N4IN

The sunspots finally got us. For several years, even though conditions were declining, station and operator improvements kept performance about the same. We also lucked out in having the contest on some of the better propagation days. This time many scores were less than half of last year's. Activity was somewhat lower, but conditions were the main factor. Only the best equipped and best located W/VEs worked any Europeans the first CW night, and not many, even for them. The second night opening was too brief for even the big guns to work them all. Phone DX was more limited by QRM than by propagation, but the latter was never very good.

The following numbers of active stations were reported on both modes from each country having over ten:

CW	Cntry	Phone	CW	Cntry	Phone
—	CT1	10	10	UC	32
90	DL	27	—	UF	11
—	EA	11	—	UI	13
12	F	12	—	UL	47
110	G	65	—	UM	12
12	HA	—	10	UP	16
27	HB	18	18	UQ	18
33	I	56	12	UR	—
177	JA	—	107	UA9	136
16	LZ	10	110	VE	159
20	OE	22	1772	W	1886
38	OH	11	12	VK	24
207	OK	22	42	Y	10
10	OZ	—	12	YO	—
30	PA	14	20	YU	—
17	SM	—	—	ZL	15
10	SP	—	182	Others	204
364	UA	912			
222	UB	921	3702	Total	4694

There were 117 countries on CW and 90 on phone. All states were on in both modes, but again this year very few got Alaska. Eastern stations had the most trouble getting Montana, and for the west, Mississippi was the tough one. Only those with good imaginations put in claims for VO2, VE8, or VY in either mode. There were very few pirates on this time, the most notable, 7X5, being denounced as such by a large number of operators.

CW Contest—January

Most of these prefixes were especially welcome from the 117 active countries: 4B8, 4S7, 5B4, 5H1, 6Y5, 9H1, 9M2, 9Y4, CE, CT2, CT3, DU, EA6, EA8, EA9, FM, FO, GD, GJ, HK0, HL, HP, IS, IT, J7, J8, KG4, KH2, LX, OH0, P4, SV9, TA, TF, TG, TI, UA/FJL, UD, UG, UH, UI, UJ, UM, V8, VP2E, VP2M, VP2V, VS6, VU, YB, ZD, ZS, DJ4SO/MM, NA7P/MM, and VK4CY/MM.

*3075 Florida Ave., Melbourne, FL 32904



When it comes to checking logs, any help is appreciated. Here contest chairman N4IN is aided by his four-legged friend.

GW3YDX has been an active participant for many years, providing a multiplier for many of us. In 1989 he was able to work well into USA and win the world-high score of 393,712. This is about 45% of last year's highest. Runner-up K4TEA operating KP2A was close with a 352,304 score. For many "little pistols" he was the only DX contact. Third-place PJ9JT at 303,510 was the only other station to exceed 300K points. They were followed by PA3DQW* 295,275, YT2R* 283,500, I4EAT* 272,560, VE6OU/3 232,920, OK5TOP* 211,586, GM3IGW* 195,615, UR1RWX* 195,238, W2GD* 192,685, W3LPL (WA8MAZ Op.) 191,952, and K5NA 190,180. (Asterisks denote multi-operator stations.) Top 10 scores in the W/VE Single Operator, DX Single Operator, and Worldwide Multi-Operator categories are shown in the score boxes. Trophy sponsors and winners are shown in the trophy winner's box. Runners-up may be shown as winners if the highest scorer in that category received a trophy last year.

QSO leaders were W9AZ 778, W2GD 749, K5NA 734, N4RJ 718, W3LPL 716, AA1K 706, WO0G 700, GW3YDX 695, W0AIH 678, KP2A 663, and VE6OU/3 and PA3DQW 658. Outside W/VE, QSO leaders were GW3YDX 695, KP2A 663, PA3DQW 658, YT2R 620, OK5TOP 598, UR1RWX 567, I4EAT 561, IB8A 533, OK3KAP 531, and UP1BWR 511. High contact totals outside NA/EU were PJ9JT 457, UZ9CWA 365, YV1OB 302, UL7MU 301, KH6CC 264, UA9AQN 256, UA9FAR 253, RV9CFA 248, KX6DC219, UA9MR 173, and JH3CYZ 147.

The Caribbean region has produced the

highest multipliers for many years. Even though multiplier totals are now well below record numbers, this is still true. World high of 97 was made by KP2A. He was followed by N4RJ 92, W2GD and AA1K 89, K5NA and GW3YDX 88, K1ZM and W3LPL 86, W9AZ 85, N2NU 84, I4EAT 80, and WO0G 79. DX multiplier leaders not shown above were PA3DQW and YT2R 75; CT1AOZ 72; GM3IGW 69; PJ9JT, OK3KAP, and OK5TOP 67; and G4BYG and G4OBK 66.

Probably the most dramatic example of declining conditions is in the countries-worked totals of the best equipped and operated stations. Last year the highest was 74; this year it was 59! The leaders were GW3YDX 59; I4EAT 56; YT2R 54; OK3KAP and OK5TOP 52; HB9CIP and UR1RWX 51; PA3DQW 50; DL0KF, LZ9A, OK1KQU, and UR2RGN, all 49. W/VE country leaders were N4RJ 41, W2GD 40, AA1K and K5NA 38, K1ZM 37, W3LPL 36, N2NU 33, W9AZ 32, and WB2P and N4IN 30.

Single and multi-op winners in each state, province, and country will receive CQ certificates. In close races runners-up will also receive one, as will all in the top ten groups. We never before had the situation that exists for the top single-operator England score. G4BYG



Fifth world high multi-op GM3IGW team. Left to right are G3BBD, G4GLL, and G3IGW. (Not shown is G4MH.)

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and G4OBK had the *identical* score of 157,278. They both had the same multiplier, but a different country and QSO total. Of course, both get certificates.

Confusion Department: We had KA1HBV in CT and KA1HDV in ME. K8HVT in CT and K8SVT in OH. Then there were K5NRH and KA5RNH both in LA, N0ICQ and N0IQ both in MN, WB5BHS and WB5OHS both in AR, WA5QVE and WA5VBE both in AR, and WA0NRC and WB0NCR both in IA. Several scores were increased a bit if they thought any of these were dupes.

It doesn't seem to help your overall score to have one or two very high-speed hours somewhere in your log. Those stations just won't be workable later. High-speed artists with the following QSO/hour rates for a selected best hour were W9YSX 101, K1TO 100 (237 total QSOs), N2LT 86, WX4G 85, KY1H 84, AA1K 82, and KW8N 80.

Phone Contest—February

Even with fairly low noise, the QRM was so great that not much trans-ocean DX was worked. Many logs bemoaned the lack of a DX Window and requested it be restored. Some of the requests came from flagrant violators of the old window, who caused its demise! No one suggested how the window could be enforced or offered to forego the contest to become a full-time policeman. The JAs are still working it successfully on CW by transmitting above the crowded part of the band and listening near the low end. Phone DX could do the same thing within the allowable transmitting range.

Of the 90 active phone countries, the following might cause pileups: 4X, 5B4, 6Y5, 9H1, 9M2, A92, CE, CP, DU, EA8, FK, FM, GD, GU, HC, HC8, HK0, IS, J6, J8, KL7, KP4, KX6, LU, LX, OA, OY, P4, PY, SP, SV, TI, UA/FJL, UA2, UD, UG, UH, UI, UJ, UM, VK, W3UQJ/MM, ZP, and ZS.

The world-high score of 375,992 was made by multi-op VP9AD* (again, asterisks for multi-ops). Like KP2A on CW, he was the only DX worked by many W/VEs. Veteran contesteer VE6OU/3, who was 7th world-high on CW, placed second on phone with a score of 307,564. Third world-high WB9Z, sporting a new call, was highest USA scorer with 202,905. His log continues to be the neatest and most accurate of any near this large. These scores were followed by K3KG 161,109, K11G* 145,872, K5NA* 141,636, UZ6AXE* 141,082, KR9S* 114,816, KD9SV 113,728, W3TS 105,300, and NQ4I 103,125, to complete the list of over 100K scores.

The world-high QSO leader was UZ6AXE with 1069, followed closely by WB9Z with 1063. It took some excellent operating to hold this to only a 10% drop from last year. Next in line were VE6OU/3 at 944, K11G 858, VP9AD 833, K3KG 822, KR9S 801, K5NA 788, KD9SV 787, W3TS 715, NU8Z 698, and W0CEM 695. Outside W/VE high-contact totals not previously listed were RB5IOV and UB4QWW 523, RB5DX 471, LZ9A 408, RF6FKF 286, OK5TOP 280, OK1DXS 218, and YU4BR 200. Outside NA/EU contact leaders were RF6FKF 286, KH6CC 139, A92BE 134, YV1EQW 131, PJ9JT 121, and UA9MR 109.

Along with everything else, the top multipliers obtained by the best stations are down from last year. The highest (86) was made by VP9AD. Then followed K3KG and WB9Z 81; NQ4I 75; K5NA 74; K11G 72; AA4MM, WB4NMA,



Working CW in California is tough going, as W6PU will attest to.

VE6OU/3 68; N4IN 67; AA1K 66; W3TS 65; KD9SV and KR9S 64; K4YT and NU8Z 63. DX multiplier leaders not shown above were YV1EQW 53; PJ9JT 48; CT1AOZ, YU4BR, and ZF2MV 44; KH6CC 43; IV3PRK and OK5TOP 41; and OK1DXS 40.

The top country total of 41, worked by YU4BR, is far below last year's 54. Next in order were HB9CXZ, IV3PRK, and OK5TOP 38; LZ2JE and LZ9A 37; OK1DXS 36; RB5DX and VP9AD 33; and OE3WQB and UZ6AXE 32. W/VE country leaders were K3KG 29, WB9Z 26, K5NA 22, NQ4I 22, and K11G 21.

Selected best-hour QSO-rate producers were KR9S 125, WB9Z 116, K4YT/3 at 110, K5ZD/3 at 97, KN5S 96, KC8JH 95, K3KG 94, and KX3Q and WB4GNT 85.

Sponsors and trophy winners for various categories are shown in the plaques box. Single and multi-op winners in each state, province, and country will receive CQ certificates, as will top 10 and close seconds.

Miscellaneous

Make sure your log is readable. Check for fadeouts if you xerox it, and restore them.

Wasting half of the CQ WW DX sheets to get down to 40 QSOs per page doesn't help. We need space to make corrections and give you credit for them. If you want assurance that your log arrived, include a self-addressed stamped card. It's cheaper than a post-office return receipt.

Warning! These logs could have been disqualified for being illegible, too many phoney calls, or excessive dupes (7 of them had more than 20 and claimed points for all!). CHECK your log for dupes before submitting them. We find them all. We won't say which had what problems, and we let them all off without penalties, in the hope major improvements will be made next time.

CW: W3LPL, N4XM, KR7G, KD9SV, KR9U, K0LIR, DL0KF, I3VHO, IB8A, OK1DWC, OK2HI, PA3EYP, RB5BA, UR1RWX, UT4UXW, UZ3RXX, UZ9CWA, and YT2R.

Phone: W6UE, WB8K, KR9S, UB4QWW, UZ6AXE, and YU4BR.

Club Competition

The Frankford Radio Club put in a lot of effort and regained first place. The Southeastern DX Club also put in a lot of work and moved up to second. These were the only two clubs to post seven-figure scores. The Society of Mid-West Contesters moved up from seventh to third place. All scores show the effects of declining conditions. There were 85 clubs reporting this time, up a bit.

Next Time

The CW contest will be held the last full weekend of January 1990 (January 26, 27, and 28), and the Phone contest will be held the last full weekend of February (February 23, 24, and 25). Times for both are 2200Z Friday to 1600Z Sunday.

Send your business-size SASE to CQ, 76 North Broadway, Hicksville, NY 11801 with enough postage for the summary and log sheets you plan to use. You can photocopy sheets or make up your own, 40 QSOs per

TROPHY WINNERS

Single Operator CW

World by K5AAD: Winner Ron Stone, **GW3YDX** (The David E. Busick, N5JJ Memorial)
U.S.A. by K4TEA: Winner Francis Donovan, **W3LPL** (WA8MAZ Op.)
Africa by K4SB: Winner Louis J. Amoroso, **CT3CU**
Asia by NE4S: Winner Victor Y. Peredreyev, **UL7MU**
Europe by K4UEE: Winner Edgardo Petronzio, **IB8A** (IK8DOI Op.)
Oceania by K4TKM/6: Winner Roi-Namur Radio Club, **KX6DC** (NZ8B Op.)
South America by K4JAG: Winner Charles H. Ponson, **YV10B**

Phone

World by K5AAD: Winner John Sluymer, **VE6OU/3** (The David E. Busick, N5JJ Memorial)
U.S.A. by K4JRB: Winner Jerry Rosalius, **WB9Z**
Africa by WB4ZNH: Winner Salvador Patruno, **EA8XS**
Asia by W4LVM: Winner Serg Diakonov, **RF6FKF**
Europe by N4NX: Winner Wasil Panchenko, **RB5IOV**
Oceania by K4DLI & KB4SSS: Winner Jack Wheeler, **KH6CC**
South America by KL7JAR/4: Winner Celso R. Perdomo, **YV1EQW**

Multi-Operator CW

World by N4RJ: Winner Gerard Geurts, **PA3DQW**

Phone

World by Southeastern DX Club: Winner Allan Davidson, **VP9AD**

page, with Universal Time (Z), station, info sent and received, sequentially numbered multipliers as each is first worked, and claimed points. Indicate all zero-point dupes, but leave them in for cross-checking. There is no penalty for marked dupes. Include a summary sheet showing your name, address, call, and state, province, or country of operation. Multi-ops show who was operating when the change was made.

If you make over 200 QSOs, include a check sheet that agrees with the log. Alphabetized lists are especially welcome.

CW mailing deadline is February 28, and Phone deadline is March 31. Send logs to 160 Meter Contest Director Don McClenon, N4IN, 3075 Florida Ave., Melbourne, FL 32904 USA. Logs may also be sent to CQ. Please indicate CW or Phone on the envelope. We want good photos of your setup, and they may be sent well after log deadlines.

Hope to meet in both 1990 contests.

73, Don, N4IN

Soapbox W/VE CW

Fine opening to Europe Sat. night and JA both mornings helped. I first participated in CQ 160 test in 1964. This is my 25th one. Worked W0AIH in 19 of the tests, from the first to this one. . . . W5FIX. Found conditions to be very poor this year, especially Friday night; couldn't get further west than Colorado! . . . VE3CUI. Wind took down dipole, plus finals went south, plus had to take YL out Sat. night, equals low score . . . NA2Q. Gee, was it my imagination or were conditions poor? . . . N1ACH. Staying up till 2:00 AM doesn't seem to be as easy when you are 78 years old . . . KA9ACS. The contest was a real gas, lots of QRN here, but the 940S with two 400 Hz 400 IRC filters and VBT was a dream. Forgot to push right button a few times and accidentally called JAs at 1909 very embarrassing! . . . W6PU. Thanks for the contest and keep up the good work. It brings a lot of hams a lot of enjoyment . . . NA9N. Had to be away from home, but did better than I thought I would with such a low antenna. However, no DX to speak of and low multiplier . . . W4DMB /4. Wow! So this is 160. I heard C31 but he never heard me. I'll be back next year hoping for EU opening. Thanks for the thrill . . . KV8Q.

I got my license on Dec. 22, 1988, so thought that this contest would be a good way to make lots of contacts. Friday night my barb-wire fence antenna did not work at all. Saturday morning I added wire to my 80 m. inverted Vee, and it worked fairly well. This was good fun; next year I'll be prepared sooner . . . VE6NAD. Activity seemed down. Guess everybody was on 10 and 15! . . . K3ND. A few very very wide signals ruined it for everyone . . . W3BGN. Finished the contest early Sat. because of severe line noise 3/4 miles away; when it rains it pours . . . KR9U. Was still working on my antenna outside and the contest was already in progress for three hours . . . KJ0B. Never worked so hard for so little a score . . . N2MM. Poor conditions make poor score! Ours was less than half of last year's! . . . W0CD. 1988 CW conditions spoiled us all . . . VE6OU/3. Conditions were bad, I was glad I had set aside only a few hours to operate . . . AA5B. Bad cold, bad conditions + Murphy = low score. What happened to the W1s and VEs? Just because the sunspots are up doesn't mean 160 is dead. The band was open a lot of the time with a real lack of operators. Look for you next year . . . WC7S.



Relaxing here is the eighth world high multi-op OK3KAP team.

Talk about mice and men and Murphy, I'm almost ashamed to send in this fabulous entry, but I know it will help your bookkeeping; looking forward to next year and hopefully no more equipment problems . . . VE2DVI. Nice to work one of the best contest events in the calendar . . . VE3ABG. Snow static—oh, my ears! First time all computer log! Typing has to get faster for a good score . . . VE3PN. High solar flux sure ruins 160 DX . . . NN3Q. Too many alligators call CQ CQ CQ and don't listen for the 100 watt trap dipole guys . . . AB1U. Went for fun weekend and a little bit of operating, good food, some ski activity and snow shoeing in the bush. We heard one station who called CQ with very short listening periods for one half hour and did not work anybody. There were several of them on the air, especially noticeable the second night . . . VE2OJ.

Thunderstorms cut operating time in half, but got KH6 (only need KL7 for WAS now) . . . KO5D. Is this a new contest just for 6- and 7-land? . . . KH6DW/6. Had fun working 100 QSOs in one hour, but conditions too poor to run a good overall score . . . K1TO. Aside from Friday night when conditions were terrible, we thought it was OK, not great, but EU/AF/OC/SA/NA were all workable. K2TW, KU2C, and I made an all-out effort in this year's contest. The station was kept on the air throughout the contest and we managed to find someone to work every hour. During the week prior we all actively promoted the contest to anyone who would listen on the various repeaters we use commuting to work and the packet networks in the area. This clearly got several stations to get on who otherwise would not have . . . W2GD. Worst top-band conditions in many years—only heard 3 Europeans! . . . VE3DO.

Lost my first 80 QSOs when the computer bombed out. Live and learn. Not much DX out here . . . K5DX. This was done on a PC using a new version of KV0I's software. Used it in real time mode. It does almost everything except make coffee . . . N8BJQ. Half hour into contest and already had worked 2 touch lamps and 1 stereo VCR at the nearest neighbor. Took 2 hours off to build up 3 line filters. They fixed the touch lamps, but could not filter 1.8 MHz out of the stereo VCR's audio section, so made a compromise deal not to operate during daylight hours . . . W3TS. Lousy conditions! I got tired of repeating my call to confirm QSOs. With the sunspot cycle peaking soon, I will have to rethink my strategy for the next year with a better antenna. Also maybe a few more watts. It's not as easy to get out on 160 meters with my long wire as in the past few years . . . VE3HCT. Conditions very spotty; no NE USA at all from this QTH. No SE either, but heard N4IN once . . . K6MO.

Soapbox DX CW

Really bad conditions this year; many 449 reports . . . RV9CFA. Activity and propagation down from last year, but first time JA on 160 . . . DL6RAI. Conditions were much worse than last year. Conditions to USA/VE first night were bad! Many stations were active in Europe. We hope you get logs from most contest men. All the best to the CQ team. In OK it's a very popular contest . . . OK3KAP. My first 160 Meter contest. Surprised at so much activity and hope to participate next year, too! . . . OH6NIO. This is the fourth time I have participated. It was an enjoyable contest with good activity from the Europeans . . . F1JDG. Very glad to be called by VS6DO, 5H1HK, UW0LT, and ZS5BK four new zones for my 160 meter WAZ! . . . I4EAT. Good for Western USA, but Europe was not open well . . . 9M2AX. Conditions very FB, Europe and USA, but they won't listen on 1910 kHz! . . . JH3CYZ. It was a "test run" for our new amp! . . . JA3YKC. Great frustration when the coax feedline open-circuited during that splendid opening to Europe . . . ZL2SQ.

It was nice to be back in the contest after missing last year with no antenna. Conditions were not '85 or '86. Hi! But band did open at times the second night. The first night was a bust here with no signals most of the time. Still

TOP 10 SCORES

Top 10 W/VE Single Op. CW		Top 10 W/VE Single Op. Phone	
VE6OU/3	232,920	VE6OU/3	307,564
W3LPL	191,952	WB9Z	202,905
	(WA8MAZ Op.)	K3KG	161,109
K5NA	190,080	KD9SV	113,728
AA1K	172,660	W3TS	105,300
VE3DO	156,177	NQ4I	103,125
K1ZM	154,542	K4YT/3	93,555
K3ZO	120,675	WB4NMA	88,672
W3BGN	120,150	AA4MM	70,584
AA4S	111,160	KB4WQO	65,016
VE3KP	108,805		

Top 10 DX Single Op. CW		Top 10 DX Single Op. Phone	
GW3YDX	393,712	RF6FKF	74,907
KP2A	352,304	YV1EQW	65,137
	(K4TEA Op.)	RB5IOV	59,450
PJ9JT	303,510	KH6CC	57,749
IB8A	181,536	PJ9JT	55,440
	(IK8DOI Op.)	RB5DX	54,054
YV1OB	167,720	YU4BR	45,200
G4BYG	157,278	OK1DXS	44,880
G4OBK	157,278	A92BE	39,122
UR2RGN	146,025	IV3PRK	38,458
CT1AOZ	144,864		
G3XTT	141,696		

Top 10 Multi-Op. CW		Top 10 Multi-Op. Phone	
PA3DQW	295,275	VP9AD	375,992
YT2R	283,500	K11G	145,872
I4EAT	272,560	K5NA	141,636
OK5TOP	211,586	UZ6AXE	141,088
GM3IGW	195,615	KR9S	114,816
UR1RWX	195,238	NU8Z	96,264
W2GD	192,685	W0CEM	90,480
OK3KAP	185,327	WB8K	90,402
N4RJ	177,744	LZ9A	77,774
HB9CIP	168,064	K8MJZ	76,842

looking for a few more 160 DXCC, Hi. Good luck and thanks for a FB contest . . . W2ZZ/CT3CU. After last year's results (PA0ERA, 10th multi-op), we decided not to change the winning team and entered again with the same antenna (3x quarter wave sloper) and the same group of ops (PA3EYZ, ex SP4FCG, and PA0ERA). The condx were really "knudde" (Dutch for terrible), and we already decided to suggest to change the contest to the CQ WW 10 meter and try 160 again in 1995 or so, but the second night conx were much better, and we got struck again by the 160 meter virus. Look for us next year. We worked about 110 OKs and 65 UB5s! . . . PA3DQW. First Europe on 160 in a contest—UA1OIL. Forced off air second night by lightning storm . . . KH6CC.

Bad conditions to USA during first night . . . OK5TOP. Hoped to work Vermont and Rhode Island in this contest (the only two I need for CW160 WAS), but no luck this time . . . XF1C. Next year will be better! . . . YO3APJ. Fifteen minutes before start antenna tuner blew up, therefore just a few hours of operation . . . YT3AA. Very hard to work stations in Europe . . . JA7YAA. My first 160 M WW contest since 1978. Worked lots of new countries . . . DJ6TK. Although I could not put much time in on it, I thoroughly enjoyed the contest and the general standard of operating was very good . . . EA5ZY. Biggest thrill when 5H1HK answered my CQ call. VFB conditions with JAs and Pacific . . . HB9CIP. Recently purchased a new amp that had 160 meters on it, so then I put up an antenna. Next year I will try a vertical also. Had fun . . . AL7CQ. I had almost given up hope, but sunrise on Sunday I worked my first American . . . PA3ENM.

I heard many countries, but they didn't hear me. Sorry so few QSOs; I hope to do better next year . . . PY1BVY. I could not get up early for Europe QSOs. Nice contest, thank you very much . . . JR1IJV. Condx were not the best. Heard N4FD/C6A very weak. Hope better next year, without pirates 7X5AB and 7X7AB . . . OK1DWL. A hard go this year . . . GI4BBV. It was a pity that the conditions were not better. I didn't hear any DX except one 7x station. But nevertheless, a good contest . . . HB9BQU. Too much solar flux and not enough power! Maybe next year with KW . . . FM5BH. Thought it was going to be an inter-Europe short-skip contest till the band suddenly started hopping with "across the pond" signals on Sunday AM. The band always comes up with surprises. Glad I put up the beverage ants. Thought they would not be needed . . . G4BYG. My first 160 Meter Contest. Never heard so many USA stations in a half hour. FB! . . . PA3EYP

Conditions were very poor in general except for the first hour to Europe. On a sad note, this will be the last 160 contest for me from VS6. Although I will still be here, I am moving to another flat where I have no room for antennas for the LF bands. So after 23 years of 160 operation, we will have to QRT . . . VS6DO. Conditions were very poor in Europe, heard no overseas . . . DJ4WS. First night terrible conditions. Second night mediocre! . . . GM3PPE. Not much success; noise level too much. Could only hear 6 stations, but it was fun trying . . . YB3ASQ. Bad propagation to USA first night. Second night very good . . . PA3AUC. Great thrill to work contest from Hawaii. Good signals heard with S9+ power line hash; could not copy weaker stations calling; perhaps better receiver ant. next time. Had fun . . . VE7QO/AH6. It was fun to participate my first 160 me-



Top CW multi-op PA3DQW hung three slopers from this.

ter contest ever! I'm sure I'll spend much more time on this contest next year . . . OZ1BIZ.

Soapbox W/VE Phone

Friday at noon I shot an arrow into a tall poplar to put up a 100 ft. vertical. Strung eight 100 ft. radials before dark. It worked so well, I thought I might even win my state. Daylight break allows R & R and return to humanity . . . AG8Z/4. If LA is a rare state, how come I didn't have any pile-ups? Must talk the wife into getting me an amp next year . . . N5EKF. Just got my antenna up last weekend. Sorry I missed the CW weekend. I'll be there next year looking for more! . . . K5KT/6. Great contest! First time on 160 M in my 15 years in ham radio . . . WF2G/4. Balloon got into trees. Wind blew bad just before dark, and 200 ft. antenna broke. Fishing line held it . . . WB4NMA. Operators: me and the cat, but he just watched and napped. I think some of those guys with KW signals use a dummy load for a receiving antenna. It's quiet but several missed Iowa . . . K0RW. Weather kept me from getting to the farm the first night and second night freak snow and ice storm almost kept me from getting there again . . . W8WEJ.

Is the sunspot cycle changing propagation on 160? The dipole worked better than the vertical. Please don't quit having the contest! . . . W0CEM. Will try a quarter wave kite or balloon next year . . . KA1S. How about antenna preamp articles for 160? Transmit is better than receive here—not a good situation but did have fun . . . K9OSH. First time ever on 160 meter mobile. I'll be back next year. Tnx to all who listened patiently for my 100 W signal . . . KA0ZFX/M. Thanks to all of those who stuck in there to dig out my weak signal . . . WD9IAB. Had antenna trouble on the first night. Enjoyed the challenge of trouble-shooting antenna to get station on the air . . . WB6EGE. Activity about 50% of last contest. Conditions fair to midnight—no east coast . . . W6PFE. Prior to the contest I had made only 2 contacts on 160!



Second world high CW K4TEA, operator of KP2A, having TEA to celebrate.

I discovered that "RF Bite" is a real phenomena! . . . AA5CH. My amplifier started arcing about 10 PM Sat. night, but I got it fixed in about 45 minutes and back on the air again . . . W4DMB.

At age 76 can't stay with it like I used to . . . W4TWW. Funniest story: my score! I thought retirement was supposed to be fun . . . W4TMN. Line noise too high to hear DX or weaker signals even on snake. Several stations (as far away as IL and VE3) told me I was the only Georgia station they had worked. One said he called Alabama for nearly 4 hours . . . K4JRB. New to contesting and 160 meters. Wonderful contest and had loads of fun . . . KM4GW. Worked everyone I heard—must need a pre-amp. YU1EQW was very patient with everyone! . . . AB4LX. Unfortunately this contest falling between ARRL contest, and my wife's birthday, precluded me from putting in more time. Always fun seeing old friends and new ones on the band . . . W3BGN. Was really surprised at the number of stations on considering the solar cycle. Did hear Nova Scotia and PEI so conditions were pretty good. Thanks for a fun weekend . . . VE7ERY.

I was very disappointed to hear only two other VE3 stations. It was a lot of fun, even if I lost my voice and the XYL is not speaking to me . . . VE3NXA. I'm afraid that fone contests are not my "thing," but use this log as another "pea for the pot" . . . VE3CUI. This is my first 160 meter contest ever. I finished putting up the inverted L coaxial antenna by flashlight and was late getting started, but still had a great time . . . W7EYE. DX conditions poor; everyone was on the high bands! . . . K3ND. Worked 90% of contest and found I was using 40 meter beam, in error. It loaded up. No wonder I didn't get out as good as I usually do . . . WF5E.

It was a good contest this year. Lots of new calls. We improved our antenna systems considerably, but found DX stations to be very few . . . KR9S. It was nice getting armchair copy reports in Wyoming from Virginia running only 100 watts on SSB . . . NQ7Q. Thrill working Wyoming (WC7S) on 160 M. with a 45 foot tower from NYC . . . W2JGQ. Wife and neighbors OK with new antennas now, but how do I convince SOL to lower his noise level? First night east coast couldn't hear me. Second night much better but fewer stations. See you next year, with a new rig and amp and more antennas. P.S.: Yes, Virginia, there is too a Wyoming! P.S.S.: What happened to Vermont, Conn., and KL7? . . . WC7S. 160 meters still the "gentleman's" band . . . WA9TZE. My biggest thrill was that this is the first SSB contest I ever

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1500W.

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The Barker & Williamson PT2500A Linear Amplifier is a completely self-contained table-top unit designed for continuous SSB, CW, RTTY, AM or ATV operation. Intended for coverage of all amateur bands between 1.8 MHz and 21 MHz. Two type 3-500z glass envelope triodes provide reliability and rapid turn-on time.

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

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Call or write factory for complete specifications.



1500W.

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Top USA phone Jerry Rosalio, WB9Z (ex-WB9HAD) at the base of his 160 foot insulated radiator. It has 120 radials using 16K feet of wire. He listens on a high inverted Vee and eight 1000 foot beverages.

entered, and I got a chance to compete against my Dad . . . KA1NNI.

My first contest (of any kind) and enjoyed it greatly! Using inverted V at 120 feet but no linear; hopefully by next year! Hearing USA much better than they heard us . . . VE6SWL. Wore out coax switch during exchanges; dipole was low noise favorite for receive but not after dawn. Fri. evening could hear better. Sat. doubled radials from 8 to 16 and picked up 3 new states from stations previously heard but not worked. Heard California but could not work. He had bad ears, probably using vertical for receiving . . . AG8Z/4. Freedom doesn't come cheap, but they shouldn't schedule Navy reserve drills on contest weekends . . . WI4R.

Soapbox DX Phone

It was very nice to be in a SSB contest on 1.8 MHz. Thanks to the PTT for the license to use SSB on 1.8 during the contest, and the use of 100 PEP input power. Normal is low PEP and only CW 1830-1850. Conditions were not so good. Will try to be back next year . . . OY0JD. Very poor conditions to USA this time, but still a good contest. See you next time . . . CT1AOZ. For the first time in my life, I entered a contest on 160 meters and enjoyed it a lot . . . PA0IJM. Really hard to get EA8XS for a new country . . . OK5TOP. We had a real great time during the contest, but had power supply problems. This seems to be typical of the voltage problems I ran into before on other islands. I think it's low voltage plus 50 cycles that our power supplies don't like. Ended up going on 12 volts from boat battery. Sure would be a great place for a solar power station. I also heard lots of DX stations from EU and S. America calling USA stations without the USA stations taking time to listen . . . K0GVBC6A.

My kite fell into the ocean after 2 QSOs . . . ZF2MV. It was good to hear DX signals, even if I couldn't work any of them . . . ZL3TX. First night conditions very good, but many signals

below the high noise level . . . A92BE. I didn't put in much time because CQing USA stations clobbered the whole band, leaving no room for DX . . . PJ9JT.

CW Multi-Op Station Crews

KY1H & KB1W, NS1M, N1ACH & K1EA, Net. NE1I & KA1NNI. W10P: N1AKO, W1GS, WA1JHV. W2GD & K2TW, KU2C, Net. N2NU & KZ2S, WA2IUO. N2GZL & W2REH. W2XL & WB2Q. KY2J & Packet. W3GM & KA3PIT, N2EA. K3IPK & Net. W3FV & Net. K3WW & Net. K3ND & Net. N4RJ & KM9P. K4UEE & Net. WB4GNT & Net. N4HOH & Net. N4XM & KD4U, N04R. AA4NC & Net. AA4V & N4SF. KB5UL & NU5M. W5MPX & W0TV. N6DX & AD6C, N6VR, NM5M, WT7F. N6LL & NN6L, WA6CDR, WA6OTU. WB6EGE: N6QC, WB6WPO, WB7DEG. K7QQ & K7SS. W7XR & KE7V, W7WA. KR7G & Net. K7LXC & K7HBN, K7QBO, K7WA. W0CD & K8GG, W8SEY, W8UVZ. N8EA & K8LX. AC8P & N8AAU. WD9INF & W8IQ. W8FN & Net. W8SDL & K4VYU, N88G, NZ8M, WB8RRR. W8WEJ & AA4VV, W8VVE, WA8SDA. KD9SV & KA9A. W9J00 & WD9EMM. W9AZ: AK9F, K9IFO, K9NR, K9ZO, KJ6R, WB9Z. W0AIH/9 & K0FVF, KM00. W0UN & K0RF. W0BXR: N2AWE, K9AYK, K9WA, N9OK, W9TW, KA8OVA, NU0G, WD0AZW. W00G & K4VX, KA9VAK. K0LIR: AA0A, KB0KK, KE0YO, W0HBH, WD0FPY. VE20J: VE2FLD, VE2SD, VE3GNW, VE3NJ. N4FD/C6A: N4FD, NQ4I, W1UA. UZ9CWA: UA9CGA, UV9CAF.

UL8CWW: UL7CC, UL7CT, UL7-028-271. JA9YBA: JA9VDA, JH9VSF, JA9-10148. JA3YKC: JG3MRT, JG3WDN, JH4RHF. JA7YAA: JJ3CNL, JH0ORW. JA0ZRY: JH0ILL, JP10GO, JR0BOD, JP1NOM, JQ10TD, JH9COQ, N. Inukai. JA7YTB: JA8-4847, JA8-5073. JE6ZAI: JF4ETK, JS1PWV. OH0AM: OH2BH, OH2HE, OH7JT. LZ9A: LZ2DF, LZ2WM, LZ2-E-44. OK5TOP: OK1AUT, OK1DFP, OK1DOK, OK1DQW, OK1DWX, OK1DXZ, OK1FCW, OK1FDY, OK1FOW, OK1JDX, OK2DFW, OL1BRA. OK3KAP: OK2BFN, OK3CZM, OK3PA, OK3PC, OK3TPV, OL8COS, OL8COZ. OK1KQJ: OK1DXS et al. OK1KZD: OK1DHJ, OK1FMU, OK1FOP, OK1FRR. OK2KHF: OK2BZY et al. OK2KBA: OK2PMA, et al. OK1KLX: Not shown. OK1KPU: OK1DXR, et al. OK2KJT: Not shown. OK2KHD: OK2EC, OK2FUN, OK2KHD. OK1KYP: Not shown. OK2KJU: OK2BDX, et al. OK2KRK: Not shown. OK10FM: OK1ALZ, OK1-22847. OK10PT: Not shown. OK1KCF: Not shown. OK3ROM: OK3CXS, et al.

DL0KF: DJ4FZ, DJ6TN, DJ7SW. DL6RAI & DL5MAE, DL7MAE. DL0FJ: DK4VP, DK8LN, DL4LV. DK6QX: Not shown. HG0D: HA0DR, HA0HG, HA0NAE, HA0NAR. I4EAT & I4IND. IK8EJN & I8IQM. PA3DQW & PA0ERA, PA3EYZ. PA3AUC & PA3BAS, PA3CLH, PA3DSB. LA5M: LA9VDA, LA9ZV. GM3IGW: G3IGW, G4MH, G4GLL, G3BBD. HB9CIP & HB9BLQ, HB9CXZ. YT2R: YU2DQ, YU2MM, YU2MY, YU20G. 4N2D: YT2DU, YT2VM, YU2FW. 4N2E: YT2LL, YU2EU, YU4YA. UC10WE: Nemiro, Vitkar, Taranov. UC1WWM: Griadovsky, Mihalochkin, Semeshko. UR1RWX: UR2RDJ, UR2RJ, UR2RRR. UZ6AXE: RA6AOS, UA6BGL, UA6-101-355. UZ10WZ: UA10IZ, UA10LT, UA10Z. UZ3RXX: UA3-151-170, UA3-157-4, UA3-157-609. UZ3XWB: RA3XA, UA3-127-200, UA3-127-204. UZ4AXQ: UA4-156-876, UA4-156-885. UP1BWR: UP2BAW, UP2BIL. UT4UXW: UT3UA, UT4UZ, UT5UGR. UB5IVD: Not shown.

Phone Multi-Op Station Crews

KY1H & Net. K11G & K1NG, KB1EM. K5NA & KU2Q, WB2Q. AA1K & Net. K3WW & Net. K3IPK & Net. K3ND & Net. WB4GNT & Net. KC4MJ & WA4CUG. WF2G: AB4HI, AB4MG, N4OWL. KA40DV, et al. N5KDA & N5JBZ. W5MPX & N5LXG. N6LL & K6PVC, WA6CDR, WA6DVG, W8TIF. WB6EGE: K16LP, N6QC, WB6WPO. NK7U & N7GPO, N17T. N7BHC & K7RJ, KA7GZH, WD0EFZ. KA7AUH & N7HJJ. NU8Z & K8AQM, KA8POW, KB8ECG, N8ABW, N8IVQ, NN8H, W88N. K8MJZ & W8JW. WB8K & W8JGU, WA8BIN, WA8RCN. WB8PHI & W8SJU. KR9G & WD0FLJ. W9J00 & WD9EMM. KR9S & K9GM, KR9R, WE9R. N0BSA & WB3LBD. W0CEM & AB0S, K0WA. KD00Z & N3DCT, KA0QBE, KA0UPF. K0LIR: AA0A, KB0KK, KE0YO, N0IS, WD0FPY. VP9AD & VP9IJ, W3MA. UZ9JWV: Klucherov, Dolvenkov, Dolbilov. UI9BWE: Belov, Gerner, Pankratov. LZ9A: LZ2DF, LZ2UA, LZ2WM. OK5TOP: OK1DFP, OK1DWX, OK1FUA, OL1BRA. G0KBB: G3XMZ, G3VMM, BRS-90717. UZ6AXE: RA6AOS, UA6BGL, UA6-101-355. UP1BWB: UP2BPY, UP2-038-728, UP2-038-2519. UB4QWW: RB5ORQ, RB5QW, UB5-064-1441. UB4IWS: Necaevsky, Noddubny, (T. & U.). UB4TXL: RB5TK, UB5TEC, UB5-079-369. UB5ZME & UB5-069-564. HK6LRP: HK6AUG, HK6BDX, HK6FIM, HK6KKK, HK6MKK.

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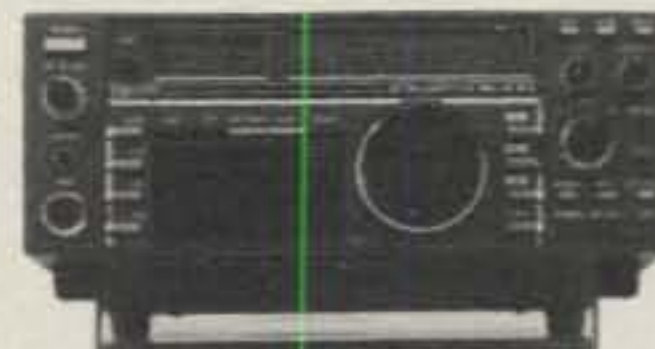
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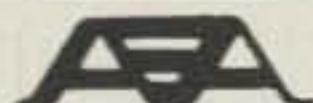
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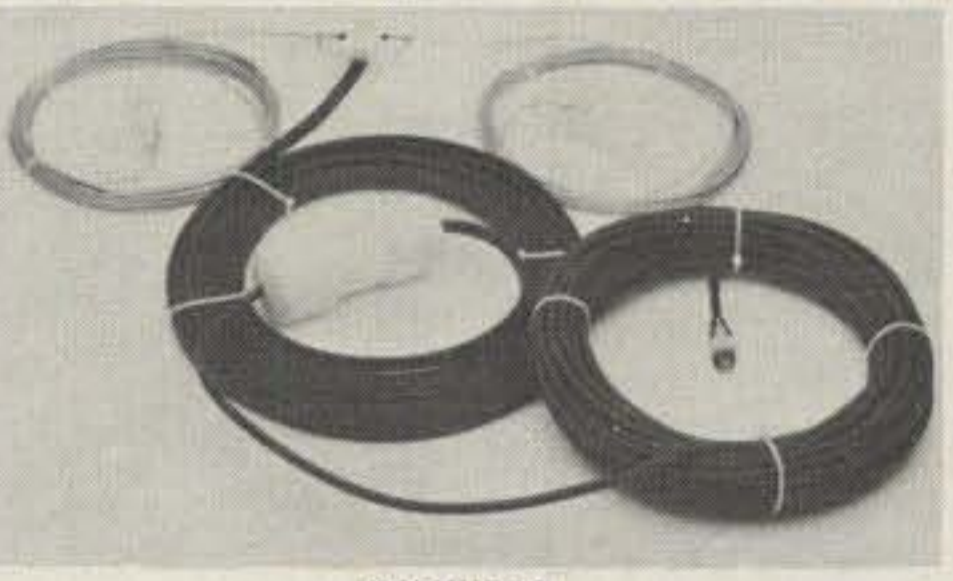
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Heil's Concept 2000 Audio Products

BY JOHN J. SCHULTZ* , W4FA/SV0DX

It seems that Bob Heil, K9EID, owner of Heil Sound, is determined to save us from transmitting dull-sounding, flat audio, especially on SSB. Well, I for one heartily agree with him that a lot of stations do have terribly undistinguished audio. I don't mean that everyone's audio should sound razor sharp to the point of being irritating, but a station's audio should be clear and articulate. I have worked quite a few stations where I have had to ask for repeats on simple things such as a name or QTH. This wasn't because of heavy QRM, but because of trying to "pull out" some information against a normal noise background while a station's audio had the quality of someone reciting a mellow lullaby.

Articulate audio revolves around voice control and the use of the right microphone. The former subject has hardly ever been addressed in amateur literature. However, being in the broadcasting business myself, I have worked quite a few amateurs who are or were professional announcers. There is no doubt that their years of voice training and practice make their SSB audio "stand out" regardless of the microphone, speech-processing device, or transceiver they are using at any given moment. I don't suggest that radio amateurs go in for professional voice training! Make a simple tape recording of yourself as you talk in a relaxed, conversational manner and then try to switch to a voice quality emphasizing the calm-sounding but urgent conveyance of an important message. The range of control you can achieve over your voice quality is quite amazing. I definitely do not suggest trying to sound artificial, but I do suggest trying just a bit to learn to control your voice emphasis.

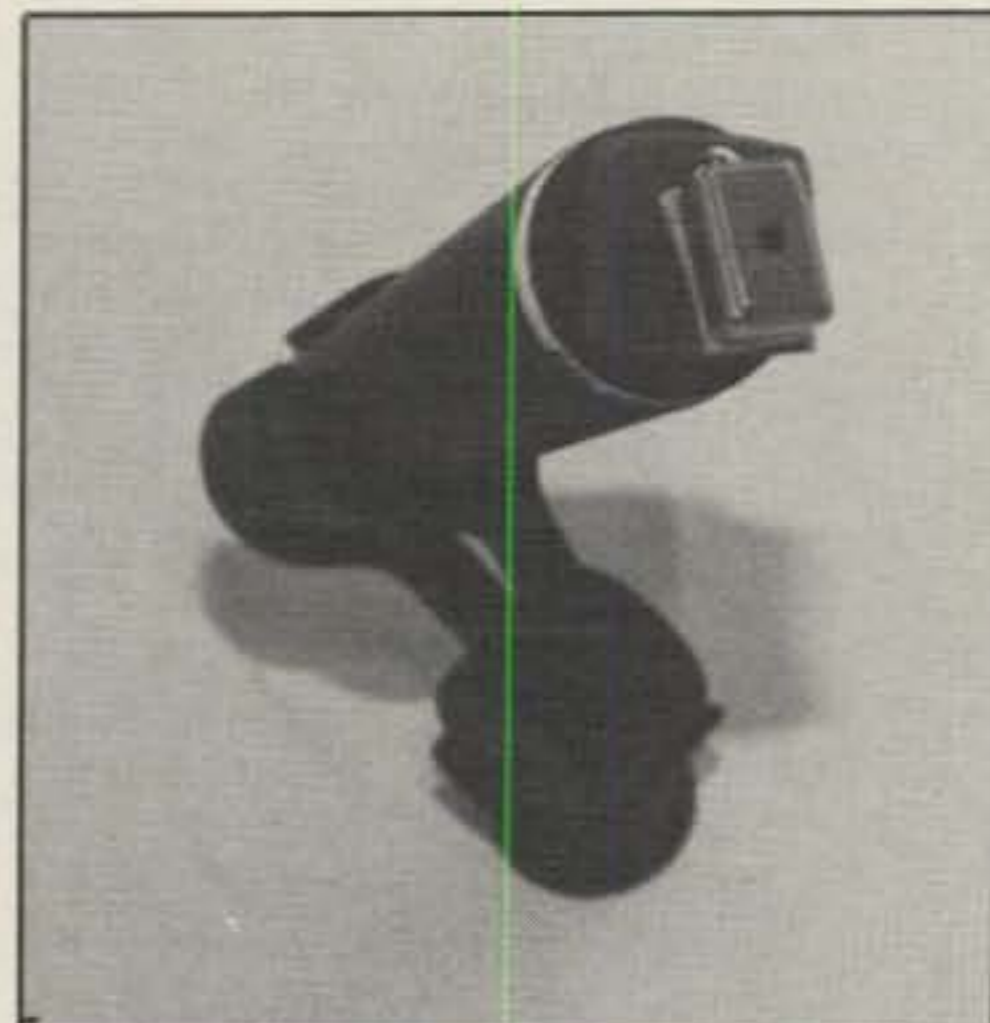
Most of us need the help of the right microphone for really clean, articulate SSB audio, and that is where the Concept 2000 of Heil Sound comes into the picture. Heil's Concept 2000 is a coordinat-



The HM-10 microphone with its included stand adapter.

ed line of microphone enclosures, microphone elements, microphone-enclosure mounting booms, and accessory items that will interface easily with Kenwood, ICOM, Yaesu, and Ten-Tec transceivers. It is planned for the line to evolve into a wide range of items, but at the moment it's starting up with some fundamental items such as the new HM-10 microphone, the FS-1 footswitch, and AB-1 microphone boom.

I guess Heil wanted to indicate right away that the HM-10 is new and special. It doesn't arrive in the usual cardboard box, but in a vinyl plastic carrying case which has a separate partition with formed foam plastic lining for the microphone and another compartment for the microphone cable and a stand adapter. The microphone is about 6½ inches long and of the usual ball-type appearance. But don't compare it to the plastic cheapies. The microphone housing is 100% professional in construction and is all metal. It has an excellent weighted



An inside view of the HM-10 if you unscrew the top "ball" from the microphone housing. In this case an HC-5 element is mounted on an internal foam plastic "cushion." There is sufficient space to mount both HC-4 and HC-5 elements within the enclosure.

feel to it if you use it as a hand-held unit. The overall finish is a beautiful satin black. A slide switch functions as a PTT switch, and the recessed connector on the end of the housing is a professional four-pin Cannon type.

The top "ball" of the microphone screws off from the body, and you can see which microphone cartridge is installed. The microphone can be ordered with either the Heil HC-4 or HC-5 cartridges installed, or on special order with both cartridges installed. In the latter case, external switching is normally used to choose which cartridge is in use. The HC-5 is a full-range element rolling off below 300 Hz and has a +6 dB boost at 2100 Hz. It provides clear, articulate speech for those who would like to get away from the mushy sound of most standard microphones but yet don't want a distinct, punchy DX type of audio. The latter is supplied by the HC-4 element. Its response rolls off below 600 Hz and it has a +10 dB boost at 2100 Hz. My clear favor-

*c/o CQ magazine

ite is the HC-4, although I must admit that I modified my original HM-10 to include an HC-5 element in order to cover all situations.

The HM-10 comes with a 7 foot long mating cable assembly with a Cannon connector at one end and a transceiver microphone connector and female 1/4 inch connector at the other end. The custom cable assemblies are color coded (ranging from red for Kenwood to white for Ten-Tec) and are completely ready to be placed into service. The switch on the HM-10 is wired for PTT, and the microphone cartridge is wired straight through in case VOX operation is being used. The HM-10 does have an internal 1 mF capacitor wired in series with the cartridge to accommodate transceivers (e.g., ICOM) which carry a DC voltage on their microphone lines.

The 1/4 inch female connector at the transceiver end of the cable assembly is to accommodate a foot switch for the PTT line in a transceiver. As you might guess, Heil does supply a footswitch, the FS-1, ready to be plugged in and used. The FS-1 measures about 3" x 3 1/2". It's large enough to be readily located, but yet not large enough to become an obstacle under the operating position. I found it comfortable to use and not at all tiring to hold down for extended transmission periods. If you look inside the FS-1, you'll find a microswitch and a spring for tensioning. I suppose you could modify or replace the spring if you wanted to achieve a specific "feel" for the footswitch. The switch is rated to handle up to 1 ampere at low voltages. It comes with a 7 foot shielded cable terminated with a 1/4 inch phone plug. The footswitch, by the way, is also of all-metal construction and should easily stand up to very rough usage by even the most avid contester.

The AB-1 adjustable boom complements the HM-10 microphone. The boom is a streamlined type composed of two telescoping tubing elements with an adjustable mounting flange at the end of the larger piece of tubing. The table mounting flange is unique in that it can either be used as a clamp-on mount on the side of an operating table, or the stud screw associated with the clamp-on mount can be removed and the flat base, with its three screw holes, screwed or bolted directly to a tabletop. The boom will swivel 180 degrees in either the horizontal or vertical plane around the base flange. The tension of motion in either direction is adjustable.

The telescoping boom itself measures about 25 inches when retracted and can be extended about another 9 inches. The 25 inch retracted length is rather generous, but it can be shortened easily down to any desired length with the minimum being about 13 inches. This is done by removing the smaller telescoping tube and



The custom cable assembly (brand of transceiver must be specified) which comes with the HM-10 microphone. The cable assembly already has provisions for mating together with the optional FS-1 footswitch (shown on the right).

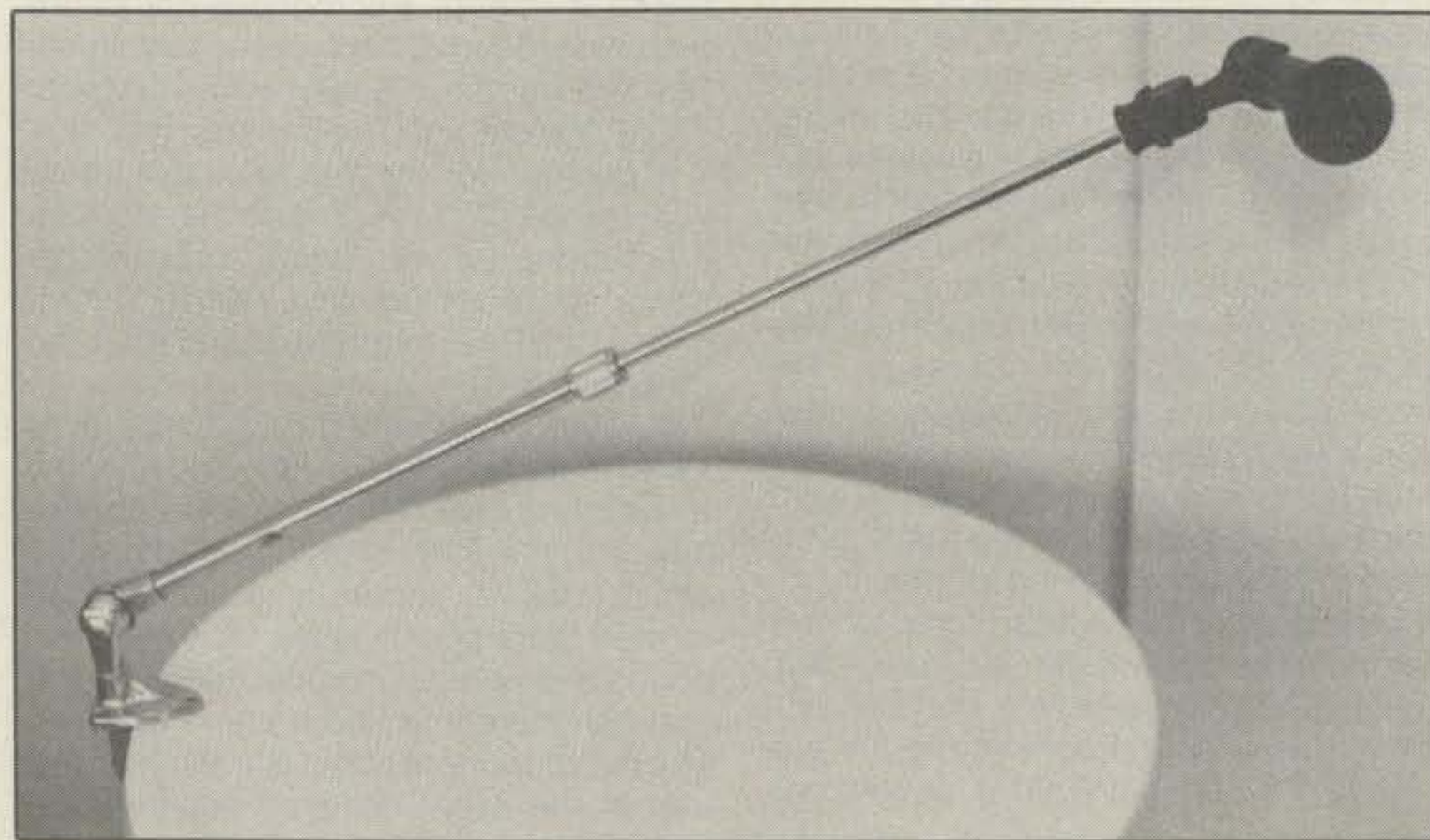
cutting it down to size using a regular hacksaw. The cut end of the smaller tube disappears into the larger tube so you need not worry about the appearance of the cut end of the smaller tube. If the smaller tube is cut down to the 13 inch minimum, it can still be extended 9 inches from the larger tube leaving quite a margin of length adjustments. The outward end of the small tube contains standard threading which mates with that on the stand adapter supplied with the HM-10 microphone. So between the swivel action provided by the stand adapter and the adjustment possibilities provided by the AB-1, you can have a microphone properly positioned for close talking whether you wish to work closely over the operating position or lean back in a chair while enjoying a really casual QSO. Compare that with photographs of operators bent over a desk microphone or awk-

wardly lifting up a desk microphone so they can sit back in their chair and be comfortable!

The photographs illustrate the HM-10, FS-1, and AB-1 units, but probably do not convey sufficiently the very good construction quality of all of the units. They are built to last.

As I mentioned before, the HM-10 microphone comes with a customer-specified cable assembly for a given brand of transceiver. You just plug the cable assembly between the microphone and transceiver and start to operate. I tried out the HM-10 with a Kenwood transceiver and it worked perfectly.

I modified the HM-10 to include both the HC-4 and HC-5 elements. Normally you would externally switch between the elements. However, since I was using the FS-1 for PTT rather than the slide switch on the HM-10 for PTT, I rewired the switch



The HM-10 microphone mounted on the AB-1 adjustable boom. As discussed in the text, the swivel mount on the AB-1 plus the flexibility of the HM-10's stand mount adapter allow the microphone to be positioned in any desired operating position.

(a SPDT type) so it could select either the HC-4 or HC-5 element. After many on-the-air tests I concluded that this was just about the *ideal* microphone arrangement. I normally used the HC-4 element, but when signals were very strong or when another station commented on my rather sharp audio, I switched to the HC-5. A nice thing about the construction of the HM-10 is the screw on/off feature of the front part of the "ball" on the microphone. If an "HC-6" element should become available some time in the future, it would be an extremely simple matter to exchange it for one of the other elements.

The HM-10 comes with a foam plastic windscreen which can be placed over the microphone ball in case syllabic sounds are a problem. It works, of course, but use of the screen detracts considerably from the appearance of the microphone. I much preferred to screw off the front part of the microphone ball, and I inserted a small piece of 1/2 inch thick foam plastic in front of the microphone element(s).

I have long been a fan of using microphone booms instead of rigid microphone mountings. About all I can really say is that if you haven't used a boom support such as the AB-1 before, you are in for a pleasant surprise. The comfort factor goes up by a factor of at least ten times, and the ability to position a microphone in front of you where you desire it to be allows you to "work" the microphone for optimum speech effectiveness. There is just no way you can breath properly and fully while hunched over a microphone as compared to maintaining a reasonably upright posture.

Just as this article was finished, Heil announced that the HM-10 with both the HC-4 and HC-5 elements installed will become a standard production item named the "Dual 10." Both elements are mounted on a PC board inside the microphone housing, and a small toggle switch located above the PTT slide switch will select either element. The unique system of different colored, pre-wired cable assemblies for different brands of transceivers remains the same, except that a cable for Collins equipment will also be available.

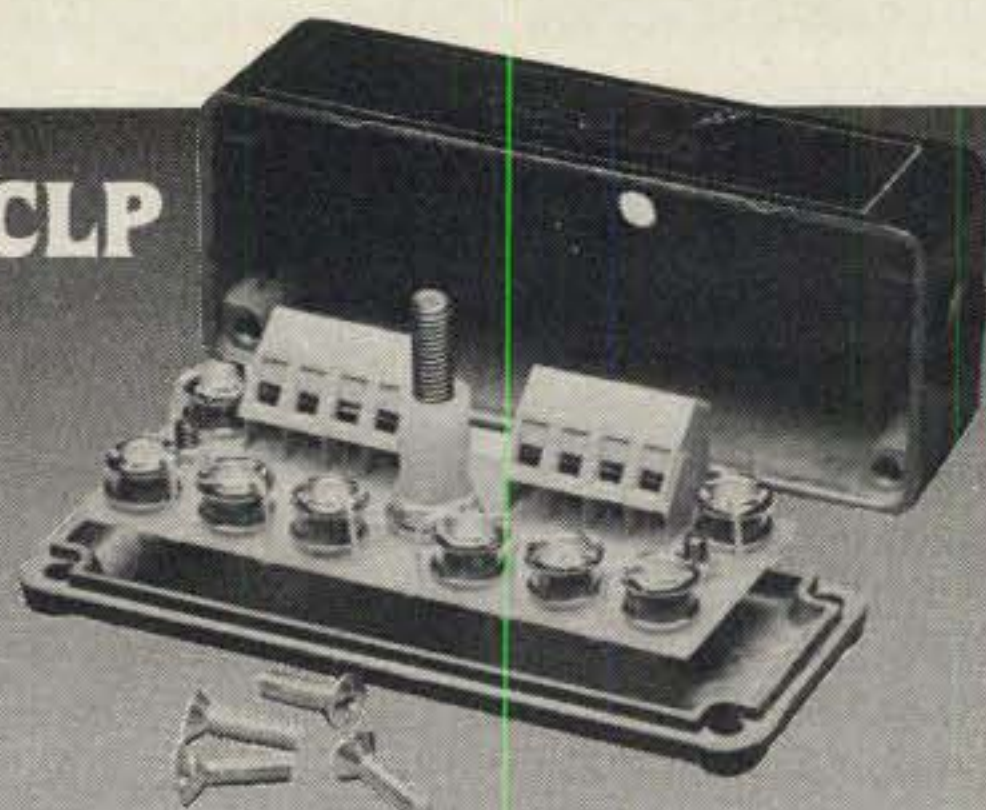
I think Heil is off to an excellent start with their Concept 2000 audio products. The first few items, as just described, are of excellent quality and directly address the needs of amateur operators. It surely will be interesting to see how Heil expands the Concept 2000 line.

The units are priced as follows: HM-10 mike (with standard HC-5 mike element; specify which rig it will be used with so correct cable will be supplied) \$79.95; AB-1 boom \$65.95; FS-1 footswitch \$22.95; Dual 10 (with standard HC-4 and HC-5 elements; again specify rig for cable choice) \$119.95; additional cables \$19.95 each. The units are manufactured by Heil Sound and are available direct or through distributors.



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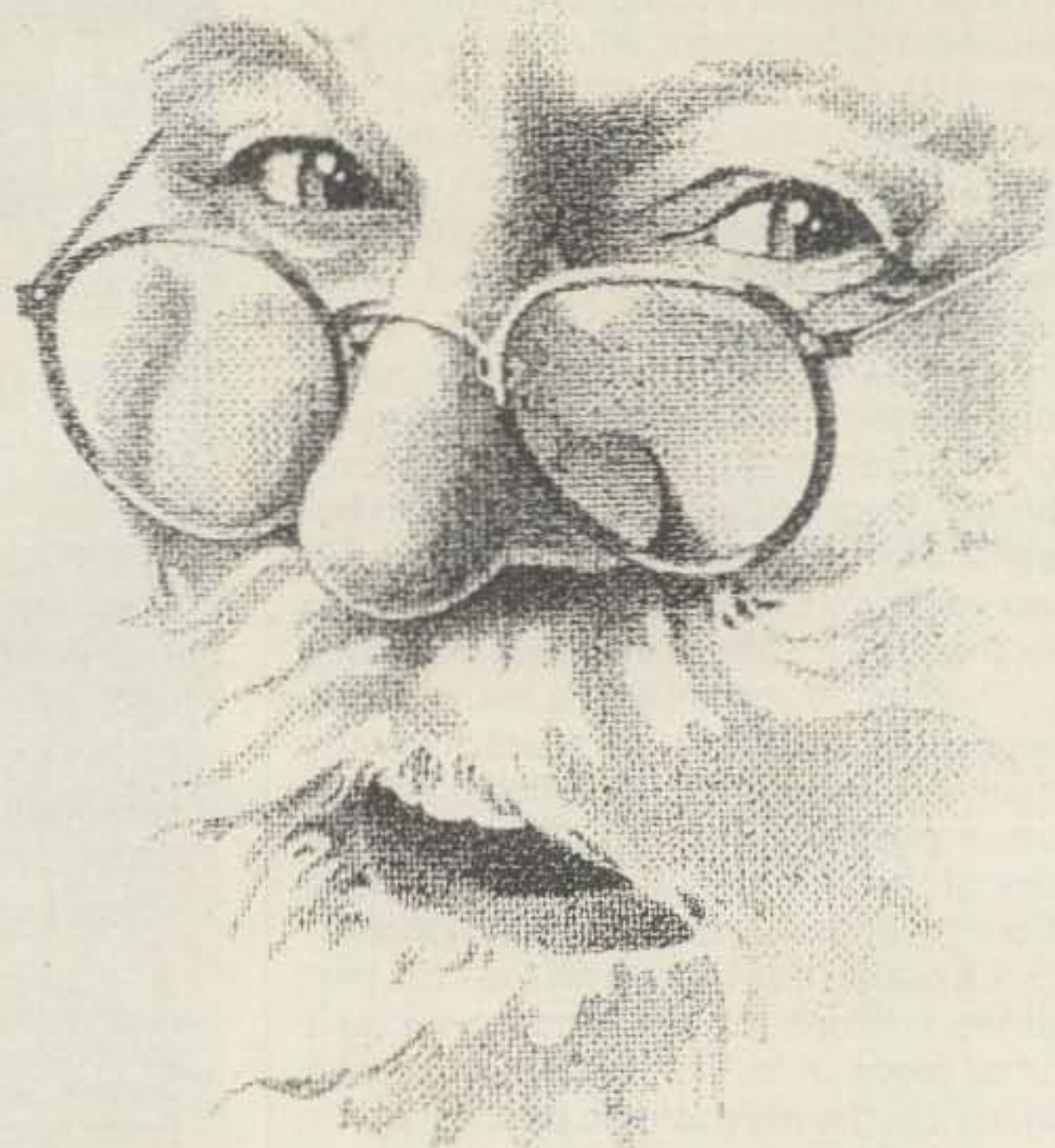
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Where did the local repeater Santa Claus come from? Well, it was no accident, and it makes a great club project.

“Hello, Santa Claus, Over...”

BY W. MAX ADAMS, W5PFG**



“Hello, Santa, this is Cindy. . . .” The local repeater hardly had time to complete its courtesy tone “beep.”

“Ho! Ho! Ho! Hello, Cindy. This is Santa Claus at the North Pole!”

You do not have to be standing in the presence of Cindy to see the amazed joy in her eyes. It also shines in her voice during each transmission.

Where did this local repeater Santa come from? Well, it was no accident. It takes a bit of planning, time, and money—all in the spirit of Christmas and amateur radio. I am sure that this is performed in many places, and for those of you who wish to bring joy to some children to whom Christmas is just another day, the reward is priceless.

You start by contacting the various “assistance agencies” in your community, compiling a list of children (and families) who are physically and/or financially handicapped. The list is then edited and filtered to a reasonable size for execution by the local amateurs who volunteer their time, etc.

Next you call by telephone and explain the procedure to a responsible adult member of the family and request an appointment for an eyeball QSO to gather simple details about the child, or children, of the family. The details needed are names, ages, color of clothing (which will be worn during the “surprise” visit), favorite pet’s name, etc. These details are used to fill out a “gouge-card” about each individual child. Finally, you make an appointment for Santa’s helpers’ visit and QSO shortly before Christmas.

Santa Claus can stay home with convenient operating facilities and a complete set of gouge-cards. Repeater “listeners” should be aware of what is happening so that no unnecessary transmission(s) spoil the show. Their monitors and scanners should be isolated from listeners in homes with small children; let them learn about Santa another way! The mobile crew goes to the appointment, tests handie-talkie communications, gets all the “cryptic” signals straight, then knocks on the door. The door is quickly opened.

“Hello, Cindy (or Butch, Margie, etc.) is anxious to talk to Santa Claus. Please come in!”

A speaker-mic equipped, handie-talkie control operator “breaks the ice” by explaining amateur radio to the entire family. A second talkie across the room provides a convincing demonstration (on simplex) that it really is two-way communication to another station.

“Cindy, how would you like to call Santa Claus at the North Pole?”

Cindy’s answer may come as a distrustful sideways glance at the stranger in her home, while enjoying the passification of her left thumb buried in her mouth.

“Uh-huh!”

“Well now, let’s see if I can get through to Santa!”

“Hello, North Pole. This is Cindy calling Santa Claus, over!”

“Ho! Ho! Ho! Hello, Cindy. This is Santa Claus. How are you this evening? Are you being a good girl?”

The speaker-mic (after the demonstration) offers no problem to quick-learning children, especially when it is held in the thumb-sucking hand.

“Uhh . . . Hello, Santa. Uh-huh!”

“Well now, I hear that you have been

real good. Are you ready for Christmas? I’ll be in my sleigh soon. What would you like for me to bring you?”

“Santa Claus” uses his gouge card to prompt his remarks, and “wings it” according to Cindy’s responses.

Several years back I was outside sitting in the car as a back-up Santa just in case we found the appointment QTH in a micro-volt-grabbing hole which did not allow “solid, full-quieting” repeater contact. John, WB5ILR, not only looked like Santa, but sounded like and had the charisma of Santa!

“Well, Cindy, I know your puppy dog Spot is there with you. Tell me, what kind of dog is Spot?”

“Gee whiz! If you know my puppy dog’s name, Santa, how come you don’t know what kind of dog he is?”

Like I said earlier, Santa must be prepared to “wing it”! I do not recall Santa John’s reply, but later when the crew stopped laughing and returned to the car, the conversation centered on the joy that Cindy exhibited with happy-eyed looks to everyone in the room.

Later another of Santa’s helpers delivered Cindy’s Christmas gift (this is often accompanied by an appropriate Christmas tree, should the family not have one) for Cindy to “find” on Christmas morning. Other children in the household should not be forgotten and should receive a small “I haven’t been left-out” present.

Other hams who for various reasons cannot physically participate—as well as local businesses, clubs, etc.—can provide gifts or cash donations.

Try it. It is a fantastic club project. I do not have to tell you the memories I will always carry with me, especially “. . . how come you don’t know what kind of dog he is?”



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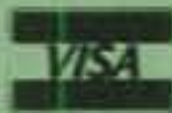

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In Part II of this series we complete the receiver portion of the transceiver and tune in some 30 meter signals.

The 30 Meter Fun Machine

A Superhet 30 Meter QRP Transceiver

Part II

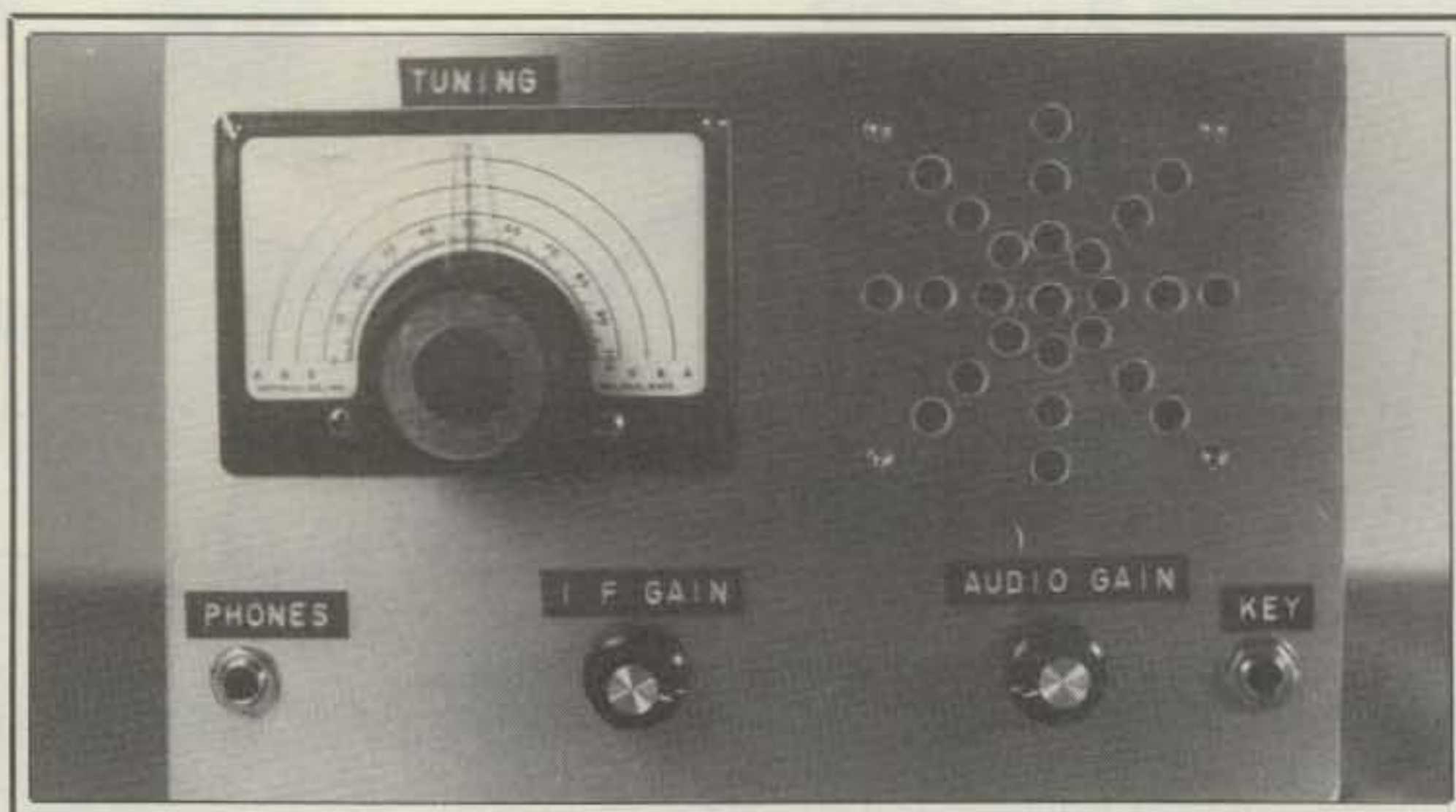
BY PAUL D. CARR*, N4PC

Last month I described the receiver section of our little QRP rig, and we began construction by building the audio section and the sidetone oscillator. By the end of this month's session you will have a fully functioning 30 meter CW receiver, and you will be copying off the air! Are you ready? Here goes.

Although I did not specifically state it, my philosophy for building a receiver is to start at the speaker and work my way stage by stage toward the antenna. This technique allows you the satisfaction of knowing that each stage is properly working before continuing to the next stage. Following this technique, when you reach the antenna you will hear signals off the air.

The first stage for construction this month is the IF/Product detector. (Refer to fig. 1, Part I, for schematic.) Again, the modified "ugly technique" will be used. Prepare another Radio Shack dual circuit board. One half of the dual board will be used for the IF/Product Detector and the other half for the BFO/Heterodyne Oscillator.

First, the IF/Product Detector. Clean the pads with very fine steel wool and cover the holes with plastic electrical tape. Next mount an 8-pin mini DIP socket with pins 4 and 5 at one end of the circuit board. Wire the IF section as indicated on the schematic, keeping the component leads short. Components can be mounted vertically or horizontally as long as the leads are reasonably short. The MC1350P will provide about 30 dB of gain and about 60 dB of gain control, so any extraneous signal that gets into this stage will find its way into the speaker whether



Front view of the 30 meter QRP transceiver. The front panel was fabricated out of printed circuit board material. The dial is an old National MCN. You can dress up the unit to suit the materials you have or to suit your taste. The big thing to remember is that it's fun to build and it works.

you like it or not! Next mount the SBL-1 on the end of the circuit board opposite the IF amplifier. I mounted the SBL-1 in the "dead hug" fashion (pins up), and I glued it to the board with silicon rubber cement. Watch for shorts.

The broadband transformer can now be mounted connecting the IF amplifier and SBL-1. This circuit board can be soldered to those pads which require a chassis ground. With my rig I mounted the audio board at the right rear of the chassis and the IF/Product Detector board adjacent to it toward the middle of the chassis. Before mounting this board check for wiring mistakes and solder bridges. If you like, you can also apply +12 volts and check bias levels.

The next step is the BFO/Heterodyne Oscillator. We will end up with two results for this phase of construction. We will have the BFO/Heterodyne Oscillator and will use this oscillator to select the crystals for the crystal filter.

Prepare the second half of the dual circuit board for construction as before, and build the oscillator circuit as indicated on the schematic. After checking for wiring errors, mount the completed board on the chassis in front of (toward the front panel) the audio board. Number the crystals with a felt-tipped pen. Connect a frequency counter to the secondary of the output coil. If a frequency counter is unavailable, connect a clip lead as a temporary antenna and tune a receiver to 18

*Rt. 5, Box 212, Jacksonville, AL 36265

MHz. Choose a crystal and temporarily solder it into the circuit and against the output capacitor for maximum output. Next note the output frequency from the oscillator. Repeat the process for the remaining crystals, recording the output frequency each time. Choose the highest frequency crystal to use in the crystal filter.

Now check the output across a 50 ohm load using an oscilloscope or a VTVM with RF probe. The output should be .6-.7 volts RMS or about 1.7-2.0 volts P-P. Is everything working properly? If not, find out why. Check bias levels and look for wiring errors.

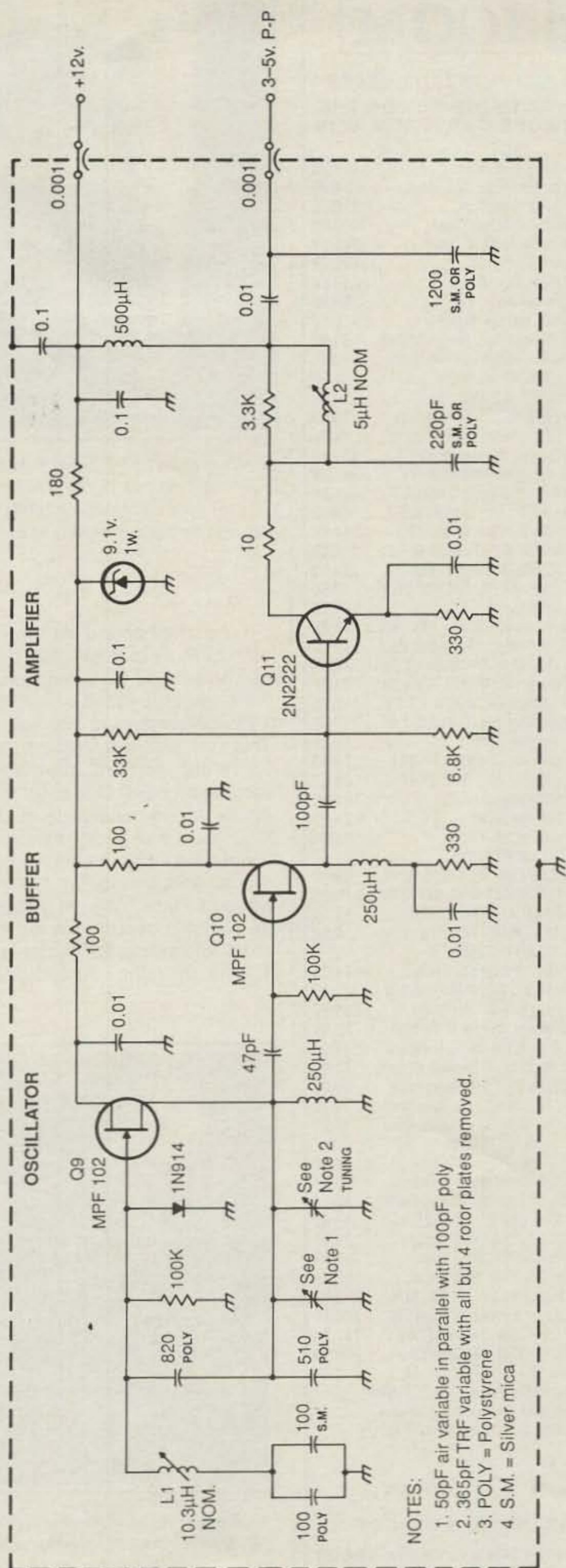
Now connect the output of the BFO/Heterodyne Oscillator to the product detector and test the receiver from the IF stage to the speaker. Lightly couple the output of a DIP oscillator tuned to 6 MHz to the input of the IF amplifier (pin 4 of the MC1350P). You should be able to hear a clean audio tone in the speaker or headphones. You should be able to control the output level with both the Audio Gain Control and the IF Gain Control. Does your IF strip work properly? If not, find out why.

One note before continuing: If you do not have access to a dip oscillator, all hope is not lost. Use one of the crystals set aside for the crystal filter in a test oscillator. You can use the same schematic as the BFO. Be sure to include a capacitor to "pull" the crystal slightly, because what you hear is the difference in the test oscillator and the BFO.

The VFO construction can come next. This is the greatest challenge and the most critical circuit in the entire transceiver. This circuit was developed by Doug DeMaw (another devoted QRPer to whom the fraternity owes many thanks). My circuit was patterned after the one that appears on page 37 of *Solid State Designs for the Radio Amateur*. This book is one that should be in the library of every serious experimenter, and it is available from ARRL headquarters in Newington, Connecticut. This is the only place where a home-fabricated circuit board is used, and this is the way I etch the board.

First copy the board pattern. Next cut a piece of *single-sided* glass epoxy circuit to size. Cover the board with masking tape. Place carbon paper over the board and trace the pattern onto the masking tape. Next cut the masking tape with a hobby knife or razor blade. Remove the masking tape, exposing the copper to be removed by etching. Now take an eraser or similar object and press down firmly on the masking tape to seal the edges to the circuit-board material. (This keeps the etchout from creeping under the masking tape and ensures clean lines.) This board is now ready for etching.

Fig. 3- The VFO portion of the 30 meter QRP transceiver.





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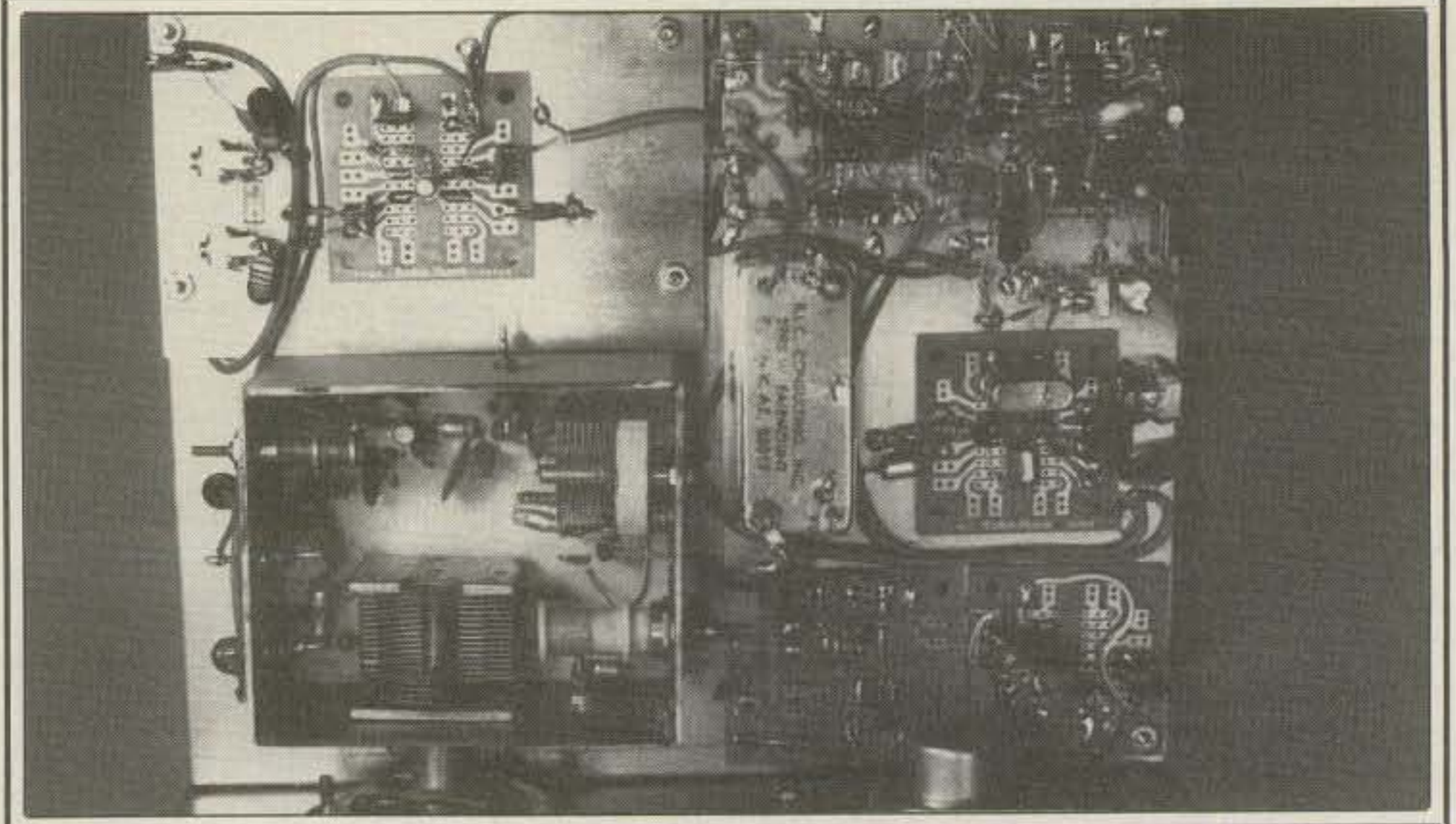
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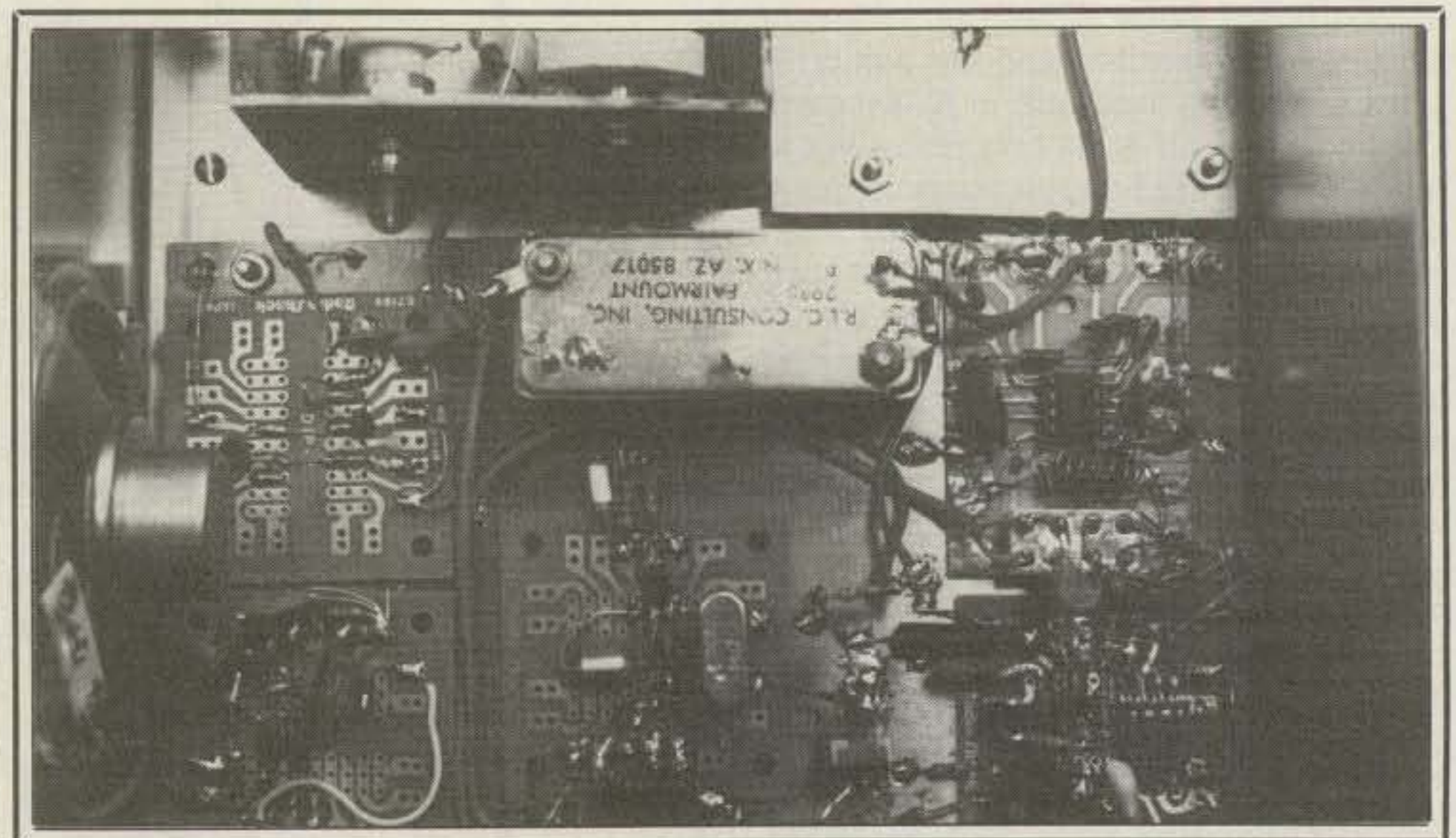


Looking down into the transceiver. At the upper left corner is the mixer circuit. The lower left corner contains the VFO. The right side of the chassis has the IF, Audio, Crystal Filter, Crystal Oscillator, Sidetone, and AGC. The Crystal Filter shown in this version has been replaced by a unit to be described in a subsequent part (see fig. 5).

I use a half-pound margarine tub as an etch tank. First take a two pound coffee can and cut a hole in the side. Place a 40 watt light bulb in the can and extend the 117 volt line through the hole in the side. This light bulb provides a heat source to warm the etchant, thus speeding the etching process. One other thing you are going to need is wooden tweezers (the kind that is used in photography dark-room work). Remember the etchant is a dangerous chemical and must be treated as such. Place a plastic tablecloth or other similar covering over the workshop stool and place the coffee can on top. Turn on the light bulb and place the mar-

garine tub in the open end of the coffee can to use as a stand. Be sure there are no trip hazards around this location—*safety first*. Pour enough etchant into the margarine tub to cover the circuit board. Be careful not to get any etchant on your tools, because rust will form almost immediately.

Next place the board in the etch bath and stir periodically with the wooden tweezers. Inspect the board during the process to check the progress. Remove the board as soon as the unwanted material is removed and wash with *large amounts* of soap and water. The masking tape can now be removed. Wash the



A closeup view of the main portion of the receiver. Top, left to right: Sidetone, Crystal Filter, IF/Product Detector. On the bottom, left to right: AGC, BFO/Heterodyne Oscillator, audio circuit. Note: The Crystal Filter shown in this view has been replaced by a homebrew version described in fig. 5 and the text.

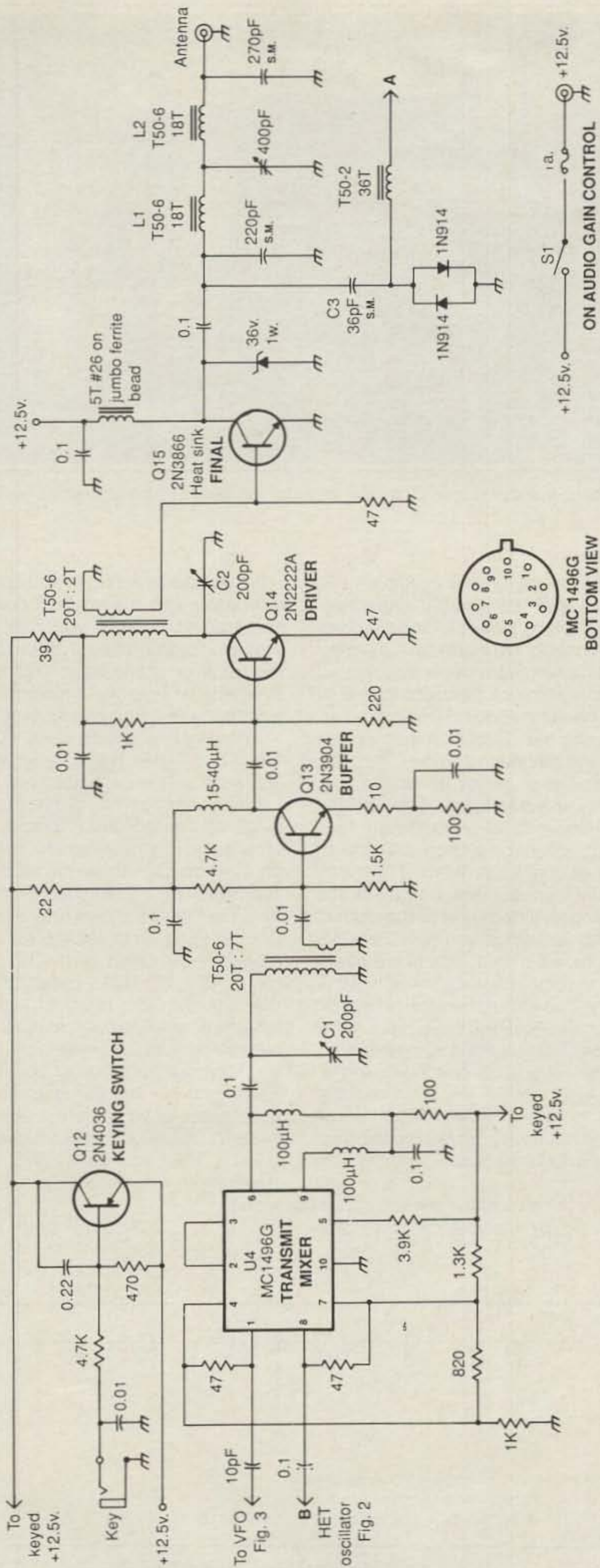


Fig. 4— Schematic diagram for the transmit mixer, power chain, and keying switch.

board thoroughly with soap and water. Pour the etchant back into the bottle (use a plastic funnel) and clean up the work area. The board can now be drilled for component placement. The etching process is really not too difficult. It is harder to write about than it is to make the board.

Most of the parts are mounted on the printed circuit board; however, the coils and calibration capacitor are mounted on the walls of the enclosure. This enclosure is made from pieces of circuit board soldered together. Be sure all components, especially the frequency determining circuits, are mounted firmly. Remember, any vibration will translate into a frequency shift. This cannot be accepted.

After the circuit has been built and checked for wiring mistakes, apply +12 volts and check your results. Connect a frequency counter and check the output for stability. With the tuning capacitor fully meshed, adjust L1 for an output of 4.1 MHz. Next tune to the high end of the band and adjust the indicator in the output section for maximum output (3-5 volts P-P). If the output is lower or higher, stop and find out why. If the output is below 3 volts P-P, proper mixer operation cannot be attained, and a voltage above 5+ volts P-P can damage the mixer. Band

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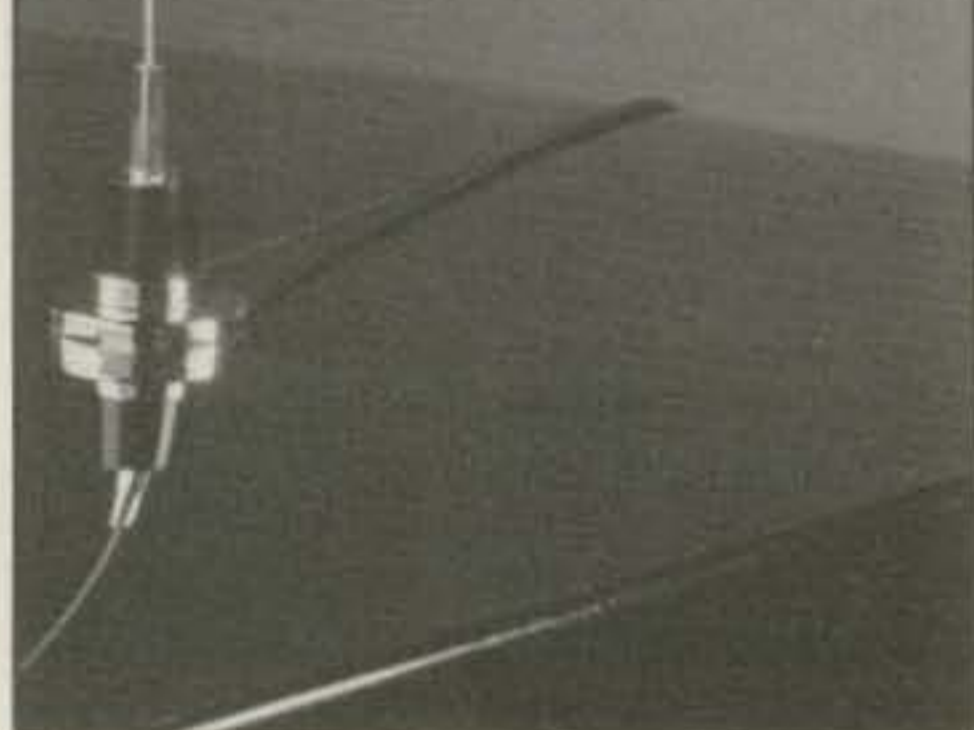
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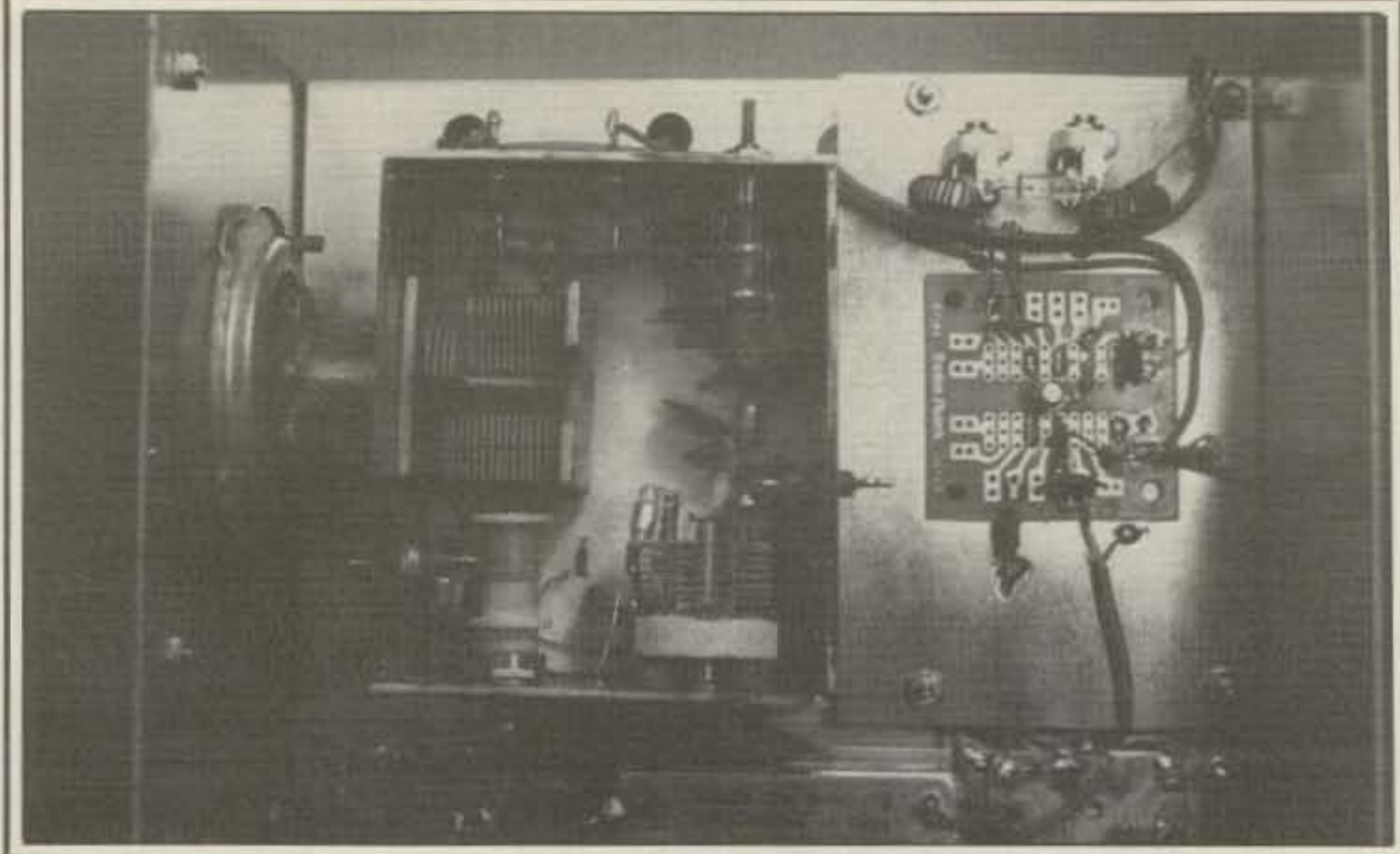
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A closeup view of the VFO (on the left) and the Mixer board shown to the right.

spread can be adjusted by juggling the value of L1 and the trimmer capacitor. Remember, always check for rigid component mounting. No vibrations, please.

The remaining circuits are going to seem like a piece of cake compared to what you have just done. First the mixer. Prepare another Radio Shack circuit board as you have done before. Wire the mixer circuit as shown on the schematic, check for wiring errors, and install behind the VFO. Connect the VFO to gate two; temporarily connect a good antenna to the input of the Butterworth filter, and temporarily connect the output of the mixer (using shielded wire) to the input of the IF amplifier. What you now have is a superhet receiver that acts like a direct conversion receiver since there is no IF selectivity. You should be able to hear 30 meter signals. Peak the capacitors in the Butterworth filter for maximum response. If you desire, you can now build and install the AGC circuit. The 50 K variable controls the point where AGC action starts, and the 5 K variable should be adjusted for a DC output of 5 volts with no input.

The only thing remaining is the crystal filter (see fig. 5). I saved this discussion

until now, because when you are building a receiver with a homebuilt crystal filter and trouble occurs, you may be hard pressed to determine if the trouble is in the receiver or the filter. This technique avoided that potential problem since you already have a functioning receiver.

This filter is known as a "Conn" or "mini-loos" filter. It was designed by Wes Hayward. All the capacitors are the same value. I constructed my filter on a small piece of printed circuit board material. Mount the crystals upside-down, leads up. Glue crystals to the circuit board with superglue or an equivalent compound. Wire the filter as shown on the schematic (fig. 5). High-value resistors (1/4 watt, 1 megohm) are used as the tie points for the input and output capacitors. Install the filter in the receiver using *short* lengths of *shielded* wire. Adjust the crystal trimmer capacitor to place the carrier on the proper position of the filter skirt. Your receiver should now sound like a great piece of equipment, because it is.

Don't those 30 meter signals sound great?! Next month we will build the transmitter, and you will be talking to the world.

(To Be Continued)

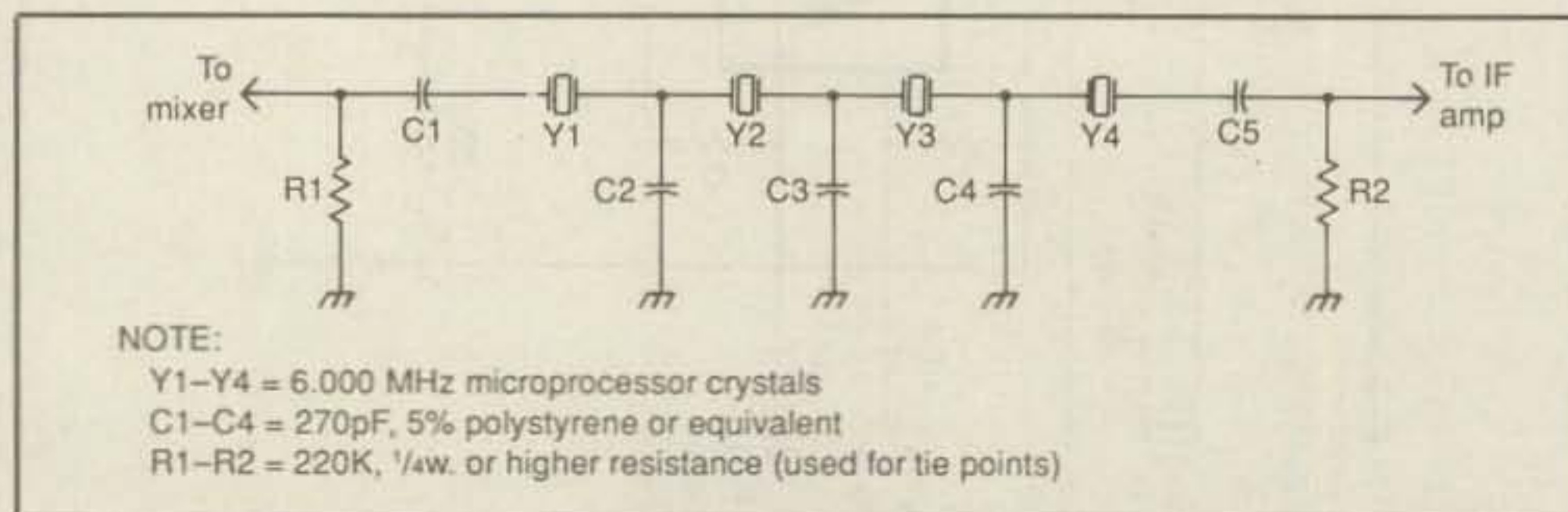


Fig. 5- The homebrew crystal filter.



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A few simple tools, a few hours, and a few bucks can put you on three bands as W1ICP explains in his latest article.

One-Element Rotary Antennas For 28, 25, or 21 MHz

BY LEW McCOY*, W1ICP

Many years ago I described an antenna for 21 MHz called "The One-Element Rotary." That antenna was built by many amateurs who used it with great success. The reason for the antenna's popularity was that it was directional, simple to rotate, an excellent match for 50 ohm coax, and was dirt cheap to build.

Recently I was looking for an antenna that I could throw together and use on the 25 MHz band. I calculated the dimensions for a one-element rotary and put one up. It has worked like a charm, so I decided to describe the construction of the antenna and at the same time include specs for 10 and 15 meters, in case one of these happens to be your choice of band.

Before describing the construction, I feel a word or two is in order about the matching system. The one-element rotary is essentially a half-wavelength dipole that can be rotated, taking advantage of the inherent figure-eight pattern of such an antenna. The nominal impedance of a half-wavelength dipole is on the order of 70 ohms. If a dipole is shortened slightly, the impedance becomes lower, reaching approximately 50 ohms, but slightly reactive—capacitive reactance to be exact. All we need do is cancel out the reactance to bring the antenna to resonance, and we end up with an antenna that is perfectly matched, 1:1 SWR, across good portions of the bands. The SWR is much less than 2:1 across the 25 MHz and 21 MHz bands and does very well on 10 meters.

Normally, shortening a dipole will degrade the performance of the antenna, but in the case of these dipoles for the three bands, the shortening is so slight that the losses are not worth considering. It is very surprising how well a rotatable dipole works. You only need to rotate the

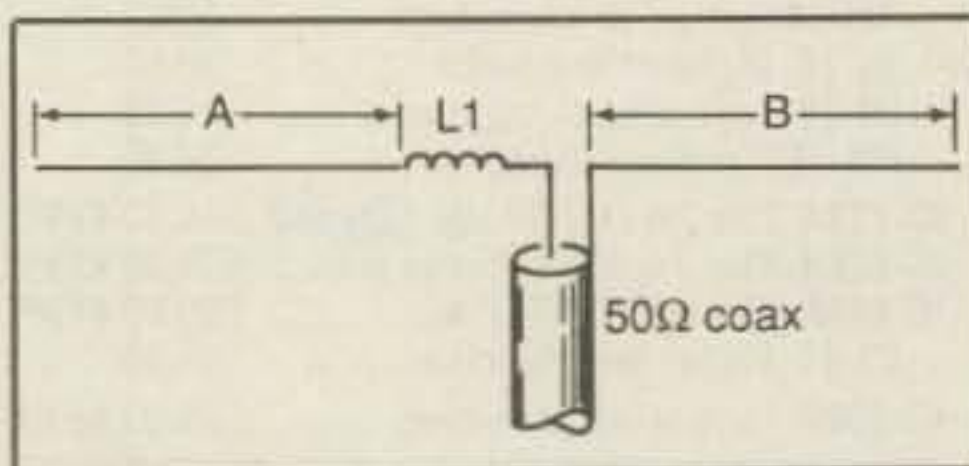


Fig. 1—Combination electrical and mechanical drawing of the one-element rotary. Dimensions for the dipole halves for each band are as follows:

28 MHz: A = 91 inches, B = 91 inches
25 MHz: A = 107 inches, and B = 107 inches

21 MHz: A = 120 inches, B = 120 inches. (The 21 MHz lengths don't require pipe cutting, as the purchased lengths were 10 feet, which is 120 inches.)

L1 is the same for all bands. Dimensions are given in the text.

antenna through 180 degrees, because the pattern is a figure-eight. I have included a printout from K6STI's computer modeling program MININEC. The horizontal pattern (fig. 4) is for the 25 MHz antenna (the pattern will be similar for all the bands). Fig. 5 is the vertical patterns for the 10 meter antenna, 25 feet above average ground. The horizontal radiation pattern shows the figure-eight. In the ver-

tical pattern you can see that the antenna has a very respectable low-angle pattern.

The cost of these antennas is very low simply because the materials don't cost much. By "much" I am talking about \$15 or less for a complete antenna!

The dipole elements are made from electrician's thin-wall conduit, 1/2 inch diameter. You can use aluminum or even copper tubing if such is available. The thin-wall tubing is made in 10 foot lengths, and in the case of the three antennas we will cut these lengths to size. If you look at the drawing, you will note that one end of the tubing is flattened, either by using a vise or pounding it with a hammer. This end is then drilled, making a 3/8 inch hole to accommodate an SO-239 type coax fitting.

Please look at fig. 1. This is an electrical circuit of one of the antennas. We have the two sections of the dipole, with the coil at the center. Now look at fig. 2. At the center there is the section with the coax fitting mounted. Attached to the other section is the coil which is used to cancel out the capacitive reactance. The coil is made from 1/8 inch diameter copper tubing (a 2 foot length is required), 5 turns, 1 inch diameter, and the space between each turn is 1/4 inch.

For me the trick in designing the antenna was to make the rotary for each band fit the same coil dimensions. Using the MININEC antenna computing program it

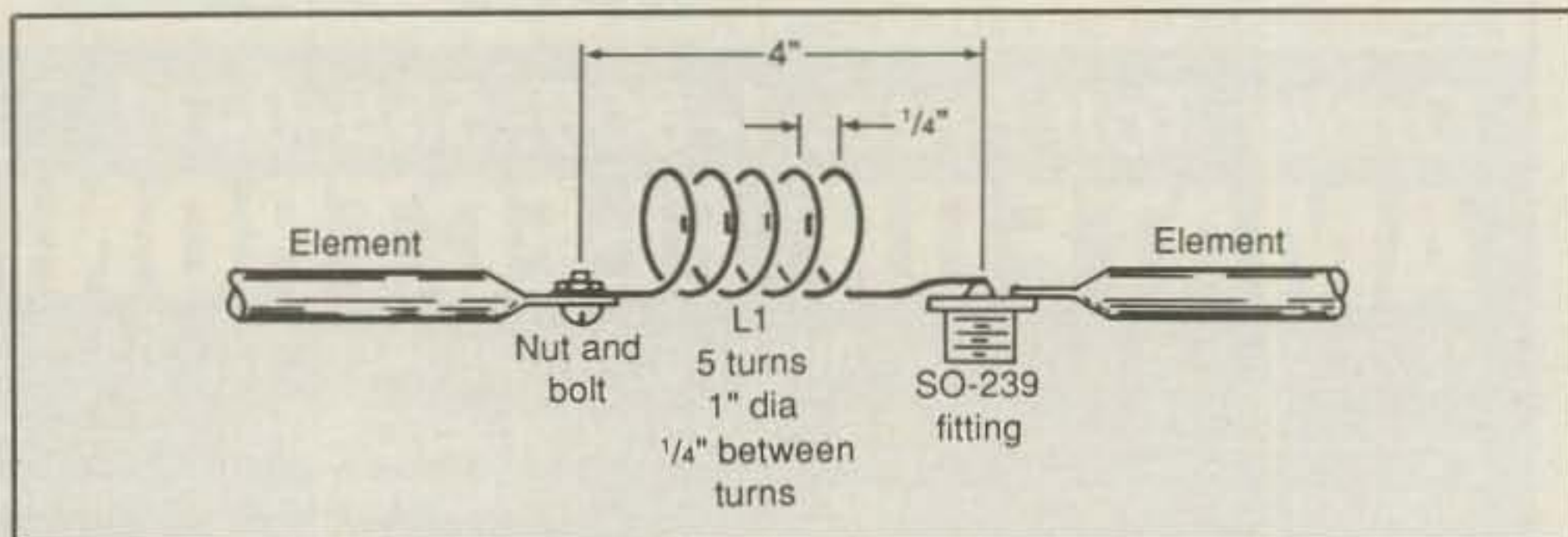


Fig. 2—Details of the coil and feed installation.

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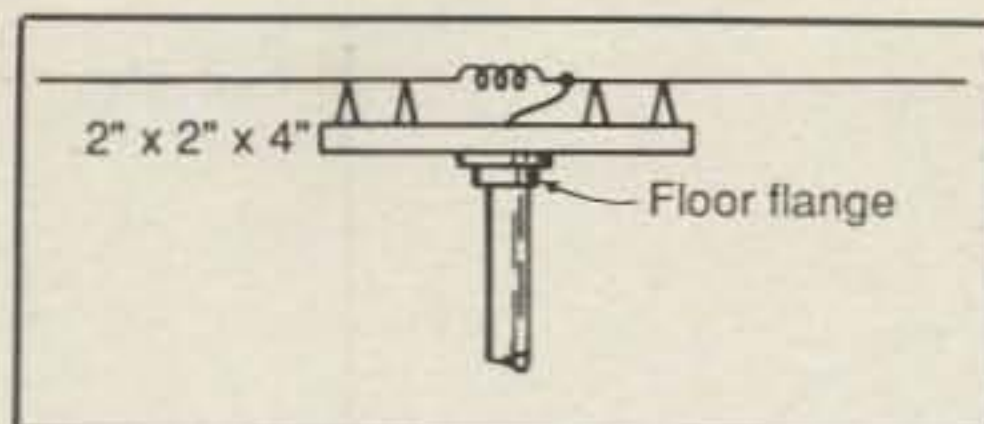


Fig. 3— This is a detailed drawing of the mounted antenna. There are other possibilities. Ham ingenuity?

was simple to "prune" the antenna length so that the same capacitive reactance was present for each band. In all cases the radiation resistance is very close to 50 ohms, while the coil will tune out the capacitive reactance. For those readers who don't understand antenna resonances and impedances, don't worry about it. Just make the coil as described and cut the element lengths to the dimensions given, and to use a favorite cliché, you'll be home free with a very well-matched antenna.

Fig. 3 is a drawing of the antenna mounting technique. A 4 foot length of wood, 2" x 2", is used to support the antenna. I had some old isolantite standoffs which I used to support the tubing, but standoffs could be made from PVC pipe or practically any insulating material. It should be simple to take some 2 inch diameter PVC, cut it into 3 inch lengths, drill 1/2 inch holes to accept the tubing, and then use wood screws set in at an angle at the bottom of the PVC to secure it to the 2 x 2. I mounted a plumber's floor flange at the support pipe. Floor flanges are available at nearly all plumbing supply houses or even at hardware stores. Radio Shack sells TV antenna wall mounts, and these can be installed to hold the antenna supporting pipe. I fed the coax down the mast pipe and hence to the transceiver.

I have always been amazed at the performance of this type of dipole. At one time, during a "hot" portion of the sunspot cycle, I used this antenna in a DX contest and easily worked 100 countries. While the antenna doesn't have any front to back, it certainly has front to side. It can really null out signals from the side. If you study the 10 meter pattern in fig. 5, you will see that the meat of the low radiation angle, with the antenna mounted 25 feet over an average ground, is on the order of 18 to 20 degrees. This is a very good angle for DX. There is some high-angle radiation, but this is useful for short skip.

Keep in mind that this antenna does not have the gain of a two- or three-element beam, but in actuality it will be only one S-unit less than a three-element beam. On these higher bands the one S-unit doesn't mean much when the bands are open.

If you decide to build a dipole for more

One element rotary or 24.95

25 feet high

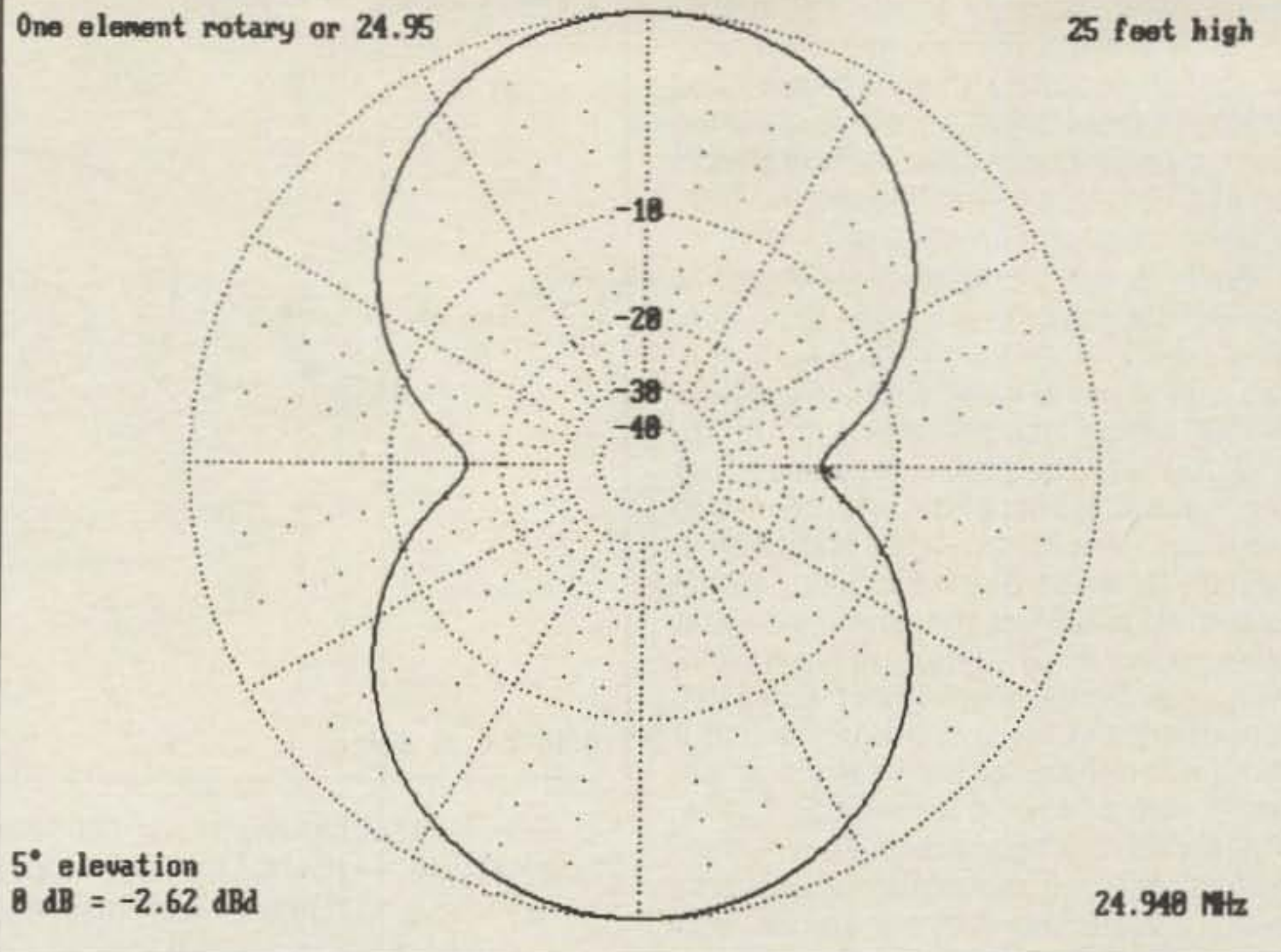


Fig. 4— Horizontal radiation pattern of the one-element rotary. Visualize yourself in space above the antenna looking down at a slice of the radiation. Maximum radiation is broadside to the plane of the end, weakest at the ends of the dipole.



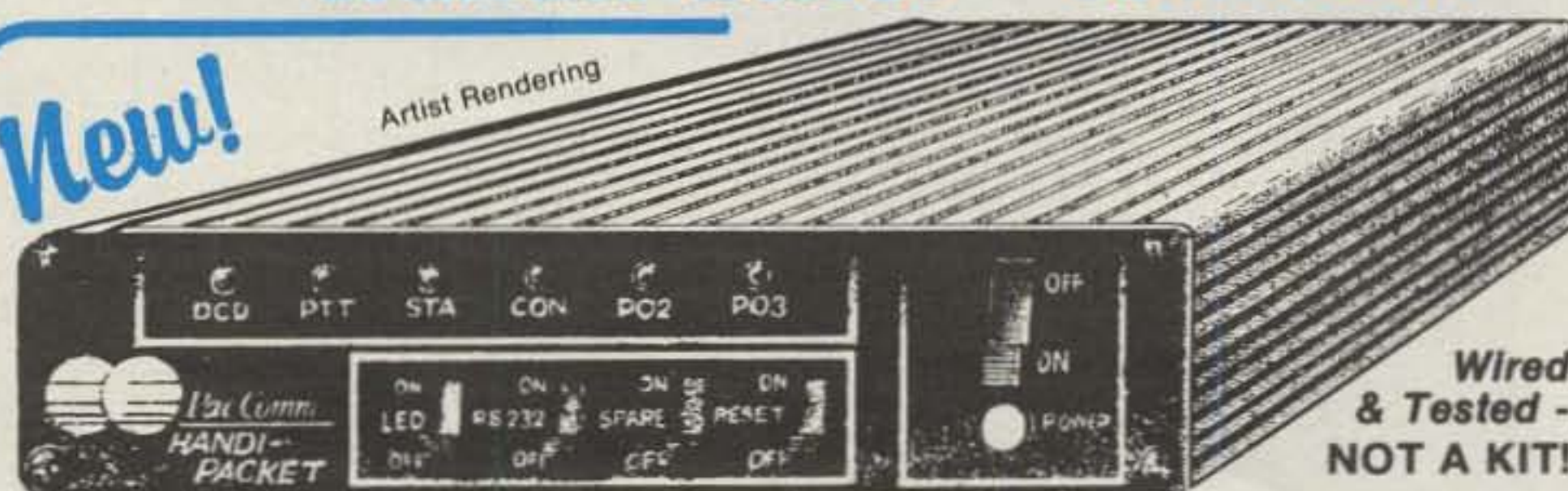
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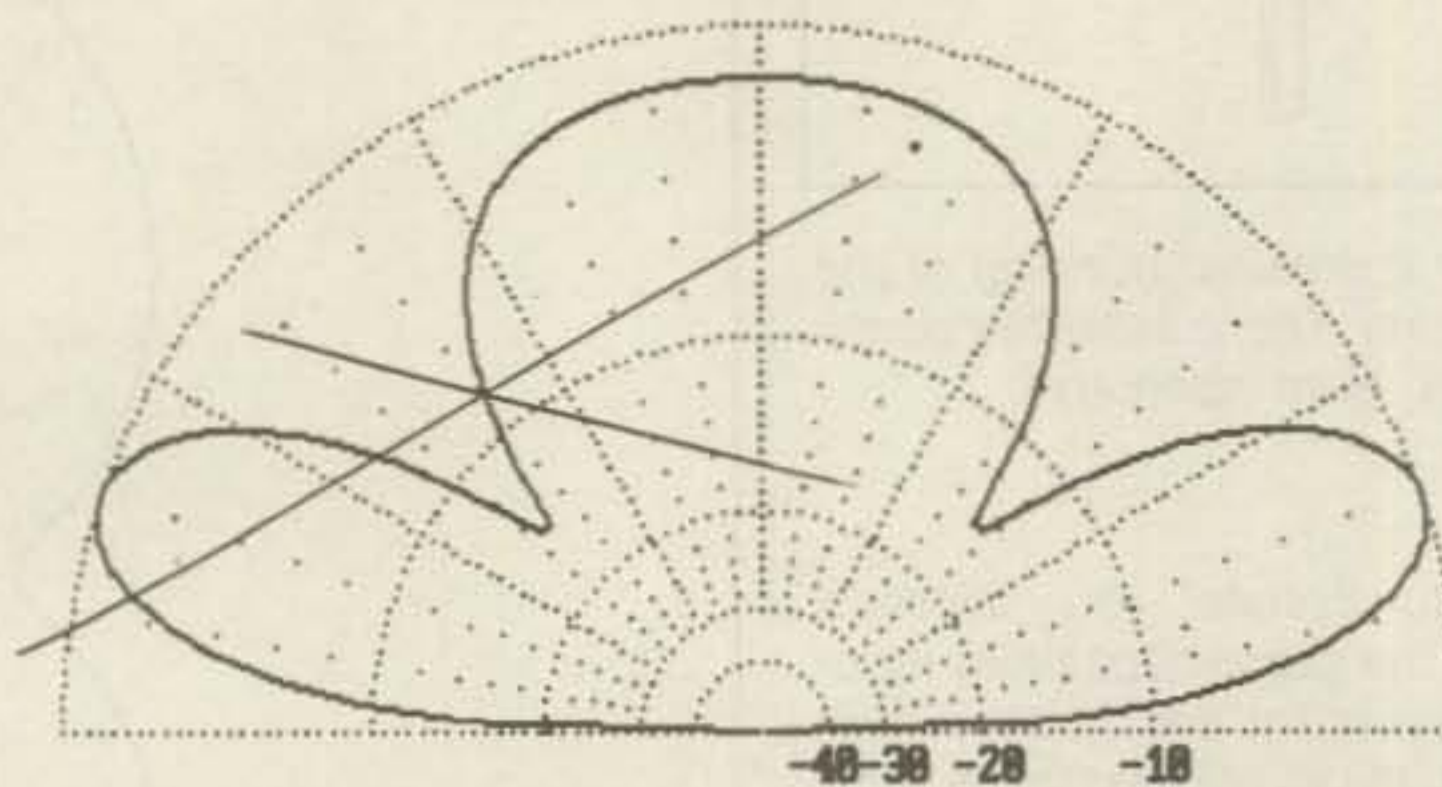
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than one band and mount them on the same mast, be sure to put the higher band antenna at the top, and preferably at right angles to the antenna below it and at least 4 feet from it. Antennas mounted near each other can have serious effects on each other, as I have found out from running computer antenna programs.

While it isn't completely pertinent to this article, many years ago I did extensive experimenting with stacking antennas on the same mast. From my experiments, which included stacking 10, 15, and 20 meter beams, I concluded that there was little effect from one antenna to the other. I wound up doing a short article called "Notes on Beam Stacking" which appeared in *QST* at the time. I did what were known as *SWR runs* on each band, with the antennas stacked as much as 10 feet apart, the theory here being that if there was interaction between the antennas, it would show up in the SWR curves. There was no interaction even when the beams were all mounted on the same boom. I stated such in my article. How wrong I was! The MININEC computer antenna modeling program takes into account the *pattern and gain* effects of the metal masses of the other antennas in close proximity, whether such metal is resonant or not. I can say for certain that pattern and gain can be severely degraded. In one case, a 7 dB gain 3-element

1 element rotary 18 meter

25 feet high



0 dB = 5.26 dBi

28.500 MHz

Fig. 5—Vertical radiation pattern. Note the "meat" of the radiation is at approximately 20 degrees above the horizon. This is for 25 feet above an average ground. The radiation angle would go lower if the antenna were raised.

ment 15 meter beam 4 feet from a 3-element 20 meter beam lost nearly 4 dB! That is very significant. I plan to do a full-blown article on the subject, assuming I find enough interest. In any case, if you intend to stack these dipoles, then do as I

suggested above. It will minimize interaction.

I would like to hear from anyone who builds the one-element rotary. I know you'll be pleased with this simple antenna.

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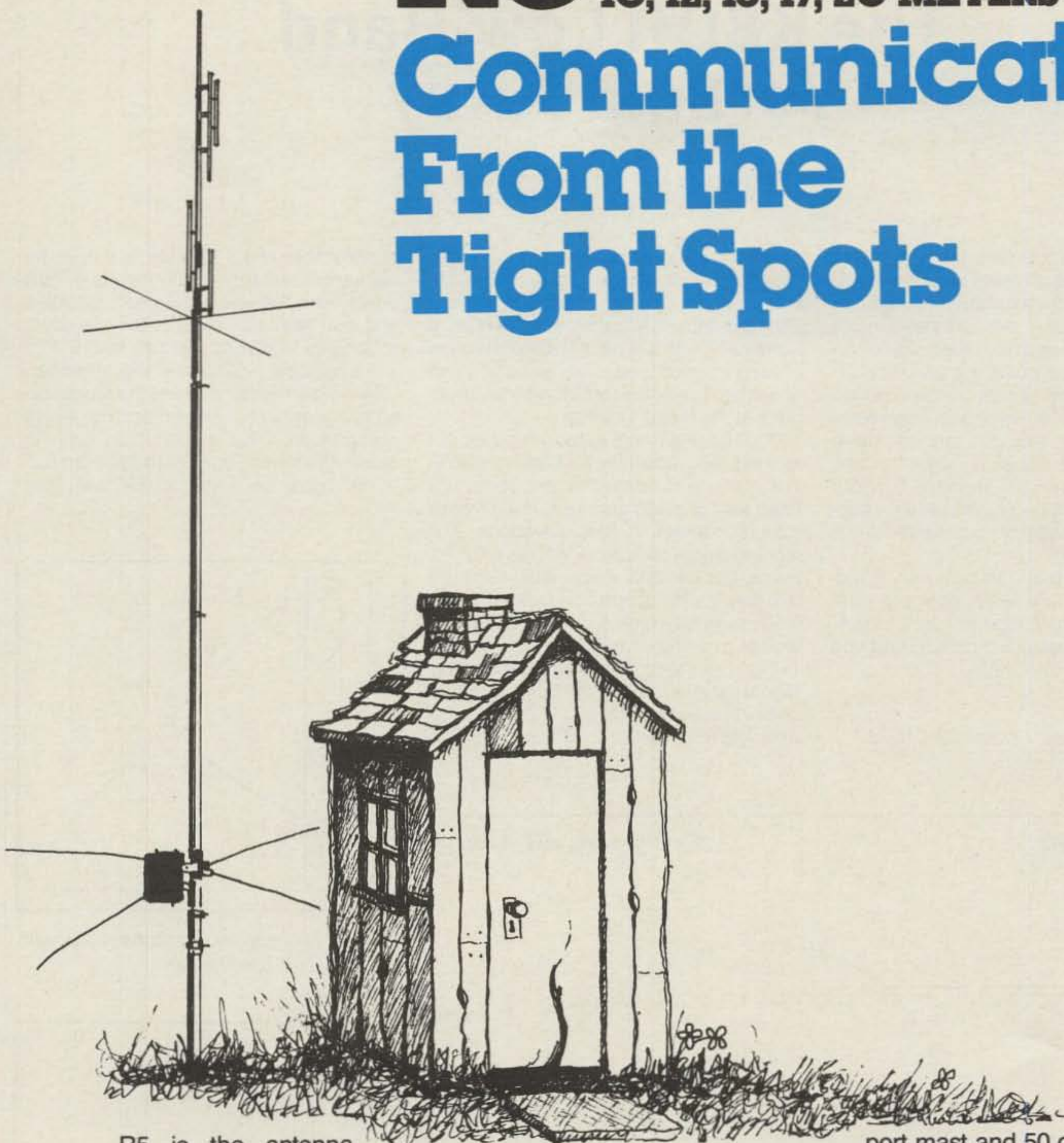
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K8UR shows us how to modify a sloping dipole to make an effective contest antenna.

The K8UR Low-Band Vertical Array

BY D.C. MITCHELL*, K8UR

For many years DXers and contesters have been trying all sorts of antennas to get an edge on their competition. On the low bands most antennas have been made of wire. DXers have tried sloping dipoles, delta loops, quad loops, vertical arrays, and everything else that would load up. The $\frac{1}{4}$ -wave vertical has always been popular, but it requires an adequate ground screen. Ground planes reduce the ground-screen requirement, but both usually require a dedicated radiator support, usually made of expensive aluminum tubing.

What I have found to be a very effective alternative to a self-supporting vertical is a "vertical dipole" that is suspended from a tower. Efficiency has been

excellent without the use of ground radials, and it is a true vertical radiator without exhibiting any high-angle component. The feed impedance is an easy-to-match, nominal 55 ohms. Four can be positioned around a supporting tower structure and phased to provide directivity in four directions at the flip of a switch.

The K8UR vertical antenna started out looking like a half-wave sloping dipole. For years on 75 meters I had successfully used four of these antennas hung from a 120 foot tower in four directions. The sloping dipole does work well as a DX antenna, but it is only marginal in its ability to provide a suitable front/back ratio, and it does exhibit a high-angle component as well as low-angle radiation.

Fig. 1 is the old tried-and-true sloping-dipole pattern that results from hanging a half-wave sloper from a 120 foot tower at an angle from vertical of 30 degrees. Fre-

quency here is 3.8 MHz. Notice how the high-angle radiation is only a couple of dB down from the low-angle peak radiation and that radiation off the back is down roughly 8-10 dB providing some F/B. Fig. 2 is a physical side view of this antenna.

A simple modification of the sloper results in a cancellation of most high-angle components. This modification only requires the folding back of the bottom half of the sloper, back toward the tower (see

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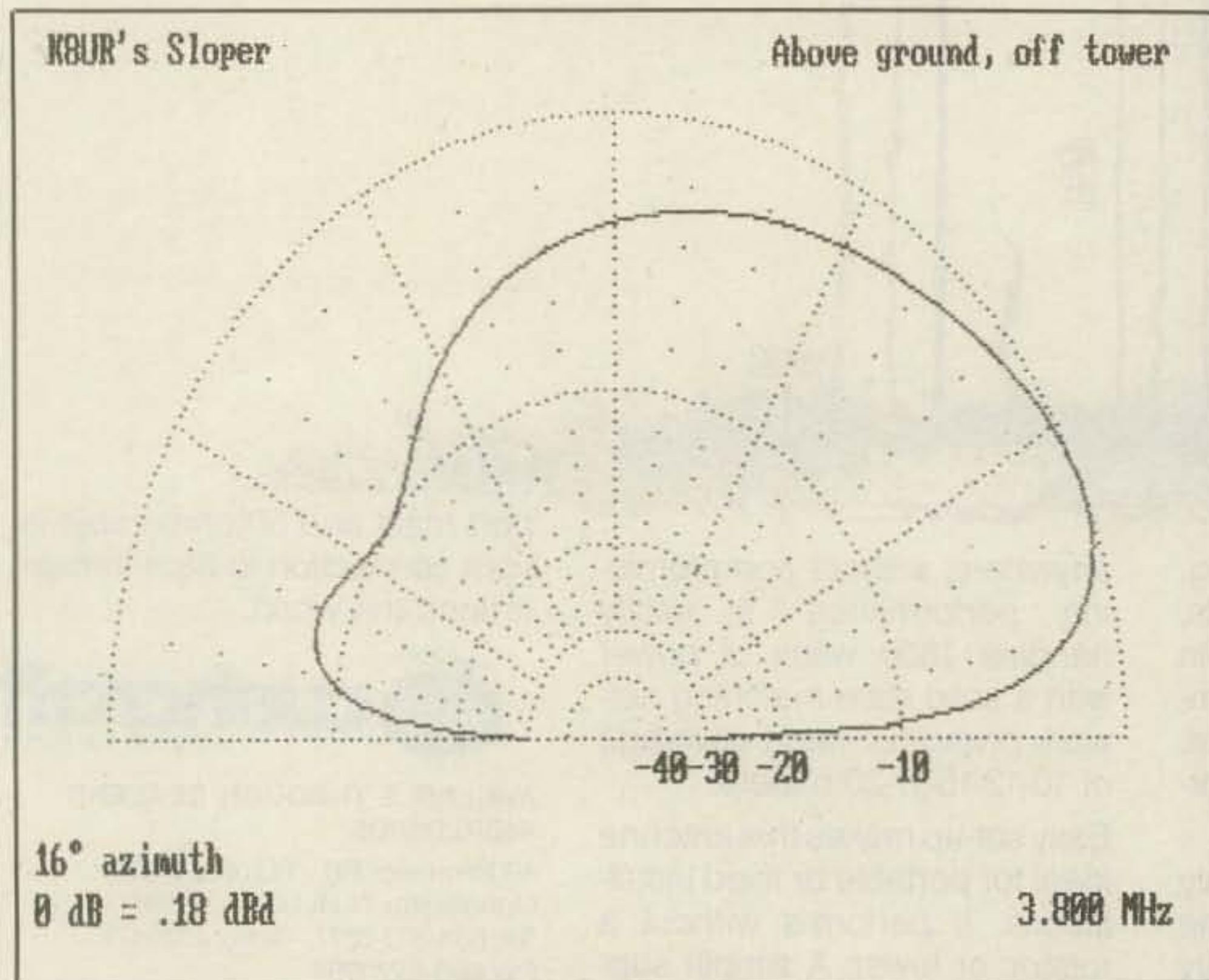


Fig. 1 - Sloping dipole polar plot of radiation angle with 120 foot tower support.

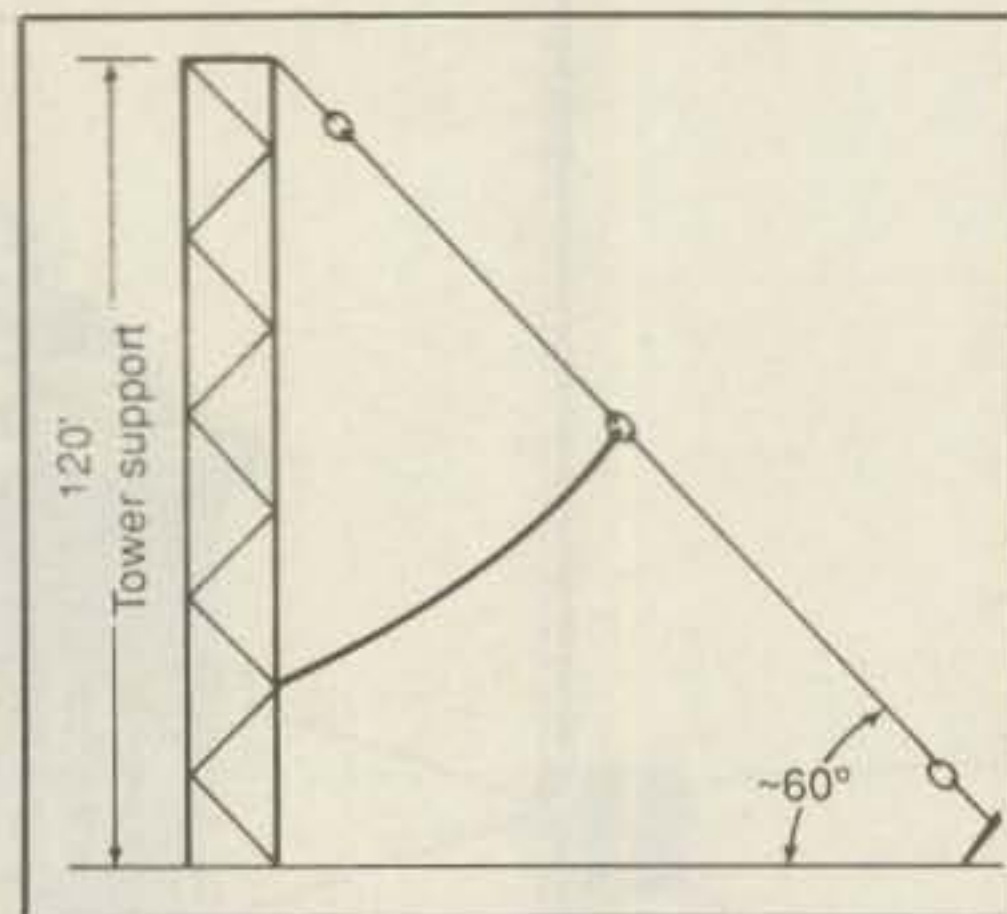


Fig. 2 - The sloping dipole side view with tower support.

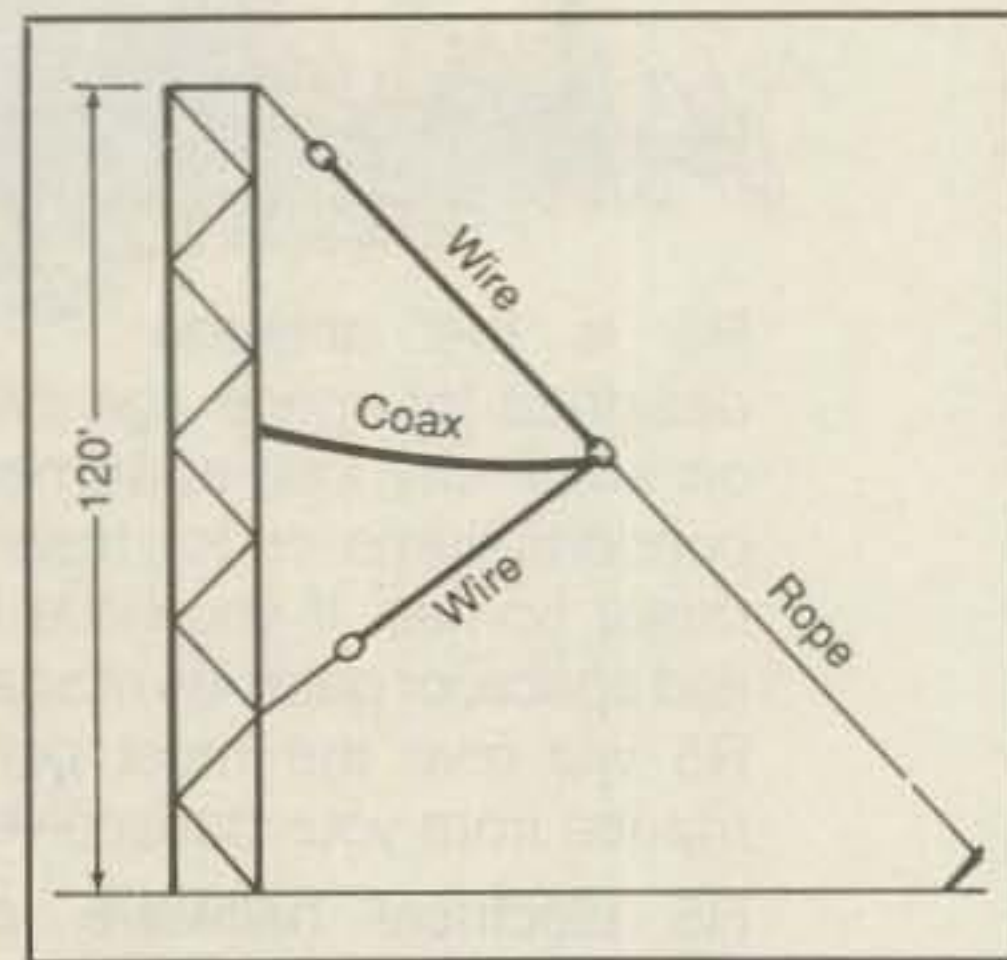
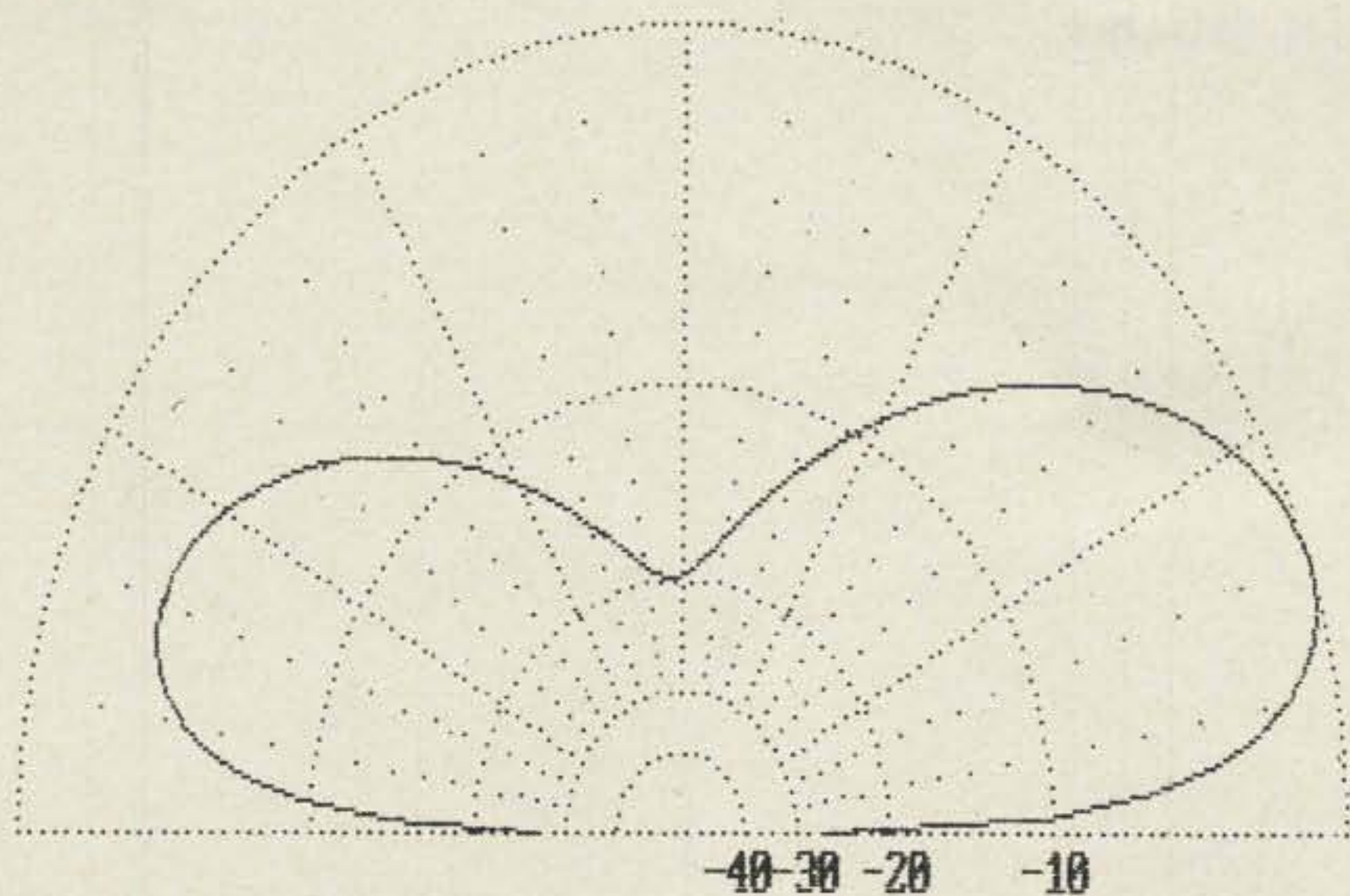


Fig. 3 - K8UR vertical (modified sloping dipole), side view. (Note: Support can be 80 to 90 feet tall for 75 meters.)

K8UR's Vertical

Above ground, off tower



0 dB = -.49 dBd

3.800 MHz

Fig. 4- K8UR vertical polar plot of radiation angle with 120 foot tower.

fig. 3). By folding back the bottom half of the sloper, you have essentially cancelled the horizontal components which fall in line with the plane formed by the antenna halves and therefore eliminated most of the high-angle radiation. Fig. 4 shows this is confirmed by the MININEC computer program. The vertical pattern can be made to be omnidirectional, as a standard vertical, by making the supporting tower not resonant in the band of interest. The pattern shown in fig. 4 includes the effects of a 120 foot tower, and

therefore has a slightly directional characteristic. This can be eliminated.

The instantaneous current vectors for this new antenna are shown in fig. 5. It can be seen that the vertical components add while the horizontal components are cancelled.

When the K8UR vertical is compared to a ground plane with four 1/4-wavelength radials .06 wavelengths (15 feet on 75 meters) above ground, there is little difference (see fig. 6). Low-angle radiation is identical. High-angle is cancelled

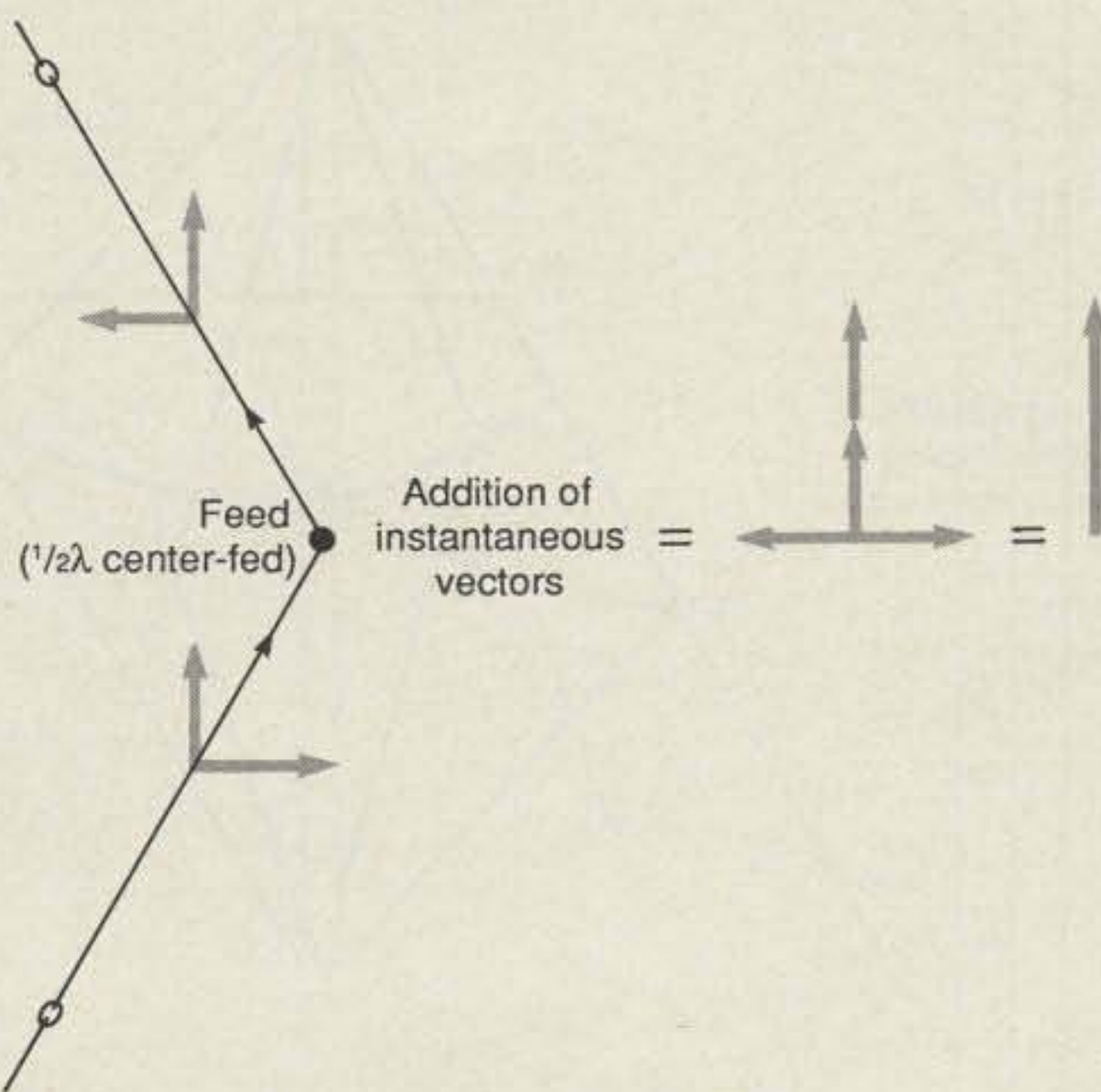


Fig. 5- Current vectors for K8UR vertical showing vertical addition and horizontal cancellation.

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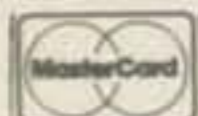
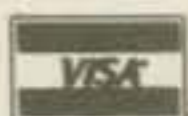
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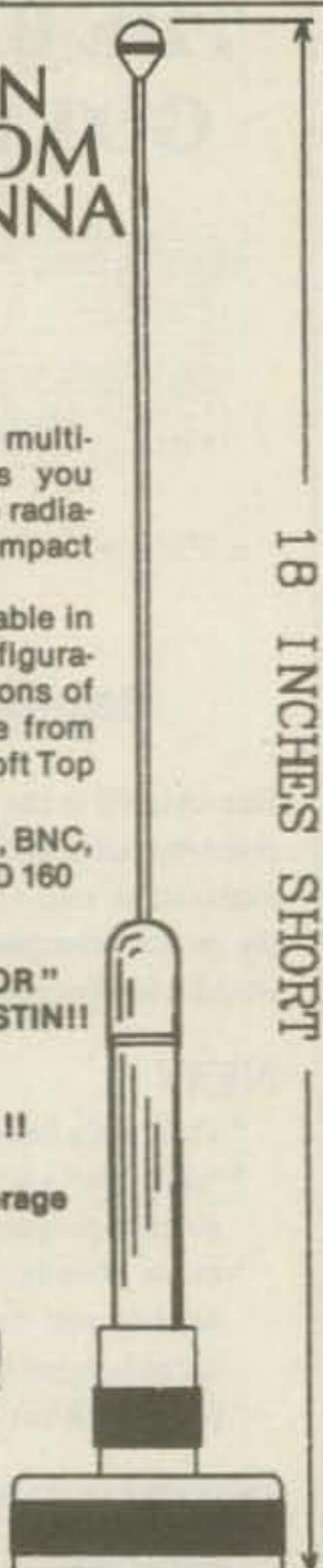
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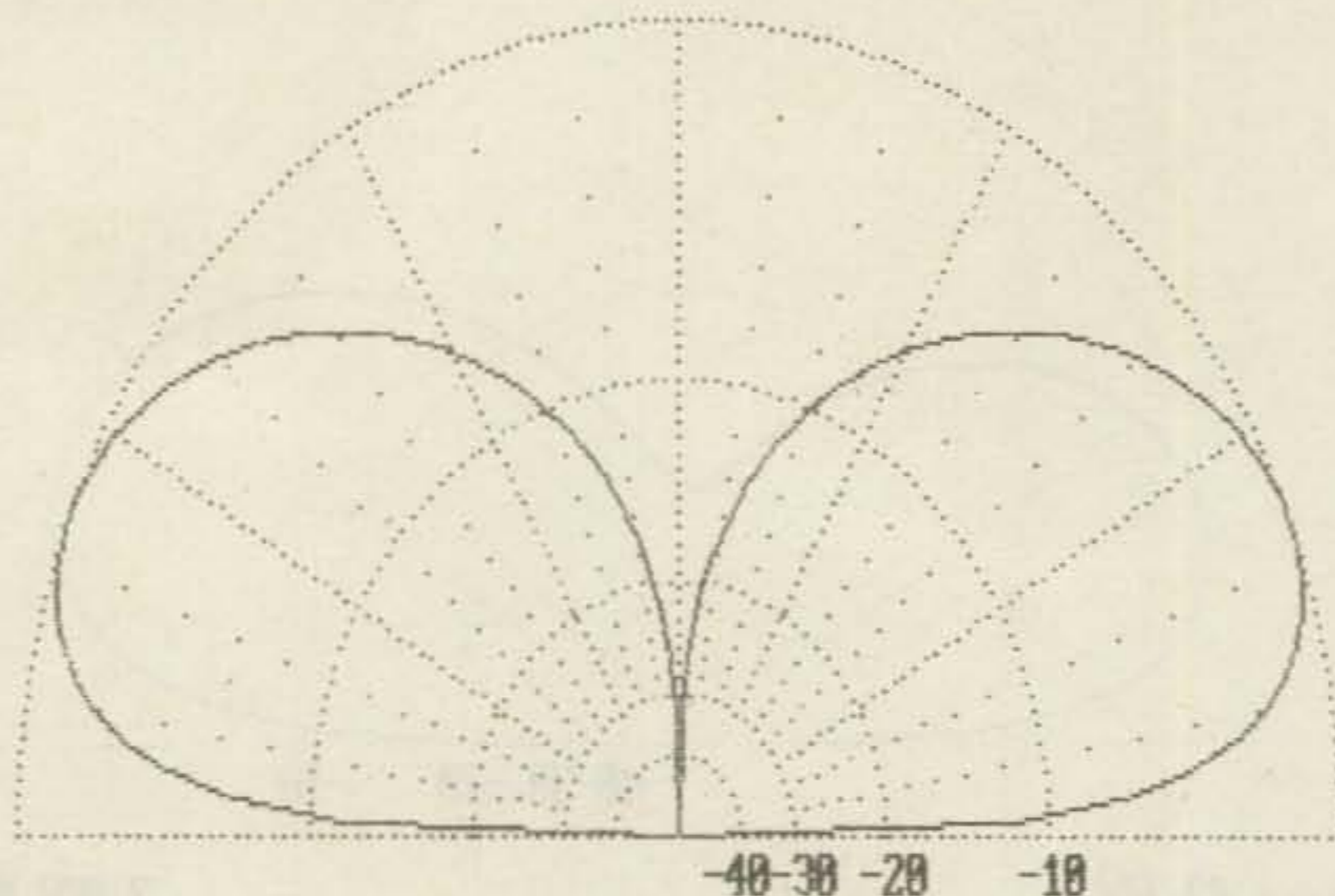
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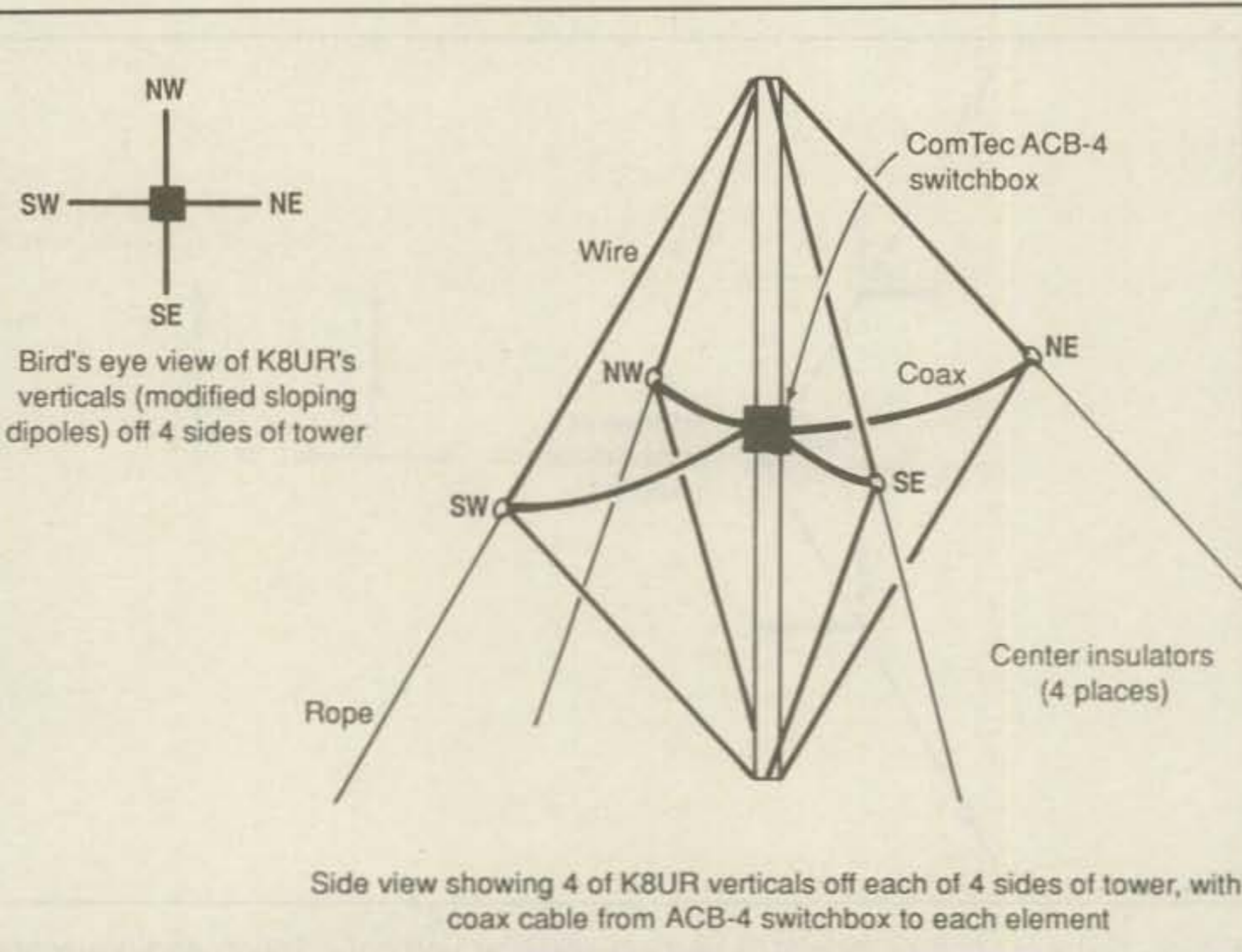
3.800 MHz

Fig. 6- Ground plane with four radials, .06 wavelength above ground at base. Polar plot of radiation angle.

slightly better with the ground plane, but at mid-high angles (60°-80°), the K8UR vertical shows a lesser response to high angles. You can also hang four of these around a single tower structure and phase all of them as a four-square array. I have been using this arrangement on 75 meters with a ComTek ACB-4 Phased Ar-

ray Switch for some years now with good results.

Fig. 7 shows how the four-square arrangement is set up around a single tower. The ComTek ACB-4 phased-array switchbox provides all the necessary phasing, switching, and control functions required for a four-square array. Fig. 8



Side view showing 4 of K8UR verticals off each of 4 sides of tower, with coax cable from ACB-4 switchbox to each element

Fig. 7- Four-square setup using K8UR verticals.

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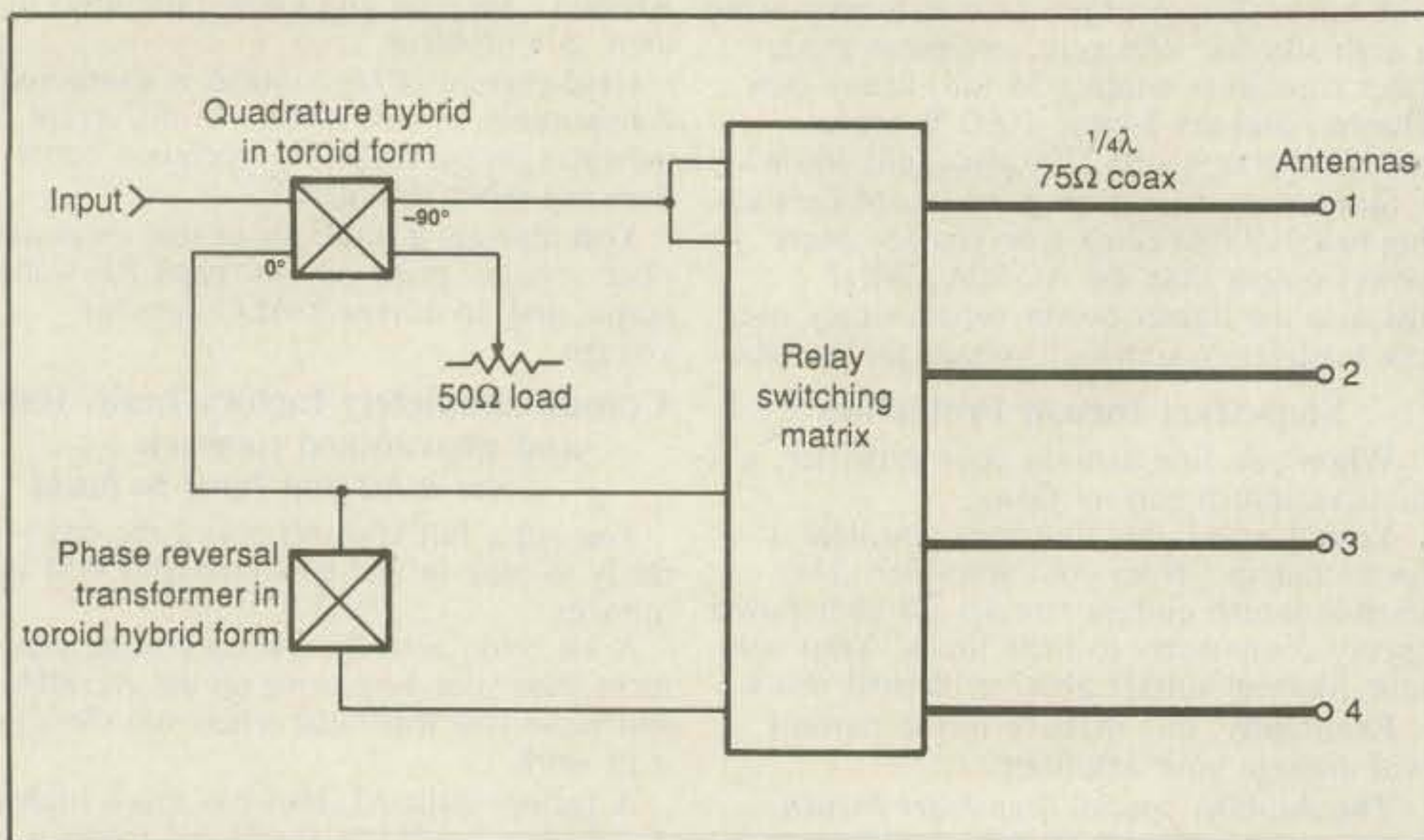


Fig. 8- ComTek ACB-4 phased array switch schematic. (Note: ACB-4 can be used for 4-element 4 squares or 2-element phased arrays.)

shows schematically the requirements to build the phasing/switchbox for a four-square array yourself. The four-square array gives added directivity and gain (approximately 6 dB gain and 15-25 dB F/B) and fires across the diagonals of the square. By using four of the K8UR vertical antennas spaced equally around a

supporting tower, it works out that the spacings required for a four-square are a freebee. The distance from center insulator to adjacent center insulator is $\frac{1}{4}$ wavelength! The problems normally associated with mutuals between elements are less because of the relative angle between each element of this array.


These arrays are now in use on 160, 80, 40, and 20 meters. They compete well against other antennas, stay up longer, cost less, and are probably better on receive for DX contests where you need discrimination against high-angle signals on the low bands.

There is no best antenna, but I have described one which I have found well worth putting in my arsenal, and I hope you will, too. See you in the pileups!

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Editor's Note

The author, K8UR, is the manufacturer of the ComTek ACB-4 phased array switch. You can contact him for more information on the switch. 

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- Tabular screen display of all of the channels stored in memory, along with a full description of each including: MODE (LSB, USB, FM, etc.), eight character alphanumeric description, call sign, sked time, comments. Data files may be sorted by frequency, description, call sign, time, etc.
- Full featured logging utility allows searching for previous entries by call sign. Separate log for each service.
- Able to automatically log hits while sweeping or scanning.
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- 50 page comprehensive user manual.
- Optional radio direction finder allows bearing information to be logged automatically.

CURRENT MENU	 MAIN MENU		VERSION 9.1	
MEM 394 K	STACK 1 K			LOCAL :	16:54:00
DATE: 10-24-1989		SELECT FUNCTION	MODE= USB	U.T.C.:	20:54:00
1. READ MEMORY CHANNELS	7. MEMORY CHANNEL	DIAL			
2. INPUT DESIRED FREQUENCY	8. WRITE MEMORY TO VFO	VFO A			
3. 500 KHZ. UP	9. UTILITY MENU				
4. 500 KHZ. DOWN	ALT-P. CHANGE MENU PAGE				
5. ACTIVATE/DEACTIVATE CLARIFIER	ALT-Z. DISPLAY OR PRINT LOG				
6. SWEEP BETWEEN 2 LIMITS	ALT-Q. END				
A. AVIATION (VHF) COMMUNICATION	D. F.M. BROADCASTING				
B. TELEVISION BROADCASTING	E. AMATEUR FREQUENCIES (VHF)				
C. COASTAL MARINE FREQUENCIES	F. MISCELLANEOUS FREQUENCIES (VHF)				
PORT= COM2	BAUD= 9600	CURRENT PARAMETERS		RDLY= 0.138	
UPPER - BAND LIMIT - LOWER	FREQUENCY	MODE	FILTER	SQ. ACTIV.	ADDR
30.000 MHZ	0.100 MHZ	17.44300 MHZ	USB	WIDE	38

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CQ REVIEWS:

Optoelectronics Model 2210 Frequency Counter

BY LEW McCOY*, W1ICP

Optoelectronics has long been known for producing handheld frequency counters. This review covers their new Model 2210.

First the frequency coverage, which is done in two ranges. The first range is from 10 Hz (10 cycles) up to 12 MHz. In the second range coverage is from 10 MHz to 2.2 GHz. The size of the unit is 3.9" H x 3.5" W x 1" D—truly a "shirt pocket" instrument.

The display is an 8-digit, .28 inch, red, common cathode LED. The decimal is placed at the MHz position. A 9 volt DC power supply powers the counter when the internal nickel-cadmium batteries are not used. The power supply will also charge the batteries while the unit is being used with the DC supply.

There is a common switched input to the counter via a BNC connector. In the "A" position (10 Hz to 12 MHz) the input impedance is 1 megohm, 30 pF, and for "B" (10 MHz to 2.2 GHz) the input is 50 ohms. The Time Base frequency accuracy is plus or minus two parts per million at 10 MHz for the A channel and plus or minus two parts per million at 3.9 MHz for the B channel. The resolution/gate period is FAST 10 Hz/.1 second, 100 Hz/.25 second, for SLOW, 1 Hz/1 second, 100 Hz/2.5 seconds.

The sensitivity of the 2210 is excellent. Fig. 1 is a graph showing the sensitivity of the instrument. Please note from the graph that over the complete range of the unit the sensitivity is less than 30 millivolts. In fact, below 2 GHz the sensitivity is less than 10 millivolts, and from 27 to 1100 MHz it is less than 5 millivolts! This makes the 2210 more sensitive than many very expensive laboratory-type counters.

The input signal limit is 100 volts AC or DC, and this limit should be scrupulously observed. Otherwise damage could result to the counter. Incidentally, the instruction booklet provided is very well detailed, and I might add well written. Circuit diagrams and photographs are included.

There are many uses for such a counter. I found it easy to check the various frequencies generated in my computers. Also, there is a chart included in the manual showing the distance in feet for readings from various items. For example, an 850 MHz cellular telephone's frequency could be read at 30 feet distance, a 450 MHz 1 watt radio at 50 feet, a 2 meter 1 watt radio at 90 feet, and so on.

It is obvious from this review that I was much impressed by this counter. I like the feature that it checks down in the audio range as well as up through 2 GHz. The list price on the instrument is \$199, and it is manufactured by Optoelectronics, Inc., 5821 Northeast 14th Ave., Fort Lauderdale, FL 33334 (telephone 1-800-327-5912; in Florida 305-771-2050).



The Optoelectronics Model 2210 Frequency Counter.

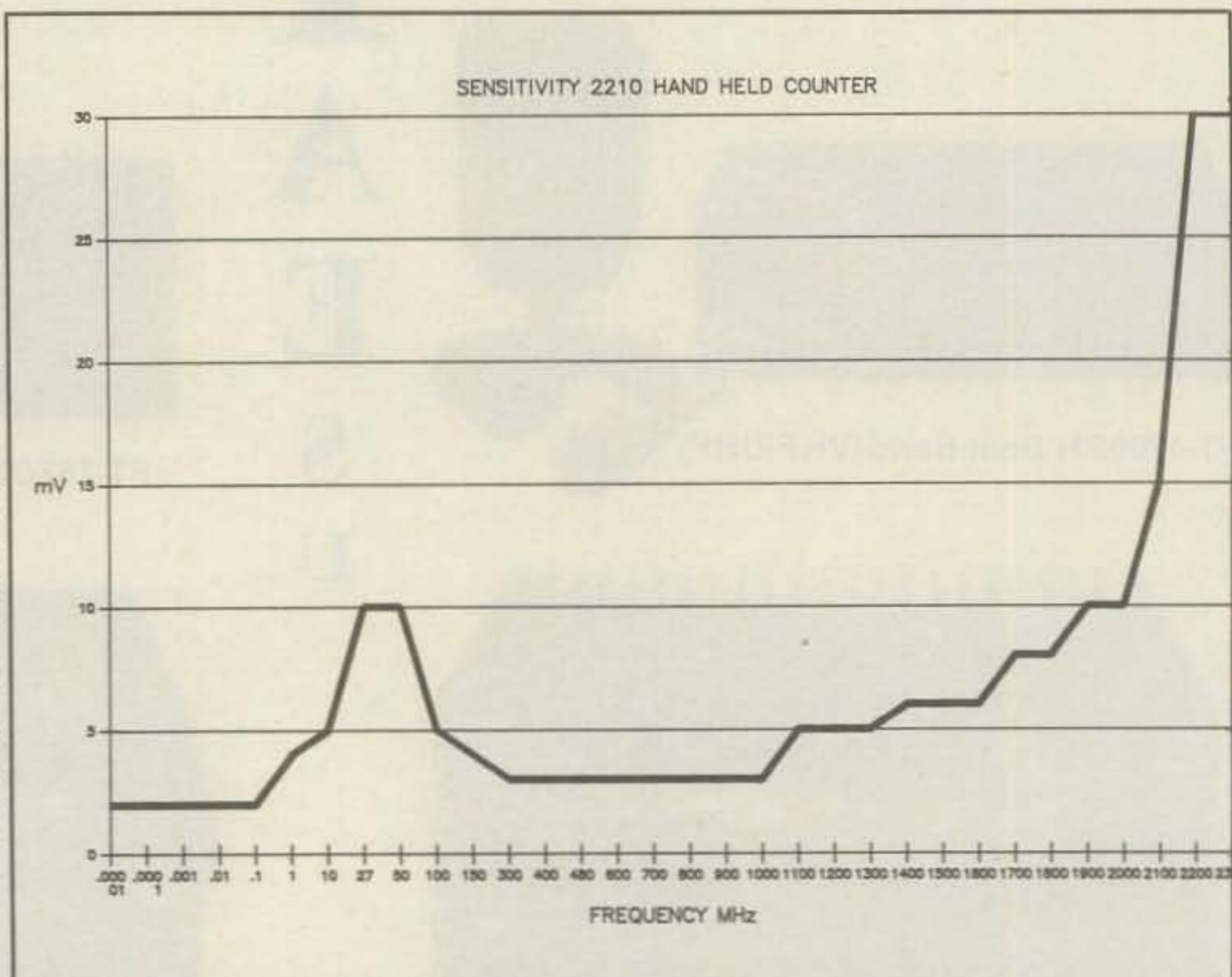
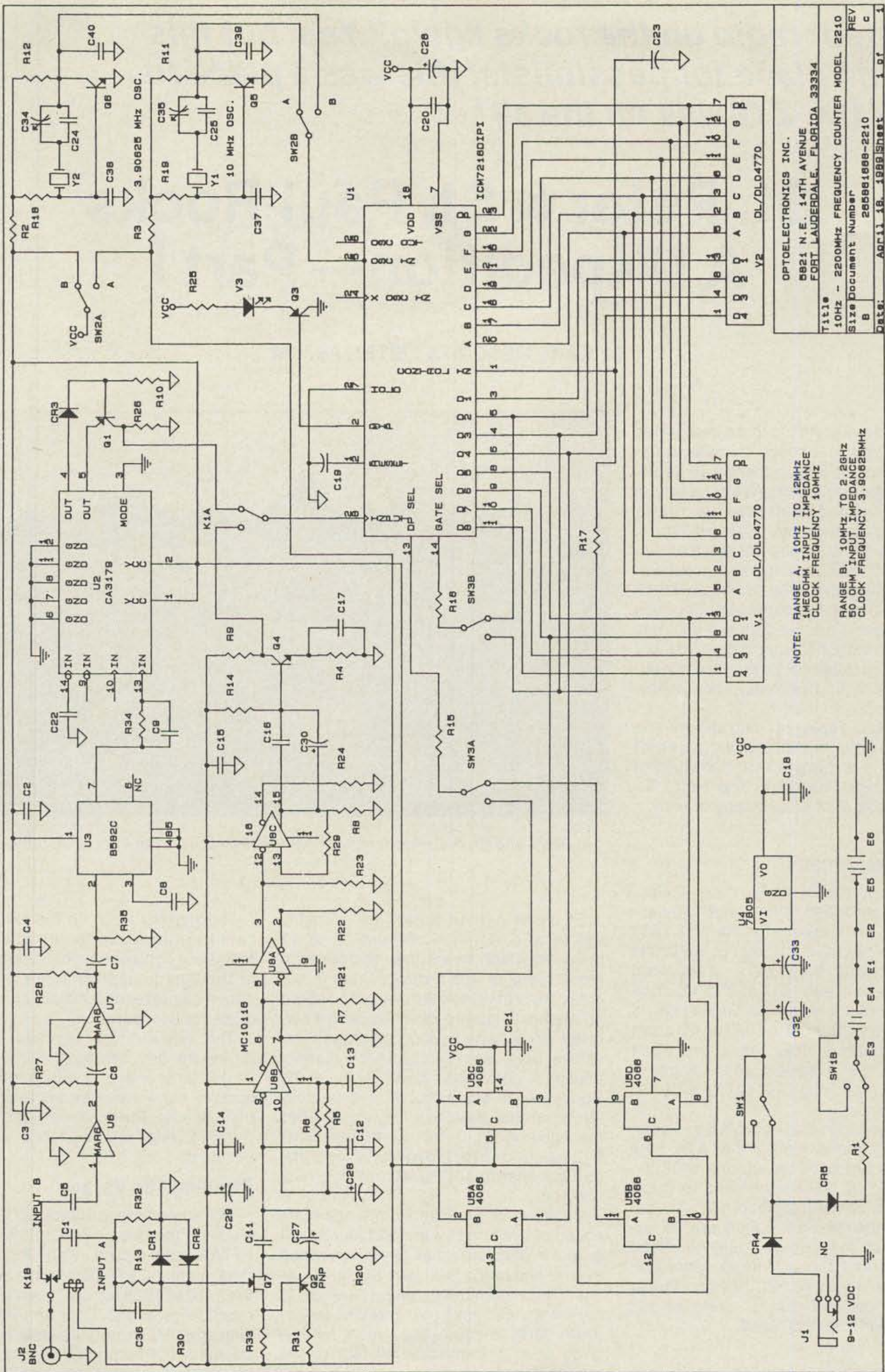


Fig. 1—Graph showing the sensitivity of the Model 2210.

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



OPTOELECTRONICS INC.
 5821 N.E. 14TH AVENUE
 FORT LAUDERDALE, FLORIDA 33334

Title 10Hz - 2200MHz Frequency Counter Model 2210
 Size Document Number 265881888-2210
 REV C
 Date: April 18, 1988 Sheet 1 of 1

NOTE: RANGE A, 10HZ TO 12MHZ
 1MEG OHM INPUT IMPEDANCE
 CLOCK FREQUENCY 10MHZ

RANGE B, 10MHZ TO 2.2GHz
 50 OHM INPUT IMPEDANCE
 CLOCK FREQUENCY 3.90625MHZ

Fig. 2- Schematic of the Optoelectronics Model 2210 Frequency Counter.



Amateur radio on the rocks again? Yes, but this was no place for pessimists; this was a place to work DX. ZY0 was on the air!

St. Peter & St. Paul Rocks A DXpedition—Part I

BY KARL MESQUITA LEITE*, PS7KM

If you had to list the top three categories of people who love rocks the most, amateurs would be right up there with geologists and rock collectors. We equally love outcroppings and formations that rise to miniscule heights above sea level. We especially love the small and practically inaccessible rock formations surrounded by water that have to be climbed precariously while carrying hundreds of pounds of radio gear. To some people it just may be a weigh station for migratory birds, but to amateurs these rocks are rare operating positions and perhaps even a new country to put on the air.

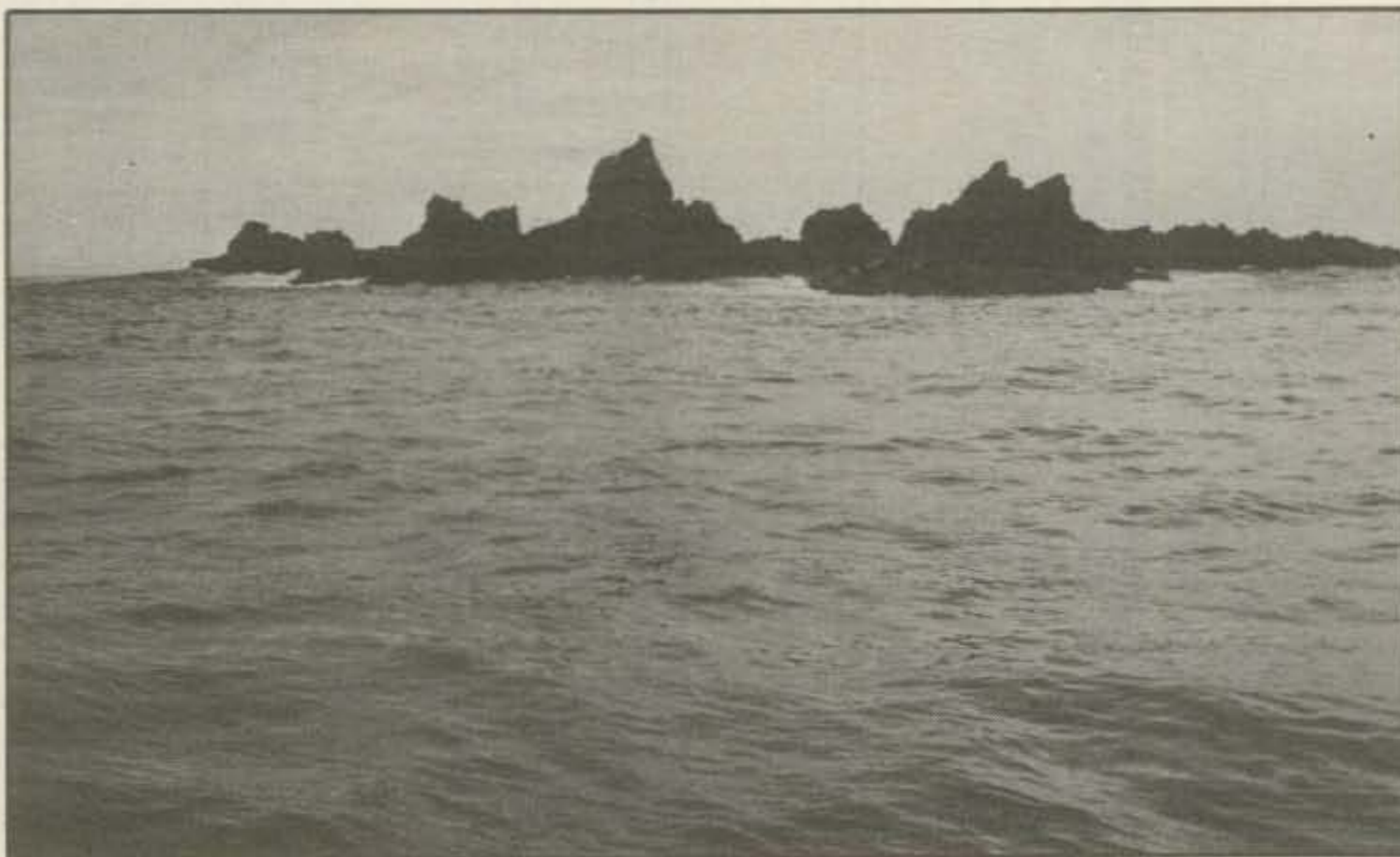
Sit back and enjoy reading about some rocks that brought shouts of joy (plus a lot of shouting in general) to the world of amateur radio last May. The Natal DX Group made a lot of us happy to work a new one.

Some Background

The early history of St. Peter & Paul Rocks is shrouded in mystery. They appear first on Mercator's Chart of 1538 and again on Ortelius' Chart of 1570. It is probable that they were discovered sometime between 1513 and 1538, since they are not shown on the Turkish World Chart of 1513. Schouten in 1642 on his chart showing dates of discovery of important spots on the Atlantic Ocean places a question mark opposite St. Peter & St. Paul Rocks.

The Rochedos Sao Pedro & Sao Paulo, commonly known as St. Peter & St. Paul Rocks, lie almost on the equator at 0° 56' N and 29° 22' W. They belong to Brazil and are situated less than half way between Cabo de Sao Roque on the extreme eastern tip of the South American continent and Dakar (Africa). More precisely, the Rocks lie 621 miles northeast of Cabo de Sao Roque, State of Rio Grande do Norte, PS7 land.

*Box 385, 59000 Natal, Brazil



St. Peter and St. Paul Rocks, which belong to Brazil and lie almost on the equator.

St. Peter & Paul Rocks are normally visible at a distance of from 10 to 15 miles, at which range they appear as a small speck on the horizon. From 3 to 5 miles away they look like one island about 40 meters in length, low lying, with a serrated crest which upon approach resolves itself into two or three distinct peaks. A heavy surf beats against the Rocks on all sides, but it is especially strong on the eastern side, which faces the equatorial current. Numerous birds fly about and cover the rocks, while crabs can be seen scuttling across the rock surface.

St. Peter & St. Paul Rocks are composed of five larger islets and four smaller rocks, plus four small pinnacles which extend above the sea near the larger islets. Their combined circumference is barely $\frac{1}{2}$ mile, and the greatest length (from north to south) is about $\frac{1}{8}$ mile. A large cove is formed by all four of the largest islands, and the water there is between 5 and 10 fathoms deep.

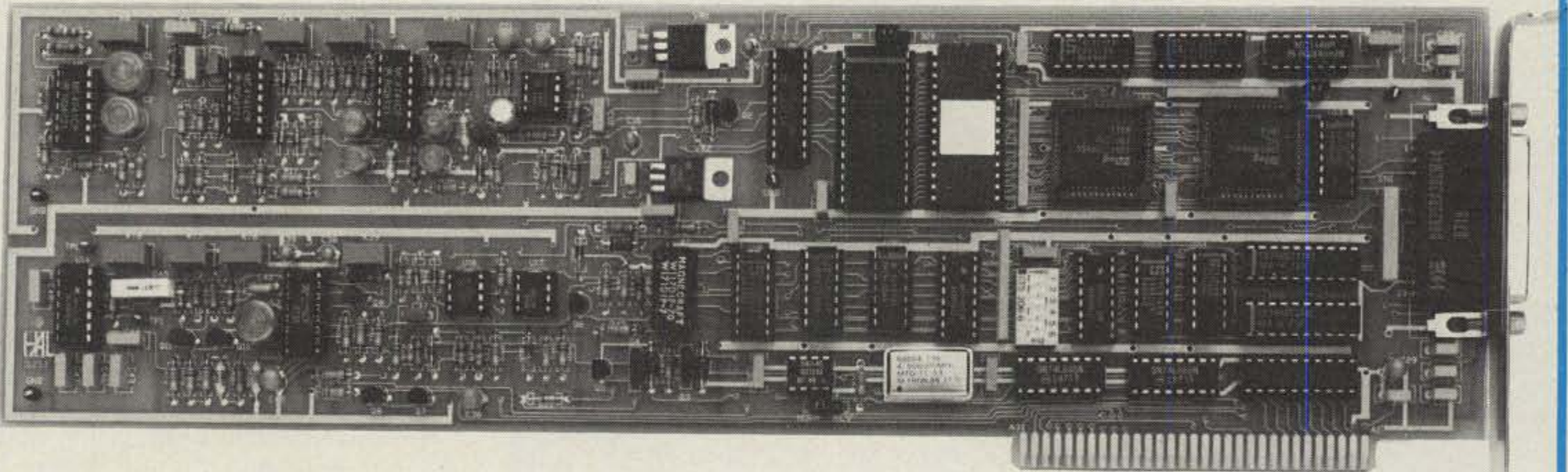
The highest point on the Rocks is located on the northeast islet, where the remains of a lighthouse are located. The top of the light is approximately 34 meters above sea level and makes an excellent place for DX operation.

The temperature reaches 40-45°C during the day, and is 20-25°C at night. At this time of year it rains almost daily, and the rains are often accompanied by high winds. There is no vegetation or drinking water on the islands, which are of volcanic origin.

Planning The Voyage

For some time the Natal DX Group, including members Leo, PS7JS, Tino, PT7AA, and myself, Karl, PS7KM, had been planning a DXpedition to the Rocks. In October 1988 we got together and decided to go ahead. Contacts were made with other PS7 amateurs and help was requested. The response was good and included rigs, tents, tarpaulins, antennas, cables, etc.

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STEP UP TO THE BEST, STEP UP TO HAL!



ZY0SS, ZY0SW, and ZY0SY put St. Peter and St. Paul Rocks on the air in May of this year.

In January 1989 we began contacting DX foundations and clubs around the world to obtain financial assistance. Among the essentials we needed were food, water, batteries, diesel fuel, a boat to rent, and two generators. The expenses were always greater than our resources, plus there was the inflation rate of 30% per month to deal with.

Of the various amateurs we asked to join us, only PS7JS, PT7AA, and myself, PS7KM, decided to put PY0 on the air. We asked the National Department of Telecommunications—DENTEL to give us prefixes to use on the DXpedition—ZY0SS for SSB, ZY0SW for CW, and ZY0SY for RTTY.

After much publicity in DX bulletins worldwide, we started to receive the first donations. After four days of searching we arranged to rent the sailing vessel *Shanty*, owned and operated by Peter Clemens Pereira. Captain Peter had already gone to the Rocks several times, and was an experienced sailor. We set the departure date for May 6.

In addition to PS7JS, PT7AA, PS7KM, and Captain Peter, we had the pleasure of welcoming to our group Sr. Alexandre Filippini, oceanographer and diver, and Chief of the Leatherback Turtle Project on the island of Fernando de Noronha. Thanks to his incredible willingness to help, he became an integral part of our DXpedition.

The Departure

A full day of preparation to leave included installing a radio and mounting an antenna on the stern of the boat in order to operate maritime mobile, as well as

carrying aboard all the needed materials. Finally, at 2108Z on May 6, 1989 we put out to sea from the yacht club at Natal.

On the following day Captain Peter advised us that we were already 70 miles from Natal, having taken advantage of the favorable winds. He showed us how to maintain the course using the tiller and compass. After that we took turns steering the boat. While it was still morning we turned on the Yaesu FT-707 and made the first contact, maritime mobile. It was at 1125Z with Felipe, PS7FNG, from Natal. We were then contacted by Silveira, PS7CW, who had contacted our families. Soon after, Pepe, PT7BR, arrived on fre-

quency from Fortaleza. These last two kept in daily contact with us, passing news of the voyage to our families.

Early Monday morning, May 8, we were visited by twelve dolphins who escorted the vessel for over an hour, making maneuvers around the prow. We made contacts with Natal and Fortaleza, and then Captain Peter started the motor, since there was absolutely no wind, a condition which lasted until our arrival at the Rocks.

On Tuesday we changed our heading towards Fernando de Noronha for refueling. We arrived at PY0F at 1730Z. After a VHF contact with Andre, PY0FF, we got our fuel, followed by a bath and an excellent meal in a hotel. We then left Fernando de Noronha at 2100Z and headed for the Rocks.

After two days of calm sailing we began our approach to the Rocks. We tested the three generators and found that the Honda was not working. Still using the motor, we crossed the equator at 1130Z on Saturday, May 13. At 1605Z I spied the Rocks, still only a spot on the horizon. After confirming it with binoculars, we also noted the presence of a fishing boat next to the Rocks.

At 1933Z, already quite close, we began circling the Rocks and identified the fishing boat as the *Do Rio Negro*, belonging to Sr. Manoel Figueredo da Silva. We approached the boat to within speaking distance and learned that Sr. Manoel, a Portuguese resident of Recife, was quiet outgoing and friendly, and had fished in the area for over eight years. He immediately volunteered to help us in any way possible.

We dropped anchor for the night about 200 meters off the Rocks.

(To Be Continued)



Landing on the Rocks and unloading all the gear was not an easy task.



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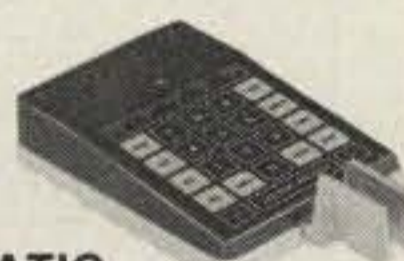
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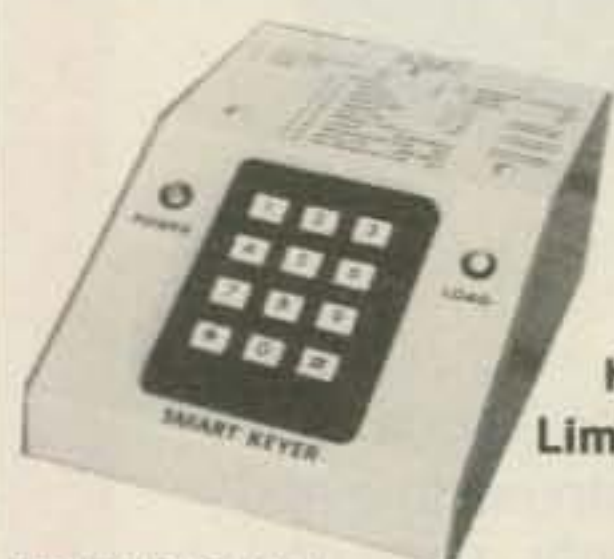
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 DUAL BAND FM

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- New Dual Band HT
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- TX-140-150 MHz 440-450 MHz
- 5 Watts Output on Both Bands
- Full Duplex & 20 Memories



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 - VFO Scan & Memory Scan
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MFJ-486

\$189⁹⁵

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Simple . . . intuitive . . . you instantly know which knob to turn, what button to press. It's unmistakable.

That's the MFJ Grandmaster concept -- more than user friendly . . . it's really easy to use.

There's no keypad, no complex keystroke sequences to confuse you.

The new MFJ-486 Grandmaster Memory Keyer™ gives you the best of both worlds -- all the features you'll ever need and the easy-to-use MFJ Grandmaster concept.

Exclusive CW Word Processor™

MFJ's exclusive CW Word Processor™ lets you change a message in memory without having to rekey it all in.

Special function keys make it simple to move around within any message, insert, delete and change your message until it's just the way you want it.

With other memory keyers you have to erase an entire message and rekey it all in to make even the smallest change.

Combine messages into other messages

The MFJ-486 lets you combine frequently used messages into other messages.

You can store QTH, rig/antenna, QSL info and other comments in separate memories.

Then you can easily build a new message by keying in memory numbers wherever you want that info in your message.

MFJ's Custom-Speed™ Control

Customize your speed control to fit you!

By pressing the Speed Set button, you can set your slowest speed to start at 4, 5, 6 -- any speed up to 20 WPM -- and your fastest speed is 20 to 100 WPM.

Matching CW speed to a QSO is best done by ear as you adjust a speed knob.

With keypads you have to figure out the exact speed of your contact and then go through an awkward keystroke sequence.

That's why matching speed with a

keypad is so demanding.

Without MFJ's Custom-Speed™, a wide range speed control is very hard to use because the *slightest* touch causes radical speed changes.

Built-in CW Course

The MFJ-486 gives you a well-organized three step CW course for upgrading and teaching.

The first step gives you random five character groups. After you learn the letters you can add punctuation.

The second step gives you random 1-8 character groups for real-world code practice.

The third step gives you an infinite number of random plain English QSOs in the same format as FCC ham license tests.

When you can copy these random QSOs, you're ready to pass your test and upgrade!

You also get Farnsworth option, answer-replay to check your copy, punctuation on/ off and earphone jack for private practice.

Remote Control . . . for memories and function keys

The MFJ-77 remote control lets you control your message memories and CW Word Processor™ function keys at your key paddle for only . . . \$19.95.

It's a lot more useful than a remote that gives you *no* editing functions and only lets you control a few memories.

MFJ Keyers are used year after year

Not so long ago there was a glut of keypad keyers. They were novel, and a lot of hams spent their money.

But because they were hard to use they ended up in drawers and closets.

They were soon no longer made.

Most original MFJ keyers are still being used -- day after day and year after year.

Why? Because they're easy-to-use. And that's why more new MFJ keyers are being put on-the-air today than ever.

More for your money

To make it really easy-to-use, it cost more to build the MFJ Grandmaster.

It just takes more hardware -- knobs to turn, buttons to press, LEDs to show

you what's going on. Plus it takes more labor, more software, more everything.

It's a real bargain compared to cheaper-to-build but harder-to-use keypad keyers.

Plus More . . .

You get over 8000 characters in 10 soft-partitioned memories -- far more than you'll ever need.

You also get . . . lithium battery backup, automatic serial numbering, automatic message repeat, beaconing, A or B type iambic keying, manual or automatic word spacing, speaker, earphone jack, easy-to-use front panel controls for speed, volume, tone, weight and delay, tune control, powerful Z-80 microprocessor plus much more. 9x2½x6 inches. Use 12-15 VDC or 110 VAC with MFJ-1312, \$12.95.

One Full Year No Matter What™ Guarantee

You get MFJ's full one year *no matter what*™ guarantee.

That means MFJ will repair or replace your MFJ-486 (at our option) *no matter what* happens to it for a full year.

Others give you a 90 day *limited* warranty.

What do you do *after* 90 days when it burns up. Or *before* 90 days when they say, "Sorry, your *limited* warranty doesn't cover *that*?"

Why take chances when MFJ gives you *no matter what* protection for one full year?

Don't struggle with keypads -- enjoy the easy-to-use MFJ Grandmaster

Don't struggle with a hard-to-use keypad and complicated keystroke sequences.

Choose the memory keyer that's *really* easy-to-use and has all the features you'll ever need - the new MFJ-486 Grandmaster.

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MFJ-949D

\$149⁹⁵

Made in U.S.A.

- **Peak reading meter**
- **Built-in dummy load**
- **Covers 1.8 to 30 MHz**
- **1 full year guarantee**



You won't find all these useful features in any other 300 watt tuner -- not even at twice the price.

New peak reading meter

The new **peak** and average reading Cross-Needle meter in the MFJ-949D shows you SWR, forward and reflected power -- all in a single glance.

Without a **peak reading** wattmeter you just won't be able to tell if your rig is putting out all the peak SSB power it's designed for. Don't be without one if you want top performance.

Built-in dummy load

A built-in 300 watt 50 ohm dummy load makes tuning up your rig sooooo easy. How do you tune up your rig without one?

An external dummy load will cost you about \$30 more -- plus it takes up valuable space at your operating position and requires another cable.

Full 1.8 to 30 MHz coverage

The MFJ-949D gives you **full** 1.8-30 MHz coverage.

Make sure the tuner you're considering covers **all** the HF bands.

Don't get a tuner that keeps you from operating all the frequencies you've worked for -- now or in the future.

Plus more ...

You get a versatile 6-position antenna switch and a 4:1 balun for balanced lines.

You can run up to 300 watts PEP and tune out SWR on coax, balanced lines or random wires.

Unconditional Guarantee

You get a **full one year unconditional guarantee**. That means we will repair or replace your MFJ tuner (at our option) **no matter what** for a full year.

Others give you a 90 day **limited** warranty. What do you do **after** 90 days? Or **before** 90 days when they say, "Sorry, it's your fault"?

What's really important? precise control for minimum SWR

What's really important is your tuner's ability to get your SWR down to a minimum -- and the MFJ-949D gives you more precise control over SWR than **any** tuner that uses two tapped inductors.

Why? Because the two **continuously** variable capacitors in the MFJ-949D give you **infinitely** more positions than the **limited** number on two switched coils.

This gives you the precise control you need to get minimum SWR and maximum

power into your antenna.

After all, isn't that why you need a tuner?

High efficiency and a compact size: performance is most important

The MFJ-949D uses a **single** airwound coil. Using only one inductor takes up a minimum of space and there's no mutual coupling problems.

The excellent form factor of the short fat coil gives you highest Q. Plus you get plenty of inductance that gives you a much wider matching range than other designs.

This results in a highly efficient tuner that puts maximum power into your antenna **and** a compact 10 x 3 x 7 inch size that complements your rig and fits right into your station.

Competing tuners using **two** tapped coils **require** a large cabinet -- not just to house the coils but also to help reduce detrimental coupling between the inductors. The result? **A tuner that's bigger than your radio.**

Your very best value

The MFJ-949D gives you your very best value, first-rate performance, proven reliability and the best guarantee in ham radio ... all from the **most trusted** name in antenna tuners. Don't settle for less. Get yours today!

MFJ's 1500 Watt Tuner

MFJ-962C
\$229⁹⁵



For a few extra dollars the MFJ-962C lets you use your barefoot rig now and have the capacity to add a 1.5 KW PEP linear amplifier later. It covers 1.8 to 30 MHz.

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How can an American manufacturer like MFJ give you more tuner for your money than clearing houses for foreign competition?

MFJ tuners are made in America.

Here's how MFJ gives you more tuner for your money than **any** clearing house for foreign competition.

MFJ builds every tuner cabinet from scratch using the latest high-speed

computer controlled punch presses.

MFJ manufactures, assembles and tests every PC board that goes into MFJ tuners.

Instruction manuals and other materials are printed in MFJ's print shop.

MFJ tuners go directly from our factory to your dealer. We're not just an importer adding profits, tariffs and import charges.

With MFJ's efficient in-house manufacturing and straight to your dealer distribution you get the most tuner for your money.

WHY CHOOSE AN MFJ TUNER?

Hard-earned Reputation: There's just no shortcut. **MFJ is a name you can trust** -- more hams trust MFJ tuners throughout the world than all other tuners combined.

Proven Reliability: MFJ has made more tuners for more years than anyone else -- with MFJ tuners you get a highly-developed product with proven reliability.

First-rate Performance: MFJ tuners have earned their reputation for being able to match just about anything -- **anywhere.**

One full year unconditional guarantee: That means we will repair or replace your tuner (at our option) **no matter what** for a full year.

Continuing Service: MFJ Customer Service Technicians are available to help you keep your MFJ tuner performing flawlessly -- no matter how long you have it -- just call 601-323-5869.

Your very best value: MFJ tuners give you the most for your money. Not only do you get a **proven** tuner at the lowest cost -- you also get a one year **unconditional** guarantee and **continuing** service. That's how MFJ became the world's leading tuner manufacturer -- by giving you your very best value.

Choose your MFJ tuner with confidence! You're getting proven performance and reliability from the most trusted name in antenna tuners. Don't settle for less.

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CQ Showcase



Heath Company Multimeters

Three new digital multimeters (DMMs) are available from Heath Company. Two multimeters—Models SM-2372 and SM-2311—are compact, handheld units with measurement functions that include AC and DC voltages, AC and DC currents, resistance, capacitance, transistor DC gain, and diode test. Both multimeters have a 3½-digit liquid crystal display, and battery condition is continuously monitored to alert the user when the battery is low. The Model SM-2311 sells for \$69.95. Model SM-2372, which features LED (light-emitting diode) test, logic probe, and a 20 MHz frequency meter, sells for \$99.95.

Heath has also added a benchtop DMM to its line of instrument products. The SM-2360 sells for \$269.95 and features true RMS cap-

ability, dB scale, audible continuity test, data hold, and automatic polarity indication. This unit has .03 percent accuracy. For more information and their free catalog, contact Heath Company, Dept. 350-045, Benton Harbor, MI 49022, or circle number 107 on the reader service card.



Kenwood TS-950S Digital HF Transceiver

In the TS-950S Kenwood engineering has moved the high-performance HF envelope using sophisticated digital techniques. The new TS-950SD is the first amateur radio transceiver to utilize Digital Signal Processing (DSP) techniques, a high-voltage final amplifier (50

volts), dual fluorescent-tube digital display, and digital bar meter with a peak-hold function. The transceiver comes fully equipped with CW, SSB, and AM IF filters. Digital processing improves spurious response and unwanted sideband suppression, the maker states, and delivers flat and clean quality sound with wide frequency response. The user may select any of 4 possible audio levels on the DSP unit. According to Kenwood, for CW, digital filtering results in a waveform free of key clicks that are sometimes encountered in analog processing. The rise time of the waveform may be adjusted. Synchronized with SSB IF slope tuning, a digital AF filter provides sharp characteristics for optimum filter response.

Other features of the TS-950S include dual frequency receive function, 150w high-power, heavy-duty cycle design, built-in microprocessor-controlled automatic antenna tuner, built-in keyer, and microprocessor-managed frequency control. Suggested retail price \$4399.95. For more information, contact Kenwood Corp., 2201 E. Dominguez St., Long Beach, CA 90810, or circle number 109 on the reader service card.

ACE WX-1000 Radio Facsimile Terminal

ACE Communications, Inc. has introduced the WX-1000 stand-alone radio facsimile ter-

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FT-470

Dual-Band

Operation Perfected

- 2 Meter/430-450 MHz
- 42 Memories
- 2.3 - 5 Watts Output



YAESU

FT-757 GX Mark II

HF Field-Day Favorite

- 100W Output
- 10-160 Meters
- 10 Memories
- Transmit
- Dual VFO's
- 500 kHz to 29.99 MHz

TEN-TEC CORSAIR II



- 160-10 Meter Operation
- 100 Watts Output
- Crystal Mixed Permeability Tuned Oscillator
- Built-in CW Keyer, Speech Processor
- Built in USA

AEA

The Morse Machine High Performance Keyer

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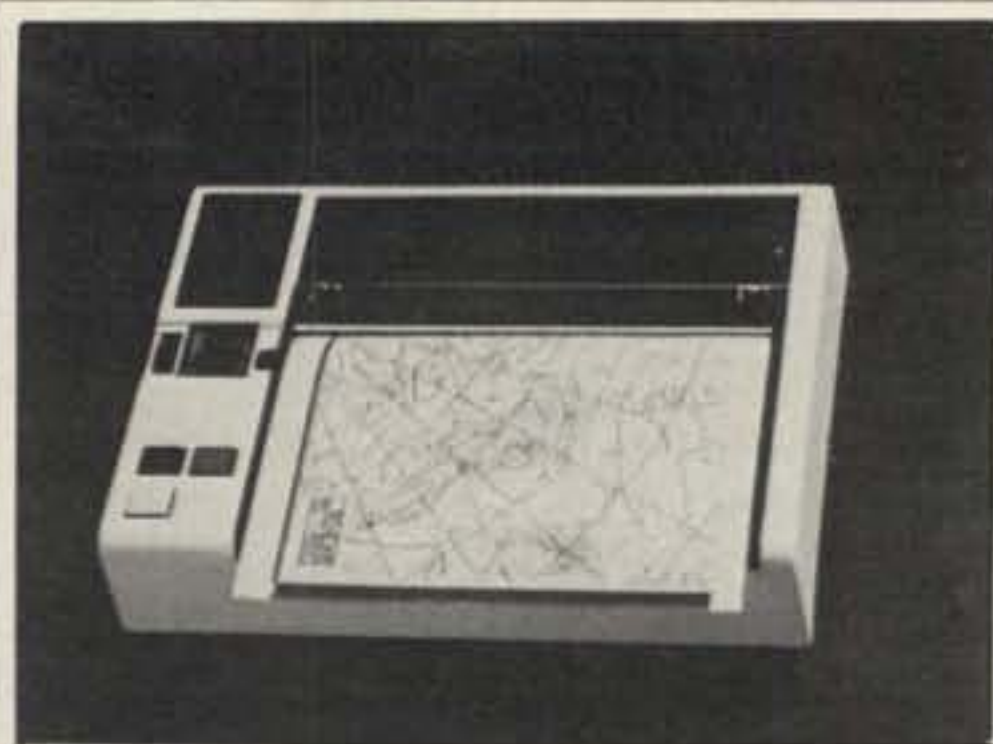
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minimal. The WX-1000 is designed to produce hard-copy images from various radio facsimile services including NOAA weather chart, NFAX, press photo, and even satellite weather picture from NOAA, GOES, and METEOR, etc. The WX-1000 requires only audio output from shortwave receiver or S-band receiver capable of receiving facsimile signals. The built-in high-resolution 24-pin thermal printer produces crisp images. It is also capable of producing gray scale, which is ideal for APT (Automatic Picture Transmission) by weather satellite.

For more information, contact ACE Communications, Inc., 22511 Aspan Street, El Toro, CA 92630-6321, or circle number 103 on the reader service card.

AEA PakMail Mailbox Upgrade

AEA has announced an upgrade for the PK-232 multi-mode data controller which includes PakMail mailbox with third-party traffic. Unlike previous upgrades, this one includes firmware and a daughter-board. Effective with units shipped after October 1, 1989, the new product name is the PK-232MBX (MailBoX) which includes this built-in feature. Customers who purchased the PK-232 on or after September 15, 1989, will receive the update free, with a \$5.00 shipping/handling fee.

This new release also incorporates the Priority Acknowledge scheme defined by Eric Gustafson, N7CL. By giving priority to packet acknowledgments for data that has already been received by a distant station, useless retries of the return acknowledgments, and possibly redundant data, can be avoided. For the SWL enthusiast, the PK-232MBX will decode Time Division Multiplexed (TDM) signals. TDM is a mode used in commercial applications that resembles FEC AMTOR, but with different coding. In addition, AEA added three more statements to its exclusive WHYNOT command and four more options to the CUSTOM command.

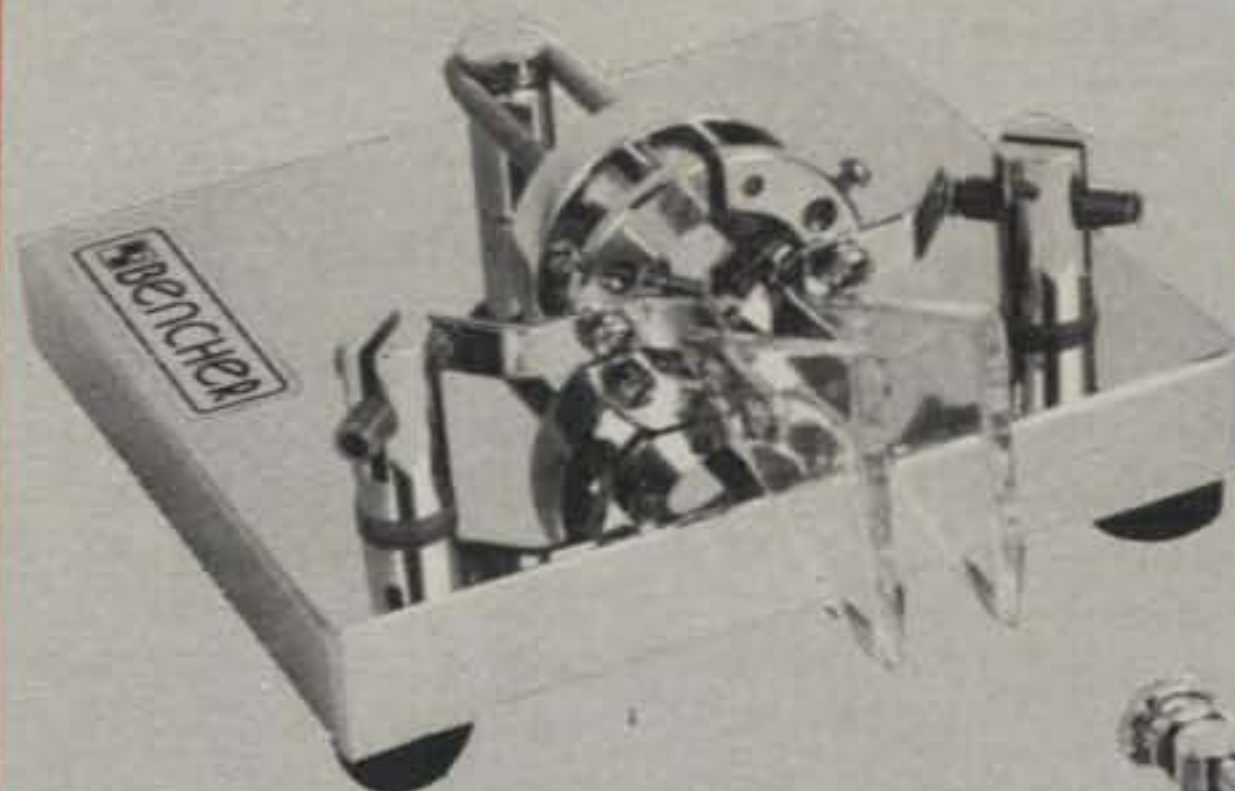
Available to current PK-232 owners, the firmware upgrade with PakMail and the daughter-board is \$65.00, or firmware only without PakMail and TDM is \$30.00. Units purchased after September 15, 1989 should include the upgrade, and be distinguished as model number PK-232MBX. To order the upgrade, customers should call AEA at (206) 775-7373. The price of the PK-232MBX will remain at the current amateur net of \$349.95. In order to keep the price at this level, AEA will include an RS-232 interface cable with each unit instead of the "Y" cable. Because of the input AEA received from current PK-232 owners, the expensive "Y" cable will now be an option. The suggested retail \$40.00. For more information contact AEA/Advanced Electronic Applications, 2006 196th St. SW, Lynwood, WA 98036, or circle number 102 on the reader service card.

the Ultimate Paddle

We Didn't Invent CW, We Only Perfected It.

Discerning CW operators world wide have long recognized the **Bencher Iambic Paddle** as the finest paddle available. You can't find a smoother, more responsive paddle for flawless keying, certain to make your CW operating a real pleasure.

- Stainless Steel Adjustable Spring for Different Fists
- Non-Skid Feet
- Nylon & Stainless Self Adjusting Needle Bearings
- Stainless Fasteners
- Gold Plated Solid Silver Contact Points
- Large Clear Plastic Handles
- Unmatched Responsiveness



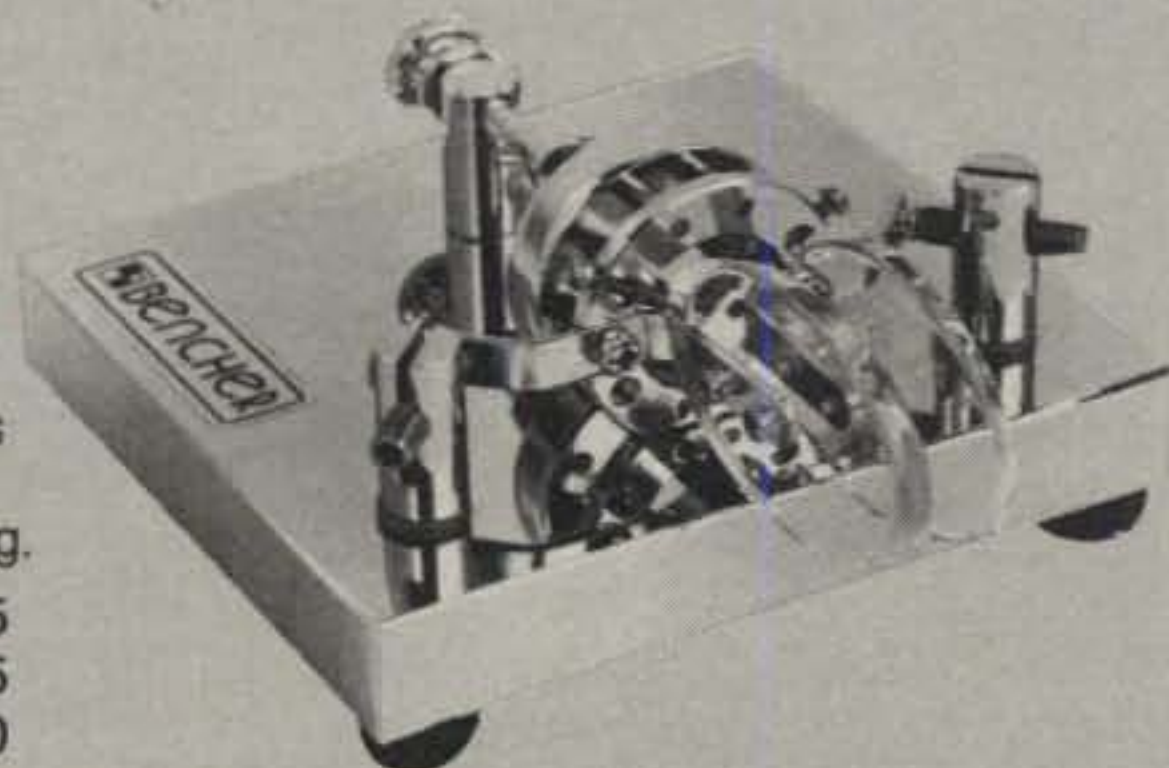
The Bencher Iambic Paddle, the Finest Available!

BY-1 Black Base \$ 69.95
 BY-2 Chrome Base 84.95
 BY-3 Gold Plated 250.00

The Bencher Single Lever, Non-Iambic Paddle —

For the amateur who prefers the more traditional approach to electronic keying.

ST-1 Black Base \$ 69.95
 ST-2 Chrome Base 84.95
 ST-3 Gold Plated 250.00



CW is the language of amateur radio — and no one speaks it better than Bencher!

The Bencher Engineered 1:1 Balun 3.5-30 MHz.

The **Bencher Balun** converts the unbalanced coax to a balanced feed, the antenna is properly driven and your power is radiated by the antenna — not the feed line.

- Finest non-rust materials
- Rugged Cyclocac® case
- DC grounded for lightning protection
- Built-in Center insulator
- Amphenol coax connector
- Rated 5KW, works with antenna tuners

ZA-1A Balun \$34.95
 HWK 2" Boom Mounting Kit 6.95



Tired Of Being The Channel Master?

YA-1 **Low Pass Filter** \$49.95

Working Range: 1.8 to 29.7 MHz
 Impedance: 50 ohms

Power Rating: 1.5kw continuous, 5 kw peak
 Attenuation: ≥ 80 db @ 54 MHz



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A LOOK AT THE WORLD AROUND US

Holiday Gifts for Radio Amateurs

Seaon's Greetings to our super friends, fans, and column followers everywhere! We sincerely wish 1989 was your best year yet, that 1990 will be even better, and your Christmas stocking will overflow with ham goodies to start the new year right! In light of those cheerful thoughts, we once again make our annual "World of Ideas" diversion to feature special holiday gifts for amateurs. Future columns will return to our usual format with more views on mobiling, classic rigs and keys, SSTV happenings, working the new microsats, and much more. Meanwhile, let's overview some new or possibly overlooked items guaranteed to boost your operating enjoyment at least three dBs. There are more delightful items to describe this year than space permits, so read carefully. I squeezed in notes everywhere!

Highlighted goodies are available from their manufacturers or national dealers, not from me. I am simply your guide for this window-shopping tour. When a particular item catches your fancy, check the ad section of *CQ* for prices and ordering info. Remember, too, that home shopping is expanding every year, and early ordering is highly advisable to sidestep UPS and postal bottlenecks. Another hint: If you see an item and want it in your hands tomorrow, pay a couple of extra bucks for overnight delivery. That's enough K4TWJ philosophy. Now let's peek inside Santa's bag. My gosh, it's filled with treats for newcomers and old timers alike—talkies, mikes, interface units, memory keyers, antennas, jewelry, books. What a blast!

Handy Hamming

Leading our collection of holiday goodies is AEA's DX Handy shown in photo 1. This trim little rig has been available for over a year, but its popularity has really increased since sunspot cycle 22's activity began peaking. The DX Handy is a super Christmas gift for any amateur from Novice to Extra class. It runs 2 watts output on 10 meters SSB and CW; it has an S/Power meter, noise blanker, RIT, built-in mike, speaker and key; and it covers 28.250 to 28.350 MHz with supplied

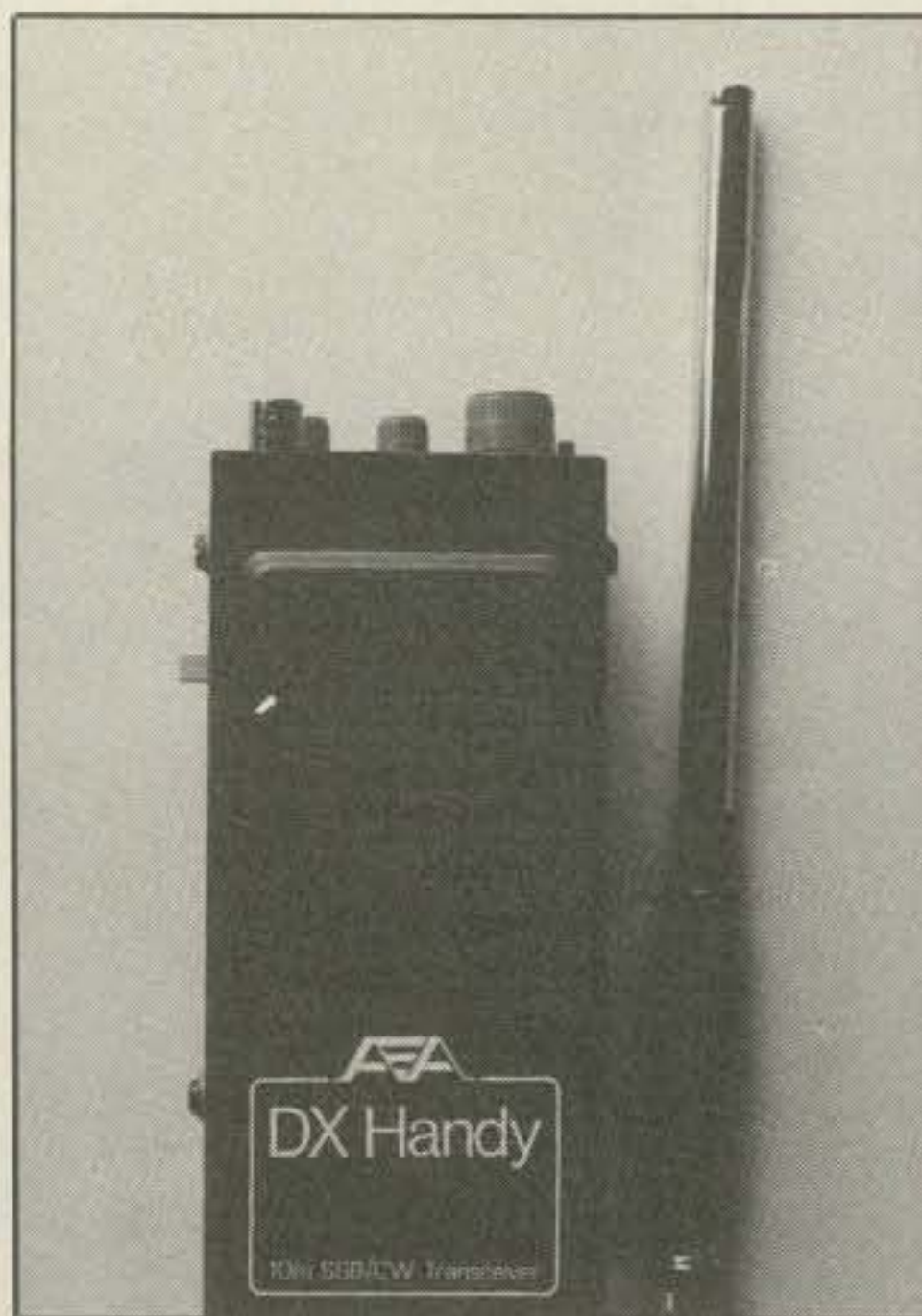


Photo 1—A 10 meter holiday delight—AEA's DX Handy. This pocket-size SSB and CW rig is a great traveling companion for any amateur.

crystal. Crystals for other 10 meter ranges are readily available from AEA. Two watts may not be a whopping signal, but it's quite sufficient when 10 meters is open like it has been recently. I have been using a DX Handy and having a ball. My first contact was VE6NS—not bad from Alabama. Now I am considering air-nautical mobile, DXing from the beach, and more. If you like portable/on-the-spot operating and HF DXing with a QRP flair, you will love the DX Handy. It is available from AEA, P.O. Box 2160, Lynnwood, WA 98036, and from numerous amateur equipment dealers nationwide.

Every properly dressed amateur needs belt-strapped rigs for both HF and VHF communications, and ICOM's new IC-2SAT shown in photo 2 is the hottest VHF handheld ever! This tiny talkie is a deluxe 2 meter FM rig with 48 memories, an autopatching delight with 10 autodialer memories, a public service/marine-band scanner, NOAA weather monitor, clock and travel alarm all in one!

The IC-2SAT's battery/power setup is unusually flexible. First, it is supplied with an internal battery you do not remove plus a bottom cover plate you can slide



Photo 2—ICOM's IC-2SAT 2 meter talkie is super small and loaded for fun all year.

off to add optional battery packs. There is also a top-mounted socket for external powering and charging. You can operate with the internal battery until it's exhausted, slide another pack on the bottom, and keep talking. When you return to your car, you can plug the ICOM into the cigarette lighter socket and charge the internal battery while you again continue talking. This little gem delivers 2 to 5 watts output, depending on battery packs. Similar S-line ICOM talkies are available for 222 and 440 MHz band operation. ICOM's new rigs are available from dealers large and small nationwide—for example, Amateur Electronic Supply and Ham Radio Outlet (see *CQ*'s advertisers index) and Acks Radio Supply Company (Birmingham, Alabama), etc. This item is selling out fast, so early ordering is suggested.

Everyone needs a safe and convenient way to carry his prized new talkie, and "The Pouch" shown in photo 3 handles those requirements in style. These nylon and neoprene holsters are made by Phil, K7OBS, and his assistants in Tucson, Arizona, and they are available in three sizes to fit any handheld. There is a "G"/generic size for standard talkies such as the DX

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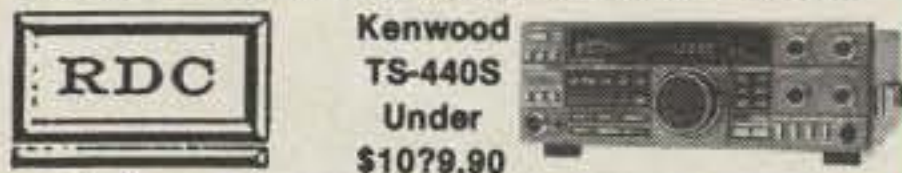
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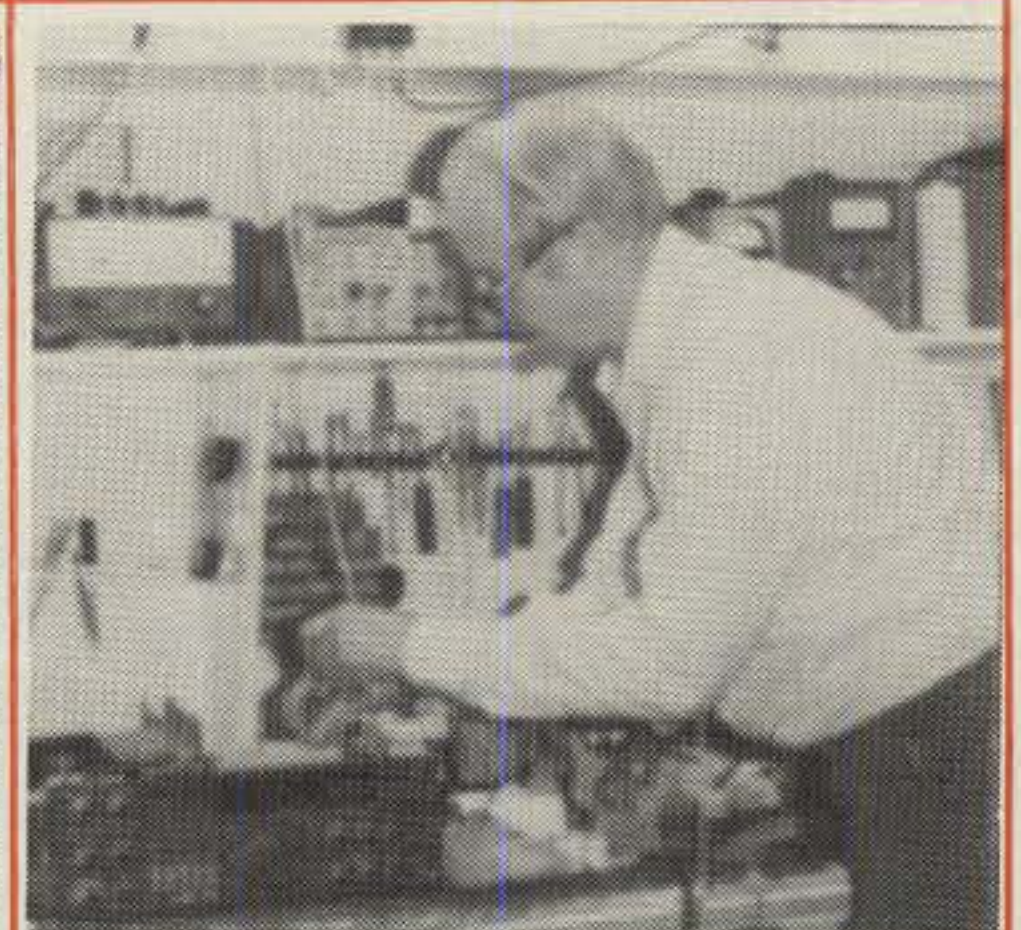
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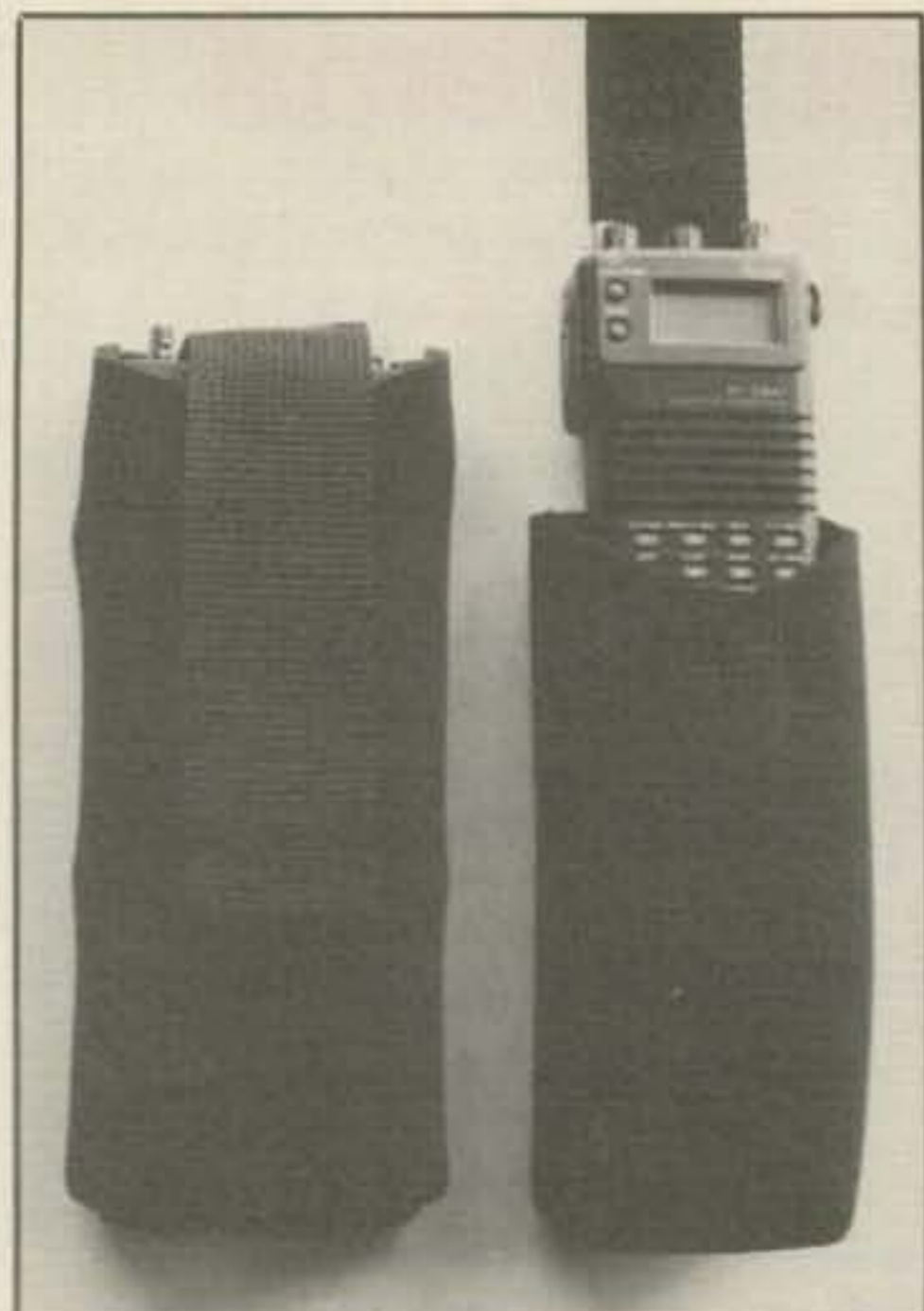


Photo 3— The latest and greatest way to carry and protect your prized talkie—The Pouch. These snug little cocoons are available for all sizes of talkies and they look like a million bucks.

Handy, ICOM's ATs, Kenwood's 215s, Yaesu's 727, etc.; an "S"/small size for micros and SATs, TH-21/25s, and FT-73Rs; and an "L"/long for tall portables such as the TH-75A and FT-470. The Pouch is made from scuba suit material that is stretchable, and more cushiony and water-resistant than leather. It's perfect when you get a new rig and need a low-cost case immediately. All the employees at Disney World and over 3000 hams now have Pouches. I have two and I love them. The Pouch is available from amateur radio dealers nationwide. Call K7OBS at 1-800-72-POUCH if you cannot find a Pouch in your area.

Image Enhancers

Our next item is a special station accessory that will stay with you for life, rig after rig: Bob Heil's new HM-10 mike and its Concept 2000 mount(s) shown in photo 4. Calling the HM-10 just a mike, however, is like calling a Rolls Royce just another car. The HM-10 uses Heil's world-famous microphone element which glamorizes your voice like nothing else on the market. It delivers high articulation for DXing and beautiful audio that makes your SSB signal stand out like a shiny new car on a dirty back road. The first time I used Heil's mike on my barefoot HF rig, a mini-pileup called to ask what I was using for such great-sounding audio. This thing is terrific!

The HM-10 also uses interchangeable cables that plug right into any modern transceiver. State your rig when ordering, and the mike arrives with a prewired



Photo 4— Heil's new HM-10 microphone and optional boom mount are a great gift guaranteed to glamorize your transmitted signal for many years hence.

cable ready to use. If you have more than one rig, simply order extra cables and swap the mike between them.

The HM-10 can be removed from its slide-in holder for mobile or hand use with its built-in PTT switch, or screwed into one of several Concept 2000 mounts. An adjustable boom that clamps to your desk is shown in photo 4. Other mounts include desk stands, goosenecks, etc. A rugged stomp-to-talk footswitch for hands-free contesting can also be used with the HM-10.

Heil mikes and accessories are available from Heil Ltd., No.2 Heil Dr., Marissa, IL 62257, and from many toll-free dealers.

Another item to improve your image at hamfests or other less formal occasions (pun intended!) is KB2MB's new amateur radio operator ring shown in photo 5. A similar ring captured attention at Dayton several years ago, but it disappeared before many folks spotted it. These impressive rings are available with a red, black, or blue stone, optional diamonds, and yellow gold or Permaglo (a silver alloy that resists tarnishing or scratching). A hand key is molded on one side and a mike is molded on the other side. Your call letters can also be engraved on either or both sides of this beauty.

KB2MB also makes gold call-letter lapel pins, and he will soon begin making



Photo 5— The classic amateur radio operator ring is back, and it is more beautiful than ever. This item, plus lapel callsign pins and a beautiful lapel handkey pin, are available from KB2MB.



Photo 6—Ready to expand your horizons during 1990? AEA's recently updated Pakratt 232 works all today's printed/computerized modes in high style.

gold handkey lapel pins guaranteed to win the hearts of CW enthusiasts everywhere. Those items should be available by the time this article appears in print. Contact KB2MB at H & M Jewelry, 26 Edgecomb Rd., Binghamton, NY 13905 for the latest news and for ordering jewelry.

Horizon Expanders

You say you are anxious to try some new modes of operation during 1990? Check out AEA's recently updated PK-232 shown in photo 6. This multimode interface connects between your transceiver and home computer, and it works RTTY, packet, AMTOR, ASCII, CW, and FAX, plus computerized CW with more features than CQ has contests. Station setup and operation are surprisingly easy with the PK-232. Connect its cables to your rig's mike and speaker jacks, connect another cable to your computer's RS-232 port, load a terminal program, and the PK-232's elaborate manual will guide you every step of the way.

The PK-232 works both VHF packet with an FM transceiver and HF packet with an SSB rig. It can be used with an IBM-PC compatible computer or Commodore 64 or 128. Its new/updated features include PACMAIL (an electronic mailbox for third-party traffic), priority acknowl-

edge to reduce packet collisions, Time Division Multiplex decoding, and an expanded set of on-screen operator assisting notes and "why not" explanations to help newcomers right from day one. This is the most elaborate and most user-friendly interface unit I have seen, and it makes one tremendous Christmas gift for any enthusiastic amateur. The PK-232 is available from AEA dealers nationwide.

Another neat Christmas goodie for super CW operating, contesting, and mobiling is MFJ's new Grand Master II Memory Keyer shown in photo 7. This item features an iambic keyer with independently adjustable dot/dash weight, dozens of extras, and enough memory to hold two or three full QSOs. You can work a full CW contest just by pushing buttons with the Grand Master II. A lithium battery is used for memory backup so you can program the keyer during slack times at home and it will be ready for action any time.

Eight of the Grand Master II's ten memories are "called up" via front-panel pushbuttons. The other two memories store self-incrementing or non-incrementing QSO numbers for contesting. You can also interrupt a message by sending from your paddle, then press a memory button, and it will continue from its paused point. Alternately, you can press a memory's button during trans-

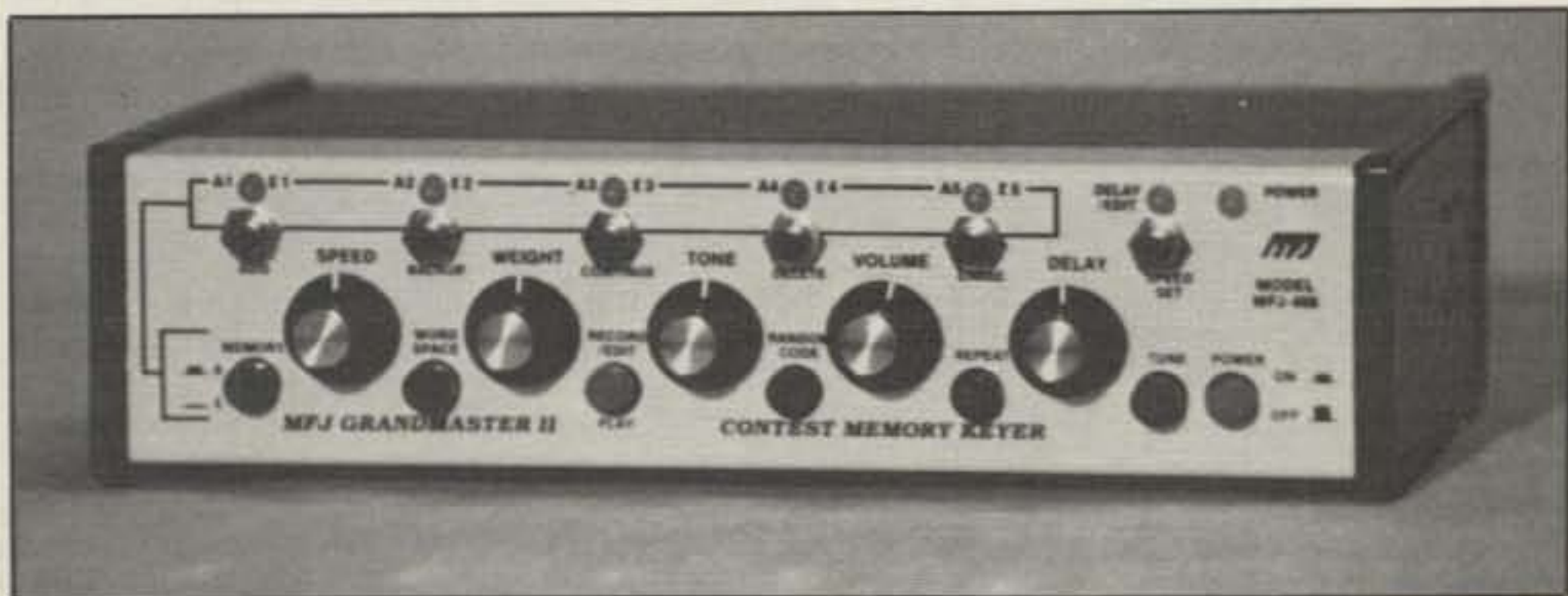


Photo 7—Serious contesters and CW mobilers will be delighted with MFJ's Grand Master II Keyer. This small unit truly automates your CW activities.

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mission and it will reset to that message's beginning. There is also a beacon/repeat feature for automatic CQing with an adjustable delay time that is fantastic, editing for inserting one message into another, etc. I have seen several memory keyers for automated CW mobiling, but the Grand Master II has beat them all in easy operation and spiffy features (many of which were omitted in this brief overview).

The Grand Master II is available from MFJ Enterprises (1-800-647-1800) or from their dealers nationwide.

If you are experiencing difficulty simply getting on the air due to antenna limitations, Jim Thompson at The Radio Works has some clever horizon expanders to make your holiday season joyful. Some of his low-cost/high-performance specials include a wire vertical (an In-TreeVert) and Rotary MicroDipole for apartment dwellers, three versions of the high-performance Carolina Windom (photo 8), and a "universal antenna" that configures (without soldering) as nine different wire antennas. The Radio Works also carries the full line of WD4BUM "Ham Stick" mobile antennas that are low in cost and work like a champ. WD4BUM recently added a clever adjustable impedance-matching base coil for mobile antennas, and it too is a winner.

The Radio Works also has an extensive line of deluxe baluns; baluns for remote use with unbalanced-output tuners; ny-



Photo 8—Antenna restrictions hampering your fun? The Radio Works antennas, such as the Carolina Windom shown here, are the perfect low-cost solution.

lon, dacron, and super-strong Kevlar rope; plus other goodies highlighted in their 56-page catalog. If putting up a good antenna stands between you and amateur radio fun, contact The Radio Works at Box 6159, Portsmouth, VA 23703 and get operating while the bands are booming with great Cycle 22 action. You will love it!

Lindsay's books are loaded! We will feature some homebrew rigs built today from Lindsay's 1934 *Shortwave Radio Manual* and 1934 *How To Become A Radio Amateur* in the near future. Watch for them!

Finally, the best gift that continues giving twelve times throughout the year is a subscription to *CQ* magazine. Needless to say, it is loaded with easy-to-understand information and contest details galore!

That's our holiday views for this year, and we hope one or two of our featured items grace your shack during the coming months. Until we meet on 30, 20, or 10 meters...

73 and Happy Holidays, Dave, K4TWJ

Conclusion

Some always favored goodies for your Christmas reading pleasure are Lindsay Publications' fantastic reprints of old-time radio books shown in photo 9. A large number of our column followers love classic rigs as much as I do, and

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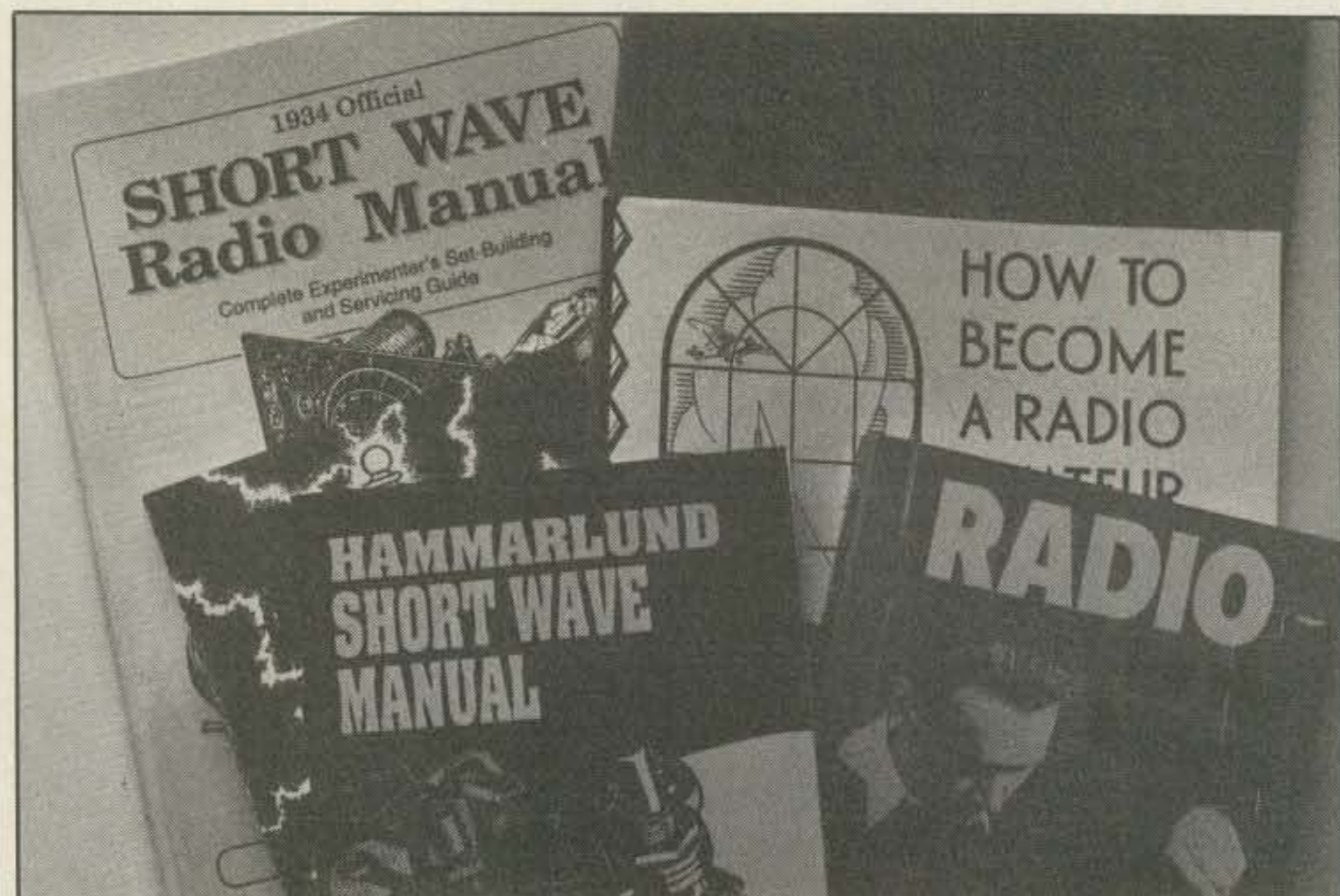


Photo 9—Old-time radio is back in full force! Check out the schematics and "how to do it" information in Lindsay's books shown here and get cracking on the fun.



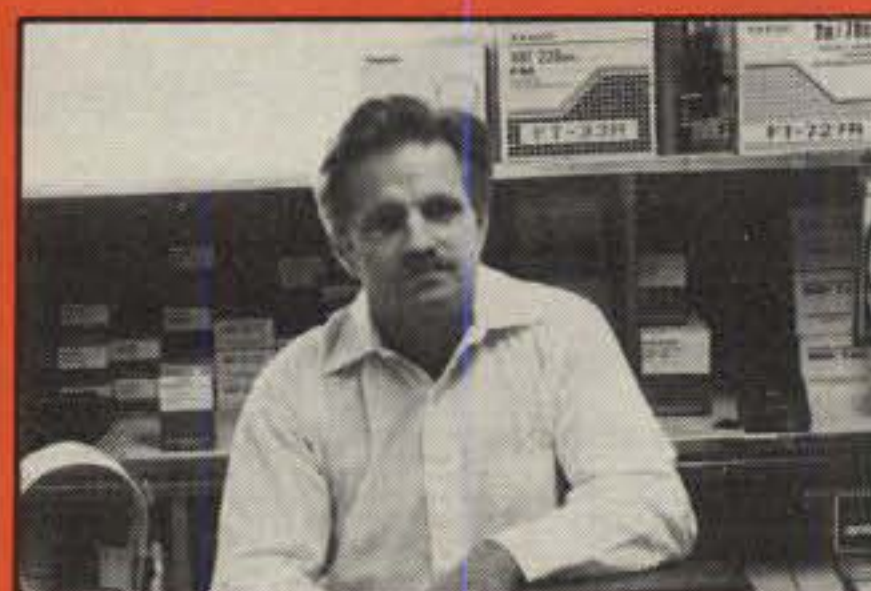
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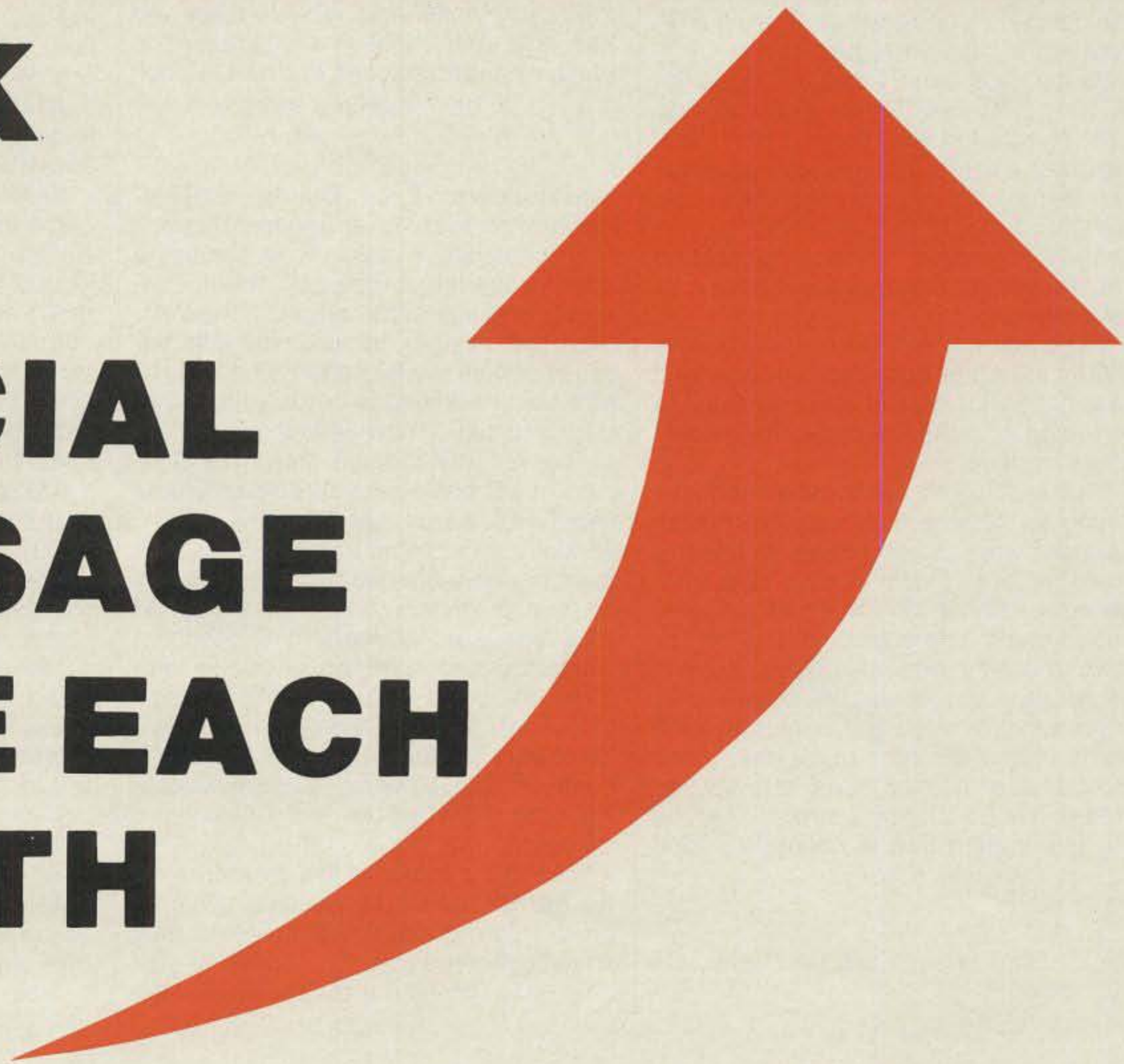
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Getting QSL Cards Without Sending Them

New amateurs have always faced the problem of having no QSL cards when they are getting started on the air. That problem is now compounded by new amateurs who do not want to buy cards until they upgrade and obtain a different callsign. The unfortunate result is that these amateurs receive very few cards from the people they contact.

It takes about six months for a new amateur to be listed in a Callbook. Since no card can be received from amateurs who do not have them, there is no easy way to send cards to these new amateurs.

If you are a relatively new amateur who does not yet have cards, please read this article carefully; it contains information that is intended to help you get cards.

In the first place, please understand that you do not have to send a QSL to receive one. Most amateurs simply need the basic information, whether you provide it in a letter or during your contact (QSO) on the air. Supply your name (including your last name), mailing address (including ZIP), and callsign, if you are requesting a card. In regard to the QSO, state the date, band, mode, and time (indicating UTC, EDST, etc.). If you provide QSL information near the end of a QSO, the other amateur will already have your first name, callsign, city, and state, plus the QSO facts. In this case just tell her/him your last name, mailing address, and ZIP. (You might even pass along your county.)

If you recently changed callsigns, simply tell the other operator your previous callsign. If you held it long enough for it to be included in the Callbook, that should usually suffice.

Those of us who scour the bands listening for Novice and Technician type callsigns want to send cards to confirm contacts. We seldom need a card from the newer amateur because we probably already have cards from her/his city or town. It is nice to receive cards, but it is not necessary to receive one before sending one. I have averaged more than 1000 Novice band contacts every year since the Novice license was established (1951). It is constantly a struggle getting the information that is needed to send



Gene Schneider, KA9CNQ, lives in Greenfield, Wisconsin. Gene has been licensed 11 years, but he did not operate until March 1989. Gene told me he enjoys operating and he wishes he had started operating when his ticket first arrived. I know he is now active, since I recently enjoyed a good code contact with Gene. He upgraded to Technician and General during May 1989, and he has also earned a 20 wpm code certificate. Gene runs a Yaesu FT-101EE with a 10/15/20 meter rotatable dipole and a 40 meter inverted Vee. He sends a QSL to each station the first time it is contacted, and his QSL collection is getting large.

cards to new amateurs. During each Novice band contact with an apparent Novice or Technician, I make sure she/he is listed in the latest Callbook. If not, I request mailing information. However, even that system occasionally fails because people move. Annually I get stuck with about 50 filled in cards which I am unable to mail to new amateurs.

The January through March 1979 issues of *CQ* contain my three-part article about QSL cards. My licensing course handout of the same information (not as fancy) is available directly from me at no charge to anyone who requests it and supplies a large (at least 9 by 11.5 inches) self-addressed stamped envelope with triple first-class postage (65¢) attached to it. That decade-old article contains a lot of very useful data. More than 2000 copies of it have been given to my licensing program students and *CQ* column readers.

Please do not drive DX amateurs off the Novice bands by sending your address information to them, unless they specifically request it. Almost all DX cards are received through the QSL bu-

reau, as is explained in my QSL article. Most DX operators want to contact as many new amateurs as possible when they are operating in the U.S. Novice bands. This means that they want short contacts. Some DX amateurs just want to exchange signal reports.

Telegraph Key Collections

Fortunately, our amateur radio service includes a few dedicated people who collect, refurbish, and display telegraph keys. If you are in the vicinity of one of the collections mentioned in this article, you might enjoy viewing it. Several of these collectors are willing to display their keys at conventions and hamfests. I have run more than a dozen major hamfests, and I know that such displays are greatly appreciated by attendees. Interesting displays help build attendance at future shows.

WB4EDB. Smiley White, WB4EDB, has a collection of keys in Virginia. His mailing address is P.O. Box 5150, Fredericksburg, VA 22403 (telephone 703-373-0996). Smiley is just starting his key collection.

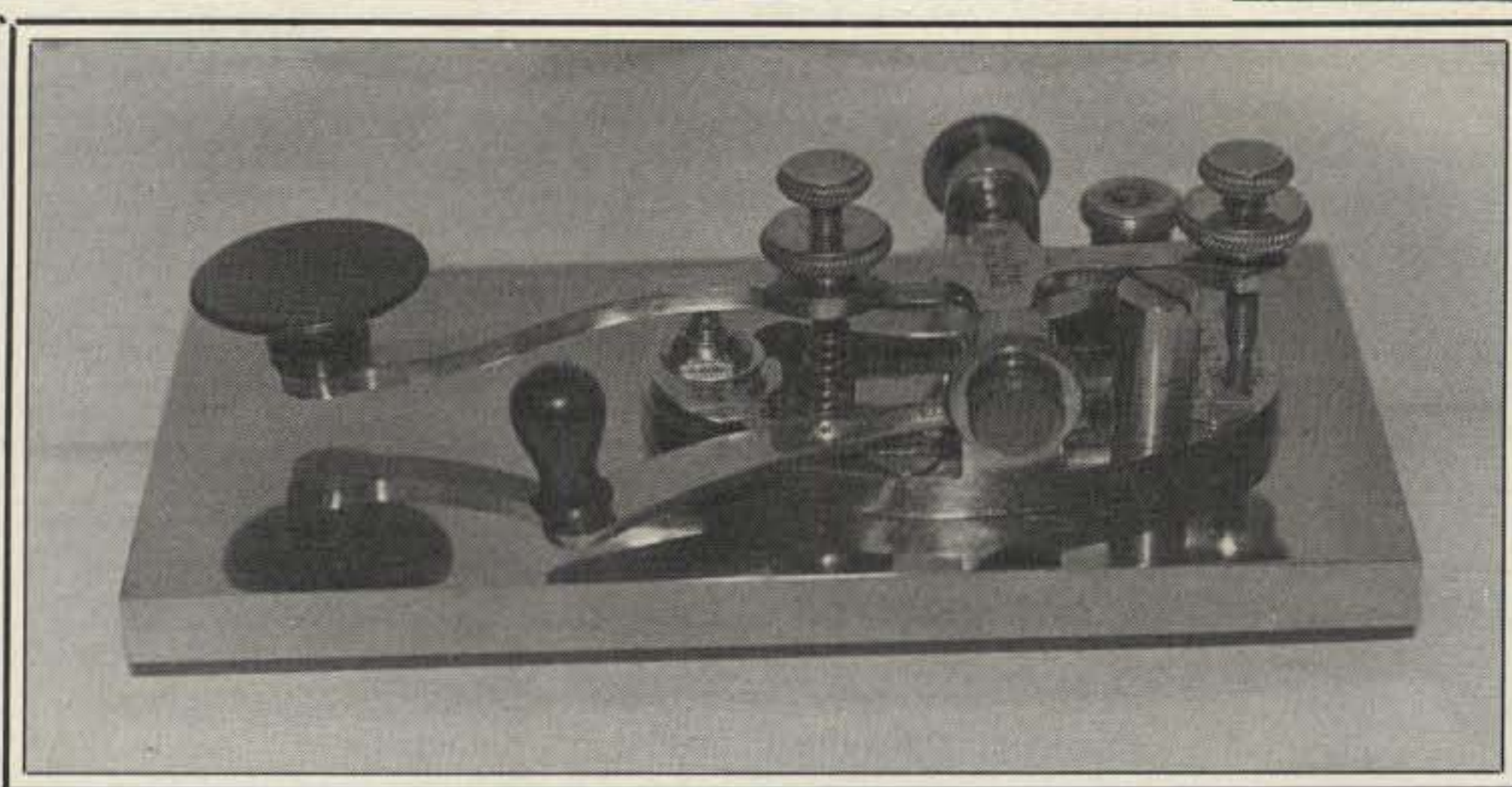
N3JT. James Talens, N3JT, has a collection of keys. His address is 5916 N. 15th Street, Arlington, VA 22205.

K4TWJ. Dave Ingram, K4TWJ, has his home filled with keys and classic radios. His mailing address is 2028 Brandywine Court, Birmingham, AL 35216. Dave's items are all operational and he welcomes invitations to show them at hamfests. However, his home is so full of his collection that he cannot host guests who want to view his items. Dave regularly uses a 1934 Mac key.

K5RW. Neal McEwen, K5RW, lives at 612 Still Meadow Drive, Richardson, TX 75081. His collection of 310 keys includes about 125 different semi-automatic keys (bugs). Each key is displayed with a card that shows the manufacturer, model number, date originally manufactured, original owner, and historical information. Radiotelegraph, spark, landline Morse, and submarine cable instruments are included in this collection. Neal also collects documentation and information about keys. A few interesting items are mentioned herein. Sears and Roebuck marketed a spark key in 1919. More than 50 companies manufactured bugs. Vibroplex built more than 75 models of bugs.

Neal is glad to show his key collection

45527 Third Street East, Lancaster, CA
93535-1802.



An AT&T Key 1A, part of Ralph Covington, W7SK's collection.

to people who want to see it. An appointment is necessary. His telephone number is 214-234-1653. The May and June 1985 CQ magazines contain a seven-page description of the K5RW key collection, including 22 photographs. That superb article was written by Dave Ingram, K4TWJ, who immediately became a key collector. If you want a free copy of Dave's article, send your request to my California address; please provide a self-addressed business-size (#10) envelope with double first-class postage (45¢) attached.

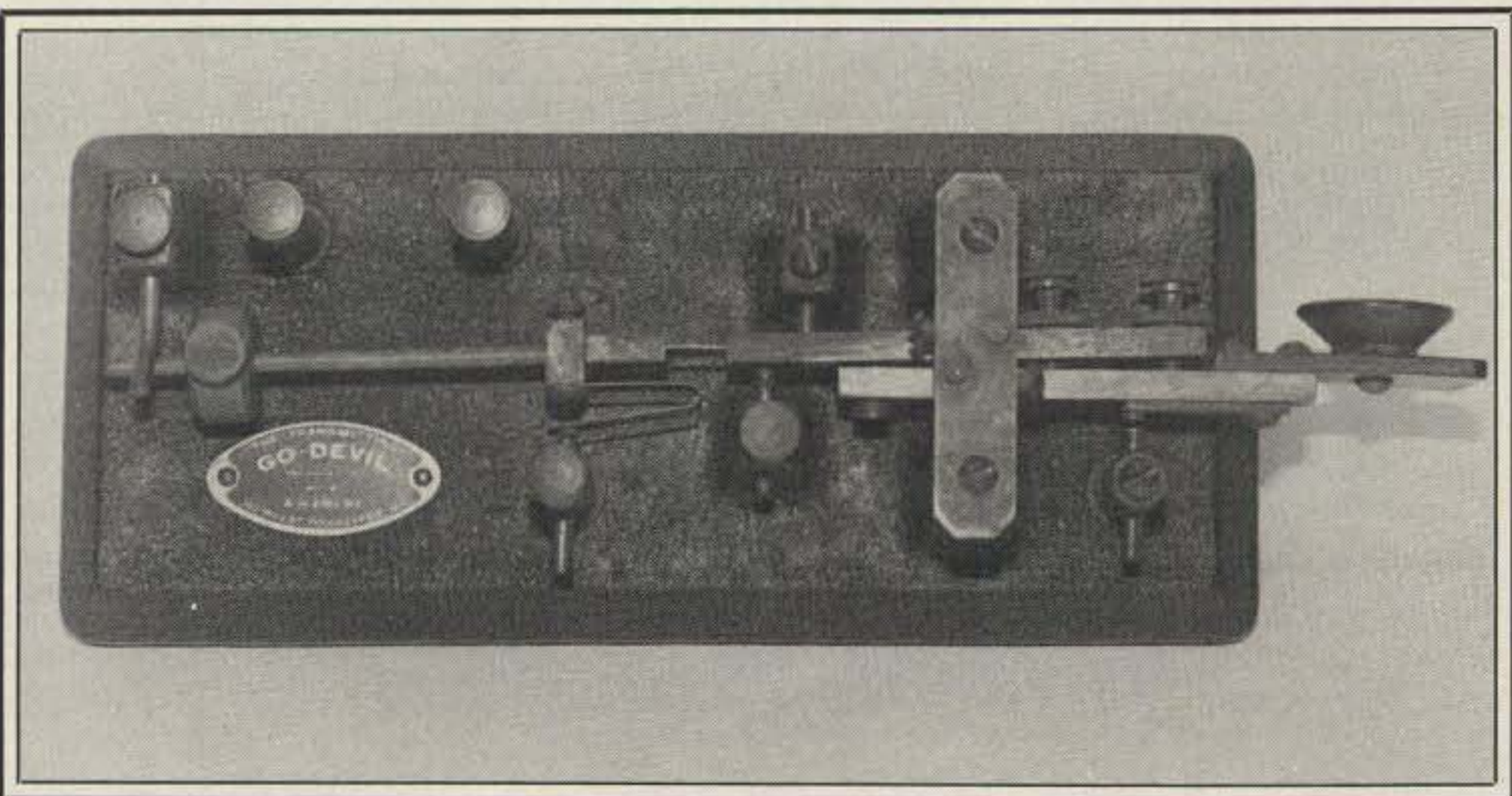
K6ARE. Dick Randall, K6ARE, has his collection of about 180 keys at 1263 Lakehurst Road, Livermore, CA 94550. His collection is available for viewing by people who make appointments by writing to him. Livermore is a city I pass through when I drive from the Los Angeles area to the San Francisco area. It is near where the hilltops are covered by large wind-driven electrical generators.

WD6DTC. Larry Nutting, WD6DTC, lives at 4025 State Court, Santa Rosa, CA 95405. His telephone number is 707-539-1883.

WW7P. John Elwood, WW7P, has a key collection that may be available for viewing. His address is 5716 North 34th Drive, Phoenix, AZ 85017.

W7SK. Ralph Covington, W7SK, is the headmaster of the Reno Telegraph Key Orphan Home. His mailing address is P.O. Box 7415, Reno, NV 89510-7415 (telephone 702-356-0615). Ralph has more than two dozen keys which are in various stages of being refurbished, including a 1934 Mac key that I used to own. The accompanying photograph shows AT&T key 1A, which got Ralph started collecting keys. It is marked patented February 15, 1881. Rex Parcels, K7AZ, gave this key to Ralph. Also shown is one of his most interesting keys. This Go-Devil was purchased from the estate of W2QFH, and he bought it new in 1937. A Dow Key bug given to Ralph by Clarke Vaughn, KH6IHY, is shown here, too.

Ralph can normally be called Tuesday through Saturday from 7 AM to 2 PM (only) Pacific time. He takes his collection to amateur radio events at which he is invited to display his keys. At the time this



W7SK's Go-Devil semi-automatic key.

article was in preparation, Ralph was making a voyage as a radio officer aboard a U.S. merchant marine vessel.

K8UR. Edward McLeod, K8UR, has a collection of bugs and sounders. His mailing address is P.O. Box 202, Hopkinton, MA 01748.

If you have a telegraph key, documentation, or facts that could enhance key collections, I hope you will bring such information to the attention of collectors. I had a few keepsake keys which have been added to the collections of people who can share them with others. If you have a unique telegraph key/apparatus, copy any markings that may be on it and take a couple of pictures. Send as much information as possible to key collectors. Your dust collector may become an important addition to someone's key collection. These people are performing an important task for us.

If you know about a telegraph key collection I have not covered in this article, please send such information to my California address. I am particularly interested in key collections that are available for viewing by those of us who would like to see them. Several more of these collections must exist.

Publications. If you are greatly interested in the history of code, you should consider subscribing to "Morsum Magnificat." The annual subscription rate is \$13 or \$16 for surface or airmail delivery, respectively. Neither checks nor money orders are acceptable. The editor and publisher is Tony Smith, G4FAI, 1 Tash Place, London N11 1 PA, England. Issues of this publication are filled with interesting articles about the past, present, and future of Morse telegraphy. "MM" was first published in Holland during 1983 by Rinus Hellemons, PA0BFN. The Spring 1989 edition is "MM" issue number 11. An authentic reproduction of the 1884 J.H. Bunnell & Co. 48-page "Students' Manual for the Practical Instruction of Learners of Telegraphy" is available from Mr. L.A. Bailey, 909 S. Evergreen Avenue, Clearwater, FL 34616. The price is \$6.50 and \$12 each to U.S.A. and DX addresses, respectively.

Used Equipment List

New amateurs are likely to purchase used equipment and accessories when they are going to set up their first station. If you are lucky, you may have a good local source of such items. Most amateurs seek used items in the classified advertisements in the major amateur radio publications, in the "for sale" sections of club bulletins, or at swapfests. Other sources of used gear exist.

One such source is the Communications Exchange Sheets (CES) published by Mike Filipiak, KO9Q, 2224 Cooper Avenue, Sheboygan, WI 53083. The CES is approximately 11 1/2 inches wide by 17 in-

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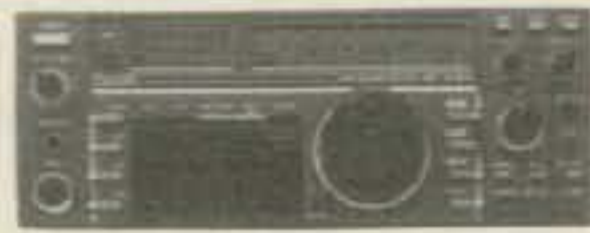
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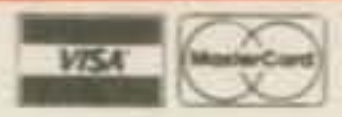
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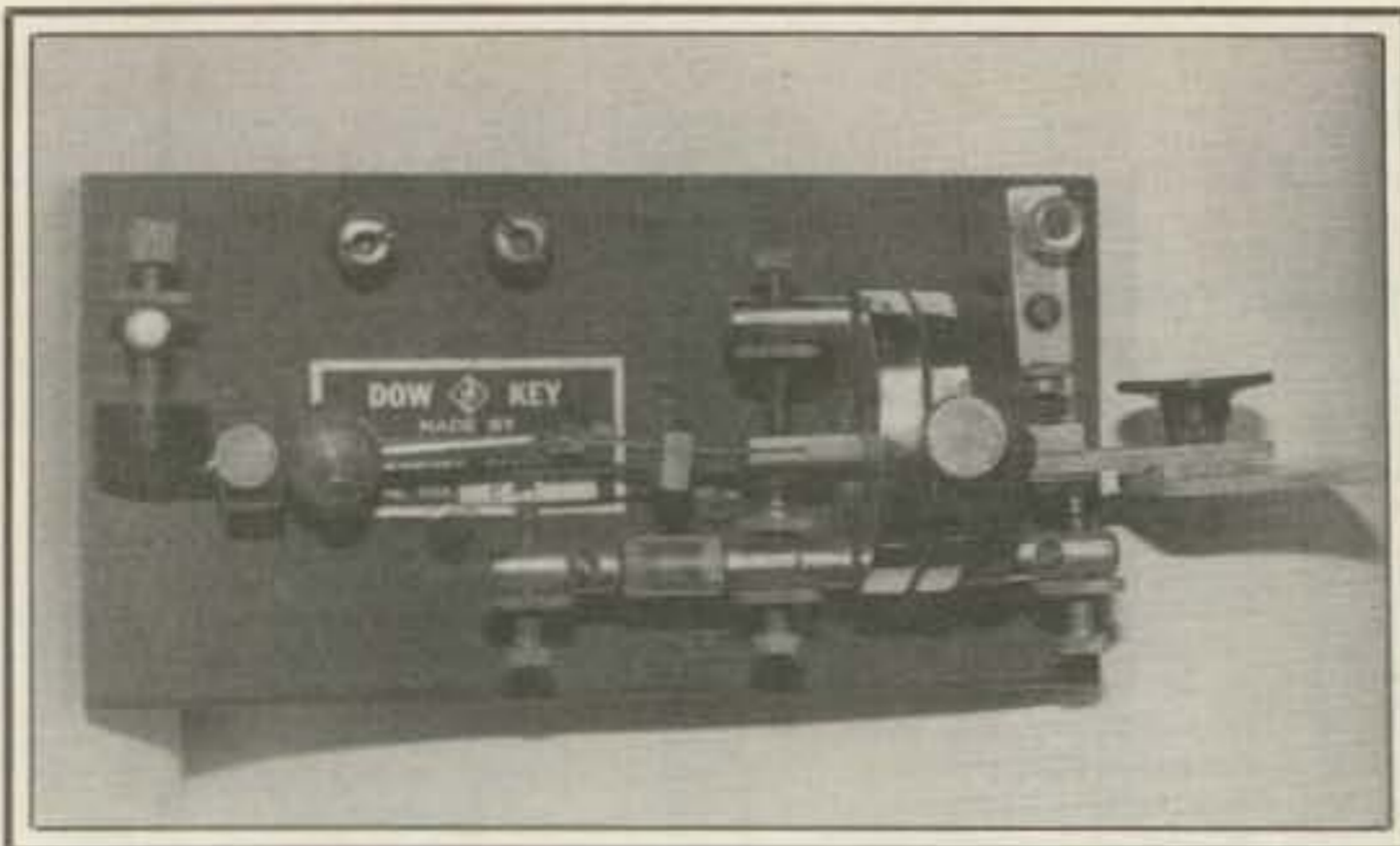


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ches high, and each issue contains several pages. The CES is intended to help new amateurs buy and sell items quickly, easily, and inexpensively. Want ads cost \$2 each. For-sale ads cost \$5 each (on a pay-when-you-sell basis), for items sold at less than \$100. For-sale ads cost \$10 for items sold at \$100 to \$500. The cost of for-sale ads for items sold at more than \$500 is \$10, plus 2 percent of the sale price. The subscription rate is \$14 per year, and you get two issues per month. A free copy of CES can be obtained by providing a self-addressed business-size (#10) envelope to Mike with 45¢ postage on it. CES is supported by its users; it requires cooperation to survive.

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962C 1500 watt tuner, the MFJ-986 3000 watt differential-T tuner, and the MFJ-989C 3000 watt roller inductor tuner. This arrangement provides improved accuracy over a wider frequency range.

Photographs Wanted

Photographs of new amateurs in their shacks provide introductions to a few of the newer licensees. Photograph size is unimportant, but good definition, contrast, and subject matter are important. Color pictures can be used, but black-and-white photographs are preferred. Operating activities and achievements, plus a self-introduction, are needed with each picture. Send an SASE if a picture must be returned. A free one-year CQ subscription (or renewal) is awarded to the one amateur whose picture I select as the winner for the month. If you are a subscriber, please enclose the mailing label (or copy) from your latest CQ issue. One award is made each month, no matter how many photographs are printed. DX amateurs, who frequently work the American Novice bands, are also urged to submit photographs.

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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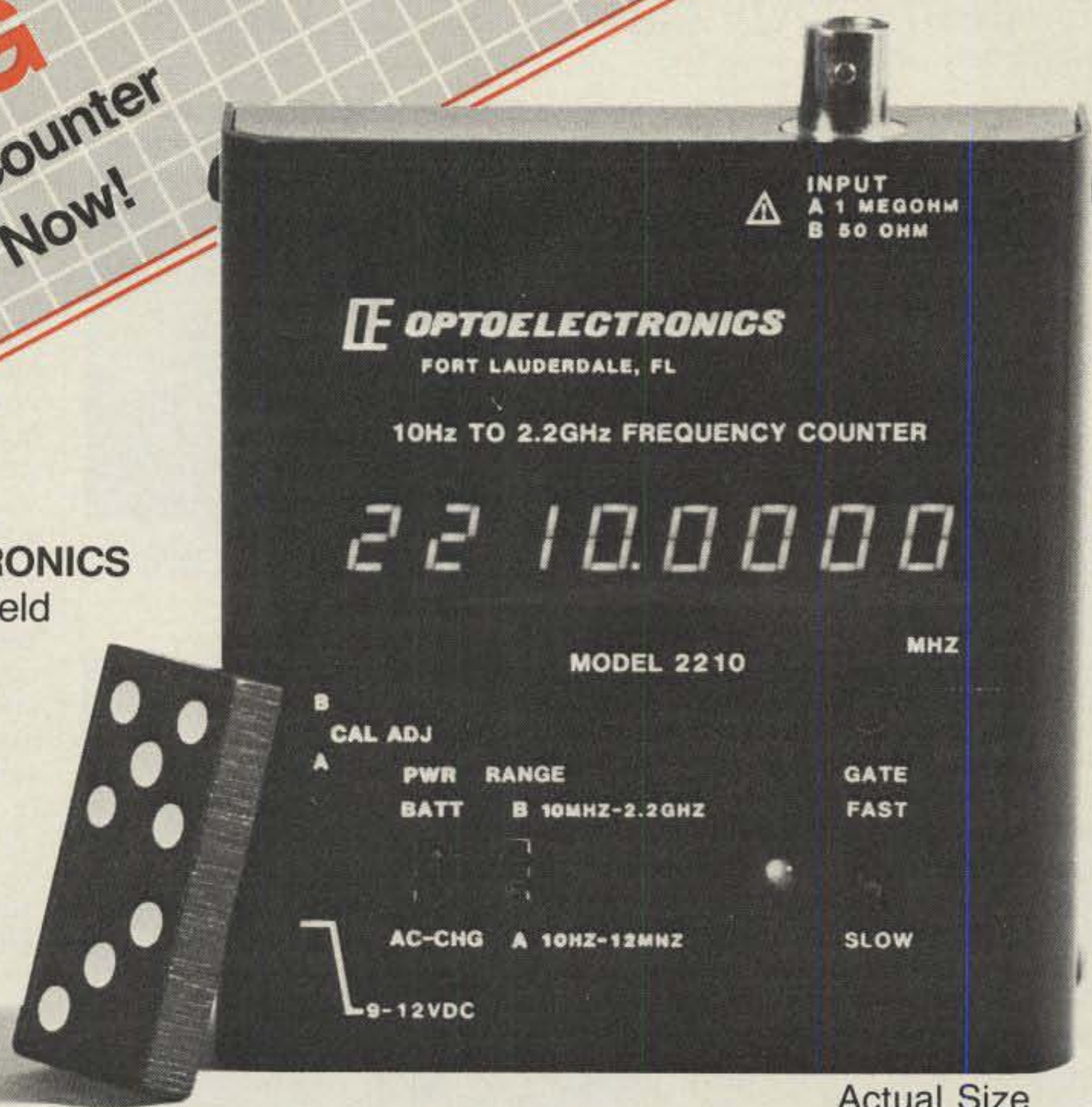
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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for December is:

Harold R. Schneider, W7BKM
USA-CA All Counties #608, All SSB,
1-27-89

"USA-CA All Counties Award #608 is framed and on the wall of my shack, as evidenced by the accompanying pictures. The pictures are courtesy of a local club member who thought the accomplishment of working all counties of the United States was worthy of commemoration through his photographic talents.

"About 2500 of my contacts were made using a Heathkit HW-101 with a 75 meter inverted-Vee antenna, or using a Heathkit SB-102 operating mobile. I have never used a linear amplifier, even though I acquired one more than five years ago. It is still sitting under the bench.

"Electronics has entered into my professional career only in minor ways, since most of my work has been in the power field with electric utilities. My involvement in the industry encompassed things such as substation design, survey of rural power lines, transmission-line relaying, supervision of a meter department, transformer repair management, operation of large irrigation pumping equipment, hydroelectric plant evaluation, and various and sundry other jobs as they popped up.

"During World War II, I helped keep the electric locomotives in operation for the old Chicago, Milwaukee & St. Paul Railroad. That was a very interesting job involving redesign of locomotive controls, load studies through the Cascade and Rocky Mountains, etc.

"During the last fifteen years of my working career I also operated a TV service and sales business as a side line (just for something to do). My XYL and myself were also quite active during the 50s, 60s, and 70s teaching and calling for square dance groups. This may give you an idea why it took 18-plus years to work all the counties.

"Sometime during 1929 an older cousin moved up to Whitefish, Montana from Dillon, and gave me a home-built receiver using 201-A tubes in a Browning-Drake circuit. This got me interested in B.C. listening and experimenting. The next step was to build a short-wave adapter, using a circuit and instructions found in a 15-cent magazine. I believe the magazine



Harold mans the controls of ARS W7BKM.



Harold Schneider, W7BKM, USA-CA All Counties #608, at his neat and effective station.

was called *Radio World*. With this adapter (battery operated, of course) I heard W7AJC, a wheat farmer in the Palouse area of Washington, on AM phone, and wrote him a card inquiring about ham radio. He referred me to the ARRL, and this resulted in the purchase of a copy of the sixth edition of the *Handbook*. About the same time, I heard of a ham in Kalispell, W7MZ, and a visit with him got me hooked. I managed to get a station together and got my first license, 'Temporary,' dated August 28, 1931. The test consisted of answering ten questions by mail, and certifying that I could send and receive code at 10 words per minute. Learning the code by oneself can be deceiving; however, after getting on the air it only took a few days to work out the kinks.

"My first transmitter was a pair of 45s,

push-pull TNT, and the receiver was a regenerative detector, capacitor controlled, with two audio stages, all 201-A tubes. Vivid memories include the spring and summer of 1933 when W7MZ and I built eleven stations, each including a one-tube transmitter and two-tube receiver for fire guards in Glacier National Park. We taught code during early spring, the guards paid for parts, and the Park Service hired us to do the building and serve as guards and radio operators during the summer. This was the first use of radio communication in the park. Note that the first rig I built for portable use for myself weighed *only* 60 pounds, including all accessories and batteries. My first transcontinental, East Coast, contact was made on 40 meters using a 71A tube in a Hartley circuit, with an input of 3.9 watts at 180 volts 'B' supply.

"The examination for upgrading to Advanced class privileges was taken in 1942 during the silent period of World War II. In 1933 and a few years following, I held the additional call W7CQU as a portable call. While several moves were made through the years, all locations were within the seventh call district, so I have been continuously licensed under the same call.

"As of November 1986, I had been deeply involved in county hunting for some time and needed only 112 county contacts to complete all counties in the USA. Two years and two months later I finally made it, to round out my 18-year-plus quest for the USA-CA All Counties Award. I would be remiss if I did not extend heart-felt thanks to all the great people who helped me along the way. I will not soon forget the County Hunting gang and the great associations that have been the real enjoyment and satisfaction of the whole effort.—73 and best wishes, Harold."

Awards Issued

Kurt Wetter, HB9AFI, completed his quest and claimed USA-CA All Counties #634, and USA-CA 3000 #664, Mixed, #1 to HB-land, dated 8-24-89.

Charles W. Menard, III, WB9IFE, filed his first application and received USA-CA 1500 #891, USA-CA 1000 #1081, and USA-CA 500 #2354, Mixed, dated 8-23-89.

USA-CA 500 certificates went to:
Chris R. Burger, ZS6BCR, USA-CA 500 #2353, All CW, #1 to South Africa, 8-15-89.

Janos Retkes, HA8UB, USA-CA 500 #2355, Mixed, 8-25-89.

William L. Rasins, N4MCH, USA-CA 500 #2356, All 10M SSB, 8-30-89.

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Kurt Wetter, HB9AFI
USA-CA All Counties #634, Mixed, 8-24-89

USA-CA Honor Roll

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		WB9IFE	2354
1500		HA8UB	2355
WB9IFE	891	N4MCH	2356
1000			
WB9IFE	1081		

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to CQ is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801, USA for \$1.25. To qualify for the special subscriber rate please send a recent CQ mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated April 2, 1985. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060, USA. DX stations must include extra postage for airmail reply.

Awards Available

Portuguese Discoveries Award. The Portu-



The Arctic Ocean Award offered by the West Siberia DX Club.

guese Discoveries Award is being offered by Rede Dos Emissores Portuguese in celebration of the discoveries made by Portuguese navigators five centuries ago.

From the 1st to the 12th of December 1989, the special call signs CT500A, CT500B, CT500C, and CT500D will be activated from Portugal. This very rare prefix, a new one for everybody, was specially issued for this event by the local authorities. All four stations will be active on all bands, in SSB, CW, and RTTY modes.

An award will be issued to those radio amateurs/SWLs who manage to work/hear all four stations. The award consists of a colorful reproduction of an old world map on which the main Portuguese achievements are marked. To apply for the award, send your log with the four contacts/SWL reports and a fee of \$5.00 US or 8 IRCs to R.E.P. Awards Manager,



The Worked All West Siberia Award for contacts with stations in designated regions.

"Portuguese Discoveries Award," P.O. Box 2483, 1112 Lisboa, Portugal.

This address may also be used as a QSL route. Luis Sutil Teixeira, CT4NH, is the new R.E.P Awards Manager.

West Siberia DX Club Awards Program. The West Siberia DX Club (WSDXC) sponsors a series of awards available to radio amateurs worldwide. All contacts after 1 January 1980 count for the awards described below. Send certified GCR list (no QSLs) with a fee of 13 IRCs to UA9MC,



The USSR Prefix Award for working designated numbers of stations with Russian prefixes.

Sergej F. Kruglov, P.O. Box 836, Omsk-99, USSR-644099.

Arctic Ocean Award. Work the following countries: JW (Svalbard), JW (Bear-Is.), JX, KL7, LA, OX, UA1 (FJL), UA1 (Novaya Zemlya), UA0 (Severnaya Zemlya), UA0 (New Siberian Isl.), UA0 (Wrangel Isl.), VE and stations within the following regions—No. 088, 098, 105, 113, 114, 139, 143, and 163.

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- Class 3—10 countries/regions

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- Class 1—40 QSOs with 9 regions
- Class 2—30 QSOs with 8 regions
- Class 3—20 QSOs with 7 regions

USSR Prefix Award. Work different prefixes of the USSR.

- Class 1—200 prefixes
- Class 2—150 prefixes
- Class 3—100 prefixes
- Class 4—50 prefixes

USSR 1,000,000 Award. Work stations from cities of the USSR which have more than 1,000,000 inhabitants. They are Alma-Ata, Baku, Chelyabinsk, Dnjepropetrowsk, Donetsk, Gorky, Kazan, Kharkov, Kiev, Kujbyshev, Leningrad, Minsk, Moscow, Novosibirsk, Odessa, Omsk (compulsory), Perm, Sverdlovsk, Tashkent, Tbilisi, Ufa, and Yerevan.

- Class 1—22 cities
- Class 2—20 cities
- Class 3—17 cities

Prefix 9 Award. Make confirmed contacts with stations having the numeral "9" in the prefix.

Class 1—50 prefixes in 20 countries on 6 continents
Class 2—40 prefixes in 15 countries on 4 continents

Class 3—30 prefixes in 10 countries on 3 continents



The West Siberia Award.

West Siberia Award. Spell the name of this award by using the last letter in the callsign from those stations which are located in WAZ Zone 17—for example, UA9AW, UL7AE, UA9WS, UH8BT, . . . UA9MA, UM8MR, UA9MD.

Rules for Membership in the WSDXC. Applicants must have 100 awards/certificates including "R-150-S" and three from WSDXC, or must have 200 countries (R-150-S list) and three awards from WSDXC. The fee is 20 IRCs; address as above.

Notes

Happy Holidays, everyone!
73, Dorothy, WB9RCY



USSR 1,000,000 Award for working large Russian cities.



The Prefix 9 Award available from the West Siberia DX Club.

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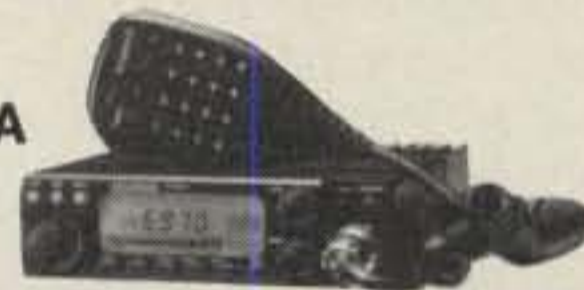
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CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Gift Ideas

I used to wonder why publishers release their magazines a month in advance of the "due-date" for that issue. Well, it has now become clear to me why this practice exists.

This is the December issue of *CQ*, and therefore also the Christmas issue. With these two things in mind, I have begun to understand the practice of advance release. This gives us, the writers, a chance to give you, the readers, a "heads-up" on what or where to find a special type or kind of Christmas gift. By having the December issue in your hands a month early, you are able to place the suggestion as to what you want for Christmas into the minds of those who are already trying desperately to discover what to give you.

This same notion works in reverse, too. This timing enables you to make selections for that favorite OM or YL with regard to the kind of gift that an amateur would want for Christmas. In the case of this "Packet User's Notebook" column, we are going to focus on accessories that can be used either directly or indirectly with packet radio.

The packet controllers are on the top of the list for many amateurs. Many of you have been waiting for Christmas to arrive so you could make the purveyors aware of your wants and desires with respect to the packet controller, or even better, the multi-mode controllers.

The All-Mode Controllers

Judging from the mail I've been receiving lately, it appears that a great majority of the readers of this column are hoping to receive the "all-purpose digital controllers."

In addition to packet, these controllers transmit and receive other digital modes such as AMTOR, RTTY, CW, FAX (WeFax), Slow-Scan TV, and NavTec. They also offer multiple ports for VHF and HF operations. The AEA PK-232, Kantronics KAM, and the MFJ-1278 are "all-mode" controllers that fall within this category.

506 Pheasant Ridge Drive, Warner Robins, GA 31088



The AEA PK-232 falls in the multi-mode data controller category. This type of data controller is a gift many packeteers hope to find under their tree.

The features may differ from one "all-mode" controller to the next, so it would be in your best interest to investigate the options which best suit your needs. (Price range: \$300)

The "Packet Only" Controllers

If you plan to operate packet only, but you wish to use both HF and VHF packet, you may want to suggest that the "would-be" Santa look for a controller that has a tuning indicator for use on the HF bands.

Almost all Terminal Node Controllers (TNCs) operate both HF and VHF, but to try operating HF packet without a tuning indicator is like fishing without bait. Your chances of catching anything are little to none.

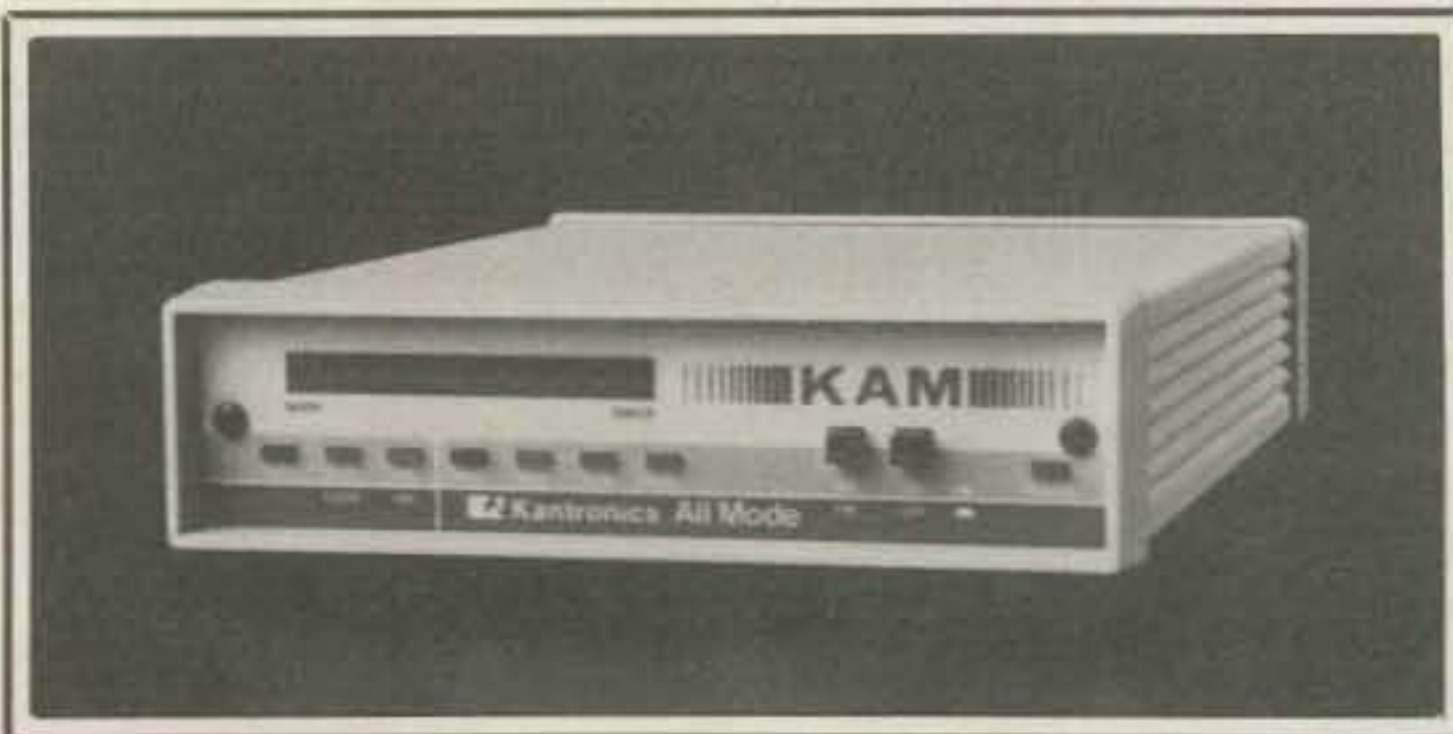
Now if you just want to operate VHF packet, there are numerous TNCs that will fill your stocking. As of this writing, just about every TNC now supports the Mailbox or PBBS feature. This allows the user to set the Mailbox or PBBS command ON while the computer or terminal is being used for other tasks, such as letter writing and data processing. The mailbox will receive and store messages while you are away. (Price range: \$150 and up)

Accessories (Goodies)

If you are interested in joining the new packet picture trend that's getting so much attention in the packet community, then you likely will want to develop your own means of picture generation.

There are several ways to compile pictures for packet. One way is to use a "Hand-Scanner" such as the LOGITECH, Genius (KYE) GS-4500, and others to scan a picture or photo into the computer memory and save to disk. It is later converted to the packet picture format. As a matter of interest, the new GS-4500 also includes the OCR software, which enables the user to read text into the computer and save it as an ASCII file that can later be loaded into a word-processor or edited with a text editor.

A second way to compile pictures which is faster and easier is to use the picture digitizer with the software that allows the



The Kantronics KAM is a versatile entry in the multi-mode data controller field.

user to save the picture to almost any desired format. The MFJ-1292 has made the packet picture processing so easy and versatile that a picture can be digitized, saved to disk, and begun being sent to another station within ten seconds. The hardware is installed into the PC or clone and accepts composite video from a black-and-white or color camera, or VCR. Monitor output is also provided, along with a remote-control box that allows the user to set the contrast and brightness.

The support software for the MFJ-1292 provides the capability of saving the picture(s) into five slow-scan formats, five packet picture formats, and four PC PaintBrush formats. The pictures saved in the PC PaintBrush format allow the user to load the picture into the PBrush program and add text, graphics, and color to the picture. The digitizer software also provides a "RAW" picture data save, which allows the user to later load the picture data back into the program and save it into any of the previously mentioned formats. Along with the hardware and software package, several other very useful utilities are included. (Price range: \$200)

Power "Up" For The HT

For the low-power packet user there are a number of linears that will boost that HT power enough to get across the mountain to the node or BBS in the next county or city. Using 2 to 5 watts is easy enough to do with packet and still reach distant stations, but many users who are isolated can only try to make it to the nearest node or digipeater. Here is where a linear power amplifier will help. A 2 watt HT can become a medium-powered station of 25 to 50 watts, or it can increase to several times that amount.

The power level will depend on the type and size of the power amplifier that you add to the HT. The RF Concepts 2-23 linear boosts both RF output and provides the additional feature of a GaAsFET receiver pre-amplifier. It has automatic antenna change-over control that is ideal for packet use with an HT. According to the manufacturer, the transit time from receive to transmit is 5 milliseconds or better. With a switching time this fast, ahead of the HT, there should be very little reason for the user to change the TXDelay. With the drive level of most HTs, the RF Concepts 2-23 will provide an output power of up to 50 watts. This gives the users an edge on the popular 25 watt transceivers.

A linear that is in the 20 watt class with a built-in low-noise pre-amplifier is the PA-10 from Ramsey Electronics. This one won't scorch any leaves, but it will get you out of a "hole."

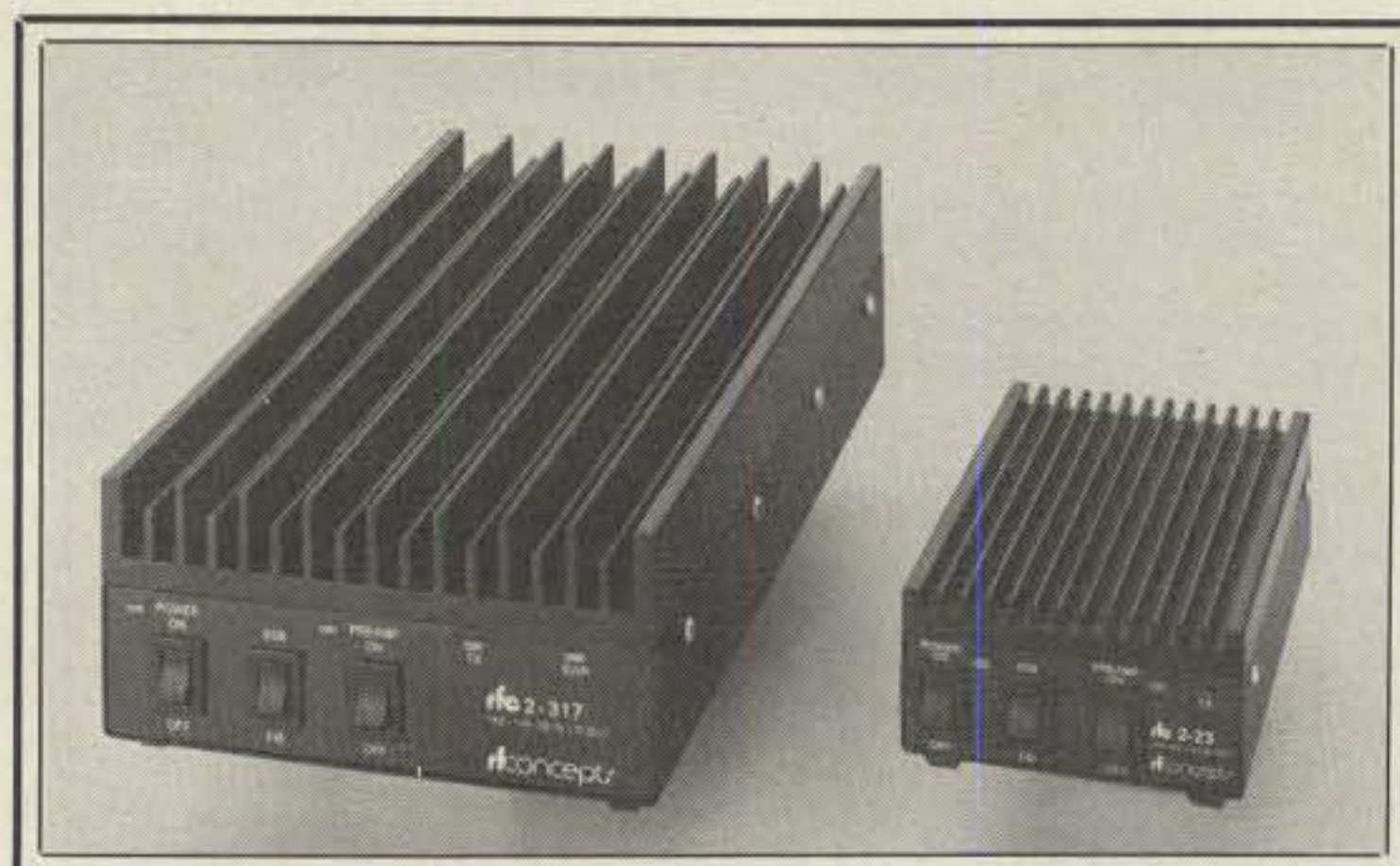
Getting It Up is Only Part of the Job

Getting the power "up" with a power amplifier is good, but getting the signal "out" is another way to improve the compact station. Look over the line of antennas that are available to the packet user. Most packet operation is conducted at VHF, and the need for a good VHF antenna is always there.

Antennas that provide good gain and are immune to terrestrial noise influence make the best gift for the packeteer. Last month we looked at several of these antennas, but we never covered them all. If you really want to make that packeteer's face glow on Christmas day, then add the new antenna to his station and let the rest speak for itself. One word of caution: Don't get an antenna that is too large for the environment in which it is to be used.

A Gift That Everyone Could Use

Well, here is your chance to give a gift that everyone could use. The CONVERSE node is beginning to attract many users, and it is a "natural" for the Local Area Net (LAN) frequency. Not only can it be used as a local roundtable packet session, but it doubles as a digipeater (DIGI).



The RF Concepts 2-23 linear boosts both RF output and provides the additional feature of a GaAsFET receiver pre-amplifier.

The outgrowth of this node can be used for networking, in a VIA type connect, or it can be utilized as a roundtable or for holding a net. The CONVERS supports multiple on-line conferences or roundtables between keyboard users. It can be connected to in the same manner as any net-type node.

The code is burned into a 27C256 EPROM which fits into the TAPR TNC-2 or clones, such as the Pac-Comm TNC-200, Tiny-2, MFJ-1270B, and MFJ-1274.

The callsign of the CONVERS node will appear in the net-type node tables just as any other node will appear. It will allow connecting in the same manner as the net-type node. The difference is that the CONVERS will only digipeat. It will *not* allow calls to be made "from" it. Calls can only be made "to" it! The Mini-Converse is a "terminal" node. In other words, it will not operate in level 3 packet mode.

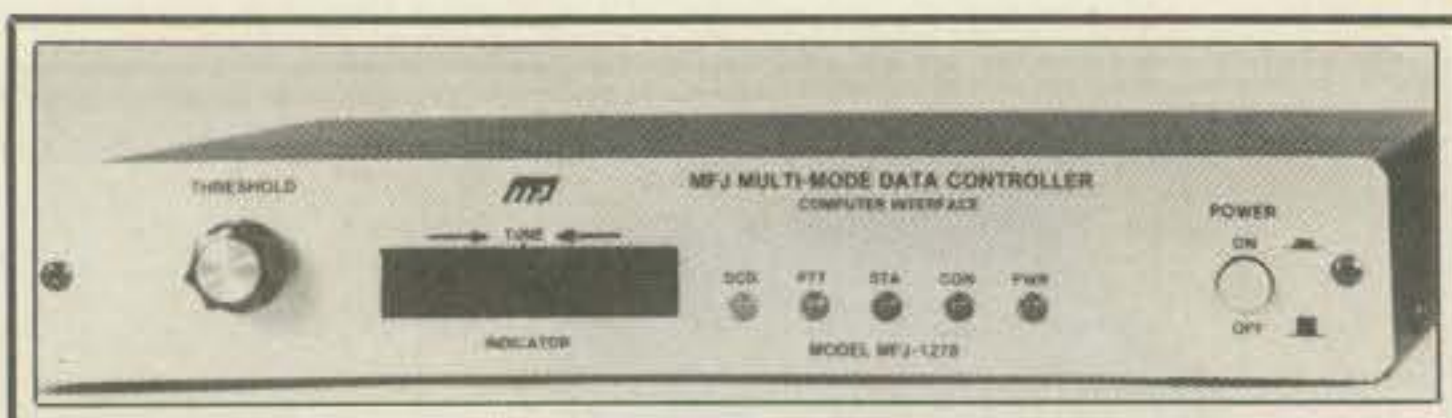
The CONVERS node operates as a stand-alone system, or it can be used with a cluster of nodes.

Initializing

The node sends out update broadcasts to inform other nodes that it is active. The CONVERS node can support 256 channels of communication, and each channel can have two or



The Pac-Comm TNC-200 and Tiny-2 are both modified TAPR TNC clones.



The MFJ-1278 is a multi-mode data controller that provides seven modes of operation.

more users on each channel. The operating parameters are set in the firmware and are not available for easy changing by the SYSOP. These parameters are located in the same place as the parameters of TheNet firmware and can be modified at the time the EPROM is configured.

Each user in a roundtable receives all the information from every other user in the net or roundtable, unless another station uses the /Message "callsign" to send a private message. Each packet will contain the callsign of the originator, and it will display at each receiving screen. Another user can switch channels and all users on the channel will be informed that "station X4XXX has changed to channel (n)."

If the channel to which station X4XXX moved is not occupied, an INVITE can be issued to other users. The INVITE can be to users on other channels as long as the correct callsign is used in the INVITE. If the channel to which station X4XXX moved is occupied, other users already on the channel are notified that "X4XXX has joined us."

Zero is the Default Or Calling Channel

When first connecting with the CONVERS node, the user is defaulted to Channel 0. Channel zero (0) is considered to be the calling channel. The callsign of our local CONVERS node is K4ABT-3 with an ALIAS of QSO.

As soon as you are connected to QSO, you immediately issue a /H or /? for the HELP menu. If you are already familiar with the CONVERS menu, then issue a /W. The /W will set the node into action to recognize your connect. If you connect to the CONVERS node and make no other entry, then you will not receive a response from the CONVERS node. A timer in the node sees that no entry has been made, and at the end of approximately ten minutes, you will be "BUMPED."

As soon as you are connected to the CONVERS node, type /H or /? and <enter>, you receive this menu:

K4ABT-3:QSO "GARDS" Commands can be abbreviated:

```

/HELP          Help
/EXIT          Terminate converse session
/BYE           Terminate converse session
/QUIT         Terminate converse session
/CHANNEL n    Switch to Channel n
/INVITE user  Invite (user call) to join your channel
/MSG user text Send text to one user only on the channel
/WHO          List all users and their channel numbers
Welcome to "Georgia Amateur Radio Digital Society" GARDS LAN
***

```

The *** is the prompt for further input, so you might enter

/Who

Note: The first line of the menu indicates that commands may be abbreviated. Therefore, you may enter /W and obtain the same information as you will with /WHO. The reply to your /W will appear similar to the listing below:

User	Circuit	Channel
K4ORT	K4ABT-5:ABT5	0
KK4DM	K4ABT-9:ABT9	0
K4ICT	K4ABT-12:ABT12	24
KB4ACE	K4ABT-9:ABT9	24
WD4DKA	K4ABT-1:ABT1	0
W4OQT	K4ABT-8:ABT8	24
WD4LYV	K4ABT-10:ABT10	0
WD4MNT	K4ABT-11:ABT11	0
WB4OLD		0
WD4JKH	WD4JKH-1:THO1	24
K4ABT		24

W4OQT issues the following command:

/C 24

At K4ICT the following appears on his screen:

*** W4OQT signed on:

This message appears on the screens of those station(s) left on Channel 0.

*** W4OQT changed to channel 24:

Here is a typical QSO of the channel 24 users.

<K4ICT>: Hey, Tom, I see Charlie joined in to our QSO.

<Tom sends a private message to a Frank, K4ICT, by typing:>

"/MSG K4ICT Hey Frank, don't forget to remind Charlie that our GARDS net meets here on QSO Saturday evenings at 8:00 PM."

Only K4ICT will receive the following message:

"<*KB4ACE*> Hey Frank, don't forget to remind everyone that our GARDS net meets here on QSO Saturday evenings at 8:00 PM."

The asterisk <*> tells Frank that this was a private message from KB4ACE. All messages you send starting with a / (slash) symbol are directed to the command interpreter of the CONVERS node.

Furthermore, you may INVITE other users from other channels to join your channel with the "/INVITE command" /I "CALL" <enter>.

With this short explanation I feel we have discovered how the CONVERS node overcomes a problem in packet radio, the solution to which previously has been unavailable to the packeteer. This is only the beginning of the fun things that can be enjoyed with this "user friendly" Christmas gift.

Place the CONVERS node on a frequency that will not interfere with other LANs and you will have many hours of roundtable fun and excitement with the CONVERS node, not to mention the usefulness in the event of adverse circumstances.

If your packeteer has "everything," then don't forget to give her or him a copy of the book with the same title as this column, *The Packet User's Notebook*, available from CQ's Book Shop.

For a list of many other great Christmas gifts for the packeteer, see the recently released CQ magazine 1990 Buyers Guide. In any case, be sure that special packeteer on your list receives a subscription to CQ magazine so that he or she won't miss any of the very interesting packet articles and news which I have planned for the coming year.

From my family to yours, here's wishing "you all" a very Happy Christmas, and as always, happy packeting.

73, de Buck4ABT

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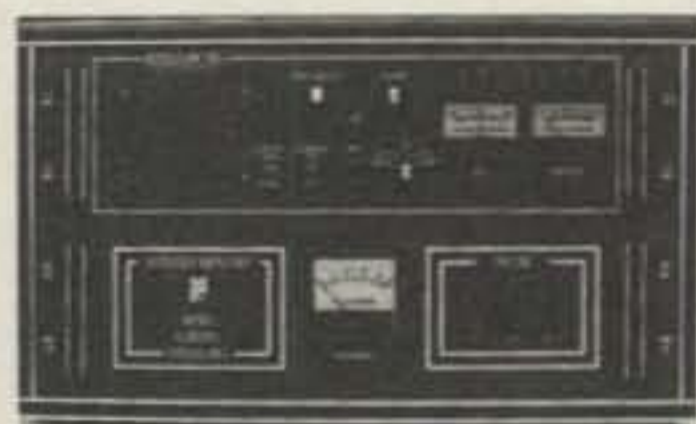
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A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

More This and That

Last month we discussed yet another variant of the popular G5RV multiband dipole and examined ginpoles for safe tower installations; we took an in-depth look at shareware and freeware; and we also highlighted software programs such as LOGWRITE, SUPER, CAT-PACK, WaveGen, PC Librarian, and TC!Power. We'll continue along the same lines this month, turning to a variety of Antennas & Accessories topics. Let's begin with the antennas side of things.

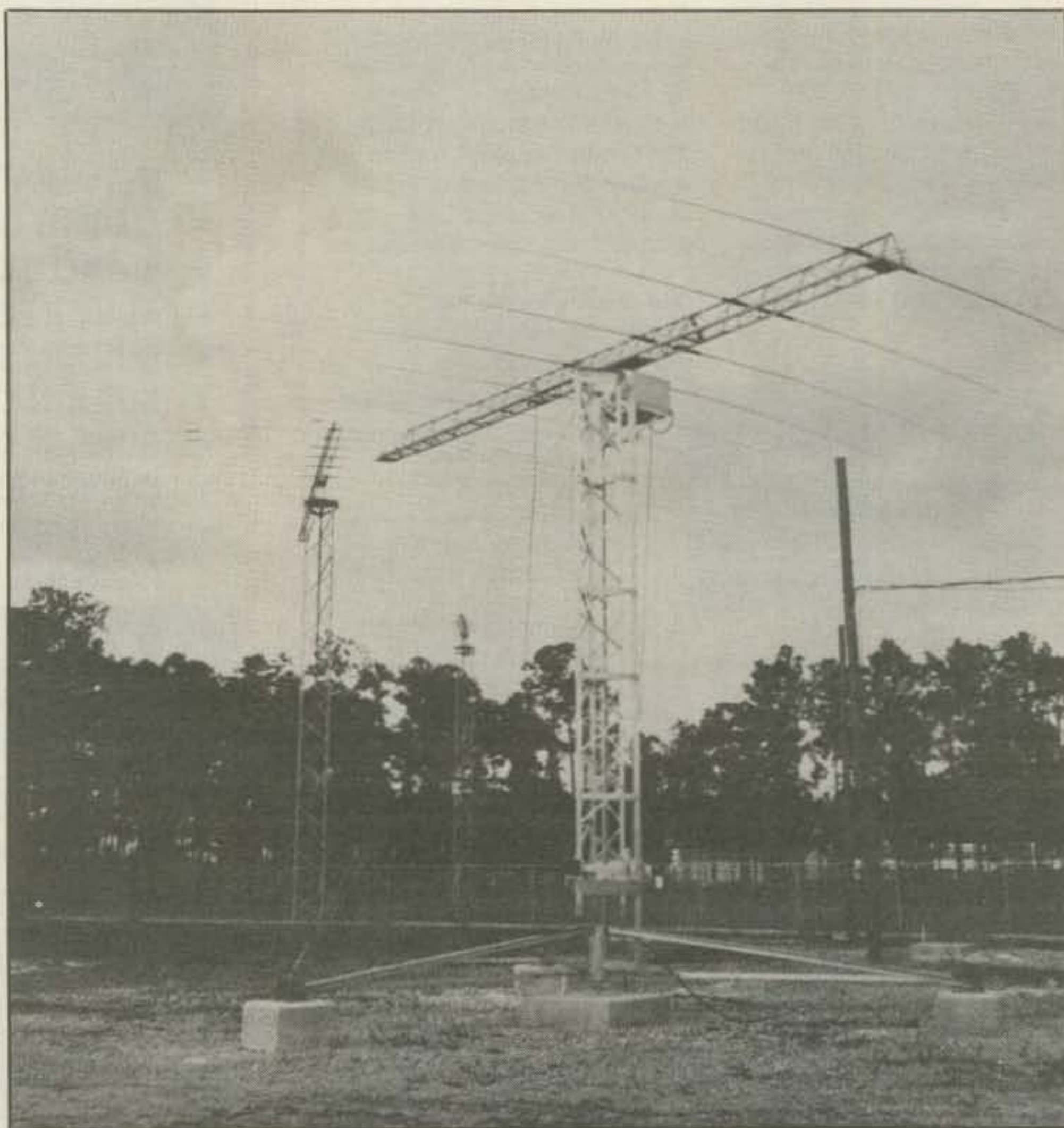
Antenna Potpourri

Sabre HF Log Periodic. Do you want multiband HF coverage, but have room for only one array on the tower? Normally, the answer lies in the use of a trap Yagi to afford multiband operation. However, many operators don't like traps and consider them to complicate antenna design—both electrical and mechanical—especially when the new WARC bands at 12, 17, and 30 meters are factored in. One alternative is the broadband log periodic beam. The log periodic typically used by amateurs is based on the planar log periodic design, the geometry of which repeats periodically with respect to the logarithm of the design frequency—hence, the term.

One of the main advantages of the log periodic array is its broadband operation over a frequency range of 2:1 or more, in which electrical characteristics such as gain, front-to-back (F/B) ratio, feedpoint impedance, etc., stay more or less constant. The reasonably constant feedpoint impedance makes the antenna fairly easy to feed with coaxial cable.

Most log periodics used by amateurs are based on heavy-duty commercial designs that have been adapted by their manufacturers for amateur use. An example is the Sabre Model 610, which was originally designed for the State Department for use at its embassies around the world. It is a planar array of half-wave dipole elements for coverage of 10 through 30 MHz; proper dipole phasing is accomplished by feeding adjacent dipoles from opposite balanced feeders.

Typical of log periodics, the Sabre array has operating characteristics of gain and impedance that remain essentially constant over a very broad band of frequencies. The array uses inductive and capacitive foreshortening techniques at the lower operating frequencies to allow physical shortening of the array; the overall length is 30 feet, with a 22 foot turning radius. As a result of this foreshortening, the gain characteristics at the low end of the operating range are somewhat reduced. The array's gain increases with frequency and remains essentially constant as the physical dimensions of the dipoles approach electrical half-wavelengths at about 14 MHz.



The Model 610 HF Log Periodic Antenna. It is a wideband array which is relatively insensitive to frequency changes within the 10 to 30 MHz frequency range. The antenna may be fixed or rotated with an appropriate heavy-duty rotator. (Photo courtesy Sabre Communications Corp.)

According to Sabre's president, D. Bailey Aalfs, claimed forward gain of the 610 is 9 dB at 10 MHz, increasing to 13 dB at 14-30 MHz (the dB reference isn't given). The average F/B ratio is 12 dB, and the antenna's input impedance is 50 ohms; type N coaxial connectors are used. Construction of the elements and boom is of high strength aluminum material with stainless steel hardware. The \$1860, 225 lb. array has a wind area of 16 sq. ft., and so a heavy-duty rotator is required to rotate the antenna.

Fig. 1 shows the 610's vertical radiation pattern, while fig. 2 graphs SWR from 10 to 30 MHz.

More details can be obtained from Sabre Communications Corp., 3400 Hwy. 75 North, P.O. Box 536, Sioux City, IA 51102.

Challenger DX-V. A rather unique multiband HF vertical antenna using the patented "G.A.P. Center Launch Technology" is offered

by G.A.P. Antenna Products.

The Challenger DX-V is a 31.5 foot vertical that is designed for operation on the 80, 40, 20, 15, and 10 meter bands. It is intended to be fed with 52 ohm coax, and is said to maintain an SWR of less than 2:1 over all bands except 80 meters, where the effective bandwidth is limited to 80 kHz. The DX-V is rated at 1500 watts PEP and weighs 15 lbs.; it is made of 6061-T832 telescoping aluminum tubing. Three 25 foot "counterpoise wires" are required for operation on 40 and 80 meters. The antenna is self-standing with a furnished 3 foot drop-in ground mount. No traps, coils, impedance transformers, baluns, or resistors are used.

The "low loss" antenna is unique in that it is fed not at the base, but rather at a point 16 feet up from the base. According to the firm, with this design vertical antenna resistance is no longer fixed at 36 ohms but can now be pre-

317 Poplar Drive, Millbrook, AL 36054

VERTICAL PATTERNS OVER AVERAGE SOIL ANTENNA 80 FEET ABOVE GROUND

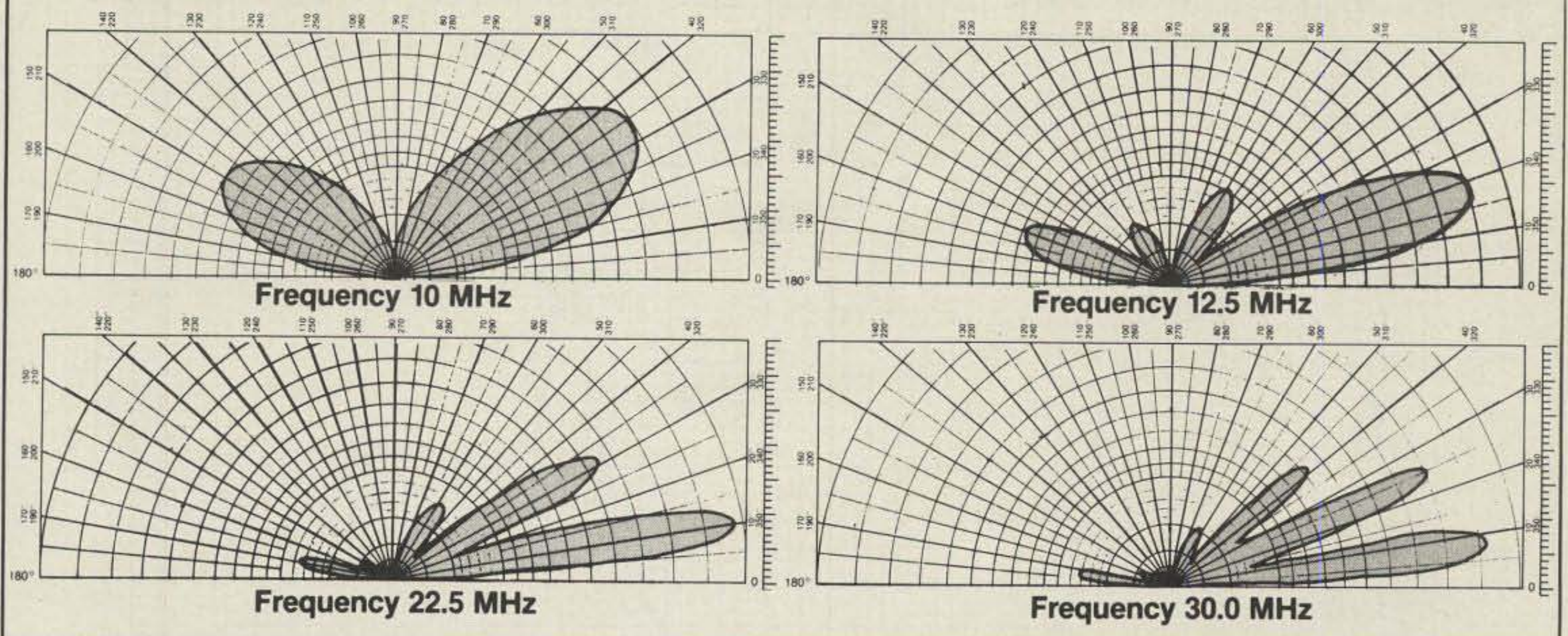


Fig. 1- Shown here are the vertical radiation patterns over average soil for the Sabre Model 610 antenna at 80 feet above ground, over the design frequency range 10 to 30 MHz.

lected. The reasoning is that since the base impedance of a vertical is normally about 36 ohms and the top is several thousand ohms, then somewhere in between is 52 ohms. It is approximately at this point where the DX-V is fed. On a single band, this point would be exactly 52 ohms, but with multiband operation there is some compromise. The high feedpoint is said to significantly reduce earth loss, a major problem with verticals.

The DX-V is priced at \$169. A six-band model, the DX-VI, which also covers 12 meters, is available as well. For more information, con-

tact G.A.P. Antenna Products, 6010-Bldg. J, N. Old Dixie Highway, Vero Beach, FL 32967.

ComTek Remote Coax Switch Systems. ComTek offers two remote coaxial switch systems, the ACB-4 Phased Array Switch and the RCB-5 Remote Coaxial Control Box.

The ACB-4 is a complete remote-control RF switching system that is intended for use with HF vertical phased array antennas. It is designed to provide the correct power division and phasing for W1CH-style "Four Square" (four vertical elements in a square, a quarter-wave on a side), or two-element vertical ar-

rays; individual models are available for 160, 80, 40, 20, 15, and 10 meters. The ACB-4, which is sold with the control box for \$295, handles more than 5 KW and includes instructions for use with quarterwave ground-mounted, quarterwave ground plane, and halfwave centered arrays.

The switchbox itself is constructed of heavy-duty 18-gauge steel which has a zinc coating with a gold chromate irradiate plating for long-lasting weather protection. Stainless steel hardware is used throughout, and circuit boards are of thick glass Epoxy. The selector



The ComTek ACB-4 Phased Array Switch, along with its control box as shown here, is specially designed to provide the correct power division and phasing for W1CF-style four-element "Four Square" or two-element vertical arrays. (Photo courtesy ComTek)



The ComTek RCB-5 Remote Coaxial Control Box switches up to five different antennas from one coax line; you can connect to one or all five antennas at once. The device handles up to 5 KW. (Photo courtesy ComTek)

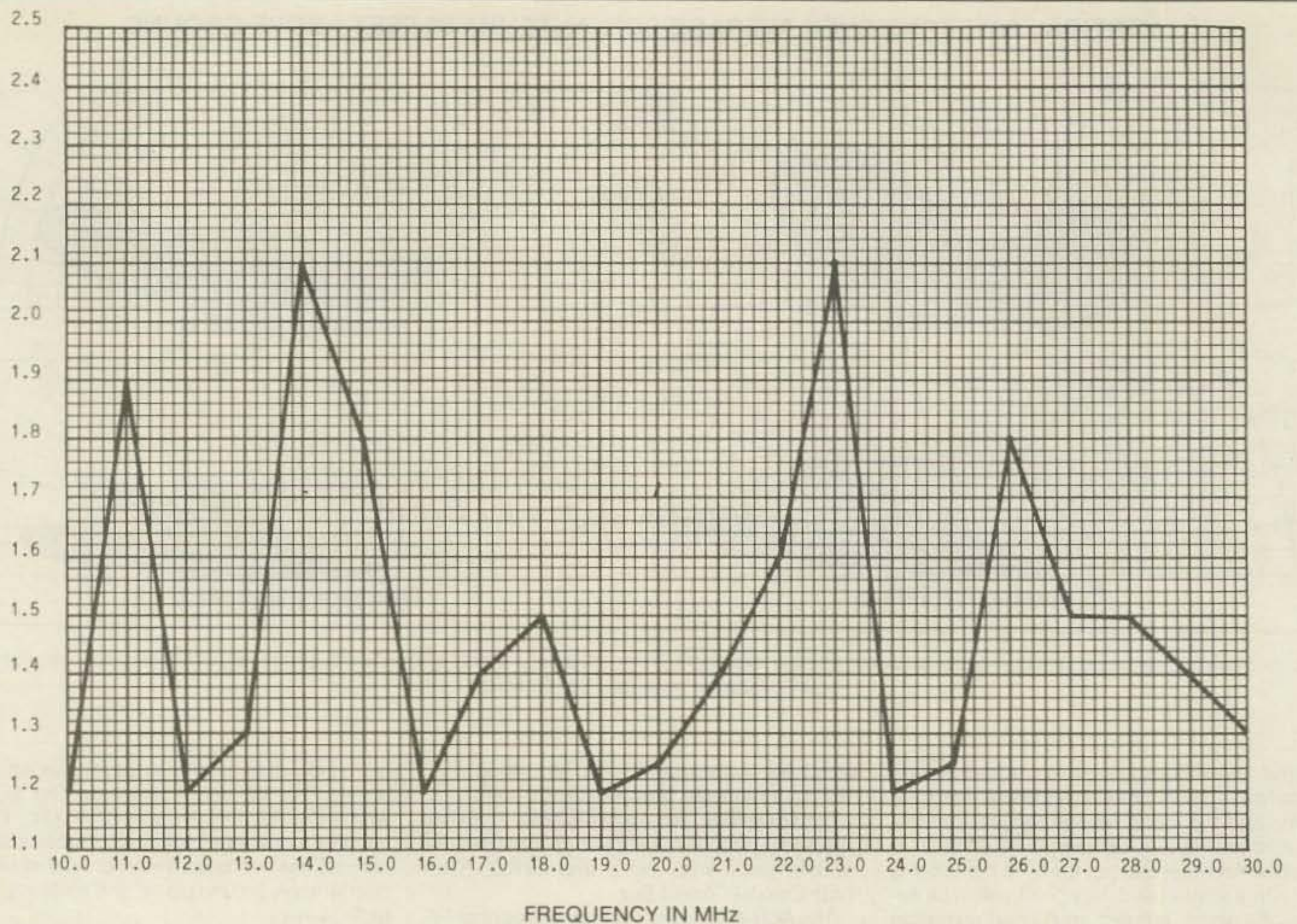


Fig. 2- VSWR graph, Sabre Model 610 L-P array. The graph depicts voltage standing wave ratio over the antenna's full operating range. Maximum VSWR is around 2.1:1, which occurs at 14 MHz and 23 MHz.

box is an all-metal box with a lexan front-panel template. The selector knob can continually rotate in either direction without stops; this allows you to always switch to the next adjacent direction quickly.

ComTek also offers the RCB-5 Remote Coaxial Control Box, which switches up to five different antennas from one coax line. You can connect to one or all five antennas at once; the box is a good choice for stacked array switching. The RCB-5 also handles up to 5 KW RF, and it boasts a low VSWR of less than 1.5 to 1 to 450 MHz. It's priced at \$149.95.

For more detailed information, write to ComTek, 1 Cider Mill Lane, Upton, MA 01568.

Texas Bug Catchers. Henry Allen, WB5TYD, is still going strong with his heavy-duty mobile HF antenna system—you know, the one with the center loading coils and big capacity hat.

The Bug Catchers are husky mobile antenna designs that you can customize for your own mobile needs and desires. Thus, the antennas can be assembled to meet almost any mechanical configuration to fit a particular installation. They are intended for center loading, since in mobile work the center-loaded antenna has the highest theoretical radiation efficiency. A base mast of 3 to 5 feet and an upper whip of 4 to 7 feet is recommended. Four different loading coils covering 10 through 80 meters are available, depending on your particular band and operating preferences.

A major feature of the Bug Catchers is the

capacity hat. Since most of the loss in loaded mobile antennas is in the loading coil, it is important to reduce the amount of inductance required. By adding a capacity hat, the resonant frequency of the antenna is lowered considerably; thus, a sizable amount of the loading coil can be removed. Another use for the capacity hat is to reduce the mechanical length of the antenna, a special consideration on 75/80 meters. Two different size capacity hats are available, depending on the length of whip you want to use for 75/80 meter operation.

The Bug Catchers are offered "ala carte" style, with four different coils, seven masts, and assorted whips, matching coils, mounts, quick disconnects, coil clips, and spade lugs available for your customization. Full details are available from Henry Allen at GLA Systems, P.O. Box 1064, Caddo Mills, TX 75005.

B&W Broadcast Equipment Catalog. I'm not sure why Barker & Williamson calls their catalog a "broadcast equipment" catalog, since amateurs don't usually "broadcast." Regardless of the name, it's chock full of a variety of amateur and SWL antennas, accessories, traps, coils and inductors, rhombic antenna terminators, chokes, transmitting capacitors, coaxial switches, TVI filters, dummy loads, wattmeters, and transmatchers.

Many of the B&W antennas are of the no-trap, continuous-coverage type, such as the AC 1.8-30 end-fed Vee continuous-coverage antenna, and the AC 3.5-30, AC 2-22, and AC

5-30 folded dipoles; all of these are nonresident designs that are claimed to maintain a constant impedance as the frequency is changed. The wideband antennas are fed with 50 ohm coax and handle 1 KW ICAS. The AV-25 is a six-band vertical which uses parallel elements for no-trap operation; it is directly fed with coax. A new line of HF vertical beams, to include the new WARC bands, is said to be under development.

The 24-page catalog is free from Barker & Williamson, 10 Canal St., Bristol, PA 19007.

Palomar Cores and Beads. Palomar Engineers has come up with some nice informational spec sheets on ferrite toroid cores, iron powder toroid cores, ferrite beads, and RFI and experimenters' kits featuring the devices.

The Palomar spec sheets feature their line of ferrite toroid cores, which are used for low power tuned circuits, wideband transformers, and baluns for transistor coupling and antenna matching. The cores have high permeability for high inductance using few turns. Also featured are iron powder toroids, which are suitable for tuned tank circuits, filters, pi-network inductors, and similar applications. They are more stable than ferrites, and do not saturate as easily. Various mixed are offered.

Palomar also provides specs on a variety of ferrite beads, which are used for RF shielding, RF decoupling, and parasitic suppression—at low frequencies they have no effect, but at RF they act like a resistor in the line and thus will

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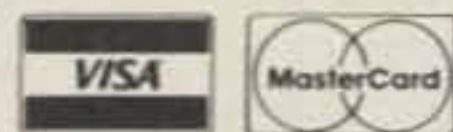
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CA-2X4SR	146 MHz 446 MHz	3.8dB 6.2dB	150W	3' 4"	MOBILE
CX-901	146 MHz 446 MHz 1.2 GHz	3.0dB 6.0dB 8.4dB	150W	3' 6"	BASE/REPEATER
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IBM PC which he calls LOG-EQF. It also includes control routines for Kenwood radios (with appropriate interfaces) so that the radio's mode and frequency are accessed and displayed on the computer screen.

Some of the program's main features include the ability to enter logbook information in any order as it is received during a QSO and to view logbook entries sequentially; search for a pattern in one of six ways; print out the logbook or search results; generate QSL labels from logbook entries; run another program from the main menu without reloading LOG-EQF; and edit or delete any entry in the logbook. The program also automatically logs time from the computer clock at the start and end of a QSO.

In Tom's view, the real power of the program lies in its serial hardware interface to Kenwood transceivers. With this capability, the program displays and automatically logs the frequency and mode currently selected on the radio. In addition, a command set is available to allow you to change transceiver mode and VFOs, or to swap VFOs from the logbook entry page. The program also displays the last station entered on the page, whether you worked the station or not, along with the frequency on which it was heard. A documentation file is included on the program disk.

Tom distributes the program as shareware, for which he requests a \$10 registration fee. However, all you need do to test drive the program is to send him a formatted floppy disk and SASE disk mailer. Contact Tom Dandrea, N3EQF, 396 Sautter Drive, Coraopolis, PA 15108.

Disk-Based TNC Emulator. Barry N. Kutner, W2UP, sent us information on Digicom >64, a software-based packet radio system, and the associated modem that he's offering.

Barry originally described the Digicom >64 software in the August 1988 issue of *73 Amateur Radio* magazine (p. 22). In his article he pointed out that it is quite possible to emulate the functions of a hardware TNC in software, eliminating the need for a rather expensive box. Digicom >64 is a public-domain program developed by several German amateurs (DL2ML, DL3RDB, and DL8MBT) that does just that. All that is required besides the software is the Commodore 64 and a modem circuit designed around the AM7910 chip. The modem, which supplies both HF and VHF packet tones, is connected to the receiver's audio output, the transmitter's mike input, the push-to-talk (PTT) line, and ground; connection also is made to the computer.

Barry's *73* article estimated the cost of the project at about \$50. He now advises that he can furnish a complete parts kit and printed circuit board for \$49.95, or an assembled and tested unit for \$79.95; both include the program disk. The program disk (with the modem schematics on it) and a blank printed circuit board are available separately as well.

For complete information, contact Barry Kutner, W2UP, 614-B Palmer Lane, Yardley, PA 19067.

Datametrics Communications Manager. A comprehensive, full-featured, computer-aided scanning (CAS) system for the ICOM R7000 receiver is offered by Datametrics, Inc. The Datametrics system is a three-part package that includes a hardware interface, which links the receiver to the IBM PC or compatible; the system software, which includes the program and other files; and complete documentation for the CAS system.

The heart of the Datametrics Communications Manager is the menu-driven software program. The program presents the user with suggested scanning parameters, which means that basic scanning can be performed immediately, though users can modify the system's control features.

The program will scan files of preselected frequencies, ranges of frequencies, or scanner memory; it offers control of scan speed, scan delay, maximum time monitored, and other features. The computer screen displays scanning parameters and information on the signal being monitored, including a comment on the frequency. The program has its own editor for building, modifying, and printing frequency files.

An impressive feature of the package is its autolog capability, which allows you to capture frequency and time data while monitoring; autolog reporting commands provide numeric and graphic displays for scanning sessions. Other functions supported by the program include uploading and downloading of the ICOM channels and various utility functions.

The Datametrics Communications Manager is \$299, offered on a 30-day full-refund basis; the manual is available separately for \$15. For specs and a copy of an interesting article on the history, current status, and future of CAS, write to Datametrics, Inc., 2575 S. Bayshore Drive, Suite 8A, Coconut Grove, FL 33133.

Wonder Plus 3.0. I've been using an early version of this powerful DOS shell, custom menuing, and hard-disk management utility on my IBM PC clone since early 1987, and so I was happy to be able to get hold of the latest Version 3. I have always considered Wonder Plus to be among the very best programs in its class from the day I first installed it on my PC in early 1987; it's been offered in one version or another by Bourbaki, Inc. since 1983, so by now it's a very thoroughly scrubbed product.

Wonder Plus is a very capable DOS utility package for integrating all of your computer operations and applications into one consistent, comprehensive operating environment. It provides a unique combination of DOS shell, custom menuing, and hard-disk management features. With it, you can easily build complex commands to run your applications, with total control over your directories and files. The program is configurable to meet the most complex and sophisticated needs of the advanced user, yet—and this is the part I like—its use is sufficiently intuitive even for the rank beginner.

Some of the neat features the program offers include point-and-shoot DOS commands; a graphic tree display; mouse support; global file operations over multiple directories; a menu library screen for quick access to any menu and command; nine optional screen display "faces" that display different information about files and directories; a built-in file editor; and a printing facility that lets you print out files, directory listings, and the directory tree structure. There's also a utility to automatically generate menus and commands to run your applications; a context sensitive help system; optional password security; and an on-disk tutorial. Right out of the box it has more than 50 built-in commands that provide most anything you might need from the simplest to the most complex operations; you can even execute commands on large groups of flagged files.

One of the more unique and powerful features of the program is its ability to fully cus-

tomize its environment. You can customize the start-up configuration and your menu and command structure; allow disk directories to display differently, possessing different "personalities"; and assign passwords to any combination of commands and menus.

At the bottom line, I've tried out most of the IBM PC DOS shells and hard-disk management utilities, but I always find myself returning to Wonder Plus. In my opinion, it is by far the most intuitive, best integrated, and most flexible product among the many DOS shells, custom menuing programs, and hard-disk managers on the market.

The program is priced at \$95 and is available from dealers or from Bourbaki, Inc., P.O. Box 2867, 615 W. Hays, Boise, ID 83701. Fig. 4 shows the Wonder Plus System Set-Up Template, one of two start-up configuration screens.

Incidentally, ever since I first tried Wonder Plus more than two years ago, I have wondered what the firm's unusual name, Bourbaki, means. Is it an exotic Greek dish? A legendary Middle East potentate? Not at all. The Boise firm takes its name from a 1930s-vintage secret society of French mathematicians. It seems that the society chose to publish its theories under the pseudonym Nicolas Bourbaki, for fear that the state-controlled educational system would reject the then-new idea of an integrated mathematical philosophy. As time progressed, however, the notion that all branches of math are somehow interconnected began to catch on. The name Bourbaki began to symbolize integration, and in 1982 the new software firm chose the name to symbolize integration in its products.

Short Bursts

Marconi or Fessenden? In an article that appeared in the May issue of *Pitt* magazine, it was brought out that a former University of Pittsburgh engineering dean, Dr. G. R. "Ray" Fitterer, believes that Reginald Aubrey Fessenden should be a household name associated with radio. This recognition would be at the expense of the Italian engineer Guglielmo Marconi, who is generally considered to be the father of modern radio, or at least wireless telegraphy. While Marconi enabled dots and dashes to travel over the airwaves, it apparently was radio pioneer Fessenden who made possible the transmission of voice and music over the air.

Dr. Fitterer has engaged in a long-term quest to correct the historical record on behalf of Fessenden, who was a Pitt engineering professor from 1893 to 1900. From Fitterer's research, it seems that Fessenden should get much more credit than he's so far received.

While at Pitt as its electrical engineering department chairman, Fessenden thought to use continuous HF electromagnetic waves to transmit the human voice; this led him to the familiar "heterodyne principle" and the design of generators to transmit the radio waves. Fessenden later worked for the Weather Bureau, the U.S. Navy, and General Electric, and he formed the National Electric Signaling Company to meet the demand for broadcasting equipment. He is said to have made the first voice transatlantic broadcast.

Despite his successes, a rift grew between Fessenden and his financial backers; after a court fight, the company acquired most of his remaining patents. Radio quickly grew, and after World War I, President Wilson ordered all radio companies and patent holders to join in a

System Set-up Template

Menus:	F10 Menu : Main Menu Alt F10 Menu : File Mgt Shift F10 Menu: Faces	Ctrl F10 Menu : Wonder+ MenuOnly 2nd Menu: Start-up Menu : Main Menu	
Directory:	\batch		
Sort Order:	Ext Nam Dat Siz - Normal	Display Hidden Files:	Yes No
Face:	QuickRef Stats Extended Wide Global 2Menus MenuOnly 2Dirs		
File Cursor:	Return to Home position Leave at "Last" position		
Memory Usage:	Fully Resident Partially Resident Use EMS		
Mouse Usage:	Off Right-handed Left-handed		
	Should Directory Personality override the Start-Up Face and Menu? Yes No		

<F9> for Help

<F10> for Screen Options

Set Up - 3.03 - Copyright (c) Bourbaki, Inc. 1986, 1987, 1988

Fig. 4- Wonder Plus system setup template. This comprehensive menuing system and hard-disk manager provides a large number of customization options. The screen shown here is one of two you can use to specify the way it initially loads.

new consortium, the Radio Corporation of America (RCA). Fessenden was left out in the shuffle, and—claiming some still-active patents among the 500 he filed—sued the consortium. He won a settlement of \$2.5 million, but agreed not to divulge the outcome of the suit. However, according to Dr. Fitterer, the terms of the settlement were published in a Boston newspaper in 1928, and they tend to confirm the legal recognition of his feats and possibly the "father of modern radio" title. Unfortunately, Fessenden died in 1932 with little rec-

ognition by the public, and so Dr. Fitterer seeks to set the historical record straight.

Tips on Buying Software. In our column we frequently take note of and review a variety of software that may have hamshack applications. Even more basic than our reviews and comments are some philosophies you may wish to consider when buying software. Consider the following guidelines:

1. *Decide what you want to do before you buy.* That is, let the software fit the task rather than making the task at hand fit the available

software. You may find that software isn't presently available to do just what you had in mind.

2. *Don't buy more software than you need.* Though there are many competing types of software in each category, in most cases you'll simplify your life by trying to identify the best product in its field, learn how to use it fully, and stick with it. Sometimes you'll be able to find a top-notch program that combines the best features of several good programs.

3. *Try before you buy.* This isn't always possible, though you can do so with shareware. Often you can obtain a demo program to give you the "feel" of the program you're considering for purchase, or a dealer will let you try out the program in his shop. Of course if you buy by mail, you're on your own, though scanning the published reviews on the software should be a big help in reaching a selection decision. Try not to "buy cold."

4. *Focus on ease of use rather than on more features.* Generally, the most expensive and powerful software also is the hardest to use. While power in software is the name of the game today, the most powerful features you can buy won't help if the software is too difficult and impractical for you to use successfully. But also bear in mind that if the software is altogether "too easy" to use, it may not be powerful and flexible enough to do what you need it to do.

Wrapping It Up

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

Overheard: If you won't admit that you've been wrong, you love yourself more than the truth.

73, Karl, W8FX

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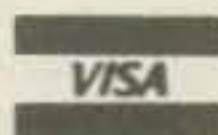
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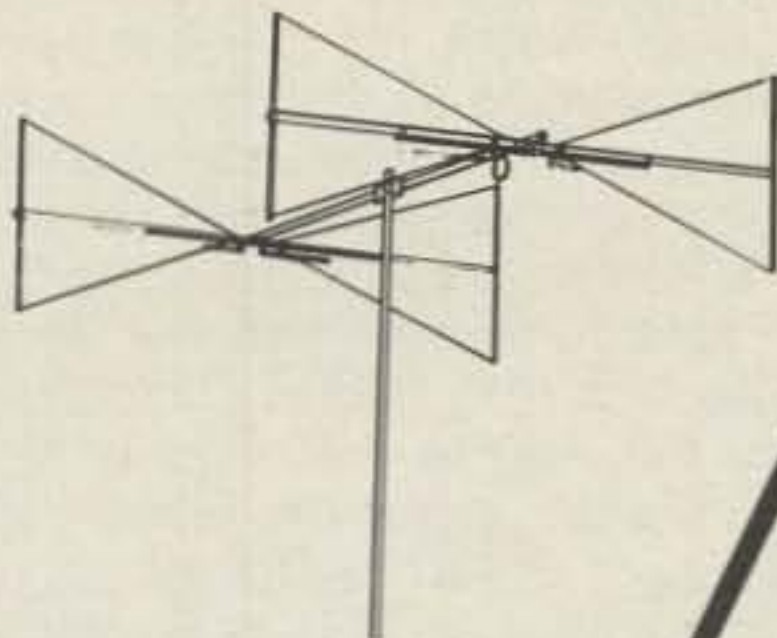
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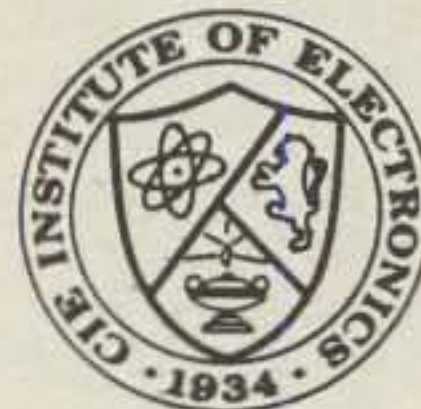
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NEWS OF COMMUNICATION AROUND THE WORLD

The Last Resort—End of an Era

A long-time fixture on the amateur bands met an untimely end in late September. The Last Resort, one of the best-known amateur radio locations in the world, was destroyed (along with most of the rest of the island) when Hurricane Hugo slammed into the tiny Caribbean island of Montserrat.

For much of its 20-year history The Last Resort was a rental QTH—a DX location open to amateurs around the world, complete with rig and antennas. The Last Resort was a training ground for hundreds of would-be DXpeditioners, providing a (reasonably) hassle-free introduction to what it is like on the other end of the pile-up.

The Last Resort was built on the easternmost tip of Montserrat about 20 years ago by Dr. Beverstein, VP2MZ, from Toronto, Canada. Doc and his wife, Hope, originally used the house as a winter vacation getaway, but soon moved to the island on a full-time basis, after Doc was diagnosed with a terminal case of cancer.

For months Doc had just enough energy to operate the radio for a few hours a day, running a Heathkit HW-101 into a 2-element quad on the top of a 55 foot tilt-over aluminum tower that his son, VP2MM, had installed in the corner of the property. Soon, however, Doc's condition began to improve. Whether it was Montserrat's tropical climate, its mineral-laden water, or the therapeutic properties of operating a VP2M callsign is unknown, but by the time Doc returned to Canada, all traces of cancer were gone!

For a few years Doc rented The Last Resort to DXpeditioners, who were then able to get a VP2M callsign. Dozens of amateurs visited the island during these years, and Montserrat became known as an "easy" multiplier in contests. (Probably the most unusual callsign issued during this era was VP2MJCA, to K7JCA.)

In 1978 an amateur from New England, fed up with snow and ice and looking for a warmer location with good radio propagation, spent a week at The Last Resort as VP2MAY, and came in second in the world in the WAE SSB test. Within hours after this amateur's return to the States, he had concluded an agreement to buy The Last Resort from Doc Beverstein.



The Last Resort rental QTH in Montserrat before Hurricane Hugo.

That amateur was, of course, the author of this column.

My family and I lived at The Last Resort during the last sunspot cycle peak, and between my own operating and that of numerous guest ops, The Last Resort gained a world-wide reputation as a competitive contest station.

Soon after my return to the States, I re-established the practice of renting The Last Resort at a nominal fee to DXpeditioners, especially first-time DXpeditioners. The combination of the exotic location, the superb propagation, and the ease of licensing and operating attracted DXers from around the world to try their hand at handling the pile-ups. The major contest weekends were particularly popular, and booked up more than a year in advance. However, many of The Last Resort visitors were average amateurs on their first DXpedition. Many of these first-timers became hooked on the sport and moved on to operate from more exotic locations. For example, Joe Adams, VE3CPU, graduated from Montserrat to Barbados, and then joined the recent Willis/Mellish Reef operation.

Such training was the primary reason The Last Resort existed. The entire DX community benefits from DXpeditions, but most amateurs hesitate before trying to master the multiple hurdles of getting to a rare location, hauling radio equipment, setting up a station, getting operating permission, and then maintaining order on the air. The Last Resort served as an intermediate step, providing some on-the-air experience and boosting the confidence of potential DXpeditioners.

In its long history The Last Resort became one of the most popular DX loca-

tions in the world, with more different amateurs operating from the same spot than any other such location.

That history came to an abrupt end when Hurricane Hugo hit Montserrat, the first such direct hit in more than 60 years. The Last Resort, in its exposed position above the Atlantic, was totally destroyed by winds in excess of 150 miles per hour and enormous waves. Since the house is in the path of a proposed new runway for the island's airport, rebuilding is not practical. Thus, one of amateur radio's DX institutions is gone.

Perhaps another amateur will carry on this tradition by equipping a home in a DX location with rigs and antennas and encouraging mini-DXpeditions.

The Race to Bouvet

On the opposite end of the scale from a vacation to Montserrat is a major DXpedition to Bouvet. As reported in October, the Norwegian Club Bouvet was hard at work raising about \$100,000 to finance a two-week operation from the number two Most Wanted Country.

Whether this operation will take place came into question in late September, however, when a group from Indianapolis, Indiana reported that they are going to Bouvet in February. The Legion of Indianapolis DXers, under the leadership of Mike Koss, W9SU, not only has landing permission and the promise of a license as 3Y0B, but they even have all funding in place, without requesting donations from the amateur community. *The Saturday Evening Post*, the National Geographic Society, IBM, Pentax cameras, and Yaesu will finance the majority of the costs. The group has the support of 15 colleges and universities for the scientific end of this joint amateur radio/research trip.

The DXpedition team consists of 12 amateurs and four other professionals, including photographers and a film crew to document the trip. Among the best-known DXers on the team are Rusty Epps, W6OAT, president of both the Northern California DX Club and the Northern California DX Foundation; Chip Margelli, K7JA, vice president of Yaesu-Musen USA; and Mike Wetzel, W9RE, an active contester.

The team will assemble in Capetown, South Africa in late January and leave for Bouvet on January 25 aboard the 168 foot

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2593	KD6WW		

Endorsements

Mixed: 450 WK0B, KD6WW, CE1YI, DK6ED. 500 WK0B, KD6WW, WM0G, DF7GK, CE1YI, DK6ED. 550 KD6WW, DF7GK, CE1YI, DK6ED. 600 KD6WW, DF7GK, CE1YI, DK6ED. 650 KD6WW, DF7GK, CE1YI, DK6ED. 700 JA4BAP, KD6WW, DF7GK, CE1YI, DK6ED. 750 K9EC, KD6WW, DF7GK, CE1YI, DK6ED. 800 K9EC, KD6WW, DF7GK, CE1YI, DK6ED. 850 KD6WW, DF7GK, CE1YI, AA4LB, DK6ED. 900 KD6WW, DF7GK, CE1YI, DK6ED. 950 KD6WW, DF7GK, CE1YI, DK6ED. 1000 KD6WW, DF7GK, CE1YI, DK6ED. 1050 WB3DNA, KD6WW, DF7GK, CE1YI. 1100 KD6WW, DF7GK. 1150 KD6WW, DF7GK. 1200 KD6WW. 1250 KD6WW, W9IL. 1400 KB0G. 2100 SM3EVR. 2300 N2AC. 2400 N9AF.

SSB: 350 IK5FTV, KD6WW, DK1HX, YC1RED. 400 IK5FTV, KD6WW, A4XJV, DK1HX, YC1RED. 450 KD6WW, A4XJV, DK1HX, YC1RED. 500 KD6WW, A4XJV, NK3U. 550 KD6WW, A4XJV, NK3U. 600 KD6WW, A4XJV, WA3GNW. 650 K9EC, KD6WW, A4XJV. 700 K9EC, KD6WW, A4XJV. 750 KD6WW. 800 K9EC, KD6WW, KB0G. 850 I3ZSX, KD6WW. 900 KD6WW, LA9XG. 950 KD6WW, LA9XG. 1000 KD6WW. 1050 KD6WW, W3GXX. 1100 KD6WW, W3GXX. 2900 ZL3NS. 2050 ZL3NS.

CW: 350 KD6WW, YU2RR, W8EAO, WJ7H. 400 KD6WW, YU2RR, WJ7H. 450 W0ULU, KD6WW, YU2RR. 500 KD6WW, YU2RR. 550 K7CU, KD6WW. 600 K7CU, I1EEW, KD6WW, W3GXX. 650 JG2LGM, KS3F, VS6UW, KA9GZM. 700 KA9GZM. 750 KA1CLV. 800 KA1CLV, DL3DD, PA3DBG. 850 DL3DD, PA3DBG. 900 DL3DD, PA3DBG. 950 DL3DD, PA3DBG. 1000 DL3DD. 1050 G4SSH, G3VQO. 1300 W9PWM. 2300 W3ARK. 2050 W3ARK. 2550 N6JV. 2600 N6JV.

10 Meters: I2TZK, KD6WW, I2IAU, DF7GK, N6SFV
 15 Meters: K9EC, KD6WW, TF5BW
 20 Meters: KD6WW, YU1PJ, JA0SU
 40 Meters: I2IAU, DF7GK
 80 Meters: JA4BAP, DF7GK
 160 Meters: KA1CLV

Asia: K9EC, KD6WW, OK1KRJ
 No. America: JA0SU, KD6WW, IK8CNT, DF7GK
 So. America: W6LC, DF7GK
 Europe: KD6WW, YU2RR
 Oceania: KD6WW, GM4OBK

Award of Excellence Plaque Holders: LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IC, 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, ZL3GO, VK9NS, DE0DXM, DK4SY, UR2**, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, W4VQ, KF20, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU.

Award of Excellence Plaque Holders with 160 Meter Endorsement: W8RSW, N4KE, I2UIY, W8ILC, W1BWS, NN4Q, G4BUE, LU3YL/W4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB9O, FM5UD, SM0DJZ, DK5AD, SM6CST, I1JQJ, W3ARK, H18LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF20, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR.

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.



Chip Margelli, K7JA, vice-president of Yaesu USA, will join the Post Society's February DXpedition to Bouvet.

ship *Deep Salvage I*. After six days at sea they will use the ship's inflated landing craft to put ashore on the rocky northern shore of the Antarctic island. They plan to assemble six complete stations using the new Yaesu FT-1000 transceivers with Yaesu FT-767 rigs for backup. A satellite communications station will provide reliable communications back to the base in Indianapolis.

Announced frequencies (transmit/receive) are 3695/3800+, 7055/7200+, 14145/14200+, 21195/21300+, and 28295/28450+ kHz on SSB; and 1825/1835, 3505/3525+, 7005/7025+, 10105/10125+, 14005/14025+, 18070/18080+, 21005/21025+, 24905/24925+, and 28005/28025+ kHz on CW. The operators plan to sign the call 3Y0B every fifth QSO on CW, and will announce bands and modes of other stations every 40 QSOs on SSB.

To allow the maximum number of DXers to make contact with 3Y0B, the operators ask that stations send their whole call (no partial calls), and their signal report only. The operation will run for 10 days, February 2-12, so they ask that "insurance" contacts be postponed until after the first few days on the air.

Joseph Pinella, WA9VGY, is the QSL route. The group offers a full-color award for working them on three or more bands. Include a fee of US \$5 with your log data for the award.

The well-organized, professional nature of this operation puts the Club Bouvet plans in doubt. The Northern California DX Foundation had to withdraw its initial pledge from Club Bouvet, as the Foundation's directors could be accused of

wasting the Foundation's funds by contributing to one Bouvet operation when another was completely paid for outside the amateur community.

As of late September, the Club Bouvet team vowed to continue their efforts, thanks to generous donations from Japanese and Norwegian DXers. However, as the word spreads about the Indianapolis effort, some of the contributors to Club Bouvet may have second thoughts. Rather than have two Bouvet operations within days of each other, it would be far better for the amateur community if Club Bouvet shifted their attention to another rare Antarctic spot, such as South Georgia, South Sandwich, Heard Island, or even a return to Peter I Island.

Everyone loses when two groups com-

The WAZ Program

10 Meter Phone

340	N6CGB
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15 Meter Phone

295	K7NW	299	YC0RX
296	T12KD	300	YC0JVT
297	JA7QFU	301	DU1DZA
298	KE3A	302	YC0RBG

20 Meter Phone

764	K7NW	767	KL7AF
765	VK3IR	768	JA2YHS
766	NI3P	769	HK4DUM

40 Meter Phone

59	DJ7RJ	60	JA2THS
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15 Meter CW

155	OK3THM	156	WR7C
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20 Meter CW

335	JA7MLG	337	WA0GUD
336	KL7AF		

40 Meter CW

107	W1GL	110	WA2UKA
108	A11N	111	KE9U
109	OH4OJ		

All Band WAZ

SSB

3393	IK7BDN	3402	I2ODZ
3394	NB7N	3403	KA1EKR
3395	WS7W	3404	W8IWJ
3396	N6NXV	3405	KA1HBV
3397	N9NG	3406	OZ1HPS
3398	IK1IYU	3407	WA9AKT
3399	KC4MJ	3408	DJ1KP
3400	K8MDU	3409	FE6EDW
3401	W3GXX	3410	TI2JJP

Phone/CW

6613	YT7OO	6624	OZ9BX
6614	NV7J	6625	I2RGV
6615	N6NXV	6626	W1XN
6616	NS3K	6627	UY5XE
6617	K6ZH	6628	KA2HMJ
6618	NC1E	6629	KD6GC
6619	DJ3GE	6630	K7WK
6620	KE3R	6631	KB2FS
6621	KK3S	6632	UQ1GXX
6622	WB3GOC	6633	DL7PA
6623	N5EPA	6634	DJ1KP

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Hajsman, 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.

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MUF-4505NGP,430-450 non-radial	38.00
MAX-9053,902 MHz.	31.00
MAX-SCAN 1000,Scanner Antenna	19.95

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MBX-430,430-450 Omni Base	54.50

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Table-1,5-1000A,B,C,D or E	52.00
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4381,portable digital BIRD	690.00

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5 Band WAZ

As of September 1, 1989, 240 stations have attained the 200 zone level.

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KB0U
IN3DEJ

The top 22 contenders for 5 Band WAZ are:

- | | |
|----------------|-----------------|
| 1. K1VKO, 199 | 12. AA4V, 199 |
| 2. N4WW, 199 | 13. K2UU, 199 |
| 3. UQ1GXX, 199 | 14. YU2CBM, 199 |
| 4. W0JLC, 199 | 15. NS7Z, 198 |
| 5. SP9PT, 199 | 16. HA8XX, 198 |
| 6. K9YRA, 199 | 17. K7UR, 198 |
| 7. K5UC, 199 | 18. PY7ZZ, 198 |
| 8. K8EJ, 199 | 19. K6SIK, 198 |
| 9. K9TSQ, 199 | 20. VE7DX, 198 |
| 10. SP6CZ, 199 | 21. W0PGI, 198 |
| 11. K9GX, 199 | 22. NY2E, 198 |

603 Stations have attained the 150 Zone level, as of September 1, 1989.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (65 cents) size 4 1/2 x 9 1/2 to the W A Z Manager, Leo Hajsman, 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.

pete against each other to activate a rare location, such as happened a few years ago on Heard Island. The division of energy and expertise hurts both groups, and doesn't really provide DXers with more opportunity to work the country. Perhaps the Club Bouvet team will realize this, and look for a DX location where their efforts would not be duplicating those of another group. (The Club Bouvet team was invited



Vince, KP2AH, was one of the St. Croix, US Virgin Island amateurs whose station was damaged by Hurricane Hugo. (KV4AM photo)

to join the Post Society's DXpedition at no cost, but they declined.)

The DXer's Bookshelf

While going on a major DXpedition to Bouvet or even on a minor one to a Caribbean island is not for everyone, even arm-chair DXers can find information and enjoyment in perusing some of the excellent books and operating aids on the market today. Three of the most useful books in the DXer's bookshelf are out with new editions in recent months.

The Complete DX'er is Bob Locher, W9KNI's entertaining and informative guide to the world of DX. The second edition of *The Complete DX'er* has been revised and up-dated extensively to reflect the changes in the DX world since the book's publication in 1983. The second edition retains the flavor of the previous edition, while offering the reader more advice on DX and DXing, including two additional chapters. *The Complete DX'er*



Members of the French DX Foundation operated from Guernsey Island GU in the Worked All Europe CW test in August, and Jersey GJ in the SSB version in September. The CW crew, from left: Alain, F6BFH, Denis, F6GKQ/GU0LWQ, Sylvio, F6EEM/GU0LWR, Florence, F6FYP/GU0LYP, Jacky, F2CW/GU0MCW, and Serge, F6AUS.

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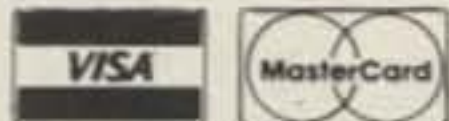
#15 PLASTIC KEY & OSC. . . \$21.95

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- #21 5-7 wpm Speed Builder
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- #24 10-12 wpm Speed Builder
- #25 12-15 wpm Calls & Numbers
- #26 13 wpm Random Code
- #27 13 wpm Test Preparation
- #28 13 wpm Car Code
- #29 13-15 wpm Speed Builder
- #30 15-17 wpm Speed Builder
- #31 17-19 wpm Speed Builder
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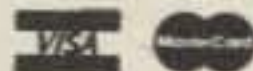
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MIXED

3780	YU2AA	2123	N6CW	1853	N6JM	1241	K7CU	947	YU2GIJ
3520	F9RM	2089	SM3EVR	1645	KL7AF	1229	JA6GWU	947	K9BQL
3381	K2VV	2077	W9NUF	1639	K8LJG	1214	AJ8S	929	VE3NUP
2932	W2NC	2052	K9BG	1601	SM0AJU	1206	NV9S	911	I5ZTC
2845	K6JG	2022	K5UR	1583	W8UMR	1206	K5DB	902	YB0EMJ
2751	VE3XN	1988	4X4FU	1583	W4UW	1205	YU7DR	901	YU7RU
2694	N4NO	1981	IN3ANE	1567	I1POR	1190	DF6EX	898	YU1PJ
2679	W4BOY	1964	DJ4XA	1562	W6OUL	1182	GM4OBK	891	W9IAL
2657	K6XP	1918	PY4OD	1561	DK5AD	1173	KC8CC	884	WA4WIN
2600	W9DWQ	1912	W0SFU	1514	WE2L	1166	WD9IID	859	OE1KJW
2568	N6JV	1909	HA0DU	1495	YU2CO	1155	PY2DBU	840	YU3PG
2558	N4MM	1903	YU2NA	1472	NN4Q	1143	I0AOF	802	W5ASP
2534	PY1APS	1902	KF2O	1468	K2OLG	1140	NE6I	778	W4WKQ
2446	WABYTM	1895	KA5W	1435	YU1SZ	1134	KS0Z	773	K3SL
2403	K0BLT	1848	IT9TOH	1421	N8BJQ	1120	JA1WJ	750	KC7EM
2403	N9AF	1841	I2MQP	1415	N2AIF	1107	YU3NU	749	W4USW
2388	EA2IA	1810	IT9QDS	1407	SM6CST	1102	DF4ZL	748	IK2BHX
2373	I2PJA	1788	I1EEW	1403	AB9O	1098	5H3RB	742	K5IC
2301	YU1AB	1756	I2DMK	1402	WB8ZRL	1081	K3UA	728	K6UXO
2297	YU7BCD	1753	N8AW	1400	AC2J	1044	G4SDJ	715	NX9H
2243	I8YRK	1743	SM6DHU	1380	YT7WW	1041	CT1QF	711	RB5MP
2192	SM7TV	1737	YT3AA	1302	4N7ZZ	1008	W0JIE	711	W6LC
2185	YT7DX	1712	HA8XX	1292	I2EOW	981	I2EAY	684	NJ1T
2136	N2AC	1687	K2POF	1262	YU1GR	966	K1BAZ/DV1	819	IK2ECN
2132	I6SF	1685	YU2TY	1256	W9IL	950	F1HWB		

SSB

3444	F9RM	1805	I4CSP	1332	CT1BY	1051	K8LJG	805	W5ILR
3218	I9ZV	1741	EA2IA	1307	I1POR	1043	WA2FKF	803	LU8DWN
2896	K2VV	1738	WF4V	1301	KL7AF	1035	W0ULU	801	N6CGB
2819	ZL3NS	1720	WA4QMQ	1294	I2EOW	1034	G4SDJ	794	NE6I
2625	K2POA	1718	K5UR	1290	PY4OD	1009	CX6BBZ	783	K3UA
2560	K6JG	1635	W9NUF	1283	IK5ACO	1004	W3GXK	757	IK7DBB
2441	CT1UA	1624	KF2O	1270	PY4OY	1002	ZS6BCR	749	GM4OBK
2430	VE1YX	1615	W3ARK	1265	KD9OT	993	KS0Z	744	IK0EIM
2371	I2PJA	1603	IT9TOH	1232	SM6DHU	985	XE1XF	731	KB2DE
2362	K6XP	1602	CT1FL	1230	N6FX	981	DK8WO	699	I7UNX
2323	N4MM	1581	I5ZJK	1229	LU8ESU	962	WB6GFJ	699	A4XJV
2300	I0AMU	1558	G4CHP	1219	SM0AJU	960	HK6BER	698	VU2SMN
2223	W0YDB	1532	W4UW	1209	I2TZK	950	F1HWB	683	YC7DF
2208	WD8MGQ	1525	KC8YM	1207	KE6KT	950	KB0C	674	KB4HU
2122	CT1NH	1521	KA5W	1200	AB9O	947	I2WZX	667	KA5YCM
2093	I4ZSQ	1515	DJ4XA	1200	F6BVB	943	W6OUL	661	K0PVI
2083	ZP5JCY	1506	G4CPJ	1192	YU7SF	939	IT9JKY	657	W5AWT
2077	I6ZJC	1485	YU2NA	1177	N2AC	917	IK2DUU	650	WM5G
2035	W4BOY	1450	XE1OX	1163	NN4Q	908	N2AIF	648	K8MDU
2023	N4NO	1437	K5RPC	1158	PY4VX	902	K3IXD	644	NM5Y
2020	OZ5EV	1431	EA4KK	1141	KC8CC	901	NK2H	641	CT1CIR
1999	I8YRP	1418	EA3AQ	1132	WB8ZRL	891	I3ZSX	639	KA0ZFX
1966	I8YRK	1405	I8KCI	1114	I8WYD	860	WN5MBS	633	SM6CST
1949	WABYTM	1405	AC2J	1103	CT1AHU	859	K8ZZU	632	KA5RNH
1902	W9DWQ	1404	CT4UW	1102	AG2K	854	IT9ONV	618	CT1DIZ
1847	YU7BCD	1401	WE2L	1084	I8LEL	838	K9BQL	613	K1BAZ/DV1
1846	I2MQP	1394	HA8XX	1052	IK8GCS	818	WB6SRK	607	K5HT
1809	NJ0C	1371	N5TV						

CW

2748	K2VV	1710	N4MM	1242	W1WAI	1024	NN4Q	790	NE6I
2613	WA2HZR	1639	PY4OD	1218	YU2NA	1019	HA5LZ	781	G4UOL
2547	N6JV	1619	W9NUF	1215	VE1ACK	1012	HA8XX	763	OE1KJW
2405	ON4OQ	1599	K5UR	1212	I7PXV	1000	DL2HBX	755	K1BAZ/DV1
2350	N4NO	1534	N4YB	1205	I8YRK	988	OK1CZ	750	W0JIE
2235	W3ARK	1508	JH3CXL	1166	TI4SU	957	VE4CE	731	YU3PG
2223	VE7CNE	1504	IT9TOH	1146	N2AIF	947	OZ5UR	704	K6UXO
2139	W9DWQ	1459	IT9VDQ	1143	SM0AJU	947	NF5Z	702	WE2P
2117	K6JG	1457	KA7T	1135	LA9XG	915	SM5DAC	685	W5AWT
2080	W4BOY	1455	I2DMK	1134	EA7OH	868	K3UA	671	NJ1T
2019	YU7SF	1337	K2POF	1134	K8LJG	865	EA1AK	659	W9IAL
2002	K6XP	1327	N6FX	1134	W6OUL	860	GM4OBK	651	VS6UW
1950	N2AC	1303	KA5W	1129	YU2CO	838	JJ1FSK	643	IS0FIC
1914	I1YRL	1285	SM6CST	1112	YU3NU	837	YU2GIJ	634	I1EEW
1874	EA2IA	1261	SM6DHU	1095	DJ1YH	829	G4MVA	622	RB5MP
1867	I6SF	1251	KL7AF	1051	OH3TQ	821	WB8ZRL	619	PY4WS
1852	YU7BCD	1245	F6HKD	1051	G4SSH	807	KA1CLV	602	4X6DK
1803	WABYTM	1243	W9PWM	1045	G4VQO	799	EA5AR		
1746	4X4FU	1242	KF2O						

is available for \$12 plus \$3 postage (US \$4 postage outside the US) from Idiom Press, Box 583, Deerfield, IL 60015.

Another essential addition to the active amateur's bookshelf is the new edition of *The K1BVDX Awards Directory*. In the 1990 edition author Ted Melinosky lists some 1300 DX awards from more than 100 different countries, by far the most comprehensive list anywhere. The book includes complete details for qualifying for and applying for all these awards, with lists of club members where appropriate. As a bonus, Ted also provides lots of general advice about award chasing, QSLing, general certifications rules, award chasing during contests, and much more. The 1990 edition of *The K1BV DX Awards Directory* is available for \$15.50 postpaid in the US from Ted Melinosky, K1BV, 525 Foster Street, Suite 1001, South Windsor, CT 06074. (Overseas prices are US \$15 surface mail, and US \$19 airmail. Connecticut residents add sales tax.)

A less-known but very interesting book is also out in a new edition for 1990. The *Call Sign Directory* by Hans Schwarz, DK5JI, is a 200-page guide to amateur radio callsign structure. The book lists every amateur callsign, complete with details such as license class, location, special event and club station calls, and more. Continent, CQ and ITU zone, and DXCC country are shown for each prefix. The book also includes a description of callsign allocation in general, and finishes with a 30-page check-off table for each DXCC country (including deleted ones) on every band and mode. The *Call Sign Directory* is available from DARC Verlag, Postfach 11 55, D-3507 Baunatal, West Germany, for 16.80 German Marks, plus postage. (The bulk of the text is in German, but can be understood without difficulty.)

Another new publication that belongs on every DXer's bookshelf is the *Radio Operator's World Atlas* by Walt Stinson, W0CP. The 5" x 7" full-color atlas shows even the smallest DXCC countries. In addition to the detailed maps, the book includes brief descriptions of most countries with facts such as area, population, language, capital, and more. The index, the key to a useful atlas, is excellent. The *Radio Operator's World Atlas* is available for \$16.95 postpaid from Walt Stinson, W0CP, 4150 East Quincy Avenue, Englewood, CO 80110.

QSLing Tips— Reducing The Rip-Off

Among DXers' greatest frustrations is the problem of stolen mail. In many parts of the world, underpaid postal workers have learned to recognize that the small envelopes with the telltale bulge of a folded envelope inside and weird combinations of letters and numbers in the ad-

CQ DX Awards Program

SSB

1706 IK7BDN 1709 WM0G
 1707 WC2C 1710 LU1ATU
 1708 UA4CX

CW

760 W2UE 762 KB9XG
 761 YU2RR

SSB Endorsements

320 OZ3SK/321 310 WB3CQN/312
 320 VE3GMT/320 310 W4UW/310
 310 VE2WY/319 310 XE1OX/310
 310 W0SR/316 300 KB0SY/304
 310 WB1DQC/315 275 K9TI/291
 310 W9RY/315 275 WD9IC/289
 310 N2KW/314 275 KC4MJ/276
 310 W2FGY/313

CW Endorsements

310 W0SR/311 275 W1WAI/295
 310 N2KW/311 275 K9TI/280
 300 W6SN/307 275 KB9XG/280
 300 W2UE/305 275 G3KMQ/280
 300 W9RY/304 150 K6UXO/164
 300 WD9IC/303 28 MHz K4CXY

Total number of active countries is 321. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

dress and/or return address (i.e., call-sign) contain valuables, including US \$1 bills. One of the many workers who handles this type of mail may be tempted to divert the letter, and keep the money or International Reply Coupons (IRCs). In this case, that worker will more likely destroy the rest of the letter, including the QSL card, rather than risk getting caught by putting the remains back into the postal system.

This obviously causes problems both for the DXer who sent the letter, which is not answered, and for the DX station, who gets a reputation as a bad QSLer through no fault of his own. The problem is acute in many South American countries, especially when a major DXpedition generates a large volume of mail. A large fraction of the mail addressed to a radio club might never arrive, for example.

I recently received two letters describing cases where the postal worker was a little more honest. QSL cards sent to Russia and Djibouti were delivered without the dollar bill, but at least they arrived at their destination.

Although it is probably impossible to completely eliminate this rip-off, a DXer can at least take steps to improve the odds that his letter will arrive with contents intact.

The trick is to make your letter look as little like a QSL request and as much like a business letter or personal correspondence as possible. This means using a #10, business-size envelope rather than



The Turkish Amateur Radio Club operated TA2KR/p Field-Day style in the WPX CW contest at the end of May. Not long ago amateur radio was illegal in Turkey!

the small, QSL card-size ones. The return envelope along with the QSL card and the US \$1 (or IRCs) fits into the larger envelope without folding, which eliminates at least one of the indicators of valuable contents.

Next, avoid use of callsigns or other designations of amateur radio operator. In other words, don't address the envelope to "amateur radio operator Ben." If all you know is the operator's first name, use an address such as "Mr. O.M. Frank." The same advice holds for the return address. One of the locals has had good success by using a "Mr. and Mrs." return address, or the name of a business firm. Typing both the DX station's address and

the return address makes it look more like an official letter, and less like a QSL request.

The use of opaque, check-mailer envelopes can prevent anyone from seeing the money inside when the envelope is held up to a light. If you can't find these large, opaque envelopes at your local stationery store, write to Writewell Co., P.O. Box 6112, Indianapolis, IN 46206. Their envelope #W131 is a large, opaque, self-seal one with imprinted return address, at \$21.95 plus \$3.95 postage for 100. The price is well worth the improved QSL return rate.

A final note: Dr. Mohammed Hamdan, A61AC, reminds DXers to put the name of

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 AN779H 20W \$ 93.19 AR305 300W \$383.52
 AR313 300W \$403.00

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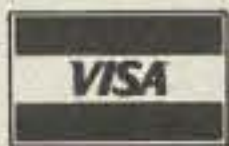
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 METALCLAD MICA CAPS—Unelco/Semco
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 SBL-1X (10-1000Mz) \$ 7.95
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 VK200-20/4B RF Choke \$ 1.20
 56-500-65-3B Ferrite Bead \$.20
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their country on their return self-addressed envelope. While US postal workers might recognize most two-letter state abbreviations, postal workers in other countries may start off your return QSL in the wrong direction, unless you add USA to the return address!

QSL Notes

QSL the August P40MA operation to Mark Allen, KJ7X. Putting the operator name (Mark, Don, or Bill) on the card and envelope will speed response.

Dave Wilson, N4DW, has a new address: Route 1, Box 11A, East Burke, VT 05832. Dave handles cards for OA4DW, ZP5XDW, ZP5XGG, N4PW/CE3, and 9L1GG.

Doug Woolley, ZP6XDW, asks for QSLs direct to P.O. Box 73, Caaupe, Paraguay.

Mike Smedal, 5B4TI, still has his logs and QSL cards from his A7XD and A71AD operation of 1980-85, and is pleased to QSL: P.O. Box 7121, Nicosia, Cyprus.

QSL the contest operations of RQ7W, EU1Q, U2QRI, club station UQ1GWW, and DXpedition UR9/UQ1GWW to Valery P. Sincov, P.O. Box 50, Riga, Latvia 226010, USSR.

Al Kovalyov, UB5ILA, now handles QSLs for Cuban stations CO7HC, CM5JE, and CM5VF, via P.O. Box 30, Donetsk, Ukraine 340000, USSR. He says one IRC gets surface mail return, and two IRCs get an airmail response, but he is one of the Russians who prefer US \$1, instead of IRCs.

Peter, T77V, says his new QSL manager for Europe, Africa, and Asia is IS0QDV. The rest of the world can continue to QSL via W3HNK.

The American Amateur Radio Club of Korea says they are knee deep in QSLs for departed HL9 US military personnel in Korea. If you held an HL9 call, or know of someone who did, send the call, dates of operation, and current address to the club's address: Dependent Mail Section, P.O. Box 153, APO San Francisco, CA 96206. Meanwhile, Dennis Wood, KT8X, says DXers can QSL his HL9USA operation in the 1989 ARRL SSB test via the same address.

QSL the Argentine contest call of AY6D via Carlos Alberto Carbonell, LU7DEE/LU7ET, P.O. Box 36, 1834 Temperley, Buenos Aires, Argentina.

Although the Réseau des Emetteurs Français (REF, the French national radio society) no longer forwards QSLs to non-members, the rival Union des Radio Clubs will send QSLs to non-members. Their address is 71 rue Orfila, F-75020, Paris, France.

QSL manager volunteers: WA7WOC, KB4GID, HG7JBN, SM2OJR, OK3CDV, KB6RFX, N4PKL, N5FTR, K5MK, and WB2PQG.

73, Chod, VP2ML

QSL Information

QSL Managers

BT8C to T12RC
 3A/HB9DCQ to HB9DCQ
 3B9FR to F6FNU
 3D2AG to OH2DY
 3D2RJ to ZL1BQD
 3D2VT to DK2WV
 3X1SG to ON7GV
 4C2TBC to XE2TCO
 4K1FA to UA1DJ
 4L1QRQ to UW3AA
 4N7N to YU7BPQ
 4N9GL to YU2BOP
 4N9N to YU1EXY
 4S7RO to DJ9ZB
 4U1ITU(JULY) to YU2HB
 4U1UN to NA2K
 4U1WB to KK4HD
 5B4WW to 5G4TI
 5H1HK to JH4RFH
 5H3TW to K3ZO
 5N4/KBLXA to WD0GJH
 5R8JD to F6FNU
 5T5CK to DL1HH
 5T5EV to DL3KCE
 5V7DP to KA1DE
 5Z4BI to W4FRU
 6Z2DK to G3OCA
 6Z2WK to G3OCA
 7P8DP to W8JBI
 7P8EG to K0JZM
 7X2SX to F6FNU
 7X4VUK to F6IFF
 8P6GM to C6ANX
 8P6RE to N7FUD
 9H3K0 to HA8ZO
 9H3YE to HA8ZC
 9J2B0 to W6ORD
 9K2MJ to JA2PDQ
 9L/PABGAM to PA0GIN
 9L1IS to KB9N
 9L2NG to J0WDX
 9M2AX to JA5DQS
 9Q5DX to KQ3S
 9Q5UN to OH3GZ
 9Q5XX to KC4NC
 A22AA to A22CQ
 A22FN to W1LOQ
 A22RA to ZS5ABT
 AP5HQ to N0RR
 C31NP to EA3BNX
 C30LBS to IK1CJT
 CE0MTY to CE3ESS
 CE1CI to W4FRU
 CG5ZX to VE5ZX
 CI1DH to VE1DH
 CI5ZX to VE5ZX
 CI7GRN to VE7IGV
 CJ2MO to VE2AJD
 CN8FC to WA4QM0
 CN8ST to F2CW
 CO2VG to I0WDX
 CR5CQK to CT1CQK
 CR9M to CT1CWT
 CT3EU to G3PFS
 CY8SAB to VE1CBK
 CY9SPI to VE1YX
 D68TW to K3ZO
 EA9EU to W3HNK
 ED18M to EA1PJ
 ED1IDA to EA1EBK
 ED98UD to EA7BUD
 EF5LBD to EA5FKQ
 EF5PAT to EC5CHV
 EI4VIQ to DK3VH
 EK2RR to UQ1GWW
 EK3LT to UA3PA
 EK4AA to RA4AW
 EL29A to WA2DHF
 EL2WK to G3OCA
 FG/FD10MP to F6FNU
 FM4FE to FD1NCZ
 FQ8AQ to F6FNU
 FQ8FB to WB6GFJ
 FQ8MGZ to F1MGZ
 FQ8V0 to N6V0
 FQ5LZ to FO4LZ
 FP/K1RH to K1RH
 FR4FD to F6FYA
 FS5R to W7EJ
 FT4ZE to F2CW
 FV9NDX to F6AJA
 FW/KABOMX to VE7YL
 FY5YE to W5JLU
 GJBLWR to F6EEM
 GJBLYP to F2CW

GJ8MCW to F2CW
 GU8LWQ to F6GKQ
 GW4UJS/P to G4UJS
 HB8/DL1GK to DL1GK
 HB8/HB9NL to HB9NL
 HC5K to K1TN
 HC5K/HC8 to KT1N
 HC8/KB2VO to KB2VO
 HH2BM to KC8JH
 HI3JH to F6RNU
 HL5BDS to HL1ASS
 HR2JEP to WB6QPG
 HS8AIT to SM3DYU
 HS8E to HS18V
 HZ1AB to K8PYD
 HZ1HZ to N7RO
 IJ7ET to I7OYT
 J37AJ to W2KF
 J37ZY to NS8G
 J52US to WA8JOC
 J73A to W3HNK
 J73D to W2OB
 J79T to W5EW
 J88AQ to W2MIG
 JW/WA4ZEL to LA8PF
 JX7DFA to LA2KD
 JY9SR to W3FYT
 KC4AAA to NC6J
 KC6NX to JH2BNI
 KE4I/DU3 to WA4FFW
 KG4HA to KB4HAH
 KH8AC to N7ZA
 KH3/NH6D to NH6D
 KN8E/KH3 to K9UIY
 KT7H/GUE to KT7H
 LE1JP to LA4DCA
 LX1RQ to SP5LJD
 NP4A to W3HNK
 OD5BP to DL1FZ
 OD5MM to HB9CYH
 OD5PL to HB9CRV
 OD5VT to HB9CRV
 OH8/OH2AQ to OH2NRF
 OH8/OH6LF to OH6LF
 OH8MM to K3NA
 OH2AP/OH8 to OH2AP
 OH2AQ/OH8 to OH2AQ
 OX/OZ1LQH to OZ1LLC
 OY3QN to OZ1ACB
 P29CG to WB9SVK
 P40MA to WJ7X
 PJ7/W5ASP to W5ASP
 R4PWY to UZ4PWY
 R9ZF to RV9FQ
 R9ZF/NN7A to NN7A
 R9ZF/NN7D to NN7D
 R9ZF/W7YS to W7YS
 RB9P/RB5WA to RB5WA
 RF8Q/UW3DM to HB9BWB
 RT8U to UT4UWX
 S79MX to HB9MX
 SM8OIG/YN to SM8KCR
 SO9IW to FO5IW
 SU1EK to W2QUV
 SV8MO/SV8 to SV1DX
 SV2/DK6AS/P to DJ8MT
 T30AC to AA6BB
 T30BC to ZL2QW
 T32AB to N7YL
 T32IO to AH6IO
 T30BC to ZL2QW
 T50DX to I2JSB
 T56G to I2MQP
 T5YD to F6AYA
 TA28KS to DJ0UJ
 TA3F to DL5YCR
 TJ/IK1JLL to I1SQN
 TK/DL7HZ to DL7HZ
 TK/HB9ASZ to HB9ASZ
 TK5EP to F6ESH
 TL8RM to F6FNU
 TL8SC to K4UTE
 TM7EU to F6KDC
 TR8CJ to G3ORC
 TT8CW to F2CW
 TU2UI to TU4DB
 TZ8MAR to DJ5RT
 TZ6FIC to F6CRS
 TZ6VV to N0BLD
 UB4GB to VE4GU
 UB4RJR/RG1G to RB5JRR
 UD6DKW to W3HNK
 UF6FDR to UF6FFF
 UG1G/UB4IYU to RB5IJ
 UG6GAW to KE6T
 UG8G/UB5IRZ to RB5IJ
 UMBNU to F6FNU

UR8RWH to UR2RE
 UZ2FWA to UA2FM
 UZ90WM/UANX to UA9OBA
 V21CW to KA2DIV
 V27T to YU2RL
 V31BB to K3FEN
 V47RF to WA2SPL
 V63AP to KC6JC
 V63JC to KC6JC
 V85DA to VK1DA
 V84GV to VE4GV
 VEBMAD to VE2FOX
 VE8/FD1JYD to F6IGX
 VE8MB to VE5YF
 VK8GC to VK9NS
 VK2EED/3 to G3GAF
 VK68DV to DJ0PJ
 VP2EXX to KC8JH
 VP5/W4NPX to W4NPX
 VP5PLS to W3HNK
 VP8BUB to G4YLO
 VQ9CC to N0JCV
 VQ9RF to WB9NYC
 VQ9VR to K6VRS
 VS6U0 to G3IFB
 VU2AIR to W8XM
 VU2GUY to F6FNJ
 VU2TTC to W8XM
 XX9SW to KU9C
 Y730P to Y53TA
 Y89TM to Y32PI
 YB2BNJ to W8AH
 YK1AA to DJ9ZB
 YN3CC to W3HNK
 YN3OCZ to NT7S
 YS1GMV to W3HNK
 YZ4Z to YU4EXA
 ZD7XY to W4FRU
 ZD8DQ to KB4FEP
 ZD8VV to G4ZW
 ZD8XX to W4FRU
 ZF2AH to WA6VNR
 ZF2LJ to KB6SFD
 ZF2NZ to KA2UHS
 ZK1XN to SM5BOQ
 ZM1BSG to ZL1BSG
 ZS1IS to KC1AG
 ZS3UN/OH7NRW to OH7XE
 ZS8MI to ZS6PT
 ZV7AA to PT7AA
 ZY8TA to PY5AKW

QSL Routes

3D2AF to PO BOX 14633, SUVA
 3DA0AH to BOX 2726, MBABANE
 6W1AD to PO BOX 3204, DAKAR
 6W1AE to BOX 971, DAKAR, SENEGAL, WEST AFRICA
 7X2SX to AFIF, BOX 2, ALGER GARE, ALGIERS ALGERIA
 7X4AN to MOHAMED, 263 ZELBOUN TKEMCEN ZELBOUN, ALGERIA
 7X4BL to BOUCIF, BOX 929, 13000, TKEMCEN-ALGERIA
 7X4KX to KADER, PO BOX 19043, ORAN ALGERIA, 31011
 9J2AL to PO BOX, 32481 LUSAKA
 9LICM to BOX 774, ST JOHNS-BURY, VT 05819
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 TU2UI to PO BOX 237, FERKE, IVORY COAST
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 UA3TT/RF9F to BOX 18, GORKY, USSR
 UB4EZZ to SANDY, PO BOX 3558, DNIPROPETROVS 320018
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 UL7BX to BOX 926, TSELINOGRAD 473000
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 UP2BIM to SAM, PO BOX 787, KAUNAS 41
 UQ1JXJ to ALEK, PO BOX 67, RiBA 226003
 UR3RA to PO BOX 806, TALLINN, 20017
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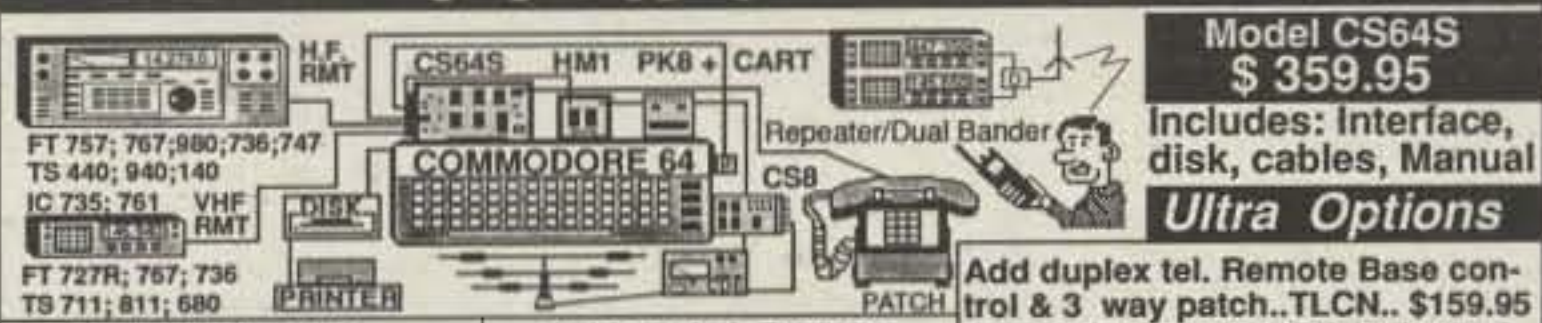
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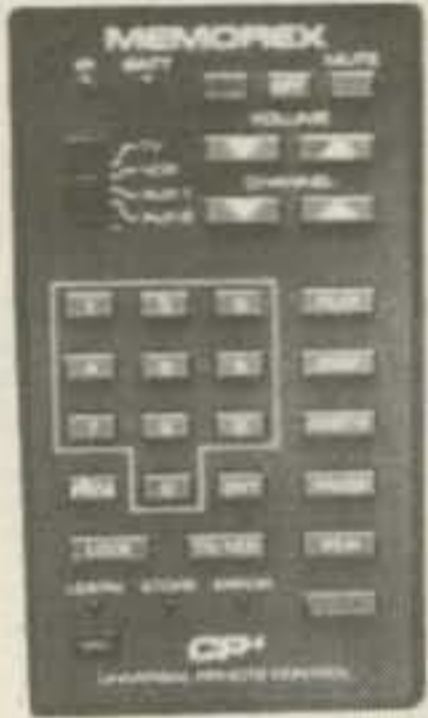
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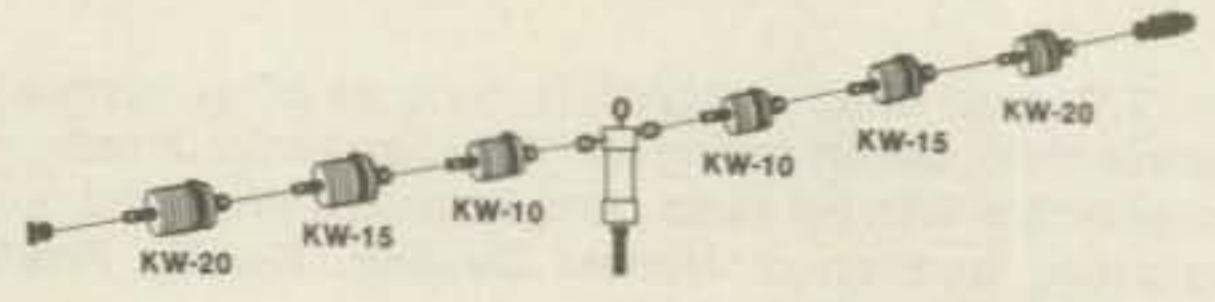
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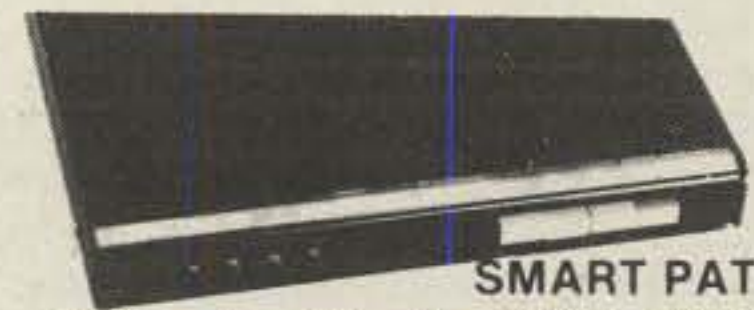
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Contest Calendar

a monthly feature by
JOHN DORR, K1AR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

It seems that wherever you turn today, an individual's ethical behavior is being examined. Politicians, tele-evangelists, business leaders, and the financial community are just a few of the social groups that come to mind. While contest operators have escaped the perils of the latest SEC probe, our ethical behavior has been a topic of spirited discussion and editorial in recent months.

This month I am pleased to present the results of our own investigation into the mind of the average contester. Although the statistical significance of the results is debatable, invaluable insight can be gained about our operating habits and attitudes.

In total we received 186 responses from all U.S. call areas, VE, and 8 DXCC countries. The average level of contest experience was 15.9 years, ranging from a few months to 53 years! The subject matter found in the survey resulted in a variety of responses. In many cases the replies were simply a list of check marks written on the torn-out page of someone's magazine. In one instance I received a three-page typed letter. Using one method or another, over 70% of the responses included some measure of additional comment.

Although many of the responses included signatures and callsigns, I elected to remain consistent and keep the results anonymous. I even received a couple of signed replies, with calls, that contained a significant number of positive responses!

Generally speaking, there were few unexpected revelations in the results. As we had hoped, the examples of blatant cheating described in the questionnaire were embraced by few. More surprising was the significant number of participants positively responding to the grayer areas of our operating practices (e.g., questions 9, 11, 12, 18). In general, there were three underlying trends in the results. First, many of us question the ethics employed by multi-operator stations. Several responses included comments admitting a change in ethical behavior when the operator hides under someone else's callsign. Secondly, while the responses displayed a trend away from outright cheating on a regular basis, there were a number of answers indicating occasional improprieties (e.g., "I have done this once or twice in the past."). Finally, there was the overwhelming concern about illegal power. Although question 6 touched upon the subject, I have to admit that I underestimated the subsequent intensity of response.

The analysis that follows attempts to pass little judgment or bias. Rather, I have sought to look for trends and include relevant and interesting commentary.

Analysis

Question 1. In general, do you think leading contest operators use operating ethics similar to those of the "small guns"?

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Calendar of Events

Nov. 25-26	CQ WW DX CW Contest
Dec. 1-3	ARRL 160 Meter Contest
Dec. 2-3	TOPS 3.5 MHz Activity
Dec. 2-3	Telco. Pioneers QSO Party
Dec. 9-10	ARRL 10 Meter Contest
Dec. 10	ARCI QRP CW Sprint
Dec. 31	CARF Winter Contest
Jan. 6-7	Hunting Lions CW Contest
Jan. 6-7	ARRL RTTY Roundup
Jan. 13-14	Hunting Lions SSB Contest
Jan. 13-15	ARRL Jan. VHF Sweepstakes
Jan. 20-21	Texas QSO Party
Jan. 26-28	CQ WW 160 Meter CW Contest
Jan. 27-28	UBA CW Contest
Jan. 27-28	YL-SSB YL/OM CW Contest
Jan. 27 Feb. 4	ARRL Novice Roundup
Jan. 28-29	1990 Winter Classic Radio Ex.
Feb. 3	Carnaval de Quebec CW
Feb. 3-4	Vermont QSO Party
Feb. 10	Carnaval de Quebec SSB
Feb. 10-11	QCWA CW Party
Feb. 17-18	ARRL DX CW Contest
Feb. 23-25	CQ WW 160 Meter SSB Contest
Feb. 24-25	UBA SSB Contest
Mar. 3-4	ARRL DX SSB Contest
Mar. 9-11	Japan Int'l. CW DX Contest
Mar. 10-11	QCWA SSB Party
Mar. 24-25	YL-SSB YL/OM SSB Contest
Mar. 24-25	CQ WPX SSB Contest

This question resulted in the most disagreement among the respondents with the division being nearly 50/50. I was so intrigued by this that I dug further into the results to discover that the division was consistent irrespective of contest experience. For example, in the 0-5 year group, the ratio of positive responses was 46.8% (47 responses). In the 15-plus year range it remained nearly constant at 47.1% (85 responses).

Comments:

"Big guns are just more aggressive and give the impression that they cheat."

"I have seen some pretty poor ethics on the part of small guns."

"I believe ethics are similar, but tactics are quite different."

"Small guns don't have the muscle to implement their lack of ethics."

Question 2. XU1SS calls you in the last 10 minutes of the CQ WW for a double multiplier. You give him his report and he doesn't reply. Would you log him anyway?

There were a lot of us who "passed the buck" on this question. One respondent said, "If XU1SS calls in that manner and doesn't respond to the report, he's just an inexperienced DX operator who doesn't understand contest techniques." In contrast, there were others who swear by the party line—If you don't make a 2x QSO, it isn't valid.

Comments:

"I'm loose at times . . . but I don't do it very often."

"I'd be too worried that he's calling some-

one else . . . very few people use both calls in contests."

"You almost always know when you've made a valid QSO . . . make the judgment as if your competition was the judge."

Question 3. 4U1TU is running Europe on 7045. Would you say to him "Listen for State-side" on his transmit frequency?

There are a lot of us who are guilty of this one. While a goodly number of responses demonstrated concern over this practice, many were also quick to admit that they would succumb to the pressure under battle. This was especially true for double multipliers in the CQ WW SSB Contest.

Comments:

"No, but I've called stations on CW to listen up."

"Everyone does this."

"No, but as a DX station I have asked several USA stations to listen DOWN."

Question 4. You have been on 14276 for 3 minutes and someone comes on your frequency and says, "You are QRMing the Chernobyl Family Hour Net. . . . please QSY!" Would you:

a) QSY from the frequency

b) Zerobeat the net

c) Tell the guy to move in a less than friendly manner (hi).

Many of you took editorial liberty with this question by adding a fourth answer such as "none of the above," "depends on how long I've been there," "would depend on who's callsign I'm using," "ignore him," etc. The results seem to show that most contesters are a friendly group despite the bad press we get about our operating styles and tendency to ignore everything to get that elusive rare multiplier.

Intrigued by the results of this question, I took a look at the 15-plus year crew to see if long-term contesters were less accommodating than their younger peers. Unlike the overall average, only 5.0% of the long-term contesters answered "c" in the affirmative (4 of 80). So much for the theory that experienced contesters lack sensitivity to others on the band.

Comments:

"I'm always very easy about changing frequencies." (no callsign listed. Too bad!)

"I'd QSY from the frequency and jam them tomorrow (hi)."

"Nets never give up even when THEY are wrong."

"I move for no one . . . PERIOD!"

Question 5. You have just finished duping your log and find that you are 1,109 points below a new category record. Would you add a few QSOs into the log to increase your score past the old record?

This question resulted in the most universal distaste and commentary. One reply went as far as recommending that those "caught in the act" should be banned from the contest for life (remind you of a famous Ohio sports figure?).

Comments:

"I must be naive . . . would anyone do this?"

"Yes, as long as I was sure that the percent change wouldn't be grounds for disqualification."

"It's absolutely impossible for me to accept this behavior... personal records are more important to me."

Question 6. You have been calling BY4AA for 10 minutes and can't work him. Would you "push the upper button" on the amplifier just this one time?

Almost no one admitted to running high power in their own station. Curiously, a much larger sample indicated direct knowledge of someone else's station perpetually committing the crime. The subject of high power is something I'll be focusing on in a future column.

Comments:

"Don't have an upper button and wouldn't want to be tempted by one."

"I always have it pushed."

"If the power was available, I would use it."

"At the multi-ops I've operated, there is always at least one BIG amplifier."

Question 7. You have just discovered 9M8ZZ on 14133. Would you work him assuming no one will notice you that far out of the band?

There were an overwhelming number of respondents who indicated their fear of FCC citation in this example. It seemed that "big brother watching" overshadowed the ethical issue of whether or not one would commit the act if he could get away with it.

Comments:

"I'd call him on CW and ask him to QSY."

"I'd like to work him, but I value my license."

"No way... I have several pink slips from the 70's to remind me that big brother may be watching!"

Question 8. WB7XYZ, in Wyoming, just called you for a "clean sweep" in the ARRL SS contest with only 4 minutes to go. Unfortunately, you copied everything but his check. Would you write something in your log to keep the QSO?

Of all the questions found in the survey, this one resulted in the most number of positive responses to a fairly "black and white" issue. Nearly one third of the answers indicated that they would write the check in their log. To be fair, most of the positive answers came with qualifiers. For example, some indicated that they would stay on the frequency and verify the station's check after the QSO. Others noted that they would compare their log with a friend after the contest (this prompted me to immediately look at Question 18).

Comments:

"I guess even I'm not lily white!"

"This is like cheating at solitaire—who's being fooled?"

"I would find out his check from someone else who worked him."

"I'd look him up in a special callbook I have that lists year licensed."

Question 9. Would you knowingly take over someone else's frequency (e.g., a weak backscatter signal on the band edge that has a slower rate than you could generate)?

This question was an attempt to measure our aggressiveness as contesters. The results of this question remind me of a professional hockey game. For 60 intense minutes the competitors beat each other up, only later to spend hours celebrating together how much fun it was. Not surprisingly, we are an assertive group as well.

Comments:

"There are NO clear frequencies in a contest."

"This is a fact of life in contesting, DXing, and operating in general."

"I compete for frequencies by firing up 0.5 kHz away and seeing who wins the battle."

Question 10. Have you ever used packet radio spotting and still claimed single operator?

Fortunately, our sample indicated little abuse of packet technology by single operators. However, additional comments raised another interesting point. How do single operator contesters view the use of packet radio in non-serious efforts or smaller contests?

Comments:

"Only in non-serious efforts... not major contests."

"I use packet as a single operator unless it is explicitly excluded by the contest rules."

"Hell no!!"

Question 11. You are tuning the bands and hear your friend running Europeans. Would you stop and ask him, "Hey Joe, are there any good multipliers on the band?" or "What frequency is he on?"

In this question I attempted to solicit your concerns about our definition of single operating versus outside assistance (in retrospect I should have indicated you were a single-op participant). Although many of you felt it was ethically correct to employ this kind of operating practice, few agreed that it was worth the time.

Comments:

"Maybe if it's slow going."

"No, but other % # % \$ & # have done this to me."

"Is there a rule that says I can't ask someone what's going on around the band?"

Question 12. Would you allow a friend to hold your frequency while you run up the band to chase a new multiplier?

The responses to this question contained the largest assortment of cynicism. There are very few contesters who know anyone willing to help in this way during a contest.

Comments:

"I have no friends."

"There are no friends during the contest, only after...."

"I don't believe in holding run frequencies at all cost... you take your chances when searching for mults."

Question 13. You just passed 9Q5XX to 20 meters for a new multiplier. All you hear is a few mumbles that sound like him. Would you log him?

Most of the responses took the conservative approach on this one. As with Question 2, there are a significant number of us who use some measure of creativity in defining a "valid QSO."

Comments:

"I view this as a judgment call."

"I disagree with passing stations at any time."

Question 14. You are in the process of analyzing your multi-single log for 10-minute rule violations and find one that results in a lost multiplier. Would you change the time in your log to allow the contact to count?

This query definitely brought opponents of the 10 minute rule out of the woodwork. Although flagrant use of a "contest octopus" was discouraged by most, there were a surprising number of respondents who openly admitted to changing the times in their logs by a minute or two as being in the spirit of the rules.

Comments:

"Rubber clocking when you're not OCTOPUSSING doesn't seem too bad to me."

"Yes, if there's only one or two minutes difference."

Question 15. Have you written in a few calls in your log during a big run, assuming that no one will be able to find them?

Question 15 was searching for the outright cheater. I'm sure you agree that the low (although non-zero) number of positive responses was a refreshing reflection on our attitude towards blatant fraud.

Comments:

"Why cheat for a few points?"

"You must be joking."

Question 16. HA1XYZ just calls you on 20 meters for the fifth time. Would you change his call into a valid QSO out of frustration?

The issues to consider with this question are twofold. Other than the obvious ethical matter is our attitude towards the inexperienced contest operator. Our frustration level often exceeds normalcy during the heat of battle. One reply summed it up very effectively: "Remember, there is ALWAYS someone else on the band who is a better operator than you are."

Comments:

"What I would tell him would damage foreign relations."

"No, but I would be tempted to rearrange his skull!"

"I would feel more frustrated that I don't know how to swear in Hungarian."

Question 17. 5Z4XX works someone with a very similar callsign to yours. Just as you figure out what he is doing, he moves on to the next call area. Would you log him?

Again, this inquiry probed the care we take to ensure valid QSOs and quantify our attitude towards "sneaking one past the log checker." As the results show, there are very few of us who intentionally fill our logs with invalid contacts. The overwhelming majority of responses indicated sincere intent to hang in there and get it right!

Comments:

"I'd wait until he comes back to my call area... isn't that what VFO memories are for?"

"Only if I really, really, really, thought it was my call."

Question 18. Would you look at a friend's log after the contest to find callsigns or other log information that you can correct in your own log after the contest?

There was a fascinating group of comments in response to this question. A significant number of contesters want to control their own destiny and not be dependent on a friend to help them along. There also was substantial paranoia about the accuracy of someone else's log (and maybe their own??). What we can gather from this sample of responses is that there is no consistent opinion about the ethics of using someone else to "fill in the blanks" although one third of us do it in one form or another.

Comments:

"I've checked the callbook or other lists to confirm callsigns."

"Is this any different than having a 10,000 QSO database of check partials?"

"I look at my logs by myself afterwards, but never compare against others."

"My friend may be wrong too."

Question 19. Have you ever changed a callsign in your log to cover a duplicate contact?

There was tremendous guilt dripping from the pens of the 5.9% of those answering this question affirmatively. I suspect the number would be much higher if we polled those who have considered this kind of action while dup-

CQ Profiles Mike Wetzel, W9RE

Many of our contest colleagues living close to the salt spray of a nearby ocean enjoy poking fun at the struggling Midwest contester trying to battle the W6/JA wall to the West and the W1/European wall to the East. All kidding aside, the effort required to participate and be competitive under those circumstances is truly remarkable. Mike Wetzel, W9RE, has proven that he knows what it takes to be a highly respected competitor who consistently demonstrates his skills as an operator and station designer.

Licensed in 1962 as WN9BWY, Mike began his illustrious contest career by submitting a single band 15 meter score in the 1963 CQ WW SSB Contest. In support of that effort, Mike used a Viking II AM transmitter (yes, Amplitude Modulation!) and an SX-110 receiver with a 3-element 15 meter Yagi. Mike recalls the thrill of his first "contest run" as he ran a string of East Coast stations during a 15 meter AM short-skip opening in the 1965 ARRL SS.

Mike attributes his interest in contesting to his early experiences with traffic nets and the days of the ARRL CD Parties. It appears to have been a natural evolution for him to eventually become one of the contest community's leading competitors. Today Mike claims that contest operating is essentially his only interest in amateur radio with the majority of his free time devoted to maintaining his antenna system. Situated in Indianapolis, Indiana, Mike's QTH is located in a 90 mph wind zone (15 mile radius). Needless to say, his antennas have suffered significant damage over the years and require constant attention. Fortunately, Mike thrives on the competitive nature of contesting and the opportunity to investigate experimental antenna sys-



Mike Wetzel, W9RE, at his custom-built operating position.

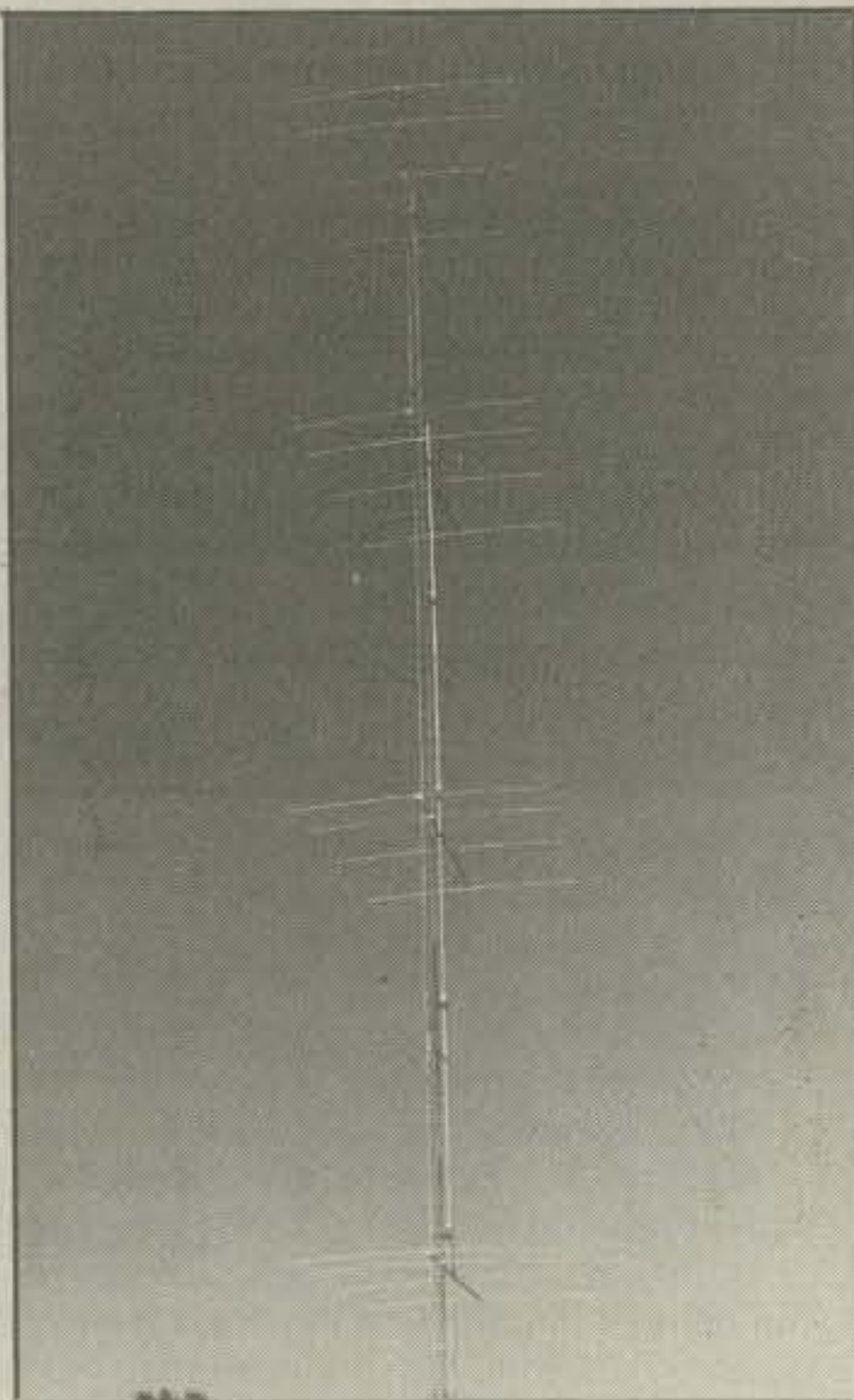
tems. This enthusiasm has led him to design and build a superb station consisting of four towers with 17 Yagis and various wire arrays.

Preferring the CQ WW SSB and ARRL DX CW contests, Mike has many stories to tell as he reviews his contest experiences. For example, Mike recalls a recent incident when using the K1EA contest logging program. After operating 43 straight hours in last year's ARRL CW contest, Mike spilled apple cider on his IBM PCXT keyboard. As usually is the case in these situations, the majority of his drink landed directly on the F1/F3 keys (probably the two most important keys in K1EA's program). The keyboard suddenly forced his station to begin transmitting uncontrollably, requiring Mike to change to an AT-style keyboard (imagine Mike standing over his disassembled keyboard with hair dryers and towels in hand). The advantage that comes from being familiar with one's surroundings became all too apparent to Mike as he was unable to

adjust to the new function key placement, reducing his QSO rate from 60/hour to a meager 20/hour for the last 5 hours of the contest.

Mike's best finish has been second place in the ARRL DX SSB (1980) and fifth in the CQ WW SSB (1988) contests. Even more impressive has been his consistency with over 60 first-place 9th Call Area/Divisional finishes and nearly 25 first-place state achievements in the CQ WW, CQ WPX, CQ Meter 160, ARRL DX, ARRL SS, ARRL 160, ARRL 10, and IARU contests.

What little spare time Mike reserves is devoted to ongoing station maintenance, various family activities, and growing his independent consulting engineering business. Mike has been married for nearly 20 years and has one child, Jonathan, 8 years old. His XYL, Ann, never gives up her dream by occasionally asking Mike whether he is ready to give up contesting, hi! Anyone who has worked W9RE lately knows the answer to that question.

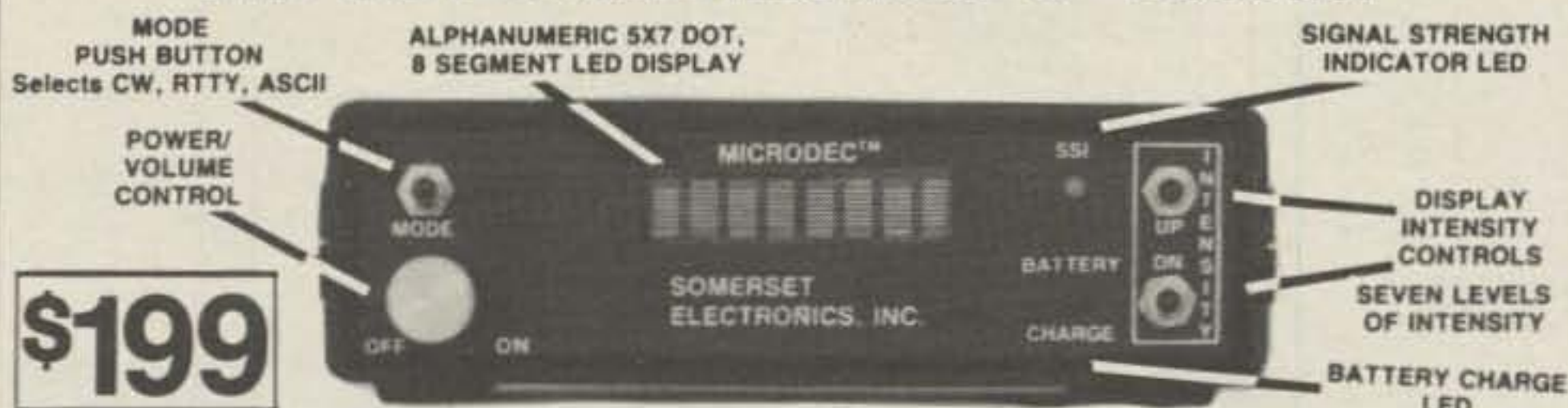


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20	Stacked 7-element Yagis at 150'/75' 204BA fixed SE at 55'
15	Phased razors (3 quad/2 Yagi elements) at 100'/40' Phased 4 stack Yagis (W2PV design) at 160'/120'/80'/40' 4-element W2PV fixed SE at 40'
10	Phased razors at 90'/55' (both rotatable) Phased 2 stack Yagis at 130'/100' 4-element W2PV Yagi fixed SE at 60' 7-element DL1BU/N4AR Yagi fixed NE at 40'

W9RE antenna field in 1989.

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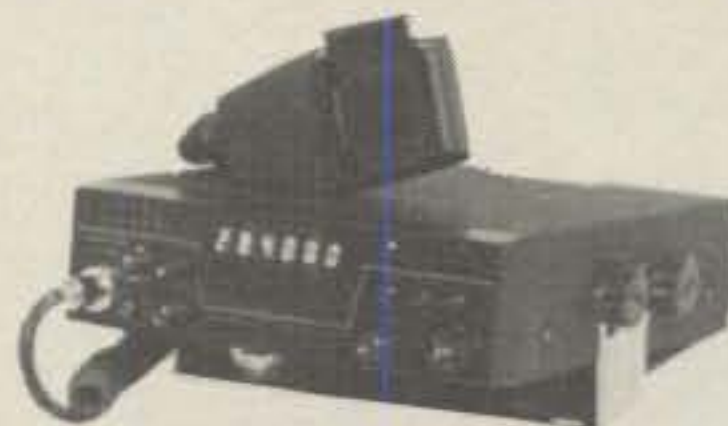
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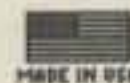
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CIRCLE 171 ON READER SERVICE CARD

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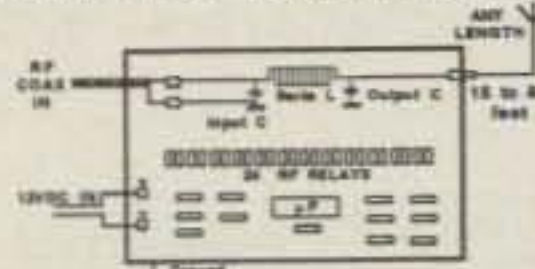


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CIRCLE 172 ON READER SERVICE CARD

December 1989 • CQ • 105

Question #	Yes	No	Total	% Yes Responses
1	84	98	182	46.2
2	42	143	185	22.7
3	51	134	185	27.6
4A	155	—	176	88.1
4B	0	—	176	0.0
4C	21	—	176	11.9
5	4	182	186	2.2
6	57	123	180	31.7
7	8	170	178	4.5
8	68	115	183	37.2
9	58	128	186	31.2
10	11	174	185	5.9
11	68	118	186	36.6
12	69	115	184	37.5
13	17	169	186	9.1
14	32	154	186	17.2
15	7	179	186	3.8
16	5	181	186	2.7
17	8	173	185	4.3
18	58	127	185	31.4
19	11	174	185	5.9
20	21	165	186	11.3

Table I—Survey results—summary analysis.

ing our logs after the contest. Several agreed that this kind of ethical problem has diminished in recent months with the popularity of "real-time" contest logging programs.

Comments:

"I have corrected calls in my log that have CREATED dupes."

"A few times over the years . . . it has never changed my standing."

Question 20. Have you ever changed the time in your log to extend your operating time limit?

Probably as unethical as questions 15 or 16, there was a statistically larger sample of positive responses to this question when compared to others. One of the common opinions from the "yes-crowd" was a feeling that everyone does it, therefore it can easily be justified. Another group considered the question from a "listening time" viewpoint.

Comments:

"Yes and I'm not proud of it."

"With two kids and a %&\$@#% wife, I've never run into a time limit problem."

"Only my listening times."

"I am usually falling asleep when this question becomes an issue."

General Comments

In summarizing your additional thoughts, I was provided with a complete range of remarks from the benign to the bizarre. For

Call Areas	No. of Responses
W1	19
W2	19
W3	20
W4	22
W5	14
W6	14
W7	20
W8	13
W9	9
W0	12
VE	7
DX	12
None indicated	5

Table II—Geographic response analysis.

space reasons it's impossible to include them all, but the following is a representative sample:

"Most of the top ten cheat!"

"Remember, it's a copying contest as well as a sending one."

"Funny how the pressure of competition/success can warp our ethics."

"Most of the examples buy more trouble than they're worth."

"Do onto others as you wish onto you."

"I suspect there are a number of big guns who routinely exceed the legal power limit."

"I suspect that 10% of contest ops have a special place reserved in hell, right next to Boston drivers."

"I compete against myself so I've no reason to be unethical."

"Contesting is like playing golf. You play the course, not your opponents."

"After 50 years of contesting . . . Ethics are still ethics and cheating is still cheating."

"I'll stomp and claw to make the best score but I won't win on a lie."

"Contesting only works when we're all honest."

"This survey was a personal sanity check of my operating ethics."

"Some contesters are so rude and obnoxious that they should have their logs burned."

"Too bad to the contesteer who applies situation ethics to his final score."

"All contests should be single operator, single transmitter with no outside help, hired guns, or external spotting."

"Illegal power is the biggest evil in contesting today."

"I would still enter contests even if I was convinced that everyone was cheating."

"I'm really an honest Joe . . . doggone contest committees still seem to erase some of my QSOs."

"I have used more ethics lately than in the past and see a trend in that direction."

"It bothers me to answer as I did."

"I am convinced that many single ops use spotting nets and fill-in exchanges when copy is poor."

"Multi-op stations are the worst cheaters during contests."

"Unlike real sport competition, contesters

should not be expected to be the participant and their own judge."

"After reading the survey, I think I'm too ethical."

"Thanks for the new ideas!"

"I'm appalled you would publish such a list of questions."

"Imagine treating your business relationships like you do your contest logs!!"

Final Comments

A good friend recently gave me some advice about writing contest editorials. He said, "If you want to involve your readers, write about something controversial from time to time and watch your mailbox explode!" That suggestion has proved to be more true than I expected. The results of this survey were exceptional in that they gave us a small inkling of our makeup as competitors. It has shown that we are an honest lot who are perhaps just a bit human, too. Moreover, we have a strong desire to participate and make contesting better for all of us. Although I haven't been able to capture the entire volume of comments in this report, your input is greatly appreciated and will be the source of future commentary.

Those of you who took the time to read the fine print in the recently completed CQ WW analyses may have noted two errors. First, I incorrectly separated W2HJR from K2GL in the SSB results. The W2HJR callsign was in fact licensed to Buzz Reeves before his K2GL days. Secondly, you should add another win to the W3GRF total on CW. Lenny won an additional time while operating at W2HJR (must be a mental block or something!).

Some of you may have noticed that your contests have dropped out of the contest calendar. After a 5-month grace period (mostly to allow for the transition of the column from Frank, W1WY, to myself), I am no longer listing a contest unless I receive your formal announcement. Please be sure to honor the deadlines so you don't miss out! The best place to send announcements continues to be my home address. Correspondence sent to CQ or Frank will only delay the process and potentially cause your event to miss the deadline.

For many of us, December is the beginning of our prime antenna building season (local joke in W1). As we approach the end of the year, I wish all of you a wonderful holiday season and a very successful 1990! Remember, your input for the March issue is due no later than January 6th.

73's, John, K1AR

More Errata

The winner of the 1988 CQ WW SSB Trophy—JA, Single Operator, All Band should be corrected to be JH0QNT.

The sponsor of the 1989 CQ WW SSB Trophy—South America, All Band should be corrected to be the Venezuela DX Club, YV5AAZ Memorial Award.

In the 1988 CQ WW RTTY Contest Results (June issue) VK2EBP should be VK3EBP (first place 14 MHz Australia). KF5YE should have been listed as a 21 MHz entry, *not* 14 MHz; this would place him first USA and North America, and second 21 MHz worldwide.

TOPS Activity Contest 3.5 MHz CW

1800Z Sat. to 1800Z Sun., Dec. 2-3

TOPS is an international club founded in Great Britain in 1946 for the benefit of CW en-

thusiasts. This year's 3.5 MHz competition is a 24-hour event in which the participants contact any amateur worldwide. Call "CQ TAC" to solicit QSOs.

Classes: Single operator, multi-operator, QRP (5 watts or less). Single operators must take one or two breaks totaling 7 hours. Multi-operator stations may operate the entire time period.

Exchange: RST plus serial number. TOPS members will also send their membership number (e.g., 599001/883).

Scoring: QSO with own county 1 point (each call area in W, VE, VK, PY, U, and JA counts as separate multiplier); QSO with same continent 2 points; QSO with other continent 6 points; TOPS member QSOs 2 bonus points (TOPS members working each other can take credit for 3 bonus points due to longer exchange).

Final Score: Total points times the number of prefixes worked (WPX prefix rules apply).

Frequencies: 3500-3585 kHz. The lower 12 KHz must be used for DX contacts only. It is strictly forbidden to work your own continent in this part of the band.

Awards: Certificates of merit will be issued to the highest scorers as designated by the awards committee.

Send logs no later than January 31st to: Helmut Klein, OE1TKW, Nausegasse 24/26, A-1160 Wein, Austria. Results will be sent via the QSO bureaus or direct if one IRC is included. Questions regarding the TOPS organization should be sent to: Phil Evans, GW8WJ, 2 Ffordd Ty Newydd, Prestatyn, Clywd, LL19 8BP, Wales, United Kingdom.

ARRL 10 Meter Contest

0000Z Sat. to 2400Z Sun., Dec. 9-10

This is the 17th annual 10 Meter Contest organized by the ARRL. It's a worldwide activity in which DX stations can work other DX and are not limited to working W/Ks and VEs only.

A maximum of 36 hours operating time is permitted out of the 48-hour contest period for all stations. The same station can be worked on SSB and again on CW for QSO points.

Categories: Single operator, mixed mode, SSB only and CW only. Multi-operator, single transmitter, mixed mode only.

Exchange: W/VE stations (including KH6 and KL7) send RS(T) and state or province. DX stations (including KH2, KP4, etc.) send RS(T) and QSO number starting with 001. Maritime or aeronautical mobile, RS(T) and ITU region. Novice/Tech must identify (/N or /T).

Scoring: SSB QSOs are worth 2 points, CW 4 points, Novice/Tech CW QSOs 8 points.

Multiplier: U.S. states (50 plus District of Columbia), Canadian provinces (NB, PEI, NS, VE2-8, VY1, VO1, VO2), DXCC countries, and ITU regions (1, 2, or 3).

Final Score: Total QSO points times the sum of U.S. states, Canadian provinces, DX countries, and ITU regions, per mode.

Awards: Certificates to the top-scoring single operator station in each category (including /N and /T) for each ARRL section and DXCC country. And to the top-scoring multi-operator station in each ARRL division and each continent.

Indicate the multiplier only the first time it is worked. Dupe sheets are required for logs with 500 or more QSOs. The usual disqualification criteria will be enforced. A large SASE will get you log and instruction forms.

Mailing deadline for all entries is January 10th to: ARRL 10 Meter Contest, 225 Main Street, Newington, CT 06111.

ARCI QRP Homebrew CW Sprint

2000Z to 2400Z Sunday, December 10

Like the Summer Sprint, this is also a shorty, only 4 hours. The emphasis is on the use of homebrew equipment. Rules are again lengthy and complicated. I recommend you get a detailed copy from K5VOL. Following is a brief summary.

Classes: Single operator, single and all band only.

Exchange: RST and state, province, or country. ARCI members will include their membership number, non-members their output power. Call must be followed with "HB" or "C" indicating type of equipment used.

Scoring: Contacts with members 5 points. With non-members 2 points. If on different continents 4 points. Add 5 points if station worked

is also using homebrew equipment.

Multiplier: Sum of different states, provinces, and countries worked on each band.

Power Multiplier: 1-5 watts output $\times 7$. Less than 1 watt $\times 10$. Over 5 watts is a check log. Output is one-half of input power.

Power Supply Multiplier: Commercial $\times 1$, battery supply $\times 1.5$, solar/natural $\times 2$.

Homebrew Bonus: Plus 2000 if transmitter is homebrew, 3000 if receiver, and 5000 if transceiver. Used on each band.

Final Score: Total QSO points \times state, province, country multiplier \times power multiplier, \times power supply multiplier and $+$ homebrew bonus.

Frequencies: 1810, 3560, 3710, 7040, 7110, 14060, 21060, 21110, 28060, 28110, 50060 kHz.

Awards: Certificates to the top three all-band and single-band overall winners. And to the top scores in each state, province, and country with two or more entries.

Include a summary sheet showing the scoring, a dupe sheet for entries with 100 or more

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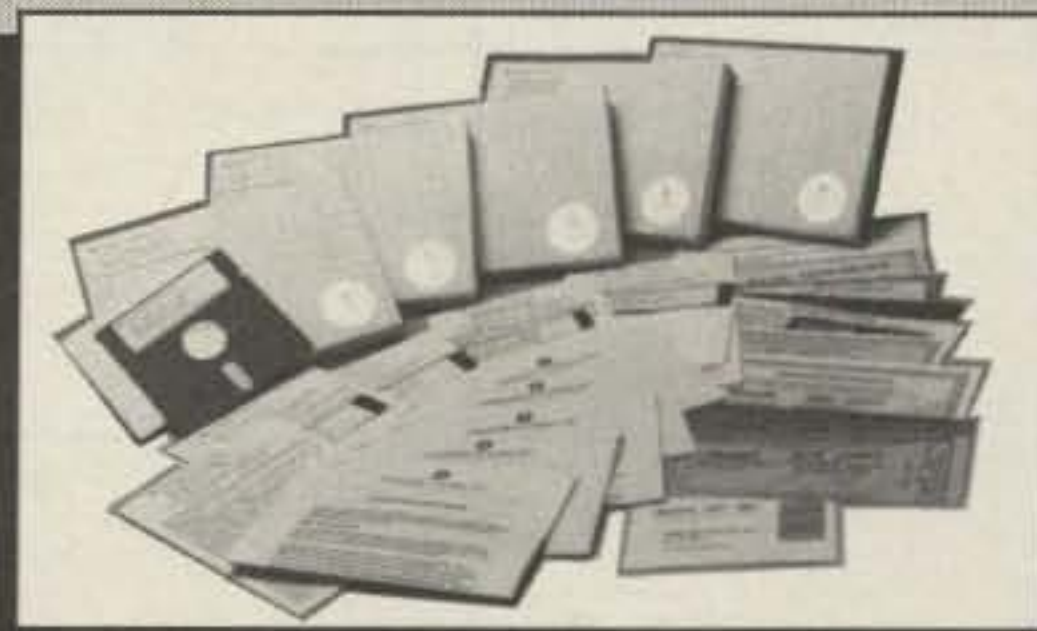
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CIRCLE 151 ON READER SERVICE CARD

QSOs, and other essential information. Sample log forms are available and also a copy of the results. Include a large SASE for each.

Mailing deadline is January 10th to: Red Reynolds, K5VOL, 835 Surryse Road, Lake Zurich, IL 60047.

Canada Winter Contest

0000Z to 2400Z Sun., Dec. 31

Again sponsored by the Canadian Amateur Radio Federation, this activity is held on the last Sunday in December.

Everyone works everyone on both sides of the border and overseas.

Classes: Single operator, all band and single band, CW, SSB, and mixed modes. Multi-operators, all band, single and multi-transmitter.

Exchange: QSO number, RS(T), name, and QTH. Province, state, or DX country.

Points: 10 points for each VE, VO, or VY con-

tact. Four points for non-VEs, and 20 points for working any CARF official station with the TCA or VCA suffix.

Multiplier: Each Canadian area (10), territory (VE8/VY1), and maritime mobile (VE0) worked on each band.

Final Score: Total QSO points multiplied by the sum of the multipliers worked on each band.

Awards: Certificates to the top entry in each Canadian area, US call area, and DX country in each class. Plaques to the top all-band, CW, SSB, and mixed mode. Top single band on 14 and 7 MHz. And top multi-single and multi-transmitter.

Results will be published in the CARF TCA magazine. Non-members should include an SASE with their log.

Mailing deadline is January 31st and logs go to: Jeff Parsons, VE6CB/3, RR #1, Oxford Mills, Ontario, Canada K0G 1S0.

ARRL Straight Key Night

1200Z to 1200Z, Dec. 31 to Jan. 1
(7 PM Sat. to 7 PM Sun., EST)

This is a friendly meeting on the air using a straight key only. Suggested frequencies on 80, 40, and 20 meters are 60 to 80 kHz up from lower band edges, 10 kHz from lower Novice bands.

Use SKN instead of RST in the exchange to clue in other stations. Include a list of stations worked plus your vote for the best fist heard during that period (not necessarily one you've worked).







This is not a contest, so any additional chatter is encouraged.

Send your report and vote for "best fist" and "most interesting QSO" to ARRL SKN, 225 Main Street, Newington, CT 06111 by January 10th.



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<p>RM-A SERIES</p>  <p>MODEL RM-35M</p>	<p>19" X 5 1/4" RACK MOUNT POWER SUPPLIES</p> <table border="1"> <thead> <tr> <th>MODEL</th> <th>Continuous Duty (Amps)</th> <th>ICS* (Amps)</th> <th>Size (IN) H x W x D</th> <th>Shipping WL (lbs.)</th> </tr> </thead> <tbody> <tr> <td>RM12A</td> <td>9</td> <td>12</td> <td>5 1/4 x 19 x 8 1/4</td> <td>16</td> </tr> <tr> <td>RM-35A</td> <td>25</td> <td>35</td> <td>5 1/4 x 19 x 12 1/2</td> <td>38</td> </tr> <tr> <td>RM-50A</td> <td>37</td> <td>50</td> <td>5 1/4 x 19 x 12 1/2</td> <td>50</td> </tr> <tr> <td colspan="5">• Separate Volt and Amp Meters</td> </tr> <tr> <td>RM-35 M</td> <td>25</td> <td>35</td> <td>5 1/4 x 19 x 12 1/2</td> <td>38</td> </tr> <tr> <td>RM-50 M</td> <td>37</td> <td>50</td> <td>5 1/4 x 19 x 12 1/2</td> <td>50</td> </tr> </tbody> </table>	MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping WL (lbs.)	RM12A	9	12	5 1/4 x 19 x 8 1/4	16	RM-35A	25	35	5 1/4 x 19 x 12 1/2	38	RM-50A	37	50	5 1/4 x 19 x 12 1/2	50	• Separate Volt and Amp Meters					RM-35 M	25	35	5 1/4 x 19 x 12 1/2	38	RM-50 M	37	50	5 1/4 x 19 x 12 1/2	50					
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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle Progress

Bulletin

This issue of *CQ* should reach most readers in time for the CW weekend of the *CQ* World-Wide DX Contest, November 25 and 26. Here is an updated day-to-day propagation forecast for the weekend made at press time. All indications continue to point to a really good, and perhaps great, weekend for the contest. The sunspot count on both days is expected to top the 190 mark, with a 10.7 cm solar flux count expected well into the 200 range. The Alpha (A) index for the geomagnetic field is expected to be generally quiet, ranging between 10 and 20. Expect generally High Normal conditions on both Saturday and Sunday, November 25 and 26. There continues to be the likelihood that a radio storm may develop on November 27, but the severity has been downgraded to Below Normal. The beginning of this storm, if it should materialize, may cause some erratic conditions towards the very end of the contest period.

Sunspot Cycle 22 continues to climb at a steady pace towards a maximum value which is now expected to occur early during 1990. It continues on track to being one of the highest cycles recorded, and it may yet be a record breaker. A more detailed analysis of the expected peak of Cycle 22 will be included in next month's column.

The Royal Observatory of Belgium reports a monthly mean sunspot number of 167 for August 1989. This is based upon daily observations of the sun made at 41 observatories throughout the world. Daily values varied between a high of 227 reported for August 5th and a low of 50 recorded on the 28th.

The August mean value results in a 12-month running smoothed sunspot number of 145 centered on February 1989. The National Geophysical Data Center at Boulder, Colorado predicts a

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LAST MINUTE FORECAST

Day-to-Day Conditions Expected for December 1989

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 3, 14, 18-19, 26, 30	A	A	B	C
High Normal: 2, 4, 7, 10-11, 13, 17, 20-22, 25, 29, 31	A	B	C	C-D
Low Normal: 1, 5-6, 16, 23, 27-28	A-B	B-C	C-D	D-E
Below Normal: 8, 12, 15, 24	B-C	C-D	D-E	E
Disturbed: 9	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 December 1, good (B) on the 2nd, excellent (A) on the 3rd, good (B) on the 4th, good-to-fair (B-C) on the 5th and 6th, etc.

smoothed sunspot number of 193 for December 1989.

The Algonquin Radio Observatory at Ottawa, Ontario reports a monthly mean 10.7 cm solar flux level of 223 for August 1989.

Check the Last-Minute Forecast appearing in this month's column for day-to-day conditions expected during December.

December Band Openings

The highest level of solar activity observed during the past 32 years is expected to take place during this December. This, coupled with seasonally peak levels of ionization in the northern hemisphere during the winter months, should result in generally excellent, and possibly fantastic, DX propagation conditions on

all HF bands and on the 6 meter VHF band as well.

Excellent daytime DX openings to all areas of the world should be possible on the 10, 15, and 20 meter bands. Also expect exceptional conditions on the 6 meter band, with peak conditions likely towards Europe, Africa, and in a generally easterly direction an hour or two before noon; towards Central and South America and the Caribbean area from an hour or two before, to about an hour after noon; and towards the Pacific, Australasia, and the Far East during the late afternoon and into the sunset period. The best days to look for DX openings on 6 meters are those expected to be High or Above Normal.

From sundown to midnight look for DX openings towards the south and west on both 15 and 20 meters, and to most other areas of the world on 40 and 80 meters. Fairly good DX openings on the 160 meter band should be possible from the eastern half of the country towards the north, east, and south.

From midnight to sunrise, the best DX bands should be 40 and 80 meters, with openings also possible to many areas of the world on 20 and 160 meters.

DX propagation conditions on the 160 meter band are usually at their seasonal peak during December. The band should open towards Europe and in an easterly direction beginning about 8 p.m. in all time zones, and continuing until 3 a.m. in the EST zone; 1 a.m. in CST; midnight in MST; and 11 p.m. in PST. These openings favor locations in the eastern half of the USA. Openings towards the south, particularly to Central America, the Caribbean area, and the northern countries of South America, should be possible from about 10 p.m. to 3 a.m., in all time zones. Openings towards the Pacific, Australasia, and the Far East will favor states in the western half of the country, but it may be worth the time to check for these openings in other areas as well between 4 a.m. and local sunrise.

Remember the old rule that applies to 160 meter DX openings, and to 40 and 80 meters as well: Optimum conditions occur about the time that the sun begins to rise at the easternmost terminal of the path.

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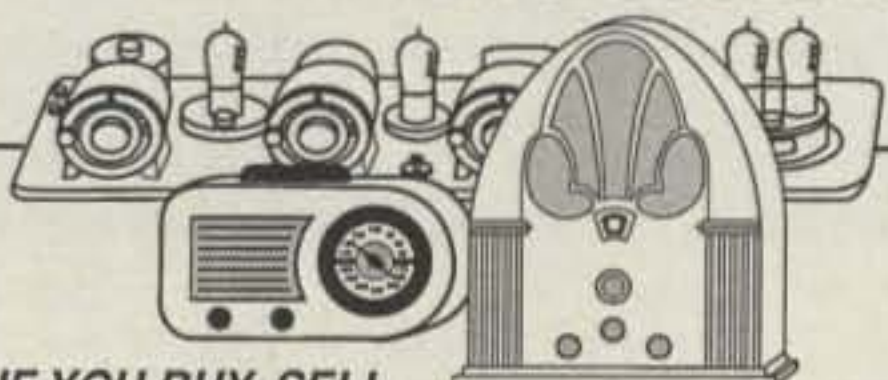


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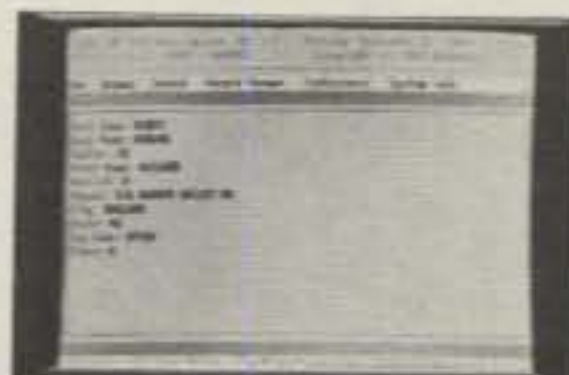
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W3ASK, CQ's Propagation Editor, was very busy recently "salting the ionosphere" in various parts of the world for the 1989 CQ DX Contest. Here he takes a brief time out for a picture in front of the City Hall in the town of Valdez, Liechtenstein (HB0).

cember try the 80 and 40 bands during the day for paths less than 250 miles, and 80 and 160 meters at night over these distances. For openings between 250 and 750 miles, 40 meters should be best during the day and both 80 and 160 meters at night. Between 750 and 1300 miles, try 20 during the day, 40 and 80 meters from sunset to midnight, and 80 meters later in the evening and until sunrise. Try 40 meters again for about an hour or so after sunrise. For openings between 1300 and 2300 miles, it should be a toss-up between 20 and 15 meters during the day, with 10 meters running close behind. Try 20 and 40 meters from sundown to midnight, then check 40 and 80 meters until sunrise. Try 40 meters again for an hour or so after sunrise.

This month's column contains DX Propagation Charts valid through mid-February. Short-Skip Propagation Charts for December appeared in last month's column.

VHF Ionospheric Openings

The best times to check for worldwide 6 meter openings on this band have been given earlier in this column. They are also indicated by ** in the *DX Propagation Charts*. The combination of high solar activity and seasonally high ionization in the F-2 layer may produce some record-breaking DX openings on 6 meters this month. A secondary seasonal peak in sporadic-E ionization should also result in some short-skip openings on this band between distances of approximately 800 and 1300 miles.

The possibility for trans-equatorial, or TE, openings on 6 meters usually decreases considerably during December,

but some openings should still be possible between the southern states and countries in deep South America. TE openings generally take place during the evening hours, and they usually peak between approximately 8 and 11 p.m.

The *Geminids*, a major meteor shower, should begin on December 13 and last for about three days. Maximum intensity is expected at about 10 a.m. EST on December 14, with an estimated meteor rate of about one a minute. This should make possible fairly good meteor-type communications on both 6 and 2 meters. *Ursids*, a considerably less intense shower, is expected to take place on December 22 and 23. Its peak should occur at approximately 1 a.m. EST on December 23 with a meteor rate of approximately 15 an hour.

There is a good possibility for some unusual short-skip openings on both 6 and 2 meters during periods of auroral activity, which are likely to occur during December when HF conditions are Disturbed or Below Normal. Check the Last Minute Forecast at the beginning of this column for those days during December that are expected to be in these categories.

The year 1989 has been a great one for HF propagation, and the New Year looks like it will be even better! It is almost certain that sunspot Cycle 22 will reach its peak during 1990, probably sometime during the first six months. It is also certain that the peak will be among the highest recorded, and it may set a new record. On this note of optimism, the Editor of this column extends his warmest wishes to readers everywhere for a Merry Christmas and a very Happy New Year and holiday season.

HOW TO USE THE DX PROPAGATION CHARTS

1. Use Chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8 KP4, KG4 and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9 and 0 areas, the Western USA Chart in the 6 and 7 areas, and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 Meters) for a particular DX region, as shown in the left-hand column of the Charts. An * indicates the best time to listen for 160 meter openings.

3. The *propagation index* is the number that appears in () after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific *propagation index* is likely to occur, and the signal quality that can be expected.

4. Times shown in the Charts are in the 24-hour system, where 00 is midnight, 12 is noon, 01 is 1 A.M., 13 is 1 P.M., etc. Appropriate *standard* time is used, *not* GMT. To convert to GMT, add to the times shown in the appropriate chart 8 hours in PST Zone, 7 hours in MST Zone, 6 hours in CST Zone, and 5 hours in EST Zone. For example, 13 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 04 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts c.w., or 1 kw, p.e.p. on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the Chart: has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado, 80302.

December 15, 1989-February 15, 1990 Time Zone: EST (24-Hour Time) EASTERN USA TO:

	10/6 Meters	15 Meters	20 Meters	40/80 Meters	
Western & Central Europe & North Africa	07-08 (1)	06-07 (1)	03-06 (2)	14-16 (1)	
	08-09 (2)	07-08 (2)	06-07 (3)	16-17 (2)	
	09-13 (4)	08-14 (4)	07-09 (4)	17-19 (3)	
	13-14 (2)	14-15 (2)	09-10 (3)	19-02 (4)	
	14-15 (1)	15-16 (1)	10-12 (2)	02-03 (3)	
	09-11 (1)**		12-13 (3)	03-04 (2)	
Northern Europe & European USSR			13-16 (4)	04-05 (1)	
			16-18 (3)	17-19 (1)*	
			18-21 (2)	19-20 (2)*	
			21-23 (1)	20-02 (3)*	
			23-01 (2)	02-03 (2)*	
			01-03 (3)	03-04 (1)*	
	07-08 (1)	06-07 (1)	04-06 (1)	17-19 (1)	
	08-09 (3)	07-08 (2)	06-07 (2)	19-01 (2)	
	09-10 (4)	08-09 (3)	07-09 (3)	01-03 (1)	
	10-11 (2)	09-11 (4)	09-14 (2)	19-02 (1)*	
11-12 (1)	11-12 (3)	14-16 (3)			
08-10 (1)**	12-13 (2)	16-18 (4)			
	13-14 (1)	18-20 (3)			
		20-23 (2)			
		23-02 (1)			
Eastern Mediterranean & Middle East	07-08 (1)	07-08 (1)	07-10 (1)	18-20 (1)	
	08-09 (3)	08-09 (2)	10-13 (2)	20-22 (2)	
	09-11 (4)	09-11 (4)	13-16 (3)	22-00 (3)	
	11-12 (3)	11-14 (3)	16-18 (4)	00-01 (2)	
	12-13 (2)	14-15 (2)	18-22 (3)	01-02 (1)	
	13-14 (1)	15-16 (1)	22-01 (2)	20-00 (1)*	
09-11 (1)**		01-03 (1)			
Western Africa	07-08 (1)	05-06 (1)	03-04 (3)	18-20 (1)	
	08-09 (2)	06-08 (2)	04-06 (2)	20-23 (2)	
	09-12 (3)	08-14 (3)	06-13 (1)	23-01 (3)	
	12-16 (4)	14-19 (4)	15-15 (2)	01-03 (2)	
	16-17 (3)	19-20 (3)	15-17 (3)	03-04 (1)	
	17-18 (2)	20-22 (2)	17-00 (4)	22-03 (1)*	
	18-19 (1)	22-23 (1)	00-01 (3)		
	08-10 (1)**		01-03 (2)		
	Eastern & Central Africa	08-09 (1)	06-08 (1)	01-04 (2)	18-21 (1)
		09-11 (2)	08-12 (2)	04-06 (1)	21-23 (2)
11-13 (3)		12-14 (3)	06-08 (2)	23-01 (1)	
13-15 (4)		14-17 (4)	08-14 (1)	21-00 (1)*	
15-16 (3)		17-18 (3)	14-16 (2)		
16-17 (2)		18-19 (2)	16-17 (3)		
17-18 (1)		19-20 (1)	17-23 (4)		
08-10 (1)**			23-01 (3)		

Southern Africa	07-08 (1) 08-11 (3) 11-14 (4) 14-15 (3) 15-16 (2) 16-17 (1) 08-10 (1)**	06-08 (1) 08-11 (2) 11-13 (3) 13-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	06-08 (1) 12-14 (1) 14-15 (2) 15-17 (3) 17-20 (4) 20-00 (3) 00-02 (2) 02-04 (1)	18-19 (1) 19-22 (2) 22-00 (1) 19-22 (1)*
Central & South Asia	08-09 (1) 09-10 (2) 10-11 (1) 17-19 (1)	07-08 (1) 08-10 (2) 10-11 (1) 17-19 (1)	06-07 (1) 07-09 (2) 09-10 (2) 10-11 (1) 17-19 (1) 22-23 (1) 23-00 (2) 00-01 (1)	06-08 (1) 18-20 (1)
Southeast Asia	09-11 (1) 11-14 (2) 14-15 (1) 18-19 (1) 19-20 (2) 20-21 (1)	09-10 (1) 10-12 (2) 12-13 (1) 18-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-21 (2) 21-23 (1)	05-07 (1) 17-19 (1)
Far East	17-18 (1) 18-19 (3) 19-20 (2) 20-21 (1)	09-11 (1) 16-17 (1) 17-18 (2) 18-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	00-04 (2) 04-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-19 (2) 19-22 (3) 22-00 (2)	04-05 (1) 05-07 (2) 07-08 (1) 05-07 (1)*
South Pacific & New Zealand	10-13 (1) 13-15 (2) 15-16 (3) 16-19 (4) 19-20 (2) 20-21 (1) 17-19 (1)**	08-09 (1) 09-11 (2) 11-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	12-19 (1) 19-21 (2) 21-22 (3) 22-02 (4) 02-04 (3) 04-07 (2) 07-10 (3) 10-12 (2)	00-02 (1) 02-03 (2) 03-07 (3) 07-08 (2) 08-09 (1) 03-05 (1)* 05-07 (2) 07-08 (1)*
Australasia	08-10 (1) 10-11 (2) 11-12 (1) 15-16 (1) 16-17 (2) 17-18 (3) 18-19 (4) 19-20 (2) 20-21 (1) 17-19 (1)**	09-10 (1) 10-12 (2) 12-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-22 (2) 22-23 (1)	07-09 (3) 09-11 (2) 11-14 (1) 16-18 (2) 20-22 (1) 22-00 (2) 00-05 (3) 05-07 (2)	03-05 (1) 05-08 (2) 08-09 (1) 05-08 (1)*
Caribbean, Central America & Northern Countries of South America	07-08 (1) 08-09 (3) 09-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 09-11 (1)**	06-07 (1) 07-08 (3) 08-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-00 (4) 00-02 (3) 02-06 (2) 06-07 (3)	17-18 (1) 18-19 (2) 19-20 (3) 20-04 (4) 04-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-08 (2) 08-10 (4) 10-11 (3) 11-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 10-12 (1)**	06-07 (1) 07-08 (3) 08-10 (4) 10-11 (3) 11-13 (2) 14-16 (3) 16-20 (4) 20-21 (2) 21-22 (1)	07-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3) 02-04 (2) 04-07 (3)	19-21 (1) 21-04 (2) 04-05 (1) 21-04 (1)*
McMurdo Sound, Antarctica	08-10 (1) 17-19 (1)	06-09 (1) 15-17 (1) 17-18 (2) 18-20 (3) 20-22 (2) 22-23 (1)	17-20 (1) 20-21 (2) 21-00 (3) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1) 06-08 (2) 08-09 (1)	00-06 (1)

Eastern Mediterranean & Middle East	08-09 (1) 09-10 (2) 10-11 (3) 11-12 (2) 12-13 (1)	07-08 (1) 08-10 (3) 10-11 (4) 11-12 (2) 12-13 (1)	07-10 (1) 10-13 (2) 13-15 (3) 15-17 (4) 17-18 (3) 18-19 (2) 19-21 (1) 21-23 (2) 23-01 (1)	18-20 (1) 20-22 (2) 22-23 (1) 20-22 (1)*
Western Africa	07-08 (1) 08-09 (2) 09-11 (3) 11-14 (4) 14-16 (3) 15-17 (2) 17-18 (1) 09-11 (1)*	06-08 (1) 08-10 (2) 10-14 (3) 14-17 (4) 17-18 (3) 18-20 (2) 20-21 (1)	06-13 (1) 13-15 (2) 15-17 (3) 17-21 (4) 21-23 (3) 23-01 (2) 01-03 (1) 03-06 (2)	18-20 (1) 20-23 (2) 23-02 (1) 20-23 (1)*
Eastern & Central Africa	07-08 (1) 08-09 (2) 09-13 (3) 13-14 (4) 14-15 (3) 15-16 (2) 16-17 (1) 10-12 (1)**	06-08 (1) 08-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	07-14 (1) 14-16 (2) 16-17 (3) 17-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	19-00 (1) 20-22 (1)*
Southern Africa	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (4) 13-14 (3) 14-15 (2) 15-16 (1) 08-10 (1)**	07-09 (1) 09-11 (2) 11-12 (3) 12-15 (4) 15-17 (3) 17-18 (2) 18-19 (1)	06-13 (1) 13-15 (2) 15-17 (3) 17-19 (4) 19-22 (3) 22-01 (2) 01-03 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Central & South Asia	08-09 (1) 09-10 (2) 10-11 (1) 18-19 (1) 19-20 (2) 20-21 (1)	07-08 (1) 08-10 (2) 10-11 (1) 18-19 (1) 19-21 (2) 21-22 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-10 (2) 10-11 (1) 17-18 (1) 18-19 (2) 19-21 (3) 21-23 (2) 23-02 (1)	06-08 (1) 18-20 (1)
Southeast Asia	09-10 (1) 10-13 (2) 13-14 (1) 16-17 (1) 17-19 (3) 19-20 (2) 20-21 (1)	08-09 (1) 09-10 (2) 10-12 (3) 12-13 (2) 13-14 (1) 16-18 (1) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-10 (3) 10-12 (2) 12-14 (1) 16-18 (1) 18-20 (2) 20-21 (3) 21-22 (2) 22-23 (1)	04-07 (1) 17-19 (1)
Far East	15-16 (1) 16-17 (2) 17-19 (4)	08-10 (1) 15-16 (1) 16-17 (2)	02-03 (2) 03-06 (1) 06-07 (2)	02-03 (1) 03-07 (2) 07-09 (1)

Time Zones: CST & MST (24-Hour Time)
CENTRAL USA TO:

	10/6 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	07-08 (1) 08-09 (3) 09-11 (4) 11-12 (2) 12-13 (1) 08-10 (1)**	06-07 (1) 07-08 (2) 08-12 (4) 12-13 (2) 13-14 (1)	02-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-13 (3) 13-15 (4) 15-17 (3) 17-19 (2) 19-23 (1) 23-02 (2)	15-17 (1) 17-18 (1) 18-01 (3) 01-02 (2) 02-03 (1) 17-20 (1)* 20-01 (2)* 01-02 (1)*
Northern & Central Europe & European USSR	07-08 (1) 08-09 (2) 09-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-11 (3) 11-12 (2) 12-13 (1)	04-07 (1) 07-09 (3) 09-13 (2) 13-15 (3) 15-16 (4) 16-18 (3) 18-20 (2) 20-22 (1) 22-01 (2) 01-02 (1)	17-19 (1) 19-22 (2) 22-01 (1) 19-00 (1)*

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	19-20 (2) 20-21 (1) 17-19 (1)*	17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	07-09 (3) 09-10 (2) 10-11 (1) 15-18 (1) 18-20 (2) 20-22 (3)	03-07 (1)*		14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 09-11 (1)**	15-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	18-00 (4) 00-02 (3)			
South Pacific & New Zealand	09-11 (1) 11-14 (2) 14-15 (3) 15-18 (4) 18-19 (3) 19-20 (2) 20-21 (1) 16-18 (1)**	07-09 (1) 09-11 (2) 11-13 (3) 13-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1) 17-19 (1)**	10-17 (1) 17-19 (2) 19-20 (3) 20-00 (4) 00-04 (3) 04-06 (2) 06-07 (3) 07-08 (4) 08-09 (3) 09-10 (2)	23-01 (1) 01-02 (2) 02-07 (3) 07-08 (2) 08-09 (1) 00-02 (1)* 02-07 (2)* 07-08 (1)*		08-10 (1)	06-08 (1) 08-10 (2) 10-12 (1) 15-17 (1) 17-18 (2) 18-22 (3) 22-23 (2) 23-00 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-06 (1) 06-08 (2) 08-09 (1)	23-05 (1)		
Australasia	08-09 (1) 09-11 (2) 11-14 (1) 14-16 (2) 16-17 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1) 17-19 (1)**	07-08 (1) 08-09 (2) 09-10 (3) 10-11 (2) 11-13 (1) 13-17 (2) 17-19 (3) 19-21 (4) 21-22 (2) 22-23 (1)	04-07 (2) 07-09 (4) 09-10 (3) 10-11 (2) 11-15 (1) 15-17 (2) 17-20 (1) 20-23 (2) 23-04 (3)	02-04 (1) 04-07 (2) 07-09 (1) 03-06 (1)*							
Caribbean, Central America & Northern Countries of South America	07-08 (1) 08-09 (3) 09-11 (4) 11-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1) 09-11 (1)**	06-07 (1) 07-08 (3) 08-11 (4) 11-13 (3) 13-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	06-07 (3) 07-09 (4) 09-11 (3) 11-14 (2) 14-16 (3) 16-23 (4) 23-02 (3) 02-06 (2)	17-18 (1) 18-19 (2) 19-21 (3) 21-04 (4) 04-05 (2) 05-07 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-02 (2)* 02-04 (1)*							
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-08 (2) 08-10 (4) 10-11 (3) 11-13 (2) 13-14 (3)	06-07 (1) 07-08 (3) 08-10 (4) 10-11 (3) 11-13 (2) 13-15 (3)	02-06 (2) 06-07 (3) 07-08 (2) 08-14 (1) 14-16 (2) 16-18 (3)	19-21 (1) 21-04 (2) 04-06 (1) 21-05 (1)*							

**Time Zone: PST (24-Hour Time)
WESTERN USA TO:**

	10/6 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (4) 11-12 (2) 12-13 (1)	05-06 (1) 06-09 (2) 09-12 (3) 12-14 (4) 14-15 (3) 15-17 (2) 17-19 (1) 22-01 (2)	18-20 (1) 21-00 (2) 00-01 (1) 19-23 (1)*
Central & Northern Europe & USSR	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-14 (1) 14-16 (3) 16-18 (2) 18-21 (1) 21-00 (2)	18-20 (1) 20-23 (2) 23-00 (1) 19-22 (1)*
Eastern Mediterranean & Middle East	07-08 (1) 08-10 (2) 10-11 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (3)	07-09 (1) 18-22 (1)

		11-12 (1)	16-17 (2) 17-20 (1) 20-23 (2)	
Western Africa	07-08 (1) 08-09 (2) 09-11 (3) 11-13 (4) 13-15 (3) 15-16 (2) 16-17 (1) 09-11 (1)**	06-07 (1) 07-08 (2) 08-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	05-12 (1) 12-14 (2) 14-16 (3) 16-19 (4) 19-22 (3) 22-00 (2) 00-02 (1)	18-19 (1) 19-21 (2) 21-22 (1) 19-21 (1)*
Eastern & Central Africa	07-08 (1) 08-10 (2) 10-13 (3) 13-14 (2) 14-15 (1) 09-11 (1)**	06-08 (1) 08-12 (2) 12-15 (3) 15-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-21 (3) 21-23 (2) 23-00 (1)	18-22 (1) 07-09 (1)
Southern Africa	07-08 (1) 08-10 (3) 10-12 (4) 12-13 (3) 13-14 (2) 14-15 (1) 08-10 (1)**	07-09 (1) 09-12 (2) 12-13 (3) 13-15 (4) 15-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (3) 16-18 (4) 18-20 (3) 20-00 (2) 00-02 (1)	18-19 (1) 19-20 (2) 20-21 (1) 18-19 (1)*
Central & South Asia	06-09 (1) 17-18 (1) 18-19 (3) 19-20 (1)	06-09 (1) 16-17 (1) 17-19 (3) 19-20 (2) 20-21 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-17 (1) 17-18 (2) 18-19 (3) 19-21 (2) 21-23 (1)	04-09 (1) 17-19 (1)
Southeast Asia	08-09 (1) 09-11 (2) 11-12 (1) 14-15 (1) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1) 15-17 (1)**	07-08 (1) 08-10 (3) 10-11 (2) 11-14 (1) 14-15 (2) 15-18 (3) 18-20 (2) 20-21 (3) 21-22 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1) 15-17 (1) 19-20 (1) 20-22 (2) 22-00 (1)	02-04 (1) 04-07 (2) 07-08 (1) 04-06 (1)*
Far East	13-14 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-19 (3) 19-20 (2) 20-21 (1) 15-18 (1)**	12-14 (1) 14-15 (3) 15-17 (2) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	00-06 (2) 06-08 (3) 08-09 (2) 09-12 (1) 12-18 (2) 18-21 (4) 21-22 (3) 22-00 (2)	00-01 (1) 01-04 (2) 04-07 (3) 07-08 (1) 01-05 (1)* 05-06 (2)* 06-07 (1)*
South Pacific & New Zealand	09-10 (1) 10-11 (2) 11-13 (4) 13-16 (3) 16-19 (4) 19-20 (2) 20-21 (1) 15-18 (1)**	07-08 (1) 08-09 (2) 09-11 (4) 11-15 (2) 15-17 (3) 17-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	04-07 (1) 07-09 (4) 09-10 (3) 10-11 (2) 11-18 (1) 18-19 (2) 19-20 (3) 20-00 (4) 00-02 (3) 02-04 (2)	21-22 (1) 22-00 (2) 00-07 (3) 07-08 (2) 08-09 (1) 22-00 (1)* 00-06 (2)* 06-07 (1)*
Australasia	10-13 (1) 13-15 (2) 15-16 (3) 17-19 (4) 19-20 (3) 20-21 (2) 21-22 (1) 17-19 (1)**	08-09 (1) 09-11 (3) 11-12 (2) 12-14 (3) 14-15 (2) 15-17 (1) 17-19 (2) 19-21 (4) 21-22 (2) 22-23 (1)	06-07 (3) 07-09 (4) 09-10 (3) 10-12 (2) 12-14 (1) 18-20 (1) 20-21 (2) 21-23 (3) 23-01 (4) 01-03 (3) 03-04 (2) 04-06 (1)	01-03 (1) 03-04 (2) 04-07 (3) 07-08 (1) 03-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries of South America	07-08 (1) 08-09 (3) 09-10 (4) 10-12 (3) 12-15 (4) 15-16 (3) 16-17 (2) 17-18 (1) 08-10 (1)**	06-07 (1) 07-08 (3) 08-10 (4) 10-13 (3) 13-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	06-08 (4) 08-10 (3) 10-13 (2) 13-15 (3) 15-22 (4) 22-00 (3) 00-06 (2)	17-18 (1) 18-19 (2) 19-20 (3) 20-04 (4) 04-05 (2) 05-06 (1) 19-20 (1)* 20-22 (2)* 22-00 (3)* 00-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	06-07 (1) 07-08 (2) 08-09 (4) 09-10 (3) 10-12 (2) 12-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1) 08-11 (1)**	06-07 (1) 07-08 (3) 08-09 (4) 09-11 (3) 11-13 (2) 13-15 (3) 15-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	05-06 (2) 06-07 (3) 07-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-01 (3) 01-03 (2) 03-05 (1)	19-20 (1) 20-22 (2) 22-00 (1) 00-04 (2) 04-05 (1) 20-03 (1)*
McMurdo Sound, Antarctica	07-08 (1) 08-09 (2) 09-10 (1) 19-20 (1) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-22 (3) 22-01 (2) 01-02 (2)	16-18 (1) 18-20 (2) 20-03 (3) 03-04 (2) 04-05 (1) 06-07 (1) 07-08 (2) 08-10 (1)	00-05 (1)

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Code-Free Amateur Class Edges Closer

Code proficiency has always been the primary requirement to gain access to the amateur bands. That's how the first amateurs communicated. Its roots go back almost to the beginning of recorded history.

Transmitting coded information from afar has taken many forms. Fire beacons, reflected signals from a Greek soldier's highly polished shield, even jungle drums were all forms of early code communication. The French invented semaphore, two rotating arms on a post viewed with a telescope. The U.S. Army came up with the heliograph—the cutting on and off of the sun's rays. All had one thing in common—physical occurrences that could be converted to an understandable message.

The discovery of induced electric magnetism in the early 1800s and wireless radio waves around 1900 propelled the code to new heights. Voice transmission over wires or through space was not yet thought of. Samuel Morse's development of a system of short and long durations indicating various characters became the worldwide standard by which all information could be sent over great distances.

The early radio pioneers were, of course, all amateurs. There were no professionals. Marconi sent the first radio signals across the Atlantic in 1901 and inspired hundreds of others to experiment with radio. It wasn't long before thousands of amateurs were all communicating via Morse code. The code is thus more than a means of communication; it is a tradition, a part of our heritage as non-professional communicators.

Maritime Service To Discontinue Morse

Over the years the code has stood us well. Bet you didn't know the *first* coded SOS in history was sent in 1912 as the *Titanic* was sinking. A recent international communications convention had agreed to replace the distress signal CQD (Come Quick Danger) with SOS, which some said meant Save Our Ship. Actually, SOS was based on three easy-to-recognize

Morse code characters—three dots, three dashes, three dots.

Over 1500 lives were lost aboard the *Titanic* even though another ship, the *Californian*, was less than ten miles away! Its off-duty radio operator didn't hear the distress call. Modern technology has now removed the necessity of a radio operator aboard sea-going vessels. Morse code and ship-to-shore and ship-to-ship emergency communication is signing off at sea for all time. It has already started. And the off-duty radio operator won't be a problem. He simply won't exist.

The new satellite-based Global Maritime Distress and Safety System transmits and receives error-free messages automatically. GMDSS distress signals can be sent when anyone pushes a button. Ships will also carry a float-free radio beacon which will automatically give the vessel's position. Shipboard communications is being updated to modern times.

International amateur radio service regulations require Morse code proficiency so hams may assist with emergencies. Over the years, however, the International Telecommunication Union countries have progressively relaxed the Morse code prerequisite. At first, amateurs had to be code proficient, period. Then ITU rules permitted code-free amateurs when operation occurred on frequencies below 144 MHz. The 1979 World Administrative Radio Conference reduced this to 30 MHz.

Another WARC is scheduled for 1992, and you may see the code requirement abolished for all frequencies. The thinking is certain to be, why require amateurs to be proficient in a mode that is being discontinued by the professionals? There are simply better methods of digital communication.

FCC To Consider Amateur Restructuring

It now appears that a code-free amateur radio class is a virtual certainty in the United States. The big question looming now is what form it will take and when it will be adopted. More than a score of other countries already have adopted code-free amateur classes.

Many petitions from the U.S. amateur community suggesting code-free amateur band access have been received, in-

cluding one from the American Radio Relay League, the 150,000 member strong amateur association. While such petitions are not new, they took on increased vigor once the International Maritime Organization, the United Nations agency dedicated to the safety of shipping at sea, signaled the end of Morse communications.

Our Amateur Service is, of course, regulated by the Federal Communications Commission. Discontinuing Morse code as an entry requirement is a major change of FCC regulations, and there are certain procedures that our government must go through to change the law.

The Administrative Procedure Act involves the public in the regulatory process. The act requires prior notice of a proposal, and the public is invited to comment on new regulations before they are adopted. These comments must be considered by the federal agency. The process generally starts when an agency accepts outside proposals and assigns them file numbers.

The FCC's Private Radio Bureau has now forwarded twelve Petitions for Rule Making from the amateur community to the Office of the Secretary with instructions that they be assigned Rule Making numbers. These twelve petitions contain various proposals for restructuring either the classes of operator licenses in the Amateur Radio Service or the qualifying requirements for such licenses or both.

If it is agreed that the petitions have merit, the bureau chief's staff will prepare a draft of a Notice of Proposed Rule Making (NPRM) for review by the Commissioners. The bureau chief in this case is Ralph Haller, N4RH, also an Extra class amateur. He is well versed in amateur affairs, having spent a good deal of his government career as an FCC engineer out in the field.

If the Commissioners agree with their staff's appraisal, then a docket number will be assigned and the NPRM will be released to the public for debate. The Notice of Proposed Rule Making will set forth a description of the issues involved and will propose new rules. There undoubtedly will also be questions on which the FCC will ask for detailed observations. It is at this stage that further specific recommendations may be made by interested persons.

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

What Do The Petitions Say?

Let's examine what is preliminarily "on the table." We have obtained copies from the FCC of all twelve petitions that were assigned RM file numbers. These twelve proposals will become the basis of the NPRM. We will summarize them in the order in which they were filed.

RM-6984, Received: March 3, 1989

Alan Horowitz, KZ1Y (6657 SW 139 Avenue, Miami, FL 33183)

The shortest proposal was the first filed. In all my days of being a professional FCC watcher, I have never seen a 2-inch-square, one-sentence, handwritten idea given an RM number! It could have been written on a QSL card. Horowitz simply said, "As an Extra class ham of 20 years standing, I would like to request the Commission to implement a 'no-code' ham license, similar to Canada's license structure. Thank you." That's it, period, end of petition!

Let's briefly take a look at what Canada is doing. I say doing, because it is no longer a proposal. They are going through with an entry-level no-code amateur operator's ticket. After nearly four years of government give-and-take, Canada has now decided to implement a four-license-class modular system to be called Certificate A, B, C, and D.

Certificate "A": requires passing 60 out of 100 multiple-choice questions (25 questions must be on rules, balance on theory and operating procedures). Holders of *Basic Theory Qualification "A"* will have access to all amateur bands above 30 MHz—all modes/emissions—using commercially purchased transmitters or kits. Maximum 250 watt input power.

Certificate "B": requires copying 25 characters-per-minute for 3 minutes (5 wpm) with five errors or less. Successful applicants must also hold Certificate "A" to gain all amateur band privileges below 4 MHz. Commercial transmitters/kits only with up to 250 watts input.

Certificate "C": requires 12 wpm Morse code proficiency, 60 characters-per-minute for 3 minutes. Candidates who achieve 50% correct copy are given credit for 5 wpm. Holders of Certificate "C" who also hold Certificate "A" have access to all bands below 30 MHz with 250 watts input using commercial transmitters/kits only. (Three volunteer examiners who have already passed the 12 wpm requirement may administer the code tests.)

Certificate "D": consists of 50 multiple-choice questions on advanced radio theory. Pass mark is 30 questions answered correctly. Holders of the *Advanced "D" Qualification* may radiate 1000 watts, sponsor repeaters and club stations, operate control links, and home brew transmitters. They also must hold Certificate A.

The new restructuring regulations are scheduled to be officially released by the Canadian Department of Communications on March 1, 1990 and will be implemented on September 1, 1990. The delay is caused by the need to develop and approve the new regulation and technical questions. The DOC is developing the regulation question bank while a joint CRRL/CARF (Canadian amateur organizations) committee is readying the balance.

RM-6985, Received: March 3, 1989

James E. Taylor, W2OZH (1257 Wild Flower Dr., Webster, NY 14580)

Taylor's proposal was in the form of a typed letter written February 28, 1989 to

the FCC. He said that initially the code requirement was needed because it provided the primary method of radio communication and theory was necessary for the construction and operation of radio equipment.

"In the early days the people attracted to the hobby came from three groups: railroad and ship telegraphers, technical people (engineers, radio servicemen, military, etc.), and non-technical people who were attracted by the romance of the communications hobby. Obviously, over the years as the technology has changed the needs have changed."

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quencies to commercial interests in the face of decreasing numbers of active hams. If we are to continue to justify our existence, we must rapidly increase our numbers—not just double, but by a factor of ten or more! This requires a thorough, critical review of the needs expressed above. First the code is no longer necessary—it is not even used by the military; the commercial telegrapher is gone! The potential base among technical people now consists of communications engineers, computer scientists, and technicians, and we need to woo these people with real incentives, not misnamed barriers.

"Based upon discussions with numerous prospective hams who are put off by the present complex, layered structure of our hobby, I propose the following:

"A. Base the primary license requirement on knowledge, to attract qualified technical people.

"B. Offer a secondary option which substitutes code for higher technical knowledge to attract interested non-technical people.

"C. Simplify the hobby—one license which confers all privileges.

"It is my feeling that only by such radical surgery can this service survive and continue to serve the needs of our country."

Taylor said he had been a ham for "many decades."

RM-6986, Received: March 17, 1989

William E. Newkirk, WB9IVR (Space Coast Amateur Technical Group, 3151 S. Babcock St. #70, Melbourne, FL 32901)

The Space Coast Amateur Technical Group is an informal organization made up of technicians and engineers from nearby Kennedy Space Center, and communications firms—Harris and Collins/Rockwell. They submitted a very formal filing. Newkirk, a technical writer for Collins, said his early interest in ham radio directed him towards a high-tech career. The group's interest appears to be in guiding youngsters towards a technically-oriented field.

Newkirk has been licensed for 17 years, is an ARRL-VEC examiner, conducts ham classes at Brevard Community College, and is establishing an amateur radio club at a junior high school.

The group asks that the FCC create a new class of "Apprentice" license yielding 30 MHz and higher frequency privileges to replace the Novice class. They selected the name "Apprentice" by consulting the thesaurus of a word processing program: "... one who is learning by practical experience under skilled workers of a trade, art, or calling."

Apprentice privileges would consist of all modes/emissions 30 MHz and higher at full amateur (1500 watt PEP) power output. The group maintains that a different power restriction would serve to sep-

arate the Apprentice from the mainstream of amateur radio operations. Callsigns would come from the 2 x 3 Group D block. Examiner requirements would be the same as the current Novice license. There would be no code requirement. Since it is expected that "Apprentice" licensees would upgrade, they would be limited to one ten-year term, although apprentices could retest to obtain another ten-year term.

Current Novices would acquire the same privileges as the Technician class for the term of their current license. Renewing Novice class licensees would be issued the Apprentice class which would not continue Novice HF privileges.

"We believe the time is right for a license that takes advantage of all internationally agreed upon rules regarding code requirements to be made available in the United States. Morse code operations were once the only way to make radio communication possible. It is now just a facet of an entire spectrum of possible methods of radio communications. It is no longer in keeping with the basis and purpose of the Amateur Radio Service to stress one facet of radio communications over all others. Knowledge of code doesn't eliminate rules violations or uncourteous operations."

RM-6987, Received: March 29, 1989

Dennis/Linda Welch, WB7VUM/WA7ZQV (6210 Fushsimi Court, Burke, VA 22015-1716)

Dennis and Linda feel that the Morse code is more of a barrier to amateur radio entry than a filter which yields disciplined amateurs/operations. "Disciplined operators result from good training programs and operating experience; no other method has proven satisfactory in military, commercial, and volunteer organizations." Strangely, however, they suggest adding another code requirement—with examinations at 5, 10, 15, and 20 wpm instead of the current 5/13/20. They propose:

1. Novice entry to the entire 220-225 MHz band;
2. Technicians obtain all 10 meter and 80 meter HF privileges;
3. General class licensees be required to only pass 10 wpm code. Technicians who successfully complete two years of verifiable HF net operation (at least six hours per month) would also be qualified for the General class license.
4. Advanced class applicants would have to pass 15 wpm code.
5. No changes in Extra class requirements.

RM-6988, Received: April 3, 1989

Clement Bourgeois, Jr., N5AIK (400 N. Patrick Toole St., Erath, LA 70533)

... wants code de-emphasized. While arguing that code is essential, Bourgeois feels that a reduction to a 5/10/15 word per minute requirement, or to just two

speeds, is in order. The petitioner states, "... theory, operation, skills, and resourcefulness" are more important than the code.

Bourgeois, 76, a long-time Advanced class licensee, feels that Advanced class licensees should be grandfathered into the Extra class after "... so many years." He has been unsuccessfully trying to upgrade for years, but due to nervousness is unable to pass the code. Apparently he has already fulfilled the Extra class theory requirement, since he also petitioned the Commission to extend the one-year test credit period to an indefinite period, or to at least ten years to obtain additional time to pass the code.

While Bourgeois's proposals appear self-serving, they also point out that the code requirement serves to keep those who would avail themselves of amateur radio privileges—especially the aged and handicapped—from participation to the extent they feel otherwise qualified.

RM-6989, Received: April 4, 1989

Burt Fisher, K10IK (389 Old Bass River Rd, S. Dennis, MA 02645)

A school teacher, Burt has been licensed for 30 years—since he was a teenager. He instructs electronics at a regional vocational high school and his interest "... is to make technology available to a larger base of people ... particularly students and young people."

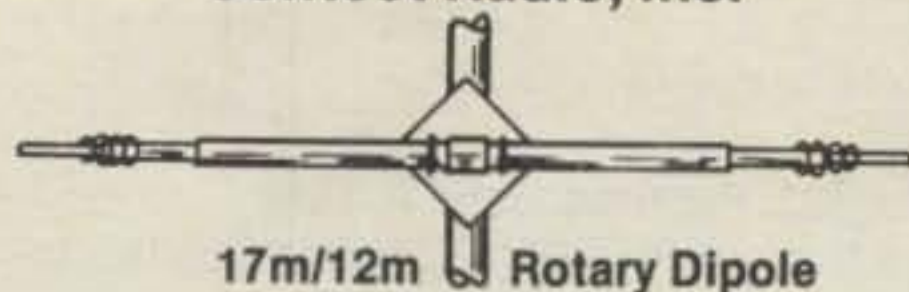
Fisher believes the reason the United States has lost much of its high-tech engineering and manufacturing capability is because of our nation's failure to interest our youth in technology. "In Japan, the percentage of students interested in electronics well exceeds ours. Part of the reason for this is Japan has a very large amateur radio base. I would like to see us expand that here in the U.S."

Still, Fisher feels code is an important part of our amateur heritage. He said he detested having to learn the code, but once he did, he found that he liked the mode.

He proposes a Novice-level sub-class to be known as the Novice-V, the V representing VHF. Privileges would include all modes, emissions at full amateur power above 52 MHz, except FM would not be allowed in the 2 meter band. He did add, however, that "If I was to file the petition the way I really wanted it, I probably would have included FM privileges on 2 meters ... but I felt it would not have any chance of being approved." The 50-52 MHz portion of 6 meters was eliminated to leave spectrum for higher class DX operation.

Other features of the Novice-V include: regular 2 x 3 Group D callsigns would be issued; and present Element 2 theory, but the code requirement would be fulfilled by recognizing ten "dot-dash sequences" on a multiple-choice test.

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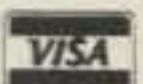
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RM-6990, Received: May 9, 1989
Dr. Michael C. Trahos, KB4PGC (4600 King St. #4E, Alexandria, VA 22302)

Mike is not only a general medicine physician/surgeon and medical school instructor, but also holds licenses in many radio services, including the Business Radio Service, GMRS, and Special Emergency Radio Service. Trahos is also very active in city/county/federal public-safety frequency planning and a certified telecommunications engineer. His professionally prepared petition took up more than 30 pages, making it the most extensive of any of the twelve submitted.

Trahos contends the number of licensed amateur operators does not warrant the total amount of spectrum allocated to the Amateur Radio Service. He feels strongly that unless at the very minimum a no-code Novice-type theory class license is created, the present ARS will experience a stagnant or decreasing number of members with increasing reallocation to ARS spectrum by the FCC to other land mobile services.

He submitted a chart documenting land mobile needs through the year 2000. "Even considering the effect of new spectrum efficiencies . . . trunking, digital/narrow band/cellular technology . . . business spectrum requirements far exceed availability."

He maintains that the ARRL no-code committee's recommendation is not enough. "The committee's proposals are designed to cope with the political unrest in the amateur community. A proper catalyst is needed to encourage Amateur Radio in the young who find Morse code a deterrent but who are also not yet technically experienced enough to pass a Technician class theory type exam. . . . to require a no-code prospective amateur to have more technical knowledge than a Novice code prospective amateur is essentially putting the 'cart before the horse.'"

Trahos proposes two new license classes. Under the Trahos proposal, the current Novice and Technician classes would be renamed Novice Plus and Technician Plus. The new code-free Novice would be required to only pass element 2 (Novice written exam) to obtain Novice privileges above 30 MHz. The new code-free Technician would require only Elements 2 and 3A to obtain VHF and higher spectrum, except the 2 meter band would not be authorized.

RM-6991, Received: May 9, 1989
Larry Ballentine, N5BZB (504 Ruth Dr., Bryant, AR 72022)

. . . wants to replace the code receiving examination with a code recognition requirement ". . . to keep the traditions of amateur radio intact . . . while eliminating the objection to code speed reception." He proposes a written test where dots

and dashes could be matched up with code characters. Ballentine proposes a 90% pass rate. He wants the code recognition procedure to extend to all amateur classes to ". . . satisfy the international requirement below 30 MHz [that] a person have a knowledge of code . . ."

Ballentine previously petitioned for the complete elimination of Morse code proficiency for all license classes. "I believe that a person should not be excluded from the multitude of other forms of amateur radio on the basis of ability in just one area."

RM-6992, Received: June 1, 1989
Bill Welsh, W6DDB (45527 Third Street East, Lancaster, CA 93535-1802)

Welsh, a well-known educator (and *CQ* magazine writer), is also an avid CW operator. ". . . most of my last 40 years on the amateur bands have been completely devoid of voice contacts." His petition was very imaginative and creative.

Welsh notes the Global Maritime Distress and Safety System is being implemented on the high seas during 1993. He suggests that the time frame being adopted for phasing out code in the Maritime Service ". . . be used to change our test requirements in ways that will guarantee that future licensees will have proven operating capabilities."

He suggests five entry-level amateur "mode licenses"—code, facsimile/pulse, teletype, television, and voice. The license examination should consist of a written test and a satisfactory on-the-air demonstration in each mode. The current Novice through Extra license classes and band segments should be eliminated.

In addition to earning additional emission privileges when one passes a mode upgrade test, the licensee would gain additional bands. As an example, Welsh suggested the following frequency privileges:

One mode license: 160, 17, 12 meter band;

Two mode license: Above bands plus 80, 30, and 6 meters;

Three mode license: Above bands plus 40, 2, and 1 1/4 meters;

Four mode license: Above bands plus 10 and 15 meters;

Five mode license: All amateur bands including 20 meters.

Each current Extra class licensee should receive a license with all mode endorsements. Current Advanced/General licensees would receive new licenses with all but the facsimile/pulse endorsement. Present Novice/Technician levels would get two mode code/voice licenses. The current Group A (Extra), Group B (Advanced), Group C (General/Technician), and Group D (Novice) callsign formats could be used with 5, 4, 3/2, and single mode licenses.

Welsh said he ". . . would miss the code as a licensing requirement, but this system would allow each applicant to be ex-

amined for the specific mode he/she wants to operate."

RM-6993, Received: June 7, 1989
John McCord, N1CVN (957 Flotilla Club Dr., Indian Harbour Beach, FL 32937)

McCord, also a CW operator, not only holds an Extra class amateur ticket, but a First Class Radiotelegraph license as well. He proposes an amateur licensing structure consisting of only three classes (Novice, Intermediate, and General) and four test elements—two code (5 and 13 wpm) and two written (basic and advanced theory).

McCord feels the amateur Extra, Advanced, and Technician class licenses should be totally eliminated. He wants the Novice class license to be restructured by eliminating the Morse code requirement, but requiring successful completion of a written examination consisting of the information now contained in Elements 2, 3(A), and 3(B)—the current Novice, Technician, and General class written examinations. The newly restructured Novice class would allow all amateur modes/spectrum above 220 MHz and digital (computer) privileges only from 50 MHz to 220 MHz.

McCord also requests that a new "Intermediate Class" license class be introduced which would *additionally* require successful completion of a 5 wpm code test. This license would allow all privileges listed above plus the privileges now assigned to the Technician class.

To upgrade to the top-of-the-line General class, an applicant would be *additionally* required to pass a 13 wpm code test and a written examination to include information now contained in Elements 4(A) and 4(B)—the current Advanced/Extra theory examinations.

McCord also proposes that an endorsement be established to the General class license which will permit the holder to become a satellite station licensee. This endorsement would require the successful completion of a comprehensive written examination applicable to stations in the Amateur Satellite Service.

McCord says he believes the above proposals would attract many young minds to the hobby of amateur radio who would otherwise not make the attempt because of the requirement to learn the Morse code. The petitioner contends there is no valid reason for anyone to pass a 20 wpm code test when the benefits to be gained are still not as generous as are given to citizens of other countries who are required to pass only a 12 wpm code test.

RM-6994, Received: July 17, 1989
David K. Stall, N5MKK (157 Piper's View Drive, Webster, TX 77598)

Stall proposes to create a new sixth "Limited" class license that would be issued to applicants passing only the Ele-

ment 2 (Novice) written examination. Limited class privileges would duplicate those of the Novice class above 30 MHz. He also suggested that the Element 2 pool be expanded or modified to address the restrictions of the Limited license.

He asserts "Everyone would gain . . ." if his proposal is adopted. Amateurs will benefit from increased use of under-utilized band segments which will assure adequate spectrum for future amateur use, more innovative technology advances will be made from a larger amateur base, the greater mass market will increase the availability of equipment thereby reducing its cost, and the public will profit from the influx of new amateurs who will provide support for countless public-service and emergency-communications needs.

RM-6995, Received: August 31, 1989

Christopher D. Imlay, N3AKD (American Radio Relay League, Booth, Freret & Imlay, 1920 N. Street NW #150, Washington, DC 20036)

The League proposes a sixth "Communicator" class offering specific privileges above 220 MHz at a maximum 250 watt power level. The Communicator class would not be an entry level—instead requiring a written examination somewhat more comprehensive than the present Technician class theory examination, but without a code requirement.

The examination would be comprised of the 30 question Novice/Element 2 and an expanded 30 question Technician/Element 3(A) which would be administered under the three examiner VEC System. No credit would be accorded from examinations administered under the Novice (two VE) testing program. The five additional questions would be on digital techniques and the use/application of Morse code.

Communicators would not be permitted to be repeater or auxiliary station control operators. Callsigns would be issued from the current 2x3 Group D callsign block now assigned to the Novice class. The ARRL acknowledged that adding another class to an already complex licensing structure would add to the burden of the volunteer examiner program.

So There You Have It!

Those twelve Petitions for Rule Making will be the back-bone of a Notice of Proposed Rule Making which is certain to be issued shortly by the FCC. Our guess is that we will see the NPRM some time within the next three months—probably between Christmas and Easter, and maybe even sooner! We will keep you posted on developments.

New Novice, Technician Pools Implemented

The questions that make up the current Element 2/Novice and Element 3(A)

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Your users will be thunderstruck by the outstanding patch and autodialer, with room for 200 phone numbers. The talking S-meter will let them check their signal strength into the repeater. Remote base support for up to six bands allows linking your repeater to others. Plus support for pocket pagers and a bulletin board.

Your technical crew will light up when they see the built-in keypad and indicators. And the ease of hookup with shielded DIN cables. With pots and DIP switches easily accessible at the rear of the unit.

Rugged, capable, easy to hook up. The RC-96 Repeater Controller - an enlightening experience for your repeater.

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"Thanks for the new country (Taiwan)! Your Heath gear sounds great!"

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Huge pileups, big city QRN, no spare parts, and a long way to anywhere. You probably couldn't find a better test of the new SB-1400 All-Mode Transceiver than Heath's expedition to Taipei in the Republic of China.

When working DX, you need sensitivity to dig for the weak ones, but still need dynamic range so the guy down the block doesn't clobber you in the middle of a QSO. Sure, the SB-1400 worked the S9+30 signals, but out of the pileups it also worked a number of stateside stations running 5 watts or less! And that's not bad for a short path distance of 7600 miles!

SB-1400

A proven transceiver.

The technology that worked the world can work for you, too, in your own ham shack. The SB-1400 is a fully assembled all-band, all-mode (FM optional), continuous duty, 100-watt transceiver. It incorporates an impressive general coverage receiver with dual VFOs for split operation and 20 memories to store your favorite frequencies. The unit includes standard SSB filter plus a narrowband 500 Hz CW filter and wide-band AM filter. It also features clarifier (RIT), front panel AGC, noise blanker, all mode

CIRCLE 77 ON READER SERVICE CARD

scquelch, 20 dB attenuator, computer interface, and a clean, "operator preferred" front panel layout.

The transmitter's PA is cooled by a quiet, thermostatically controlled internal fan and is enclosed in its own diecast aluminum heat-sink chamber, which allows for full power operation in CW, SSB, FM and RTTY, AMTOR, SSTV, and Packet.

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In addition to the SB-1400, Heath offers a full line of pre-assembled or build-it-yourself amateur radio equipment to completely outfit your ham shack or upgrade your system.

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The NEW OMNI V:

The OMNI V is a Paragon with a 12 band crystal mixed local oscillator in place of the general coverage synthesized oscillator. The result is receiver cleanliness like the legendary Corsair and Omni series. The OMNI V local oscillator is a new ultra low noise 5.0 to 5.5 MHz PLL design. Phase noise is simply eliminated as a significant variable. Dynamic range is maintained right up to the edges of the crystal filters, even under the most adverse conditions.

Many of the nifty features made possible by digital technology are included. Dual VFO's with A-B-split select, the frequency stability of a PLL, 25 tuneable memories, VFO to MEM, MEM to VFO and the SCRATCHPAD feature. RS-232 interface is standard and includes remote band switching for the HERCULES II amplifier. The memories are nonvolatile RAM and are retained until you change them. The status registers and clock are backed with a lithium battery (2 year life) so that when the rig is powered up, the status is the same as when you turned it off.

The OMNI V operates USB, LSB, fast or slow QSK CW and real FSK. FM is optional. All bands from 160 through 10 meters are push button selectable. Each band position covers 500 kHz plus 30 kHz over-shoot at the band edges. The four 500 kHz segments of the 10 meter band are switched automatically as you tune through the

The OMNI V Station with Model 961 Matching Power Supply, and the Mighty Titan Amplifier.



segment limits. Tuning is in your choice of 10 Hz or 50 Hz increments on SSB, CW and FSK. With the FM option, tuning is in 100 Hz or 500 Hz increments. Up/Down buttons tune in 10 kHz or 50 kHz increments.

An auxiliary frequency tuning system is available and plugs into the rear panel. This allows you to remotely tune the frequency from the most convenient and comfortable position. It takes about 10 ms to fall in love with this option.

A noise blanker and audio speech processor are standard equipment as is the cw sidetone and speech monitor. The rear panel has a full complement of inputs, outputs and controls for the convenience of the all-mode operator, including an auxiliary RX antenna input. High speed key lines are provided for QSK control of a fast switching amplifier, such as the TITAN or HERCULES II. Changeover in fast QSK is less than 30 ms, great for CW and the digital modes.

The front panel is spacious and friendly. The vacuum fluorescent display uses large, bright, easy to read elements. The frequency display doubles as the 24 hour clock display when the CLOCK button is pressed. Other elements indicate VFO status and warn when the memories are full.

All four of the 6.3 MHz I-F crystal filter positions are push-button selectable, independent of mode. A second filter socket is also provided, in series, behind the standard 2.4 kHz filter in the 9 MHz I-F. This may be used for an optional 2.4 kHz, 1.8 kHz, 500 Hz or 250 Hz filter which is selected with the "NARROW" button. This adds six or eight poles into the crystal filter network and

even further reduces the impact of adjacent strong signals. Most impressive!

If you do not need a general coverage receiver in your HF rig, the elegant OMNI V is a great choice. If you are also a serious DX'er and/or contester, the OMNI V is the best choice.

GENERAL SPECIFICATIONS

Frequency Range: Transmit and receive on all ham bands from 160 through 10 meters in their entirety. Twelve 500 kHz segments plus 30 kHz over-shoot at the upper and lower edges of the segments.

Frequency Control: LO generated from a crystal oscillator mixed with a low noise 5.0 - 5.5 MHz phase locked loop.

Frequency Stability: Worst case, 1 PPM per degree C at 29.999 MHz.

Frequency Accuracy: + -100 Hz @ 25 degrees C.

Antenna Impedance: 50 Ohms, unbalanced.

Printed Circuit Boards: G-10 epoxy glass.

Power Required: Receive = 1.5 A. Transmit = 20 A. 12-14 Vdc.

Dimensions: HWD 5 3/4" x 14 3/4" x 17". 14.6 x 27.3 x 43.2 cm.

Net Weight: 16 lbs. 7.25 kg.

TRANSMITTER

Modes: USB and LSB (J3E), CW (A1A), FSK (F1A). Optional FM (F3E).

DC Power Input: 200 watts maximum.

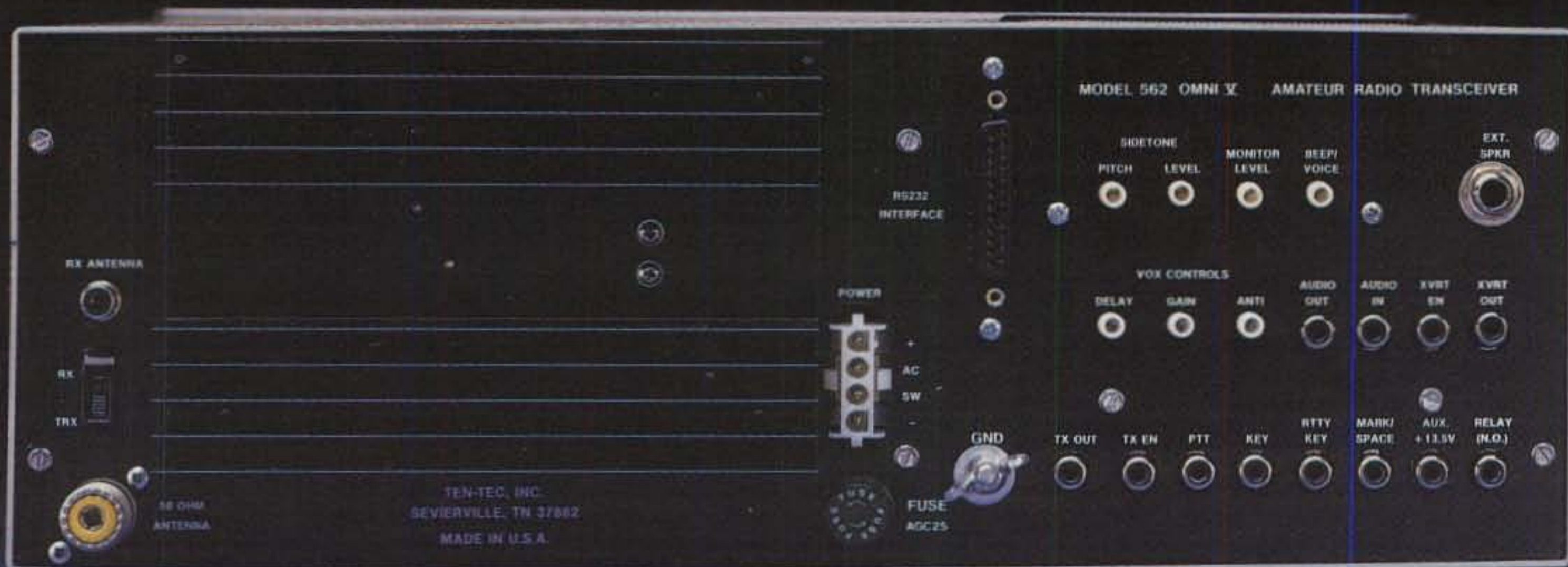
RF Power Output: ALC stabilized, adjustable from 20 watts to 100 watts (50 Ohm load) with front panel RF OUT control.

Microphone Impedance: 200 Ohms to 50k Ohms. Bias voltage for electret mic is provided in front panel connector.

CW Sidetone: Internally generated with rear panel level and tone adjustments, independent of front panel audio level control.

SSB Generation: 9 MHz, 8 pole crystal ladder filter, balanced modulator.

Carrier Suppression: Greater than 60 dB.



Impressive from either end... but it's how we make ends meet that really delivers the difference.

Unwanted Sideband Suppression: Greater than 60 dB at 1.5 kHz AF input.

Harmonic Emissions: Greater than 45 dB below peak power output.

Third Order Intermod Products: -30 dB from two tone at 100 watts PEP.

Metering: Switchable forward power, SWR, collector current or audio processing level on SSB.

CW Offset: 600 Hz.

FSK Shift: 170 Hz.

RECEIVER

Modes: LSB, USB, CW and FSK. FM with optional board.

Sensitivity: .15 uV for 10 dB signal to noise ratio at 1.8 kHz bandwidth. With FM option, .3 uV for 12 dB SINAD at 15 kHz bandwidth.

Selectivity:

	-6 dB BW	-60 dB	Shape Factor
Standard 2.4 kHz	2.4 kHz	3.36 kHz	1.87:1
Opt. 1.8 kHz	1.8 kHz	2.90 kHz	1.60:1
Opt. 500 Hz	500 Hz	1.40 kHz	2.80:1
Opt. 250 Hz	250 Hz	.85 kHz	3.40:1
Opt. FM	15 kHz	30.00 kHz	2.00:1

Attenuator: -20 dB.

I-F Frequencies: 1st I-F 9 MHz, passband tuning I-F 6.3 MHz.

Image Rejection: >100 dB.

I-F Rejection: >60 dB average.

Noise Blanker: Switchable on/off with width adjustment.

Dynamic Range: 97 dB, measured with standard 2.4 kHz filter at 20 kHz spacing, 100 dB + with cw filters.

Third Order Intercept: +10 dBm.

Noise Floor: -133 dBm @ 2.4 kHz bandwidth.

Squelch Sensitivity: Less than .6 uV.

Receiver Recovery Time: Less than 30 ms.

Pass Band Tuning I-F Shift: + -2.3 kHz.

Audio Output: Speaker, 1.5 watts @ 8 Ohms.

Fixed level 1 mw @ 600 Ohms.

Notch Filter: 250 Hz to 2.2 kHz, greater than 50 dB notch depth.

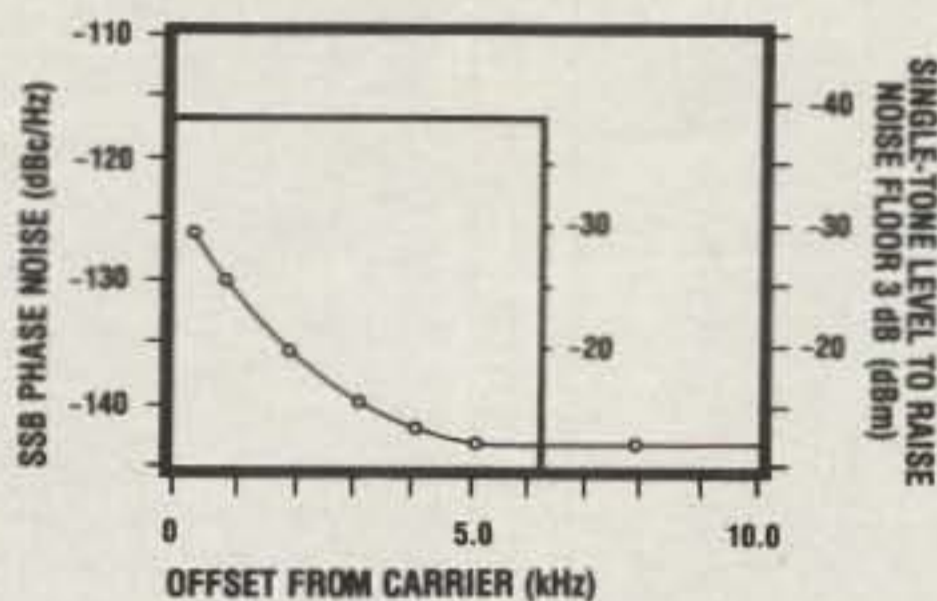
Audio Bandpass Filter: 4 pole, variable center frequency 220 Hz to 1.7 kHz, 35% band width @ -6 dB.

Tone Control: Variable 15 dB roll-off @ 5 kHz.

PHASE NOISE PERFORMANCE OF THE OMNI V

-127 dBc/Hz @ 250 Hz offset from carrier.

-146 dBc/Hz @ 5 kHz offset from carrier.



Here is a graph of the phase noise performance of the OMNI V receiver. These measurements can only be made under laboratory conditions and, even then, our test equipment is at the limit of its ability to measure the noise at the narrow offsets. The significant measurements are those close-in. Note that this graph does not even go out to 25 kHz offset where many of the published measurements are made. Certainly, we invite comparison.

A WORD ABOUT COST

The OMNI V and the Paragon are the same price. Our 12 band crystal mixed oscillator is the same cost to manufacture as our general coverage synthesized oscillator. The choice between these two transceivers is based on general coverage vs. the best possible receiver performance in the ham bands.

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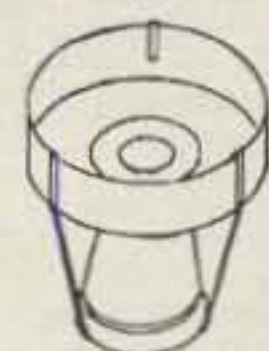
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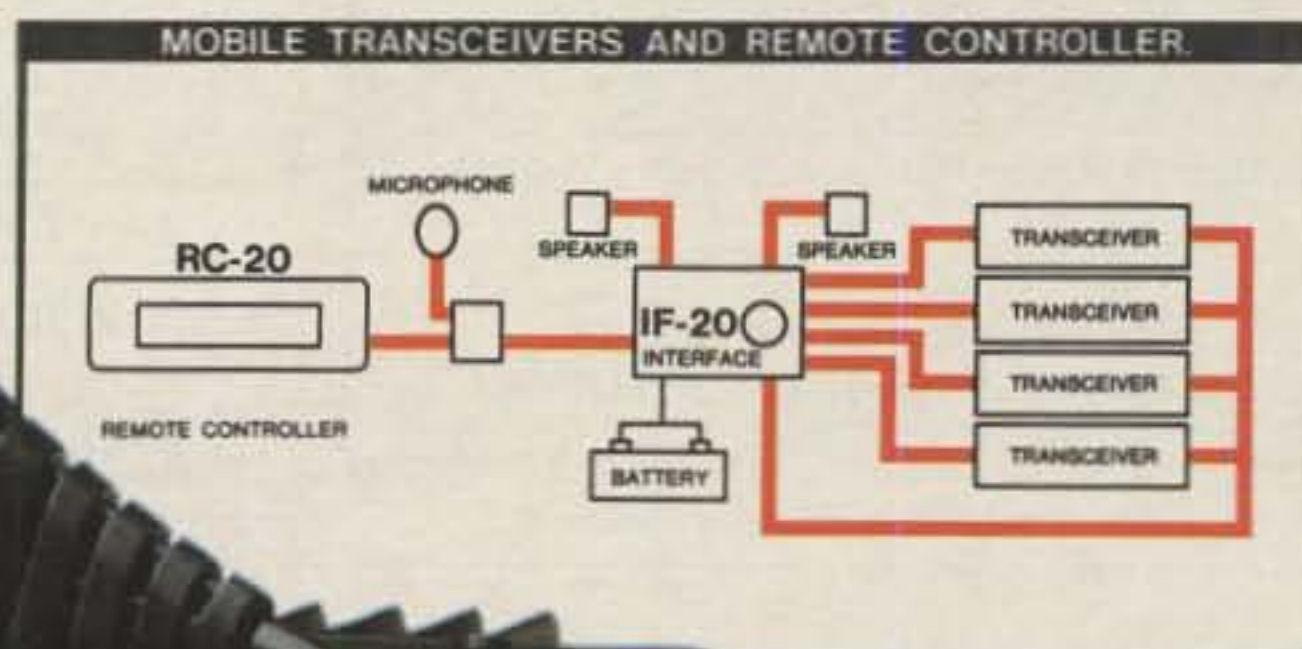
Dual memory scan

Dual VFO scan

d) **Scan stop modes**

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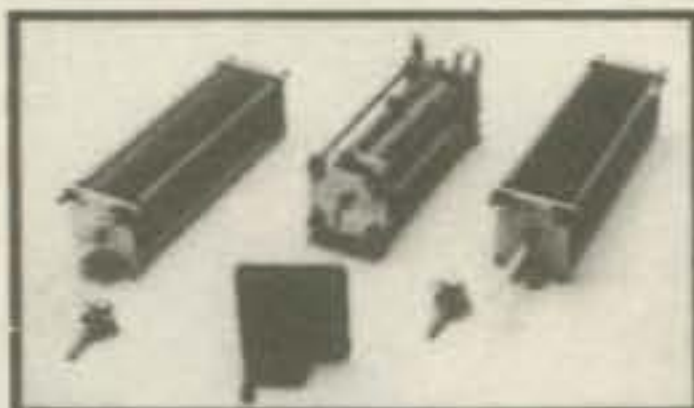
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TS-820 \$499, AT-200 \$175, MC-50 \$49, NRD-525 \$995, FP-700 \$159, FV-700 DM \$129. A few more items! All mint condition. Bob, Box 1202, Akron, OH 44309 (SASE). Call (216) 928-8369 after 9 EST.

COMMODORE 64 HAM PROGRAMS: 16 disk sides over 200 Ham programs \$16.95. 25¢ stamp gets unusual software catalog of Utilities, Games, Adult and British Disks. Home-Spun Software, Box 1064-AR, Estero, FL 33928.

HAM SOFTWARE IBM/Compatibles, 10 disks, \$26.95. MC/VISA/Discover. N5ABV EAPCO/C, Keller, TX 76248-0014 (817-498-4242, 1-800-869-7208).

BEAM HEADINGS! Worldwide headings customized for your QTH. Only \$7.00 postpaid! FUNDSERV, 1546A Peaceful Lane, Clearwater, FL 34616.

WANTED: YAESU HF MANPACK, consisting of FT-70G, FC-70M, NC-70, CSC-70, YA-70, and YH-70. Want good to mint condition. Steve Bradley, P.O. Box 3252, Taos, NM 87571.

HI-TECH TRADER, A National buy, sell, trade publication for Amateur Radio and related equipment and services. Published twice monthly and mailed first class to our subscribers. Regular subscription rates, \$13.00 for 24 issues. As an introductory offer we are offering a 4-month free subscription and 4 free ads during that 4-month period (70 words maximum, please). HI-TECH TRADER, P.O. Box 1152, Norwalk, CA 90651-1152.

COLLINS NEW TUBE SETS. 75S3 \$60, 75A4 \$80, KWM2 \$90, and 32S3 \$50 without finals. Add \$3 UPS. WE2T, 65 Aleta, Rochester, NY 14623 (716-334-1103).

ANYONE ATTEMPTING TO PURCHASE radio equipment from a private party in Cedar Rapids, Iowa, please write Joe Varga, KJ6HL, 6930 Cozycroft Ave., Winnetka, CA 91306.

ROSS'S\$\$\$ USED December SPECIALS: KENWOOD PS-50 \$179.90, MC-80 \$59.90, TH-45AT \$249.90, MS-1 \$28.95, IF-10B \$47.90, ICOM U4AT \$209.90, IC-3AT \$179.90, IC-251A \$369.90, BC-50U \$59.90, YAESU FT-780R \$399.90, FT-101E \$399.90, FT-730R/YM50 \$229.90, FRA-7700 \$39.90, COLLINS 75-S1 \$175.90, 32S1 \$249.90, 516-F2 \$199.90, AC-3805 \$200.00. **LOOKING FOR SOMETHING NOT LISTED?? CALL OR WRITE.** We have over 220 used items in stock. Mention Ad. Prices cash, FOB Preston. Hours Tuesday to Friday 9:00 to 6:00, 9:00 to 2:00 P.M. Mondays. Closed Saturday & Sunday. ROSS DISTRIBUTING COMPANY, 78 South State, Preston, Idaho 83263 (208-852-0830).

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MERRY CHRISTMAS to all and may everyone enjoy good health in 1990 and in the years to come—W9GXR (ex-K0CHE).

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WANTED: Back issues of CQ to fill out my collection. 1978-March, April, May, June, July, 1977-Oct. John, I1POR, Via M. Deandreis 52, 13040 Palazzolo Vercellese (VC), Italy.

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LOG PERIODIC: Hy-Gain 13-30 12-element for sale, no traps. Details W3CJI, 2705 Andrea Dr., Allentown, PA 18103 (215-433-4485).

WANTED: Kenwood TS-700 SP in working or repairable condition. Any options OK, but need SP model only. Need four units. B. Sabo, 1224 W. North Hills Dr., Upland, CA 91786 (714-985-5879 eves).

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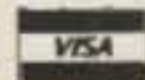
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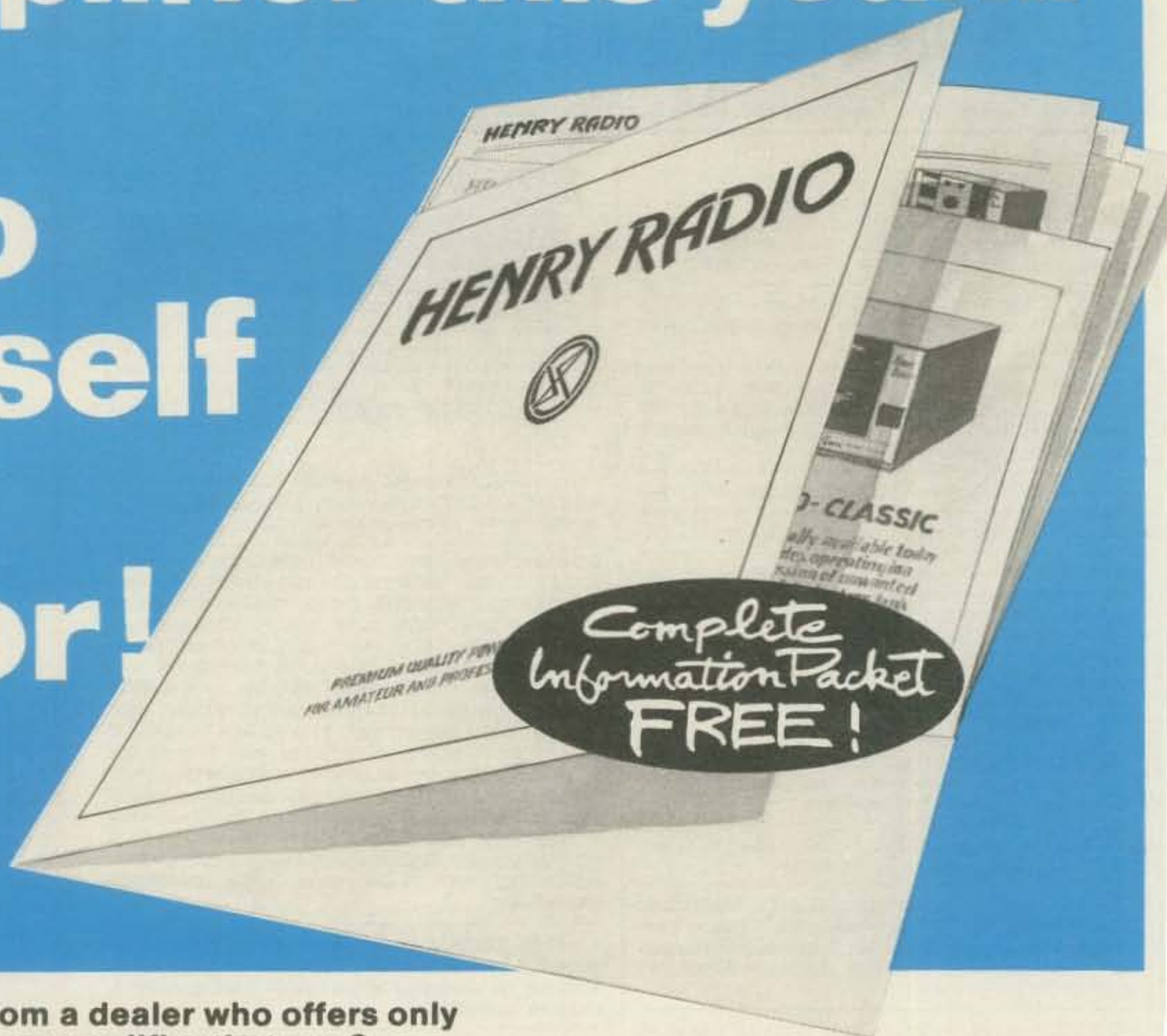


CIRCLE 81 ON READER SERVICE CARD

December 1989 • CQ • 135

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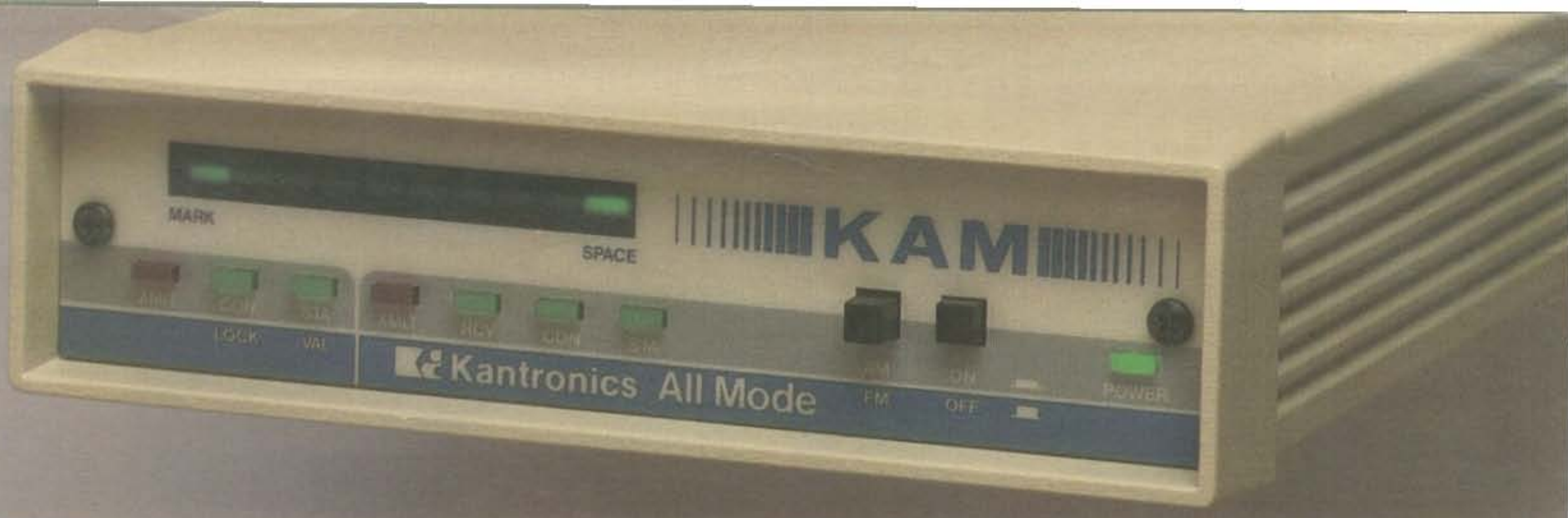
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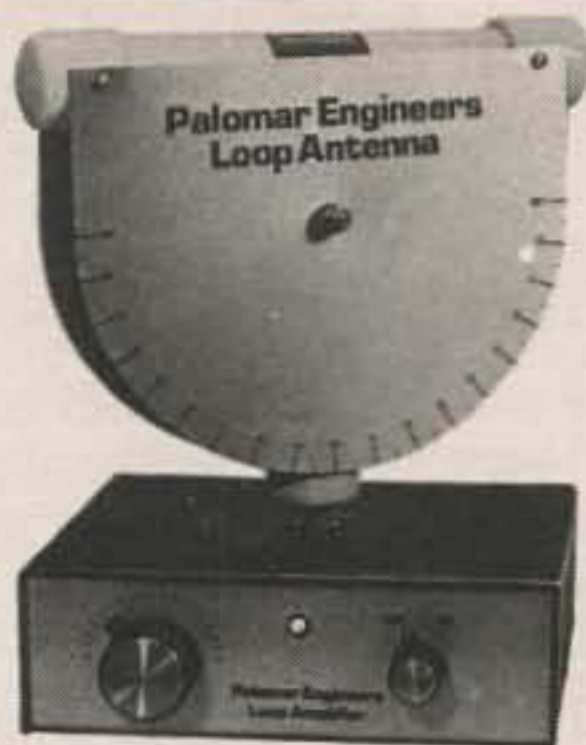


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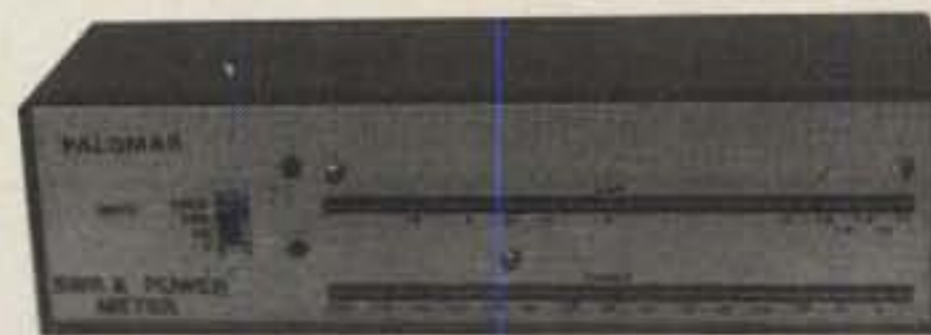
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Compare... Ours & Theirs

Choosing the radio that's right for you can be pretty confusing. That's why we decided to make it as simple as possible for you to see how these Yaesu hand-helds stack up against the competition. No boasts, no sales pitches, just a factual side-by-side comparison of "ours" versus "theirs." Because Yaesu quality speaks for itself.



2 METER HANDHELD SPECIFICATIONS	YAESU FT-411/811	ICOM IC-2SAT/IC-4SAT	KENWOOD TH-215/TH-415
Memory Channels	49	48	10
VFOs	2	1	1
Memory Channels Store Any Offset	49	10	10
Wide Receiver Frequency Range (MHz)—VHF	140-173	138-174	141-163
Wide Receiver Frequency Range (MHz)—UHF	430-450	440-450	438-450
Built-in CTCSS Encode/Decode	Included	Option	Encode Only
Memory DTMF Autodialer	10	None	None
CTCSS Paging	✓	Option	—
Programmable Battery Saver	✓	✓	✓
Backlit LCD Display	✓	✓	✓
Backlit DTMF Keypad	✓	—	—
APO, Automatic Power Off	✓	✓	—
1 MHz Up/Down Stepping	✓	✓	✓
Vinyl Case	✓	Option	Option
Scan For CTCSS Tone	✓	—	—
Built In VOX	✓	—	—
Clock	—	✓	—
Odd Split, Any Tx Or Rx Frequency In Any Memory Channel	49	10	1
Suggested Retail Price	\$406.00*	\$439.95*	\$349.95*

DUAL-BAND HANDHELD SPECIFICATIONS	YAESU FT-470	ICOM IC-32AT	KENWOOD TH-75A
Memory Channels	42	20	20
VFOs Per Band	2	1	1
Wide Receiver Frequency Range (MHz)—VHF	130-180	138-174	140-164
Wide Receiver Frequency Range (MHz)—UHF	430-450	440-450	438-450
Built-in CTCSS Encode/Decode	Included	Option	Encode Only
Memory DTMF Autodialer	10	None	None
Dual Receive With Balance Control	✓	—	✓
CTCSS Paging	✓	—	✓
Cross Band Full Duplex	✓	✓	✓
Programmable Battery Saver	✓	✓	✓
Backlit LCD Display	✓	✓	✓
Backlit DTMF Keypad	✓	—	—
Alternating Band Scan	✓	✓	✓
Cross Band Repeater	✓	—	—
Power Output on 2 Meter and 440	2.3W	5.0W	1.5W
APO, Automatic Power Off	✓	—	✓
1 MHz Up/Down Stepping	✓	✓	✓
Memory Channels Store Any Offset	42	20	20
Vinyl Case	✓	Option	Option
Odd Split, Tx Or Rx, Any Frequency In Any Memory Channel	42	20	2
Suggested Retail Price	\$576.00	\$629.00	\$549.00

YAESU

17210 Edwards Road Cerritos, CA 90701 (800) 999-2070

Data and prices obtained from latest available manufacturers' brochures & printed material. October, 1989.

*VHF Radios only.

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ONLY ICOM COULD BUILD THIS MANY FEATURES INTO SUCH A TINY RADIO

ICOM'S AMAZING NEW MINI FM HANDHELDS

ICOM's new "S Series" mini handhelds deliver top performance on the 144, 220 and 440MHz bands with super easy operation and a kaleidoscope of features. Built to fit your needs today, tomorrow, anywhere and anytime.



Wide Frequency Coverage. Plenty of overlap for scanning, monitoring, CAP and MARS use. IC-2SA/IC-2SAT: 138-174 MHz Rx. IC-3SAT 220-225MHz Rx. IC-4SAT: 440-450 MHz Rx. All units transmit all U.S. Amateur bands.

Flexible Size And Power. The IC-2SA packs 2.5 watts with supplied BP-82. The IC-2SAT, 3SAT and 4SAT's internal battery packs 2 watts of output on high power. All models deliver five watts when powered via optional BP-85 battery pack or via top-mounted 13.8 volt socket. A small rig with a big punch!

48 Memories. Store your present frequencies and expand your future interests. Offset frequencies are independently programmed in memory channels 0-9. Memories 10-47 use offset frequency contents of the VFO. Also includes soft-sector memory masking. Use only the number of memories you need!

Band and Memory Scanning with programmable limits, memory skip

function, plus selectable pause times while scanning. Additional features include:

Automatic Power Shut-off. Built-in programmable timer automatically switches off transceiver when you forget.

Optional DTMF Paging Function. Silently monitors any selected frequency for your preprogrammed 3-digit DTMF-keyed calls, then beeps and displays calling station's code.

All ICOM's "S Series" handhelds are supported by an extensive line of optional battery packs, chargers, cases, speaker/mics and other accessories. See the exciting new ICOM mini-series handhelds at your authorized ICOM dealer today!

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 Customer Service Hotline (206) 454-7619
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 1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
 ICOM CANADA, A Division of ICOM America, Inc.,
 3071 - #5 Road, Unit 9, Richmond, B.C. V6X 2T4 Canada

All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. 2SAT989

Four Power Selections

10 Memory DTMF Autodialer

DC Socket For Charging and Mobiling

24 Hour Clock With Timer
48 Memories

ACTUAL SIZE

Optional Battery Packs Vary Size, Power Output

Easy Knob or Keypad Frequency Selection

ICOM

First in Communications

CIRCLE 87 ON READER SERVICE CARD