

Amateur Radio

SERVING AMATEUR RADIO SINCE 1945

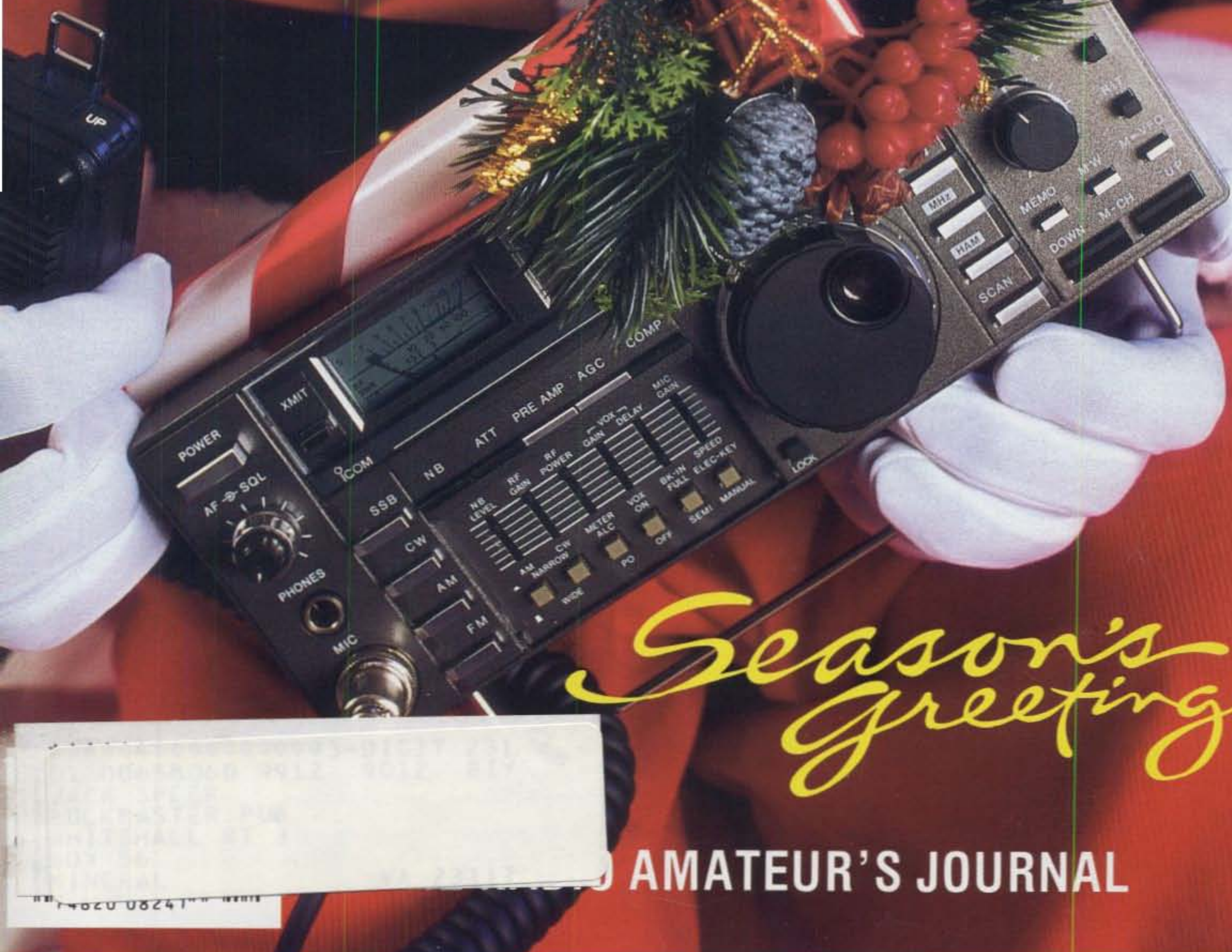
DECEMBER 1990 \$2.95

CANADA \$3.95

CQ

Including
**HAM
RADIO**

Bill Orr is back!
See his new column on p. 79.



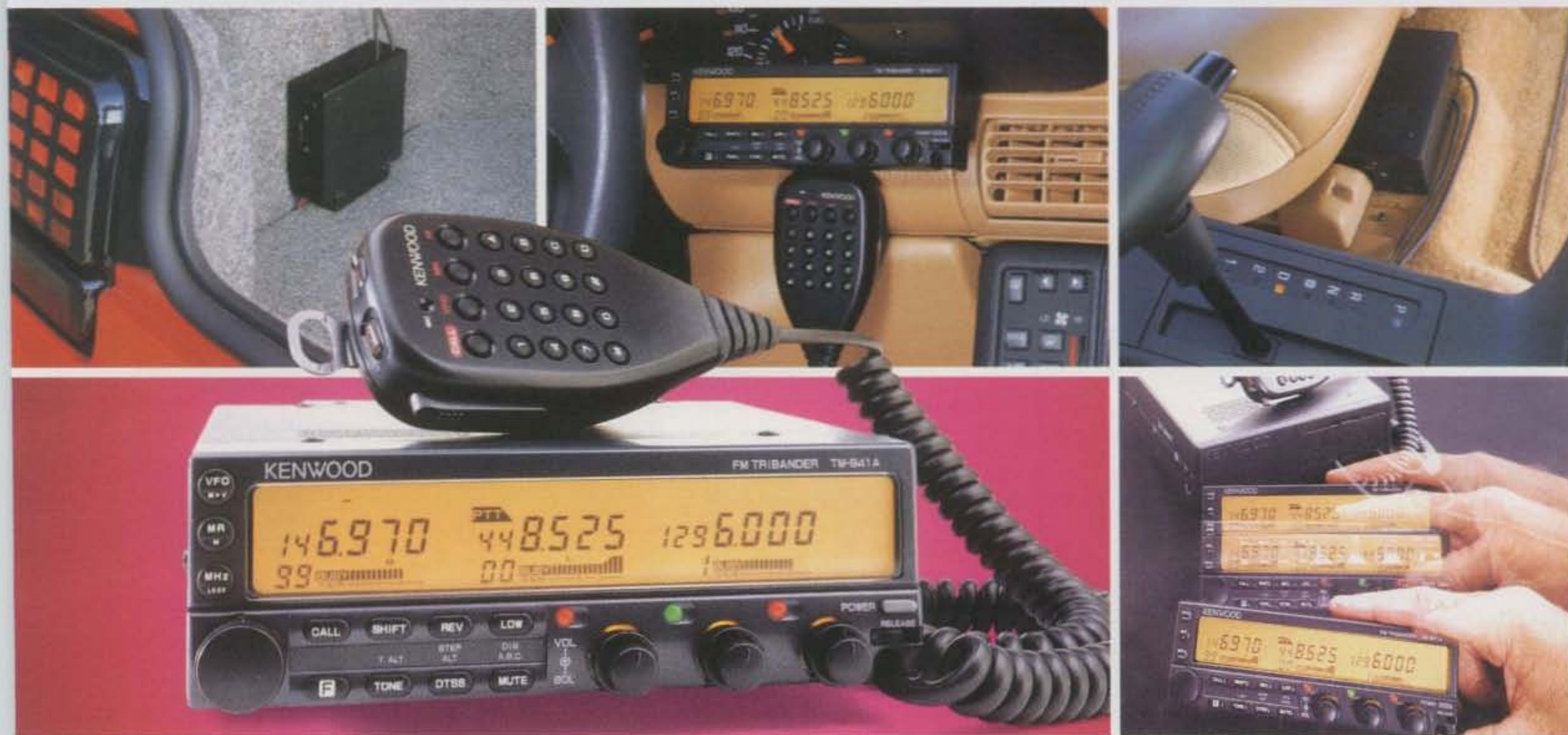
Season's Greetings

AMATEUR'S JOURNAL

Subscription information and contact details, partially obscured by a white box.

KENWOOD

Triple Play!



TM-941A TRI-BAND FM Transceiver

Kenwood brings you yet another breakthrough—the TM-941A TRI-BAND FM TRANSCEIVER. Now you can operate on *three* bands—144, 450, or 1200 MHz—with one radio! This rig even gives you full duplex, cross-band, triple-band repeat!

- **High power output.**
50 W on 144 MHz, 35 W on 450 MHz, and 10 W on 1200 MHz. (Selectable low power: 5 and 10 W, 1 W on 1200 MHz.)
- **Wide band receiver coverage.**
118-174, 438-450 (400-475 after modification), 1240-1300 (1210-1330 after modification) MHz. TX on Amateur bands only. Modifiable for MARS/CAP. Permits required.
- **CTCSS encode built-in.**
38 sub-tones selectable from the front panel.
- **Cross-band repeat function.**
Selectable single or dual input! Off-set function on output, allows simplex to repeater repeat!

- **Simultaneous tri-band receive.**
Individual volume and squelch controls help you "sort out" the signals.
- **Detachable front panel.**
Use the optional PG-4K or PG-4L to mount the front panel remotely.
- **Selective calling option (DTU-2).**
Selectively call a single station, or call a group with DTMF tones.
- **303 memory channels.**
Store everything you need for efficient operation. All channels allow you to store "odd split" repeaters.
- **Versatile scanning functions.**
Band scan, memory scan and programmed scan with carrier or time operated stop.
- **NEW! Auto memory scan.**
Automatically memorizes a busy frequency while scanning the band!
- **Automatic repeater offset on 2 m.**
Plus or minus 600 kHz for 144 MHz, ± 5 MHz on 450 MHz, and ± 12 or 20 MHz for 1200 MHz. (Manual offset for 450 and 1200 MHz.)
- **Fixed detect output.**
For packet operators!
- **Multi-function DTMF mic supplied.**
- **Auto power off and time-out timer.**

- **4-step dimmer control.**
Selectable 4-step dimmer control.
- **Three separate antenna and speaker connectors.**
For maximum performance.

Optional Accessories:

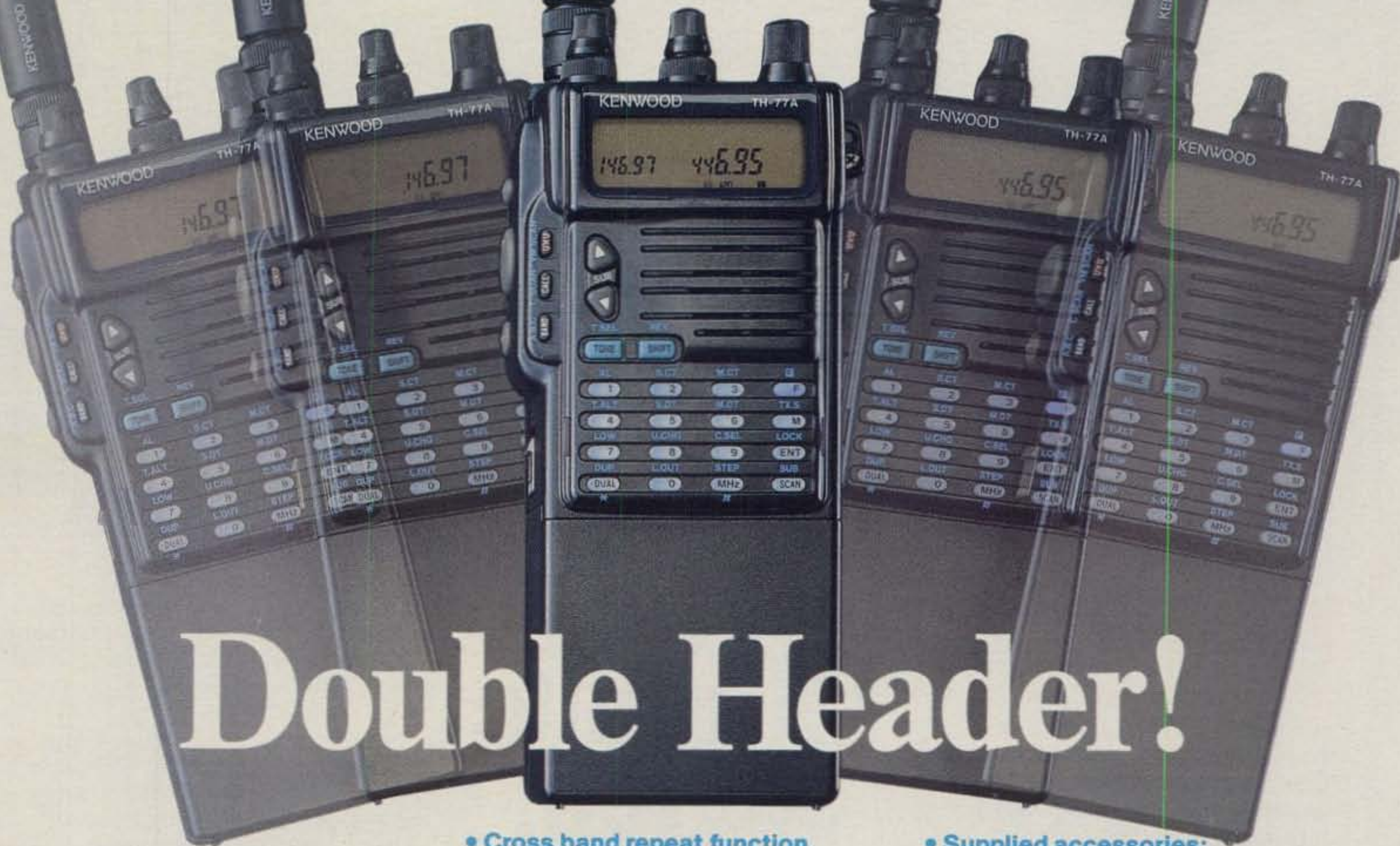
- **DTU-2** Digital paging (DTMF) unit
- **PG-4K, PG-4L** Front panel cable kits
- **MC-45** Multi function mic.
- **MB-11** Extra mounting bracket
- **SP-41, SP-50B** External mobile speakers
- **PG-3B** DC line noise filter
- **PS-430** Power supply
- **PG-2N** DC power cable
- **TSU-7** CTCSS decode unit.

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 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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Double Header!

TH-77A

Compact 2m/70cm Dual Band HT

Here's a radio that deserves a double-take! The TH-77A is a feature-packed dual band radio compressed into an HT package. The accessories are compatible with our TH-75, TH-25, and TH-26 Series radios. Repeater and remote base users will appreciate the DTMF memory that can store *all* of the DTMF characters (*, #, A, B, C, and D) that are usually required for repeater functions!

- **Wide band receiver coverage.** 136-165 (118-165 [AM mode 118-136] MHz after modification) and 438-449.995 MHz. TX on Amateur bands only. (Two meter section is modifiable for MARS/CAP. Permits required.)
- **Dual receive/dual LCD display.** Separate volume and squelch controls for each band. Audio output can be mixed or separated by using an external speaker.

- **Cross band repeat function.**
- **Dual Tone Squelch System (DTSS).** Uses standard DTMF to open squelch.
- **CTCSS encode/decode built-in.**
- **Forty-two memory channels.** All channels odd split capable.
- **DTMF memory/autodialer.** Ten 15-digit codes can be stored.
- **Direct keyboard frequency entry.** The rotary dial can also be used to select memory, frequency, frequency step, CTCSS, and scan direction.
- **Multi-function, dual scanning.** Time or carrier operated channel or band scanning.
- **Frequency step selectable for quick QSY.** Choose from 5, 10, 12.5, 15, 20, or 25 kHz steps.
- **Two watts (1.5 W on UHF) with supplied battery pack.** Five watts output with PB-8 battery pack or 13.8 volts. Low power is 500 mW.
- **DC direct-in operation** from 6.3-16 VDC with the PG-2W.
- **T-Alert with elapsed time indicator.**
- **Automatic repeater offset on 2 m.**
- **Battery-saving features.** Auto battery saver, auto power off function, and economy power mode.

Supplied accessories:

Flex antenna, PB-6 battery pack (7.2 V, 600 mA), wall charger, belt hook, wrist strap, keyboard cover.

Optional accessories:

• **BC-10:** Compact charger • **BC-11:** Rapid charger • **BH-6:** Swivel mount • **BT-6:** AAA battery case • **DC-1/PG-2V:** DC adapter • **DC-4:** Mobile charger for PB-10 • **DC-5:** Mobile charger for PB-6, 7, 9 • **PB-5:** 7.2 V, 200 mAh NiCd pack for 2.5 W output • **PB-6:** 7.2 V, 600 mAh NiCd pack • **PB-7:** 7.2 V, 1100 mAh NiCd pack • **PB-8:** 12 V, 600 mAh NiCd for 5 W output • **PB-9:** 7.2 V, 600 mAh NiCd with built-in charger • **PB-11:** 12 V, 600 mAh OR 6 V, 1200 mAh, for 5 W OR 2 W • **HMC-2:** Headset with VOX and PTT • **PG-2W:** DC cable w/fuse • **PG-3F:** DC cable with filter and cigarette lighter plug • **SC-28, 29:** Soft case • **SMC-30/31:** Speaker mics. • **SMC-33:** Speaker mic. w/remote control • **WR-1:** Water resistant bag.

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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.
- **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, resulting in minimum distortion and higher efficiency. Full-power key-down time exceeds one hour.
- **New! Built-in microprocessor controlled automatic antenna tuner.**
- **Outstanding general coverage receiver performance and sensitivity.** Kenwood's Dyna-Mix™ high sensitivity direct mixing system provides incredible performance from 100 kHz to 30 MHz. The Intermodulation dynamic range is 105 dB.
- **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.

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

The Ultimate Signal.

Digital Signal Processor. DSP is a state-of-the-art technique that maximizes your transmitted RF energy.

- **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.

- **Built-in TCXO for the 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 • Built-in heavy duty AC power supply and speaker • Adjustable VFO tuning torque • Multiple scanning functions • MC-43S hand microphone supplied

Optional Accessories

- DSP-10 Digital Signal Processor*
- SO-2 TCXO* • VS-2 Voice synthesizer
- YK-88C-1 500 Hz CW filter for 8.83 MHz IF*
- YG-455C-1 500 Hz CW filter for 455 kHz IF*
- YK-88CN-1 270 Hz CW filter for 8.83 MHz IF
- YG-455CN-1 250 Hz CW filter for 455 kHz IF
- YK-88SN-1 1.8 kHz SSB filter for 8.83 MHz IF
- YG-455S-1 2.4 kHz SSB filter for 455 kHz IF*
- SP-950 External speaker w/AF filter
- SM-230 Station monitor w/pan display
- SW-2100 SWR/power meter
- TL-922A Linear amplifier (not for QSK)

* Built-in for the TS-950SD

† Optional for the TS-950S

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MASTHEAD

EDITORIAL STAFF

Alan M. Dorhoffer, K2EEK, Editor
 Gail M. Schieber, Managing Editor
 Terry Northup, KA1STC, Associate Editor
 Lew McCoy, W1ICP, Technical Representative
 Robert D. Wilson, WA1TKH, Technical Advisor
 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
 Bill Orr, W6SAI, Radio Fundamentals
 Buck Rogers, K4ABT, Packet Radio Editor
 Karl T. Thurber, Jr., W8FX, Antennas & Software
 Bill Welsh, W6DDB, Novice

AWARD MANAGEMENT

Jim Dionne, K1MEM, WAZ Award
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 John Dorr, K1AR, WW DX Trophies & Certificates
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 Pat Le Blanc, Phototypographer
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 Linda Romanello, Typesetting
 Hal Keith, Illustrator
 Larry Mulvehill, WB2ZPI/VK5AAY, Photographer

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The Radio Amateur's Journal

ON THE COVER: The jolly old elf is on the way to bring joy to some lucky ham. With luck, perhaps he'll also be able to deliver some Middle-East peace some time soon. (Photo by Larry Mulvehill, WB2ZPI)



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It's hard to believe that on a beautiful fall day towards the end of October I'm starting to think in terms of December, the holidays, and 1991. Somehow there should be snow, brisk winds blowing, and smoke wafting up from fireplace chimneys. The CQ WW Contest should be a memory instead of something coming up, and the talk on the air should be of record-breaking scores and unbelievable contest stations. So in the 60 or so days until Christmas we can focus in on what 1990 brought us with regard to amateur radio and ponder a bit on 1991.

This year seems to have been a record year for DXpeditions and spectacular operating events. Applications for our awards have increased dramatically this year, and I would expect that the ARRL found the same thing true for them. And contest participation has also increased. It would seem that a bunch of you are actually having fun getting on the air, participating in contests, and earning some of these achievement awards. Be careful. It's contagious.

In 1990 I left out a bunch of food reviews from hamfests we've attended. There's not much you can say about bad food at hamfests except that it seems universal and that writing about it unfortunately brings back the memories of heartburn, grease, and bewilderment over what kind of critter gave his life for the sandwich or grease-dog just consumed. Maybe it's time for sprouts, seeds, and recognizable edibles.

In 1990 I read where another amateur radio editor discussed his bodily parts and functions. If it would make your life complete to have a basis of comparison, mine are all okay. The only thing that's not in great shape is my desk. It gets piled higher and higher each day. If I don't get to your letters right away, now you know why. Sometimes it is simply because my desk "ate" it.

The positive outlook for the balance of 1990 is the overwhelming joy at anticipating holiday presents. Let's face it for once and be truthful. With regard to amateur radio, we're all guilty of greed and avarice and look forward this year to getting things that'll knock our socks off. We all have visions of wonderous toys, spectacular transceivers, monumental antenna systems, gargantuan amplifiers, and computers that dwarf anything yet built by man. Don't bother to tell me the evils of conspicuous consumption. We amateurs know three things: need, want, and *gotta* have. Reality may tell us we have two chances (slim and none) of getting any of the above, but we are in a hobby where possibility is king.

On a slightly different note, and getting back to reality, I do know that I am at the median age for amateurs. I also know that I need (and use) reading glasses.



My desk might have "eaten" your letter. However, I think it's still in there somewhere. I'm going to try to straighten it out in 1991, although I keep saying the same thing about my shack, too.

What I would like to know is why the type in the *Callbook* keeps getting smaller and why do I have to use a magnifying glass to find an address? Those of you who are snidely snickering at this problem right now will soon find out that your eye strain and headaches are directly proportional to your amateur radio activity.

I have one last gripe for 1990, and that's with the Federacion de Radioaficionados de Cuba (FRC), the Cuban equivalent of the League. It's been over a year since I applied for two of their awards. I've written three letters and heard nothing from them, so I guess they're out of business and have collected enough IRCs to buy a boat to escape in. In any event, don't bother to apply for their awards, as they apparently don't issue any.

What's New

What's new isn't exactly right. It's more like welcome home. Bill Orr, W6SAI, is returning to the pages of *CQ* starting this month. In recent years Bill was writing a monthly column in *Ham Radio* magazine, and he now will transfer his energies and talents back to *CQ*. It's good to have you home, Bill, and it makes an especially nice holiday gift for our readers. If you are wondering, yes, we are keeping and going forward with Bill's Dead Band Quiz.

What Else Is New?

By now a lot of you have seen the promotional literature for our new magazine, *Communications Quarterly*. The first issue should be in the hands of subscribers by now, and we think it's right on the mark. If you want high-tech without fluff and the latest in what's gong on and what

will be going on, then check out a copy. Perhaps you know someone who has subscribed and who might be willing to let you borrow it (I doubt it) so you can find out for yourself why each and every issue will be a must-read and a saver.

Why Am I Not Thrilled?

A few weeks ago I was having some work done in the front of my house. I was outside watching the workmen when a neighbor from up the block walked down to my house to see what was going on. In the last twenty years I've probably spoken to him casually two or three times. After finding out what was going on, he said that he had just retired, and after years of seeing my antenna he decided to rekindle his interest in amateur radio. It turned out that he had once held a call which in fact was fairly close to mine and dated back to the early 1950s. He asked about equipment, band conditions, and general information on what amateur radio is like today.

I tried to sound enthusiastic when I began to answer his questions, for who knows better than me how amateur radio needs new, albeit refurbished, blood. After all, here was my chance to help the hobby grow, at least by one new amateur. Tell me, then, why am I not overly thrilled by this marvelous opportunity?

Season's Greetings

Greed and avarice, ambivalent feelings towards one's neighbor, and assorted petty complaints aside, this is after all a joyous holiday time. All of us at *CQ* want to wish each and every one of you a very happy and joyous holiday season with nothing but the best for 1991.

73, Alan, K2EEK

OVER 45,000 PK-232s SOLD!

The AEA PK-232 multi-mode data controller remains the most widely used radio data controller **anywhere**. More hams own the PK-232 than *any other* radio data controller. And AEA's hard-earned reputation for quality and service keeps them coming back. The '232 gained its popularity with features like these:

STATE-OF-THE-ART TECHNOLOGY.

Since its introduction in 1986, the PK-232 has been updated **six times** to continue bringing you the breakthroughs. Six updates in four years! And even the very first PK-232 is upgradable to the latest model, with a relatively inexpensive user-installed kit. If you want a state-of-the-art multimode controller, you want the PK-232 MBX.

ALL DIGITAL OPERATING MODES.

The PK-232 MBX includes all authorized amateur digital modes available today...Packet, Baudot, ASCII, AMTOR/SITOR (including the **new** 625 recommendation) and Morse code, as well as WEFAX (receive and transmit). Other features include the PakMail 18K byte maildrop system with automatic normal and **reverse** forwarding, NAVTEX reception, KISS protocol support, binary file transfers and more. Also included is the TDM (Time Division Multiplex) mode for SWLing that few others have. No other multi-mode has all these features.

SUPERIOR FILTERING

The 8-pole Chebyshev filter in the PK-232 was designed from the ground up to work on HF and VHF. We didn't just add some firmware to a Packet modem to create our multi-mode. Our modem was **proven** superior by tests in Packet Radio Magazine over *all the others tested*. Read the fine print! You just can't beat the PK-232 for performance, quality and integrity. 45,000 PK-232 owners can't be wrong!

INNOVATION

The PK-232 has been the one to follow for technology advances. It was the *first* radio data controller with weather-fax, the *first* with Host mode, the *first* with NAVTEX, the *first* with Signal Identification, the *first* with TDM, the *first* with AMTOR v.625, the *first* with a WHYNOT command, etc, etc. AEA has always strived to "Bring You The Breakthrough," and while others have tried to imitate, only one can be the best.



The only data controller **designed from the ground up** to be a true multi-mode, the PK-232's tuning and status indicators work in all modes, not just packet. Make sure the multi-mode you buy isn't just a converted Packet TNC. There's only one number 1!

HOST MODE

Many superior programs have been written specifically for the PK-232 in Host mode language: **NEW PC-Pakratt II** for IBMs and compatibles, updated MacRATT for Apple Macintosh, and ComPakratt for Commodore C-64 and C-128 computers.

SIGNAL ANALYSIS.

The first multi-mode to offer SIAM (Signal Identification and Acquisition Mode) was, of course, the PK-232MBX. Indispensable to SWLers, SIAM automatically identifies Baudot, ASCII, AMTOR/SITOR (ARQ and FEC) and TDM signals, then measures baud rate and polarity. Once the PK-232MBX is "locked on" to the signal, a simple "OK" command switches to the recognized mode and starts the data display. You're even ready to transmit in that mode if applicable. The PK-232MBX makes SWLing easy and fun, not difficult and frustrating.

REPUTATION

The PK-232MBX has helped AEA establish its hard-earned reputation for producing high quality amateur radio products. Anyone can **say** they have a good reputation, so it pays to ask around. Listen on the HF bands and see which multi-mode is getting *used*. You owe it to yourself to get the best possible value for your money. Don't settle for less!

Watch for the DSP-1232 and 2232 coming soon!



AEA Brings You a Better Experience.

Advanced Electronic Applications, Inc.

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Prices and specifications subject to change without notice or obligation.

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"ONE FOR THE MONEY..."



**High tech simplicity.
Isn't that refreshing!**



The Paragon, Model 585



The Hercules II, Model 420



Model 253, Automatic Antenna Coupler

A 500 WATT OUTPUT STATION. Here is a full capability station that uses modern technology to simplify operation. The Hercules II amplifier and the new Model 253 automatic, 2 KW, "match anything" antenna coupler are both controlled by the Paragon (or Omni V) transceiver. All bands, 160 through 10 meters, all modes. A 500 watt output "transceiver" that works great with, or without, a world class antenna system. The really good news is that you can own this complete station for a price less than some competitive transceivers alone! Now, who offers the best value!

THE PARAGON is the choice of many of the most experienced operators on Earth. The fussiest phone folks, cw operators that are out-and-out snobs and many of the digital stations that lead the rtty DXCC list. General coverage receive from 100 kHz to 30 MHz. 100 watts of transmitter power from 1.7 to 29.999 MHz. All of the nifty features expected in a computer based design. Dual VFOs. TX and RX offset with display. 62 programmable memories that include frequency, mode and filter plus a 7 character alpha-numeric displayed tag feature. QSK cw with a changeover time of 30 ms. All digital modes with real FSK. Outstanding ssb with a standard speech processor that is a pleasure to hear. I-F filter selection, independent of mode. In short, a truly outstanding do-everything rig.

THE HERCULES II is a really classy solid state, all mode broadband amplifier that does not require any tuning. Remote band switching can be controlled by our Paragon or Omni V. Temperature controlled cooling system is whisper quiet on ssb, yet has adequate capacity to cool the internal heat sinks under key down conditions. Runs on 12-14 vdc for battery operation, mobile or base. (A heavy duty auto battery with a 10 amp charger makes a good, and inexpensive, base power supply.) Not shown is the Model 9420, 100 amp dc power supply that powers the Hercules II and the transceiver. A remote control system is available for mobile Hercules II installations. The Hercules II is fully metered and includes a 10 element LED peak power bar-graph display. Compact, good looking and a signal within one S-unit of the mighty TITAN!

THE MODEL 253, 2 KW AUTOMATIC ANTENNA COUPLER is the latest in our highly regarded line-up of tuners. Functions as an antenna management system with the front panel, four position, antenna switch. Positions 1 thru 3 are dedicated to coax fed antennas. Position 4 may be used for coax, single wire or balanced feeders through the built-in high power balun. Tuning is accomplished with a motor driven, roller inductor and fixed value capacitors selected with enclosed relays. The system is microprocessor controlled with one memory per antenna select position. Nine memories per antenna position are available when used with the Paragon or Omni V where band information is provided. The finishing touch for any station.

UNIVERSAL STATION ACCESSORIES



MODEL 240KW, DRY DUMMY LOAD. Forced air cooled. Designed to operate at 1500 watts "key down" for up to 2 minutes. 1.5 to 150 MHz. Alarm sounds if over-temperature reached. Rear panel connection for scope signal.



MODEL 254 200 WATT TUNER. "T" match design matches a broad range of impedances. Simple and fast to operate. Metered for power out and SWR. Small size and light weight makes this a favorite for mobile and portable operation.



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ANNOUNCEMENTS

•**Rhode Island Repeater Trivia Net and Technical Talk Round Table** - A trivia net is held every Wednesday at 7:30 PM on the 145.17 and 224.56 repeater located in Rhode Island. Net control operators are Dan, KA1BNO, and Lori, KA1OCF. In addition, the Rhode Island Technical Talk Round Table Group meets every Thursday evening at 7 PM on the 223.88, KA1PBS repeater to help amateurs from Novice to Extra get answers to technical-related subjects such as electronic theory or project problems, etc. Net coordinator is KA1EGY.

•**Braille Reference Manual** - A Braille reference manual entitled "DX Around The World" is available through the San Diego Braille Transcribers Guild, 1807 Upas Street, San Diego, CA 92103 (\$4.15 paper, \$7.40 plastic—cost of materials). The 55-page manual contains the 324 countries on the current ARRL countries list alphabetically listed by both prefix and country, and the beam headings in true degrees and mileage in statute miles from the geographical centers of the West Coast of the U.S. The approximate time plus or minus UTC and the country's zone are then listed. Also included is a brief discussion of the solar index and sunspot cycle and how they affect the DXer.

•**VP5 DXpedition** - A seven-day DXpedition to VP5 Turks & Caicos Island has been planned by Joe Pater, WB8GEX, from November 28 to December 5. Ops will be Joe; Ed, WB8MQJ; Ed, NY8E; Al, W4ZQB; Jack, WD4JWO; and Dick, SWL. Operation will be 6 to 160 meters SSB and CW on regular DX frequencies. For

more information, contact Joe Pater, WB8GEX, 1894 Old Oxford Rd., Hamilton, OH 45013 (513-896-9990, FAX 513-863-8131).

•**W1FHP Special Event** - W1FHP, The Hen House Gang ARC, will operate a Christmas special event the entire month of December on 80 through 10 meters, and in the Novice band CW. All contacts count for the Worked Bethlehems Award. Send QSL and one first-class stamp (no envelope) to W1FHP, The Hen House Gang, Hard Hill Rd., Bethlehem, CT 06751.

•**Arizona Hamfest** - December 1, Superstition ARC Hamfest, P&M Rodeo Grounds (corner Brown Rd. and Meridian), Apache Junction, Arizona. Contact Chuck Kruppenbacher, KB7IOP, 602-986-3060.

•**Minnesota Hamfest** - Coupeage Center Winter Hamfest, December 1, Eagles Club, Faribault, Minnesota. Handi-Ham equipment auction, noon dinner, and program. Talk-in on 19/79. Contact Don Franz, W0FIT, 1114 Frank Ave., Albert Lea, MN 56007.

•**Florida Special Event** - The Everglades ARC will operate W4SVI from 1400Z December 1 to 1900Z December 2 to celebrate the 43rd anniversary of Everglades National Park. Suggested frequencies: phone 7.230, 14.240, 21.330, 28.375; CW 7.030, 14.030, 21.130. Send QSL and two units of postage for unfolded certificate to EARC, P.O. Box 113, Homestead, FL 33090-0113.

•**Michigan Swap & Shop** - The Hazel Park ARC will hold their annual Swap & Shop on December 2 at the Hazel Park High School. Advanced admission \$2.00, door \$3.00. For tick-

ets and table reservations contact HPARC, P.O. Box 368, Hazel Park, MI 48030.

•**W2XMN Special Event** - The Major Armstrong Memorial ARC will have a special event from Alpine, New Jersey on December 15 and 16 from 1300 to 1600Z and 1900 to 2200Z. Frequency 10 meters 28.400 plus or minus 25 kHz. For special certificate send 8 1/2 x 11 envelope to MAMARC, P.O. Box 581, Alpine, NJ 07620.

•**W1TRB from Christmas, Florida** - W1TRB will celebrate the season from 1700-2400Z on December 22 and 23, SSB on lower portions of the 40 and 15 meter General class bands and the middle of the 10 meter Novice band. For certificate send large SASE and QSL to Lou Hoekstra, Box 430, Christmas, FL 32709.

•**KE6PE from Pasadena, California** - The Relay Repeater ARC will operate KE6PE from December 29 to January 1 from 1600-0400Z each day to commemorate the 102nd anniversary of the Tournament of Roses. Suggested frequencies: 14.260, 21.335, 28.450. Amateurs in California/Nevada can contact the station on 2 meters via the club repeater 144.970/147.410 or on 220 meters via the Condor Connection. For certificate send QSL and 9 x 12 SASE (50 cents) to Relay Repeater Club, P.O. Box 81, Arcadia, CA 91066-5019.

•**Indiana Hamfest** - The South Bend, Indiana Hamfest/Swap & Shop will be on December 30 at Century Center. Talk-in on 52, 39, 09, 94, 145.29. Tables for from \$5 to \$20. For table reservations and more information, call 219-233-5307, or write to Wayne Werts, K9IXU, 1889 Riverside Drive, South Bend, IN 46616.

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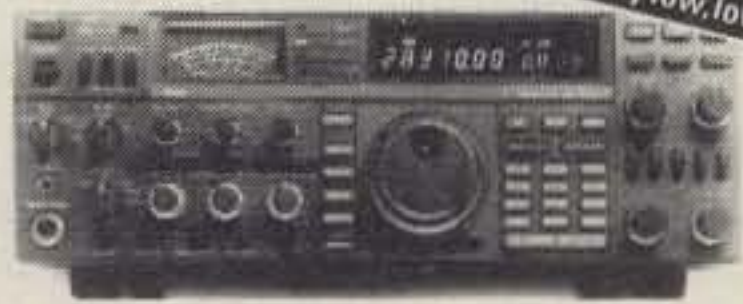
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The N4PC Loop Antenna

BY PAUL CARR*, N4PC

How would you like to have an effective low-angle radiator for 80 and 40 meters without having to mortgage the family home to finance a radial system? If you read my earlier article ("The Full Wave 80 Meter Loop—Revisited," August 1990 CQ), you know that I am a fan of Dave Fischer's horizontal loop antenna. Could this antenna be modified to produce low-angle radiation on 80 and 40 meters and still maintain its excellent DX characteristics on 20 through 10 meters? That was the challenge, and here is my proposed solution.

Background

The horizontal loop is known to be an effective DX antenna on the higher bands of the HF spectrum, and it is also known as a high-angle radiator on 80 meters. This means that on 80 meters you have an excellent antenna for local nets, but if you want to try your hand at DX, you are still searching for an antenna. I wanted to maintain the DX performance on the higher bands and find some way to produce low-angle radiation on 80 and 40 meters. This was a two-headed serpent! Here is an account of the ensuing battle.

*97 West Point Rd., Jacksonville, AL 36265

Development

I began my research by doing computer analyses of existing antennas. One antenna that showed promise was the time-tested W8JK. This antenna has no overhead component even when modeled at 20 feet over real earth. However, another problem rears its ugly head: Even when modeled at 50 feet above real earth, the resistive component of the impedance is less than 3 ohms. That was far too low to be efficient with normal-gauge antenna wire. However, another question appeared in my mind: What would happen if opposite corners of a full-wave loop were fed 180 degrees out of phase?

Back to the computer. I modeled a full-wave loop fed at opposite corners 180 degrees out of phase. There it was—the vertical component was gone. The predicted angle of radiation was 41 degrees. When I checked the impedance, I found an acceptable resistive component, but the reactive component was greater than 20,000 ohms. This reactive component was far too high for many of the transmatches presently in use. That darn serpent! Well, back to the drawing board—or the computer, that is.

I next modeled a full-wave loop with the corners which were not involved with the feed, left open. This model produced an acceptable impedance and pattern at 80 meters; however, the patterns of some of the higher bands were destroyed. The serpent strikes again.

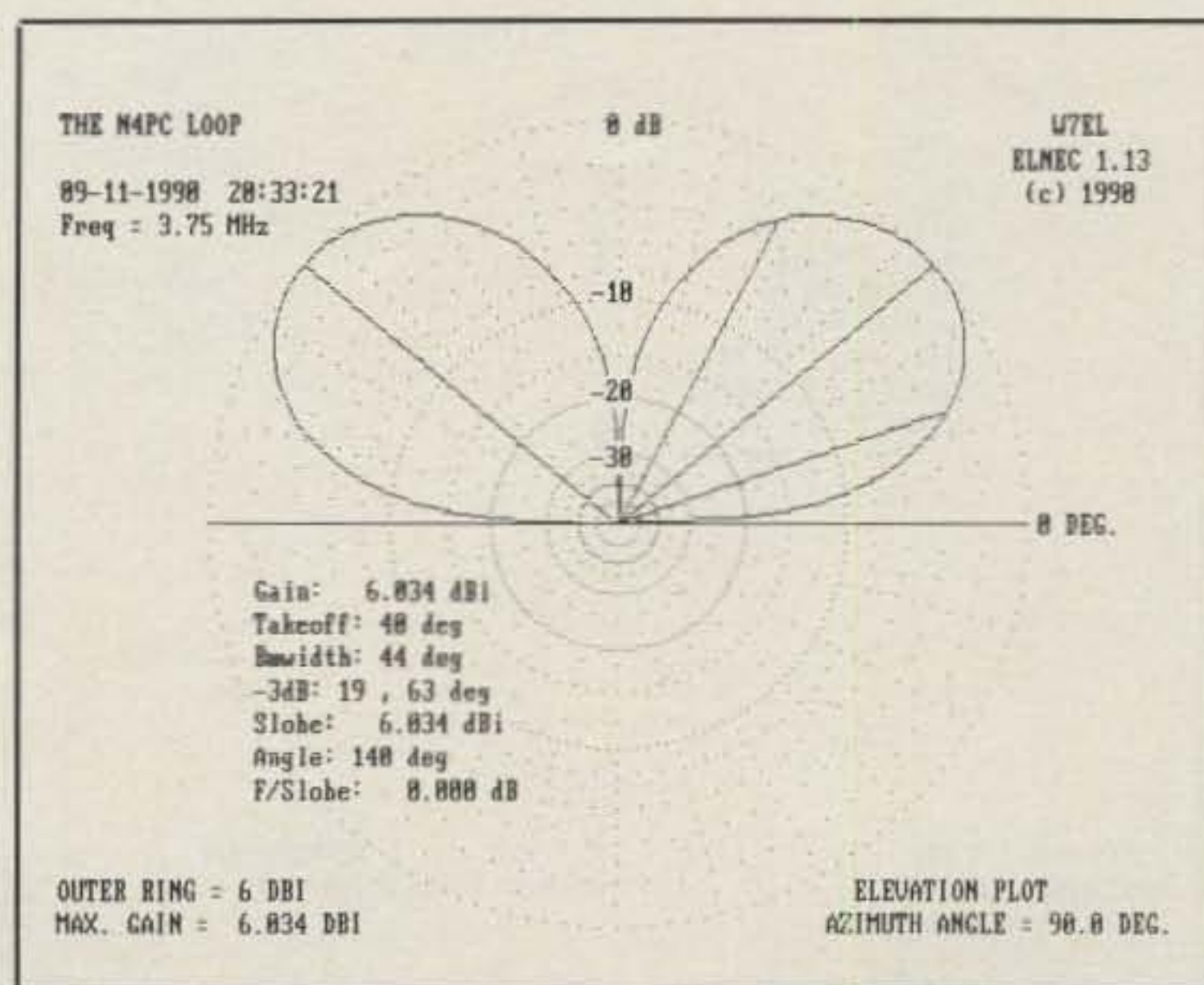
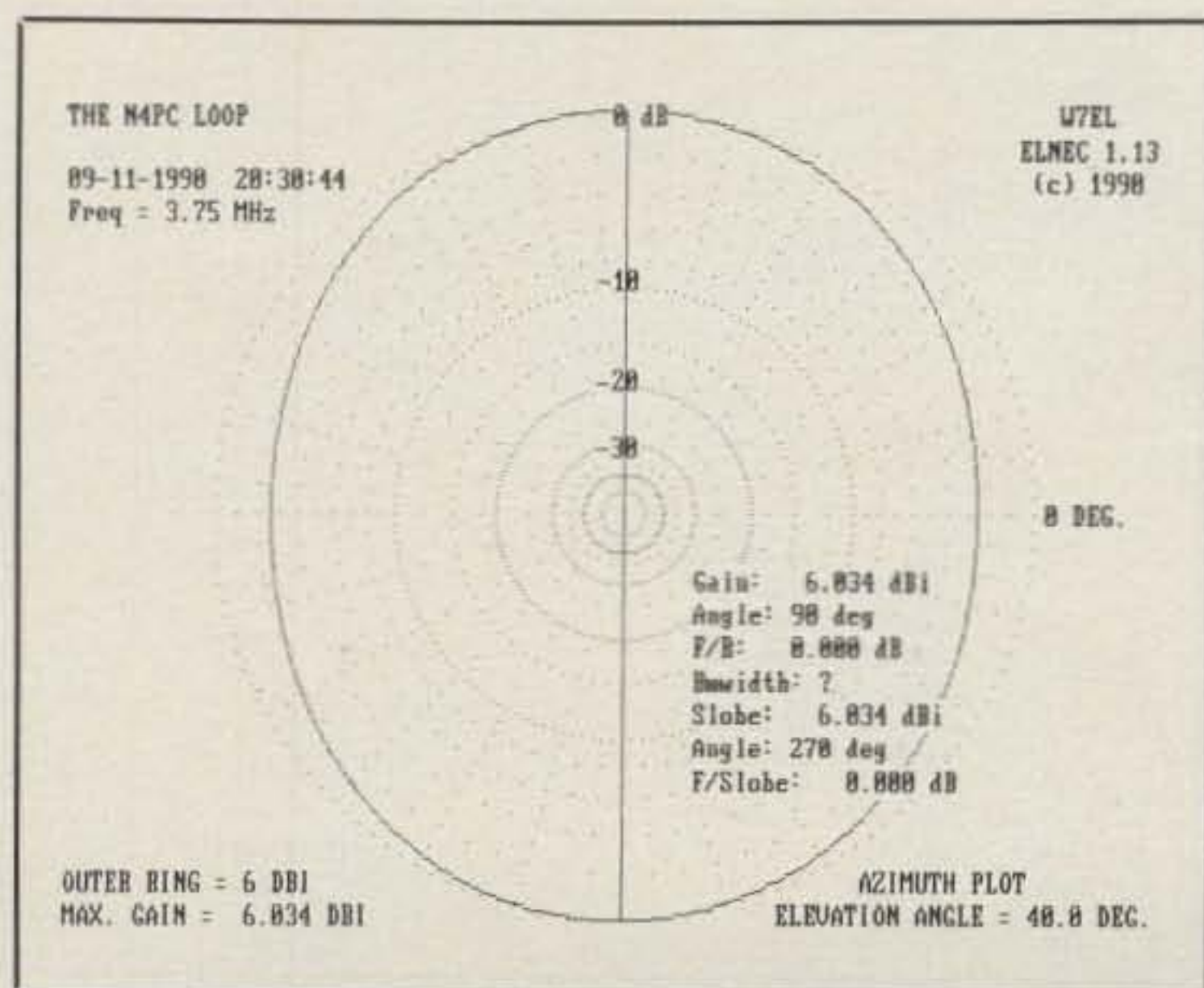


Fig. 1—The 80 meter patterns.

I have always heard that the third try is the charm, so I had to try again. This time I modeled a $\frac{3}{4}$ -wavelength antenna for 80 meters. That was it! Although the gain was less than that of a full-wave antenna, both the patterns and impedances were acceptable on all bands from 80 through 10 meters.

Predicted Results

I think a brief band-by-band synopsis of predicted radiation patterns is in order.

80 Meters. The vertical pattern is split into two lobes with maximum radiation at 40 degrees. The absence of the overhead component inherent in the W8JK antenna feed system, I feel, is the reason why. The horizontal pattern is essentially omnidirectional. (See fig. 1.)

40 Meters. The predicted vertical angle of radiation drops to 34 degrees. The horizontal pattern becomes more bi-directional with maximum radiation perpendicular to the phase line. (See fig. 2.) The beamwidth is 74 degrees.

30 Meters. On this band the vertical angle drops to 30 degrees. However, this is the same angle as predicted for Dave

Fischer's original loop. At a height of 50 feet and a frequency of 10.1 MHz, the antenna seems to show a less-pronounced effect of the phased feed technique. The pattern still goes to zero at a vertical angle of 90 degrees, but the angle of maximum radiation is no lower than a single feed loop. The horizontal pattern is more omnidirectional than on 40 meters with maximum gain perpendicular to the phase line. (See fig. 3.)

20 Meters. The pattern on 20 meters has a predicted maximum vertical lobe at 23 degrees. There are also two high-angle lobes for those of you who like to rag-chew on 20 meters. The horizontal pattern is approaching omnidirectional but slightly favoring the phase line axis. (See fig. 4.)

17 Meters. The vertical pattern has a predicted angle of radiation of 15 degrees. The horizontal pattern has four major lobes with maximum radiation again perpendicular to the phase line. (See fig. 5.)

15 Meters. This is one of my favorite bands. The predicted vertical take-off angle is 13 degrees, and the horizontal pattern has the four-lobe cloverleaf shape. The direction of maximum radiation is along the axis of the phase line. (See fig. 6.)

12 Meters. The predicted take-off angle is 11 degrees, and

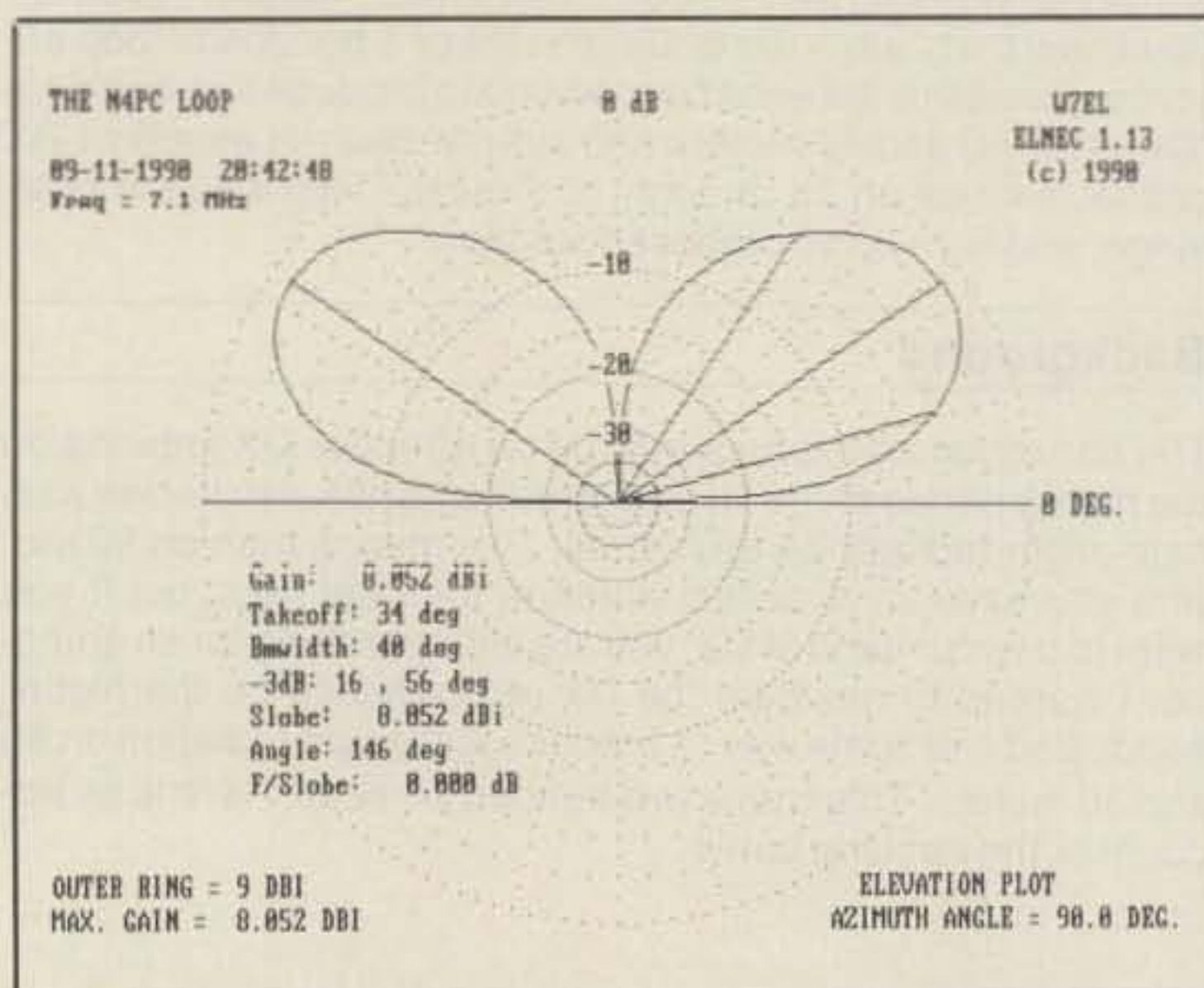
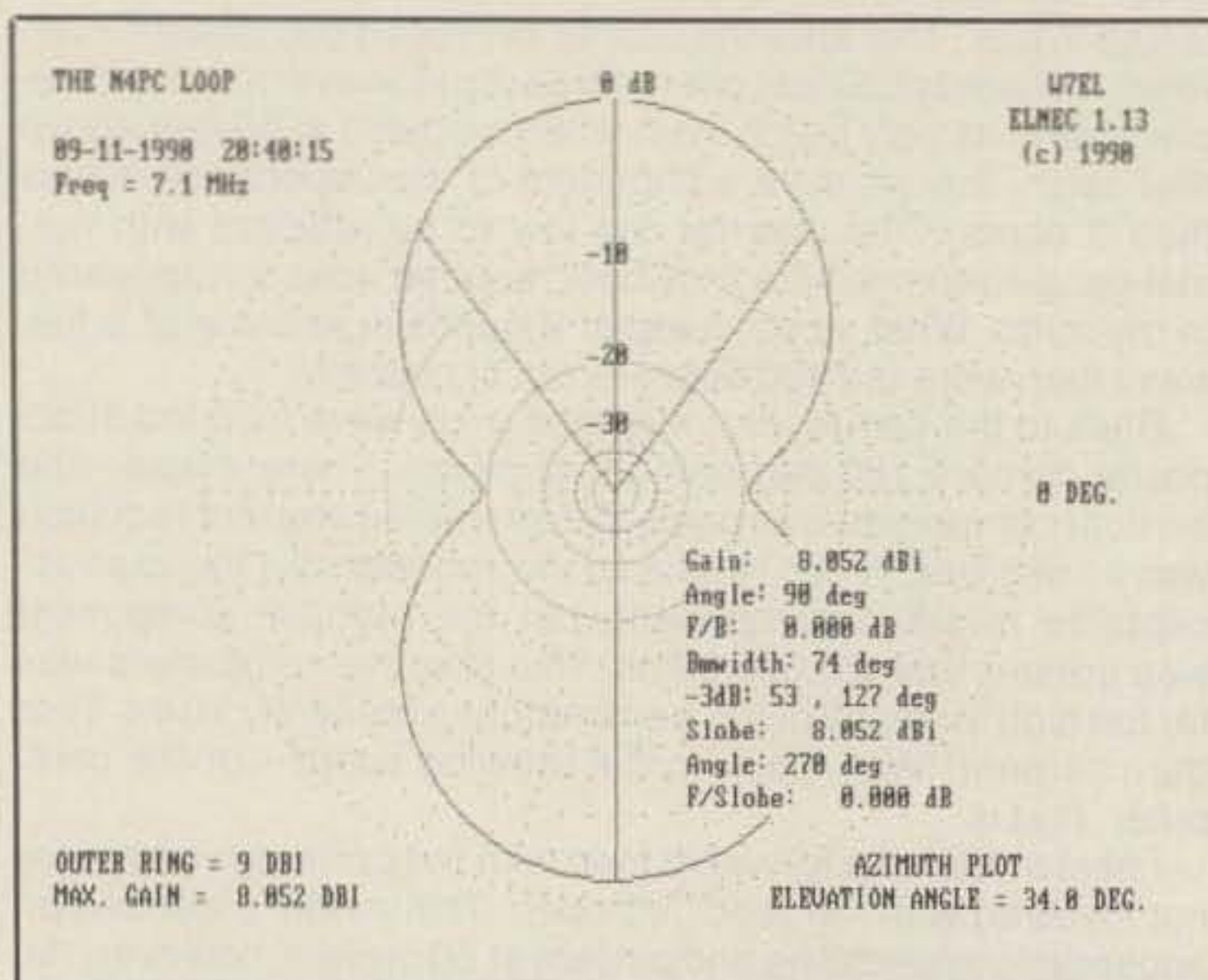


Fig. 2—The 40 meter patterns.

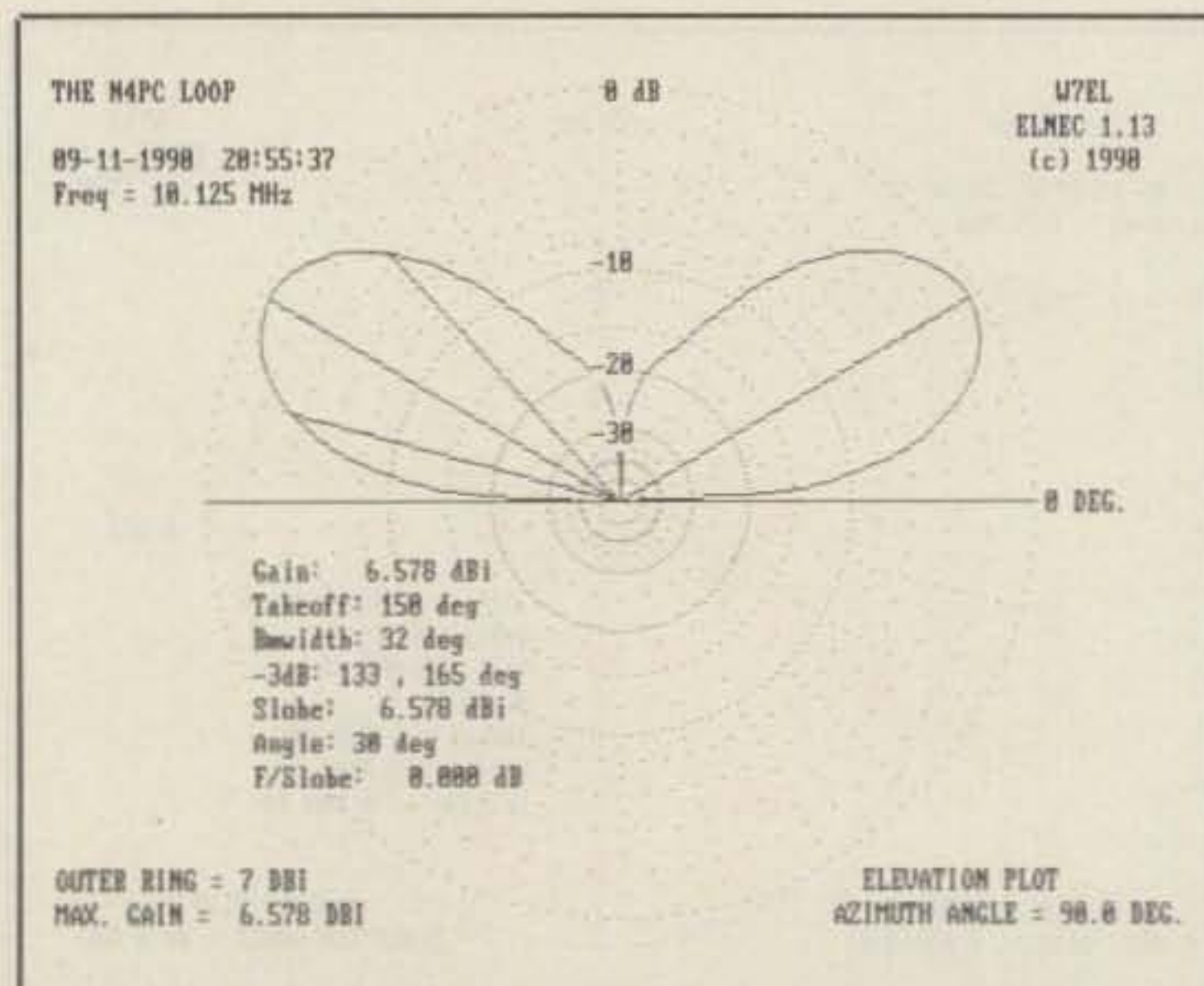
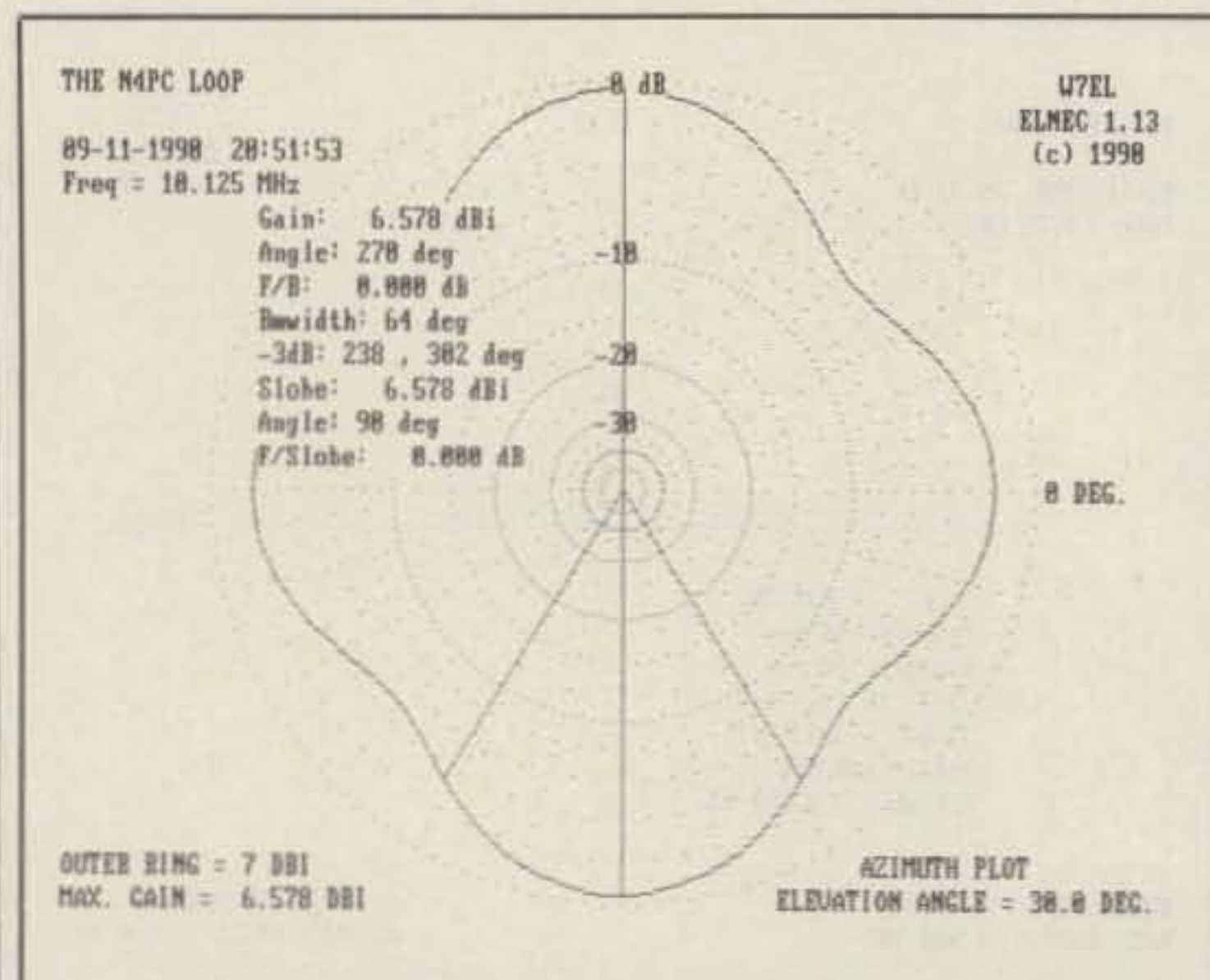


Fig. 3—The 30 meter patterns.

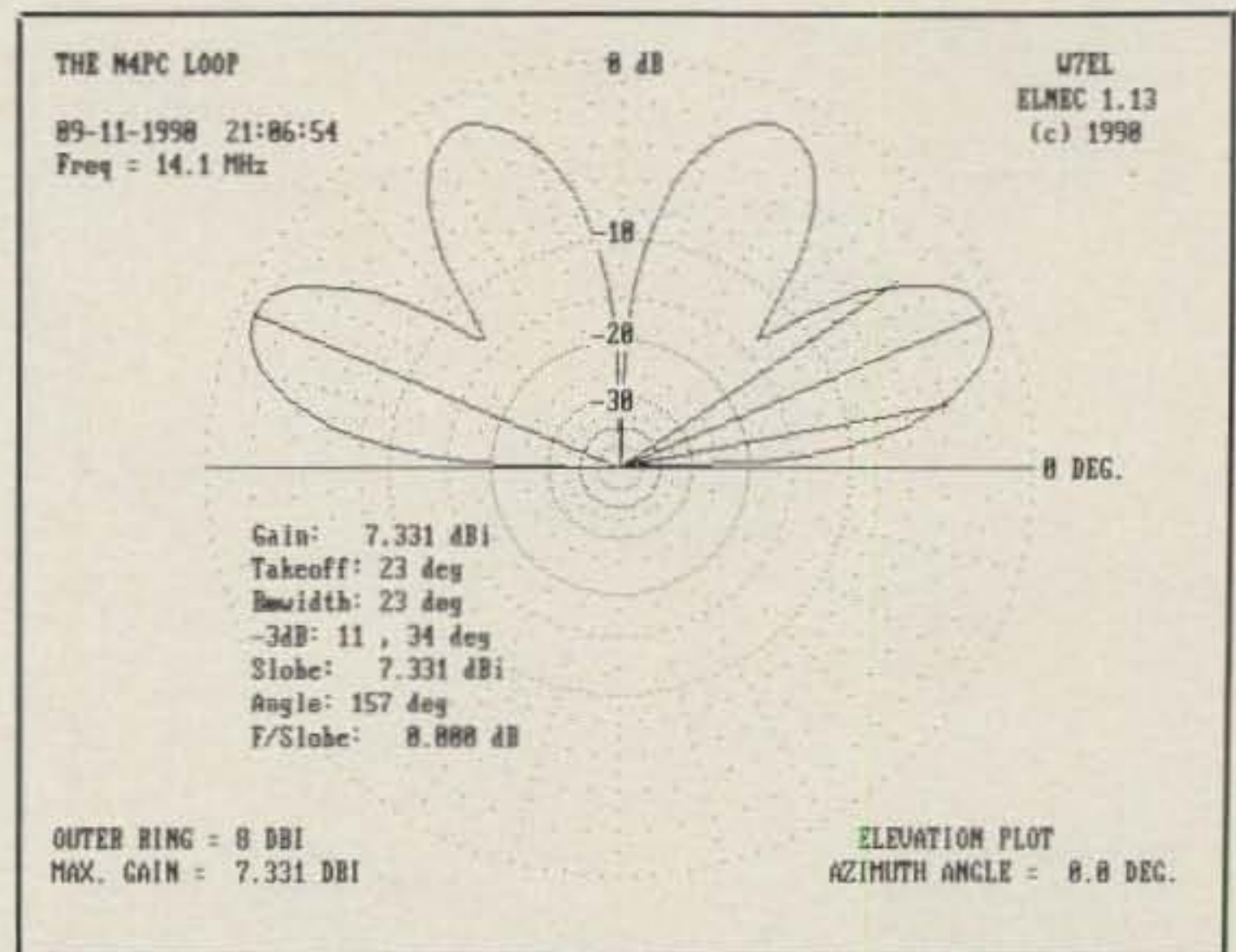
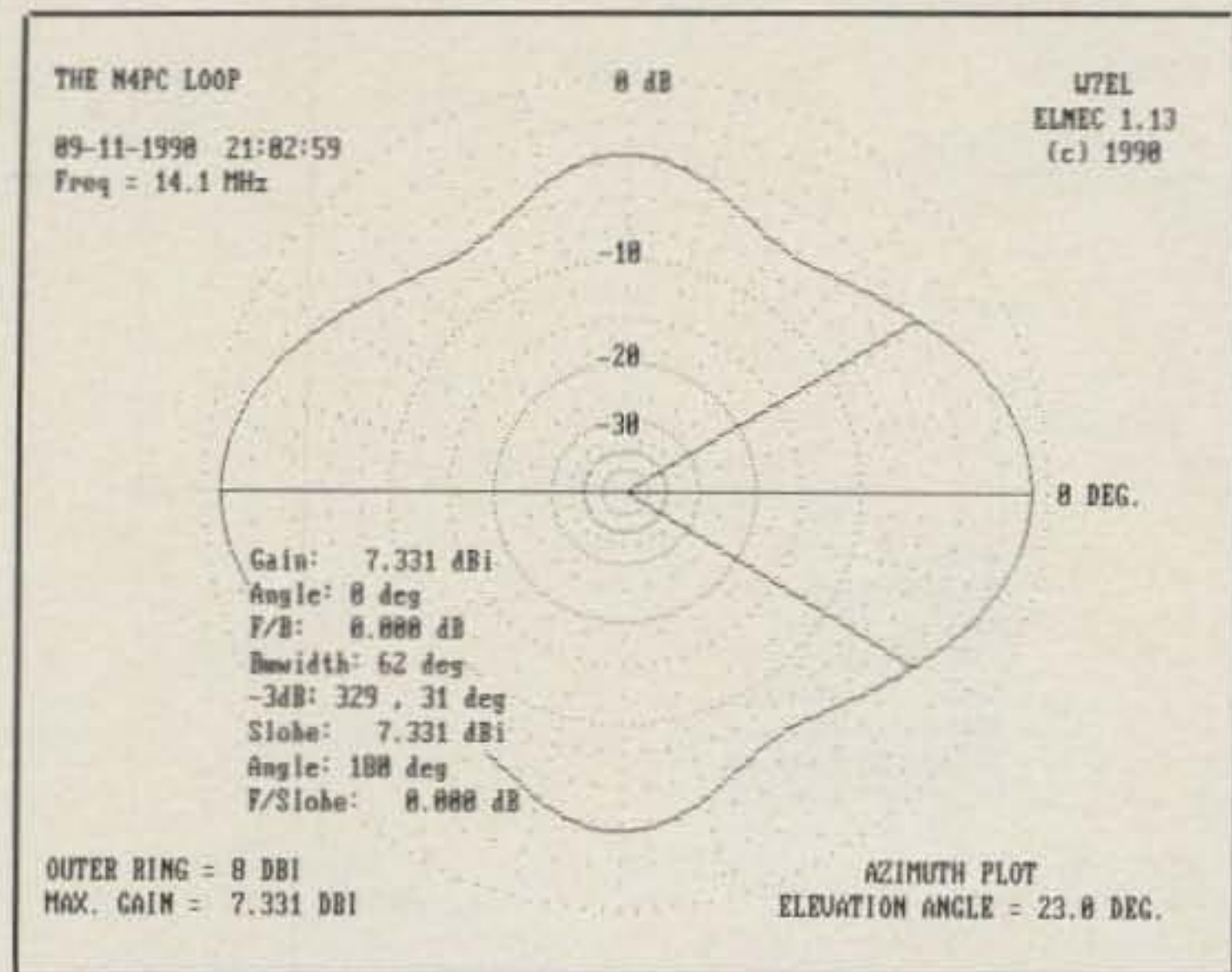


Fig. 4—The 20 meter patterns.

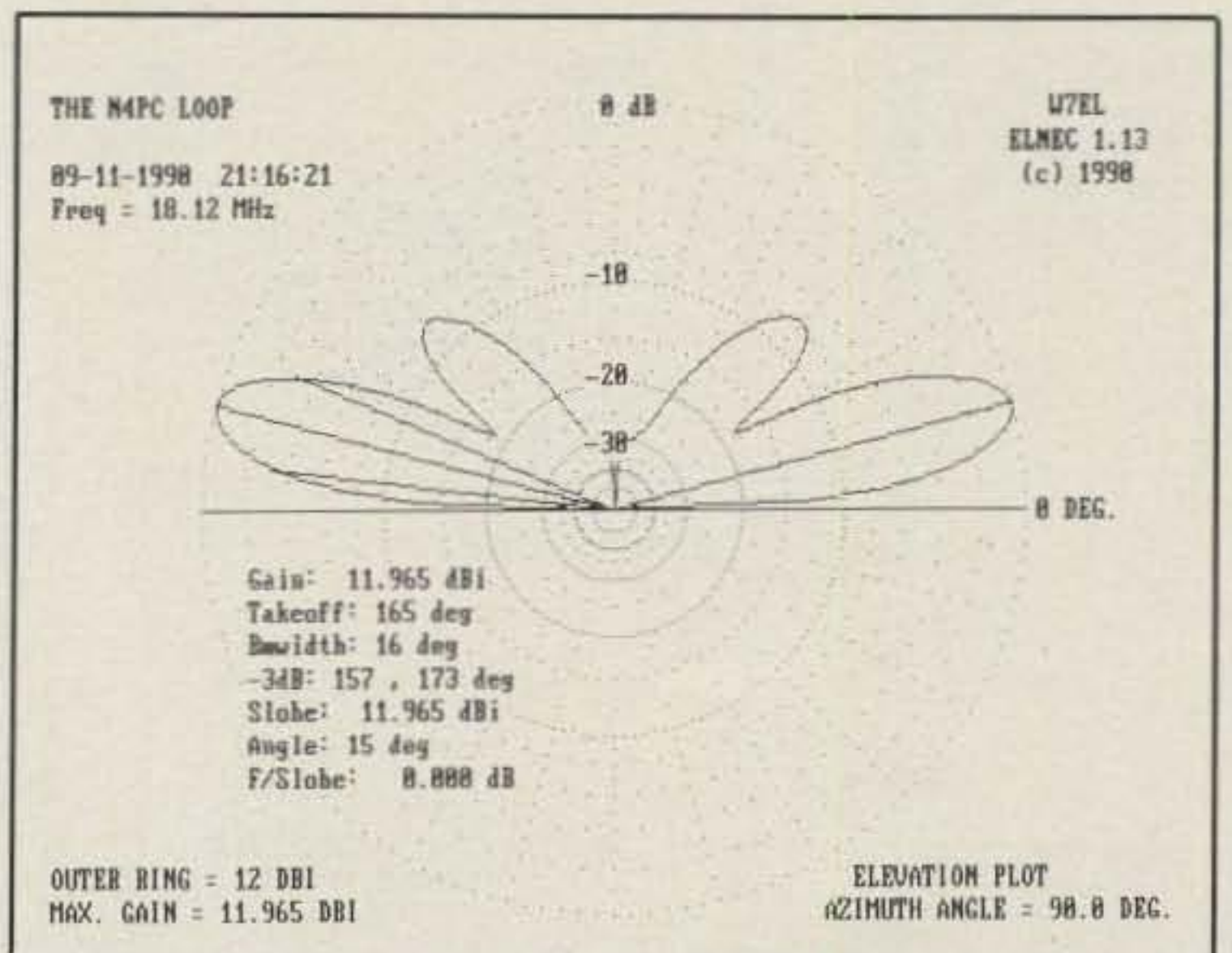
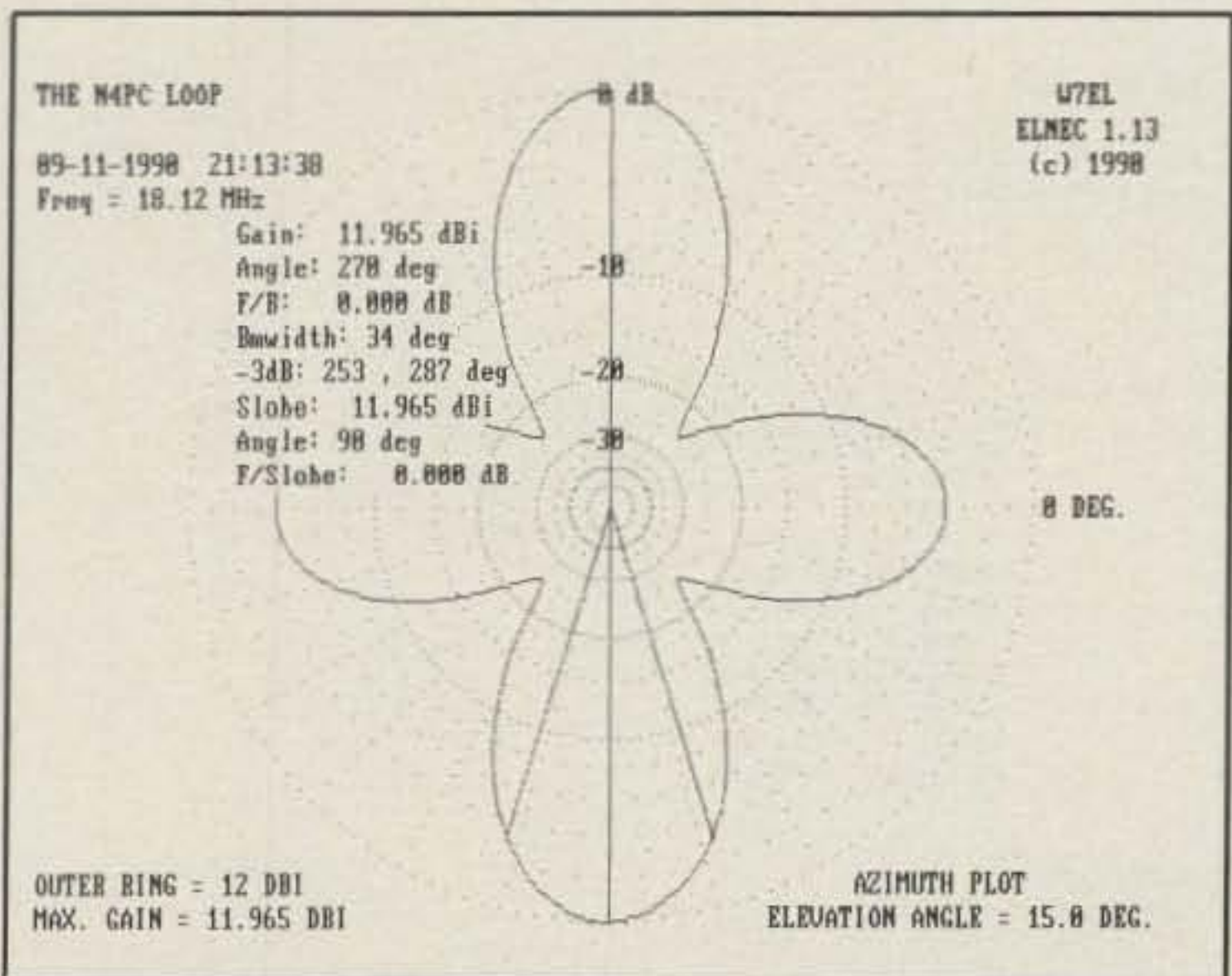


Fig. 5—The 17 meter patterns.

the horizontal pattern is along the axis of the phase line. (See fig. 7.)

10 Meters. The vertical take-off angle on 10 meters is 9 degrees, and the horizontal pattern consists of four major lobes. (See fig. 8.)

Construction

I was sufficiently encouraged by the computer predictions to begin construction. The square is 51 feet on a side supported by halyards attached at the four corners. The phasing line extends from corner to corner and is fed by a balanced transmission line attached at the center.

Specifically, this is the way to construct the antenna. Start by selecting eight high-quality insulators. Next, cut four pieces of antenna wire 51 feet long. Leave enough surplus wire at the ends to make necessary connections. Cut 72 feet of good-quality 450 ohm type twin lead for the phase line. This line is available from a number of CQ advertisers. Fold the phasing line to determine the middle and remove the insulation so the feed line can be attached later. Now lay out the four 51 foot

pieces of antenna wire as if you were going to build two parallel dipoles. Remember, there will be an insulator at each end of each wire segment. Lay the phase line flat on the ground and attach one end to two of the 51 foot wire segments. After these connections are made, turn the phase line over 180 degrees and attach the other end to the center of the two remaining antenna segments. Connection in this manner is necessary to provide the needed 180 degree phase shift. Attach the feedline in the center of the phase line. The feed line should also be high-quality 450 ohm twin lead.

The antenna is almost ready to go into the air. The remaining ends were left open temporarily just in case you need to maneuver the antenna around any objects on the ground. When the antenna is in position to go up, attach two jumpers about 6 inches long to the open corners, and the antenna is ready to hoist into the air. Be sure to solder with an iron that is big enough to provide ample heat and use a good-quality rosin-core solder. It will not be easy to correct a soldering mistake on a cold winter's night.

Raise the antenna into the air. Tension the halyards at the ends of the phasing line first, then tension the halyards on the

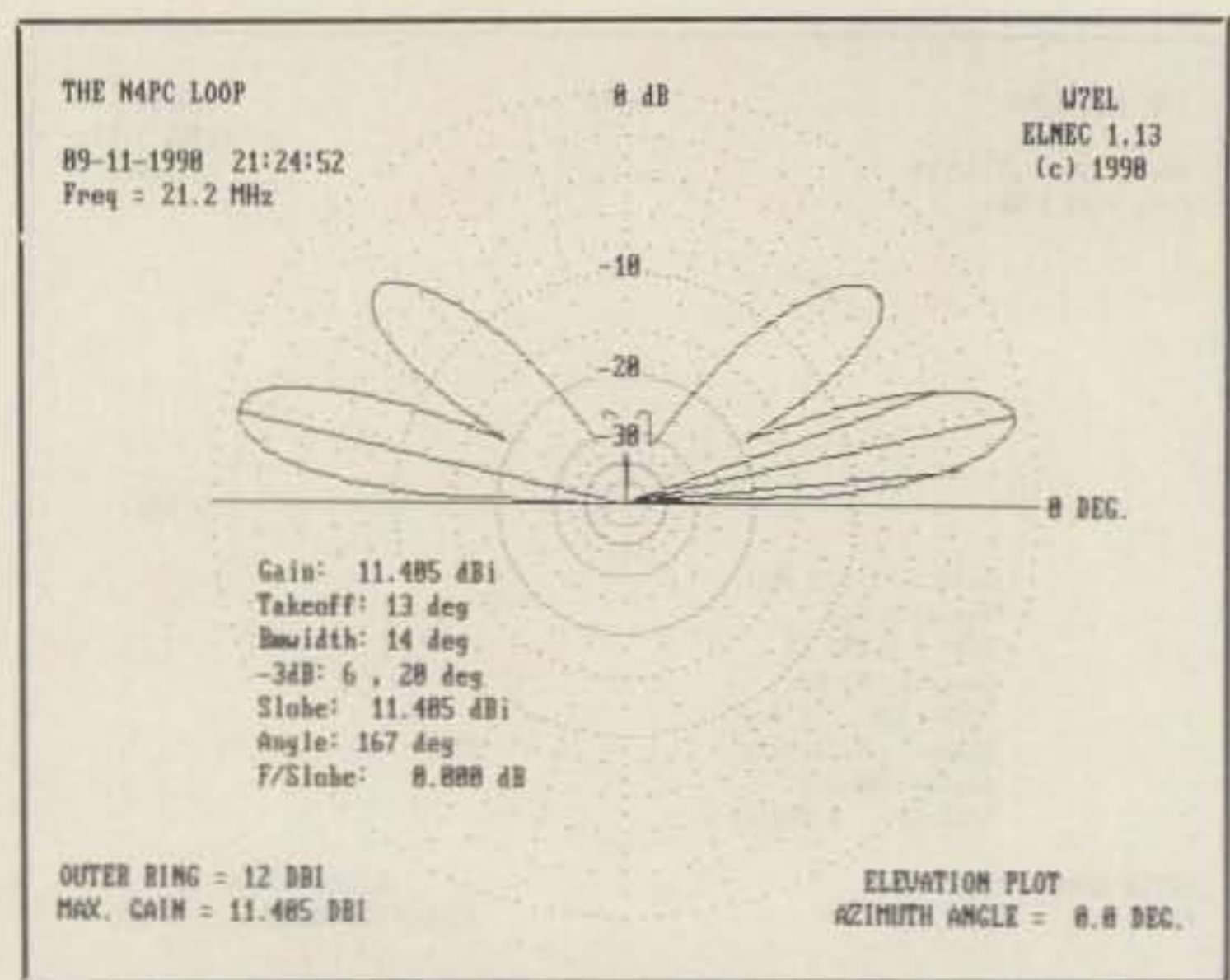
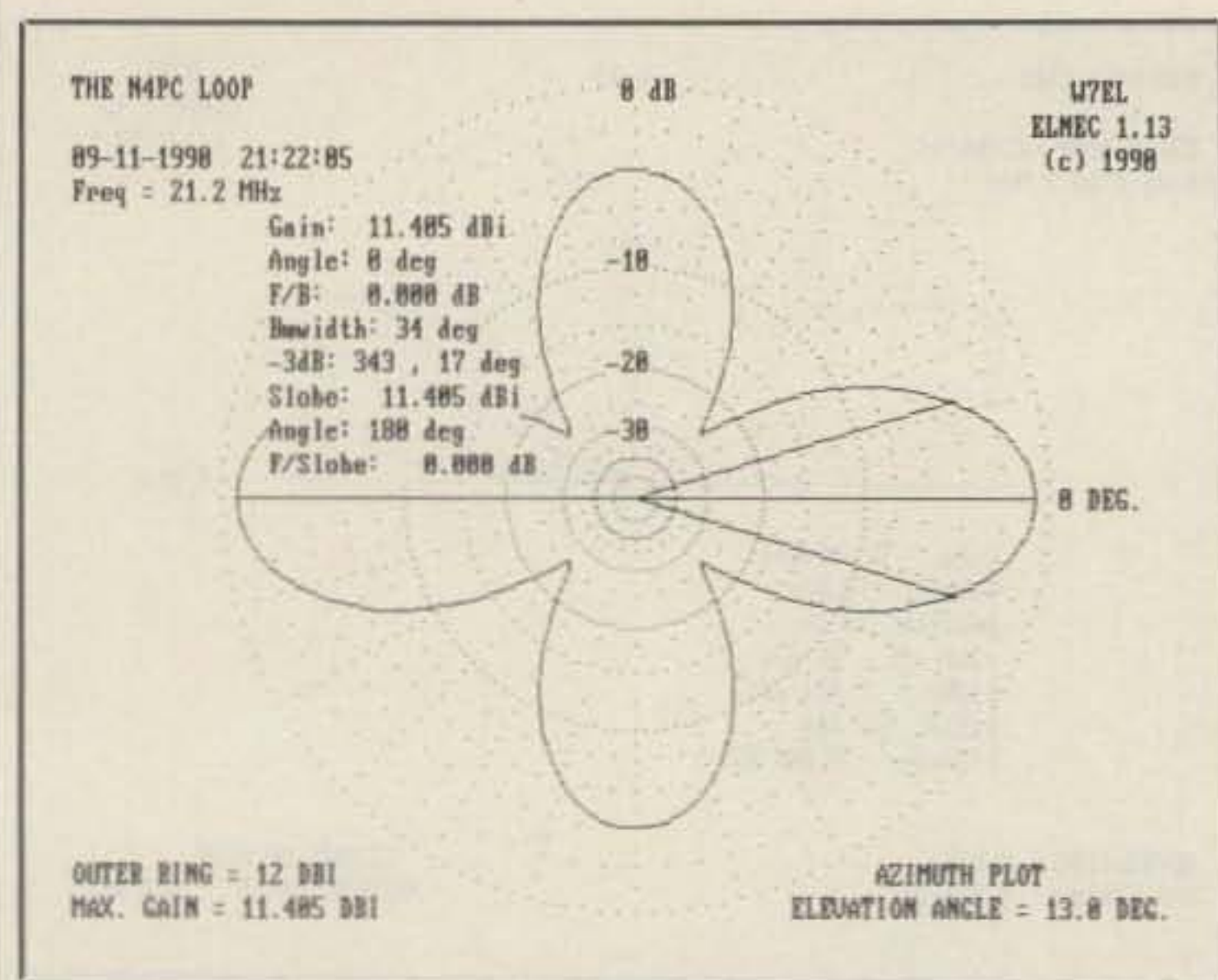


Fig. 6—The 15 meter patterns.

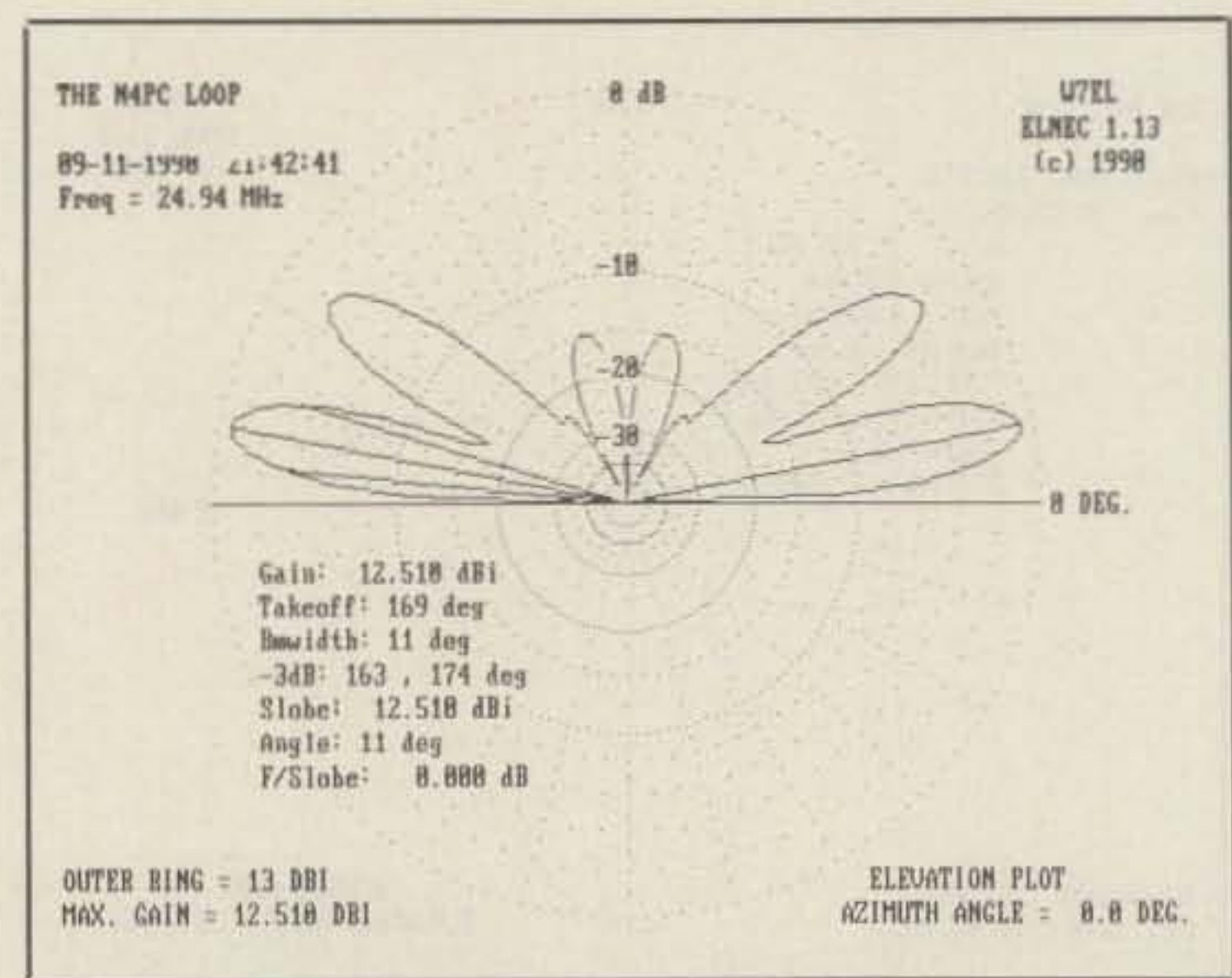
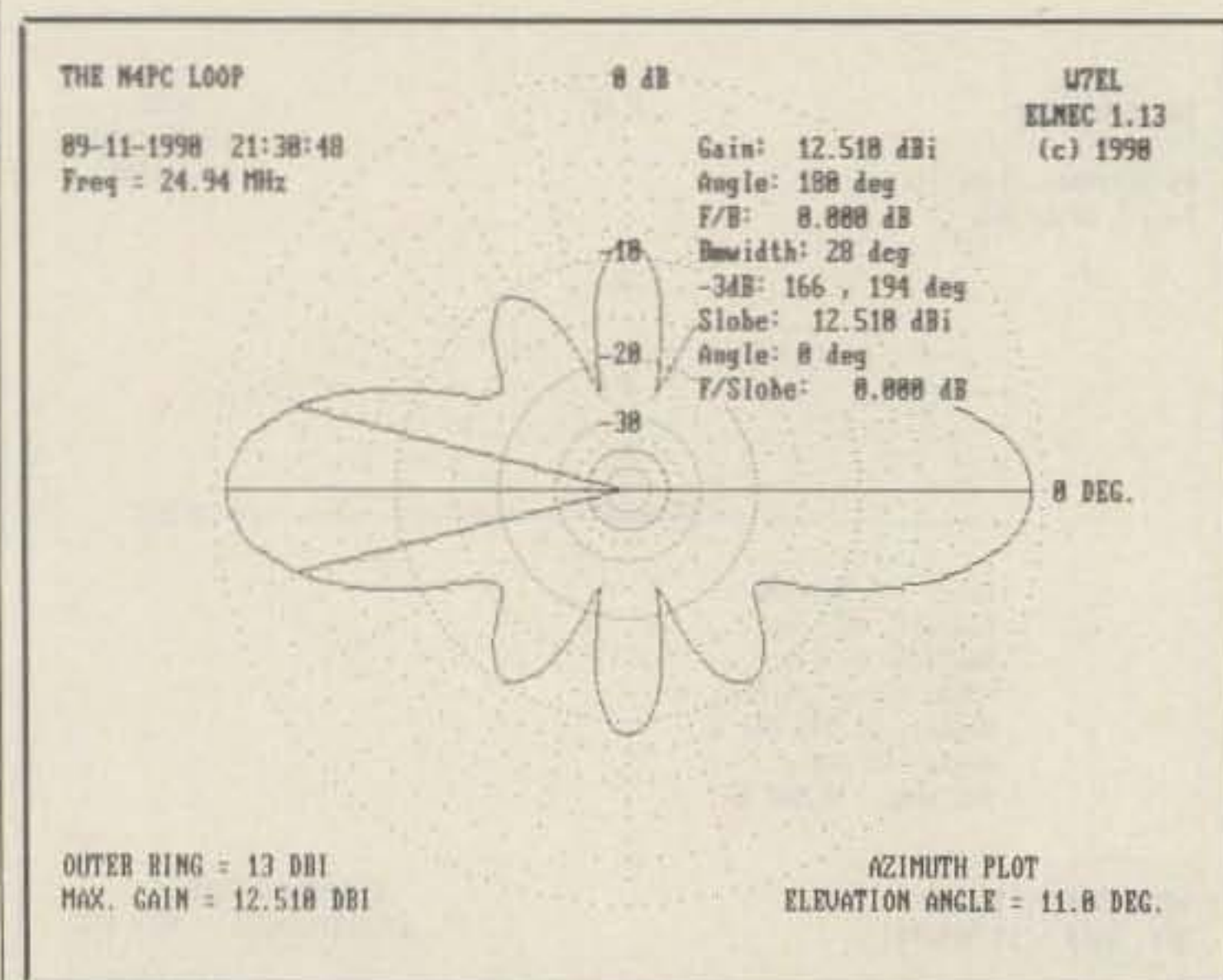


Fig. 7—The 12 meter patterns.

remaining corners. You now have a square antenna with a phasing line extending from corner to corner and the feed line hanging down from the center of the phase line.

Preliminary Test Results

My preliminary test was to see if the antenna would load efficiently on all bands from 80 through 10 meters, and it passed this test with no problems. Next I compared the loop with a dipole on 80 meters. I noticed a definite decrease in noise when I switched my transceiver to the loop. This led me to believe that the incoming noise was high angle, and the loop was showing an absence of a high-angle component.

I next tried the antenna on 40 meters. I located a South African station on CW. Although there was no drastic increase in signal strength, there was a *definite* decrease in stateside QRM. That's what I was looking for.

On the remaining bands the new loop produced results about like the loop that I had been using for many years.

I am sure this winter's DX season on 80 and 40 meters will

provide more definitive test results. After all, July is not the time to look for DX on 80 meters if you live in Alabama!

Afterthoughts

I am extremely reluctant to make any gain predictions about an antenna. There are too many variables, and it is extremely difficult to make accurate measurements. If I may, let's return to the computer to make some comparisons. I recently received a letter from Dave Fischer stating that the 80 meter signals come in at about 30 degrees, and 40 meter signals are received at about 25 degrees. Well, my computer model predicts a gain of 5.49 dBi for the loop and a gain of 0.67 dBi for a 1/4-wave vertical on 80 meters at an incoming angle of 30 degrees. This is a gain of 4.82 dB in favor of the loop over a proven 80 meter DX workhorse. Now let's make a similar comparison on 40 meters, but this time compare the loop to a bobtail curtain. The predicted gain of the bobtail curtain is 4.58 dBi and for the loop it is 7.44 dBi. This time the loop wins by 2.86 dB. Again, I offer these comparisons only as food for thought. History will make the real comparison.

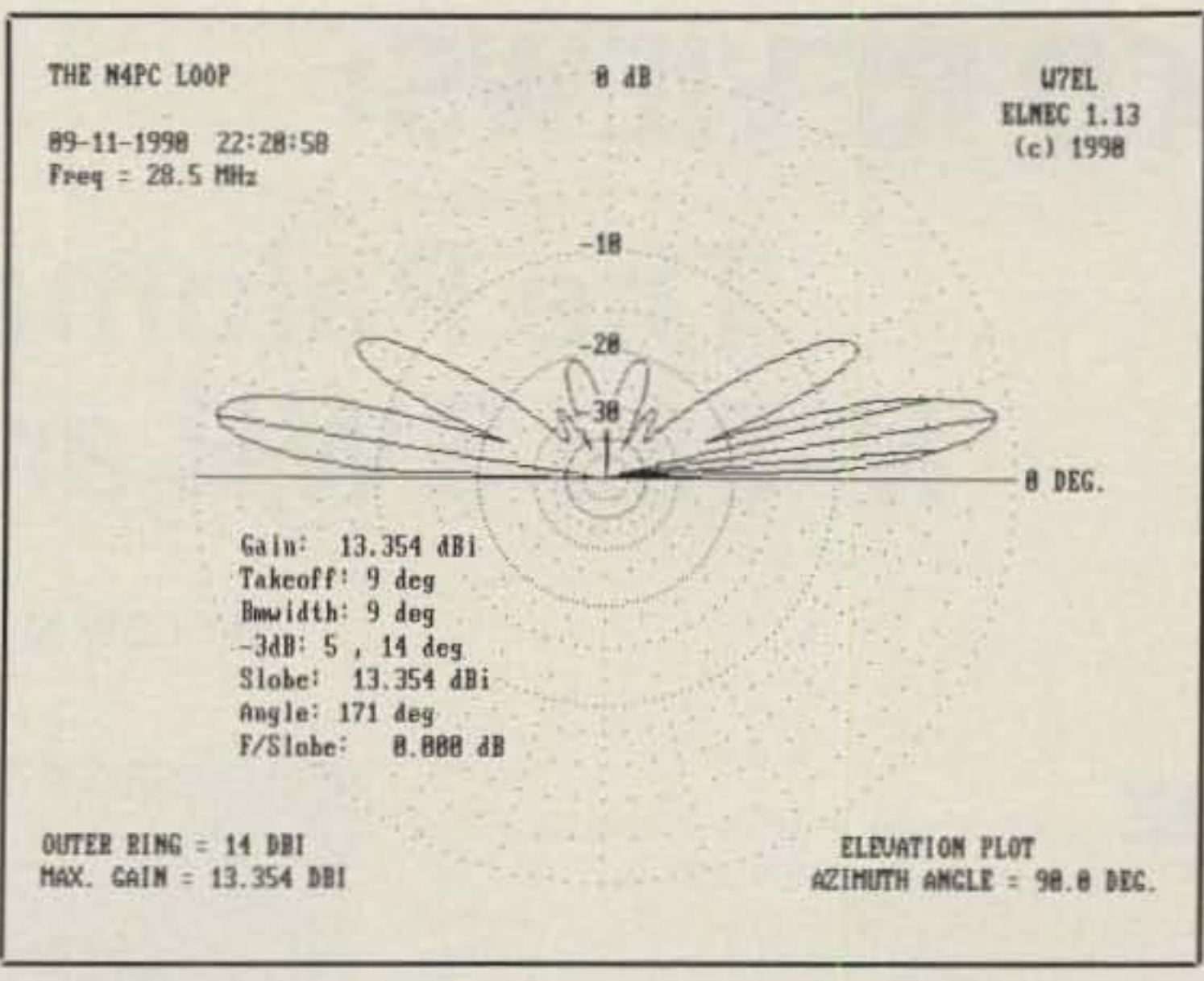
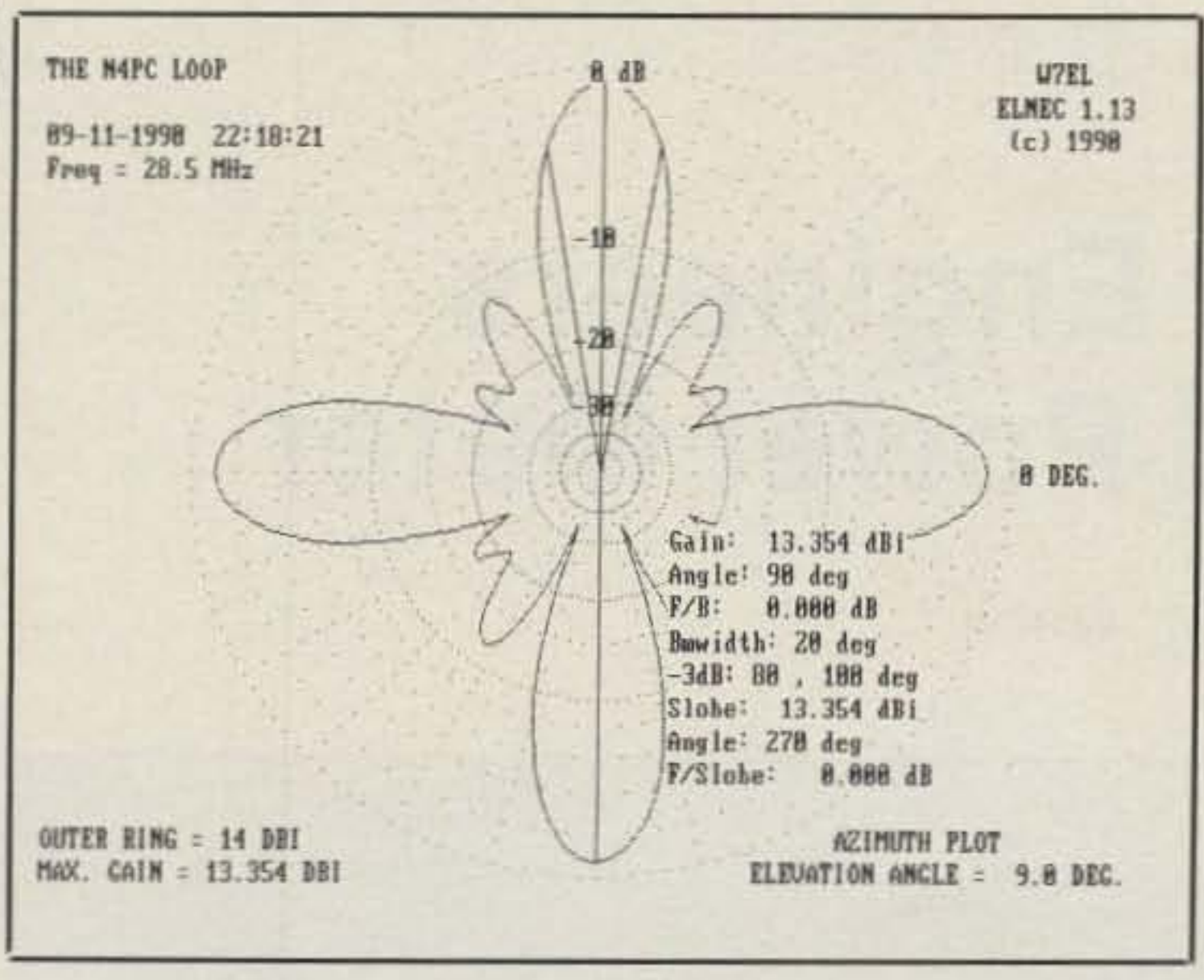


Fig. 8- The 10 meter patterns.

In retrospect I must say this project would have been impossible without a good computer analysis program. The one I chose was ELNEC written by Roy Lewallen, W7EL. Roy's program is a real joy to use and very powerful. Thanks, Roy.

Acknowledgements

I would like to thank my wife for her encouragement, proofreading, and typing. And my special thanks to my friend Lew McCoy,

W1ICP, for coaching and constructive criticism. From John Kraus I borrowed his feed technique and applied it to the closed horizontal loop presented by Dave Fischer. Thanks, gentlemen.

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

I claim no expertise in antenna theory. In Alabama we have a saying: If you place a blind hog under an oak tree, it will eventually find an acorn. I think I have found my acorn.



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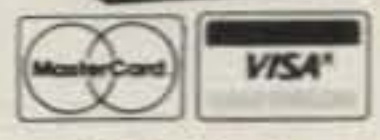
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CQ REVIEWS:

The Palomar Engineers M-835 SWR and Power Meter

BY LEW McCOY*, W1ICP

Every once in a while a product that "turns me on" comes along. This happened when I received the Palomar M-835 SWR and power bridge for a product review. Jack Althouse, K6NY, who owns Palomar Engineers, has always been one to come out with innovative ideas that have real and worthwhile applications in amateur radio. He is a knowledgeable engineer who knows what amateurs need, and he can turn that need into a practical product. That is certainly the case in this latest offering.

The M-835 is an SWR and power output indicator, but it is different from most such indicators in that it is easy to read and use. There are two rows of LED bar indicators. The top row shows SWR, and it is calibrated from unity (1 to 1) on the right up to over 10 to 1 on the left in extremely easy to read steps.

The lower row of LED bar indicators is for power, and it is calibrated in divisions from 0 to 200 (see the front-view photograph). The other item on the front panel is a power switch which has four ranges—2, 20, 200, and 2000 watts. Everyone from a QRP to high-power operator is taken care of. Incidentally, the LEDs are red and easy to see when illuminated. The unit is supplied with a separate 12 volt supply that is used to power the LEDs and internal circuitry.

There are two SO-239 type coaxial connectors mounted on the rear. One is used for the input from the transceiver or Transmatch, depending on whichever is used. The other fitting is for the coax to the antenna.

A word or two about power and SWR indicators would probably help the neophyte to understand how these devices work. There are two basic types of indicators used by amateurs. The first is a reflectometer of the Monimatch variety and its many cousins. In this type, RF passing along the transmission line is sampled by coupling a small portion of the energy going in both directions, converting that energy from AC to DC and reading it on a di-

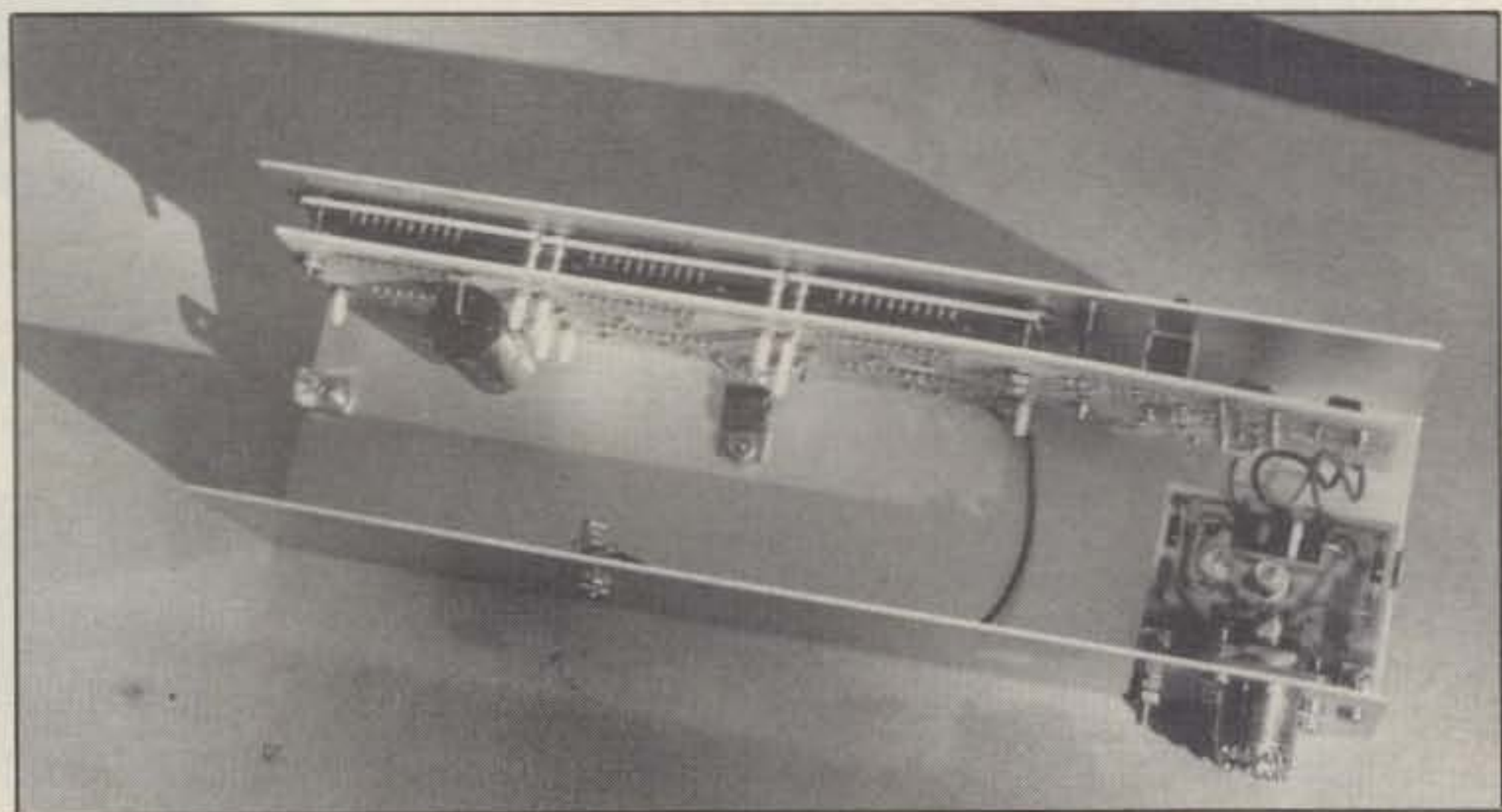


Front-panel view. On the left is the switch for changing the various power levels. The upper line of LEDs is for SWR, and the lower is for power.

rect current meter. The ratios of the two voltages can be compared to provide the standing wave ratio. One of the problems with this type of circuit is that it is frequency sensitive. In other words, the power read on one frequency may read differently on another frequency even though it is the same amount. While it is excellent for measuring SWR, it is useful for power

measurements only over a limited frequency range. Don't misunderstand. This type of circuitry can yield excellent accuracy, but an accurate power-reading Monimatch is an expensive instrument to create.

On the other hand, some years ago an amateur named Warren Bruene developed a power and SWR circuit using a coil



On the right-hand side behind the coax fittings are the bridge and SWR circuitry. Along the front panel are the board and parts for the LED indicators.

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

wound on a ferrite core. The center conductor of the coaxial feed line was fed through this coil/core and energy was coupled to the circuit. Both forward and reflected voltages could be detected and measured, and more important, the device was not as frequency sensitive as the reflectometer type.

Palomar Engineers uses the Bruene-type circuit in their M-835, plus other circuitry for driving the LEDs and achieving greater measuring accuracy. I used several tests to check the accuracy of the M-835, including some against known accurate meters. The unit I tested was perfectly within the calibration of the LED bar readings. In other words, I could find no errors in power and SWR readings.

I think what impressed me so much was the ease of reading and using the bar-graph-type LEDs. I am accustomed to using a conventional needle-type meter, either the single needle or dual needles that are popular right now in SWR bridges. However, particularly when using and adjusting a Transmatch, the LED bar reading is much easier to use. It is difficult to describe the difference, but I'll try. With a mismatched condition of the Transmatch, and say the SWR bar graph is halfway lit up, tuning and looking for a "dip" and finding the first correct tuning is very obvious with the bar graph. The last LED will "blink" at you, which quickly tells you that a matching condition is approaching. As a tuning and adjusting indicator I found the M-835 was far quicker than a conventional needle-type meter indicator.

The SWR calibration uses a single LED for each step from 0 to 2 to 1 SWR. In other words, if 10 LEDs were lit, it would indicate an SWR of 2 to 1. Calibration then goes up to 10 to 1 in steps of 3, 4, 5, 6, and then 10, and then past that to infinity with four bar LEDs. Power runs from 2, 5, 10, 15, 22, 30, 45, 60, 70, 90, 110, 125, 150, 175, and full scale, 200. As I stated earlier, the four-position power switch provides full scale of 2, 20, 200, or 2000 watts.

As many readers know, modern solid-state transceivers have protection circuits built in whereby the power output will shut down if the final amplifier encounters a mismatch. The M-835 provides an easy display to check this action. For the record, I had three different rigs that all provide 130 watts output into a matched load (key down carrier). With an SWR of 2 to 1, the output on each rig dropped to 120 watts. With 2.2 to 1, I got 90 watts output, and running an SWR of 3 to 1, the power output dropped to 50 watts. I don't know if this is useful information or not, but you can file it for future use. Hi!

The M-835 is listed at \$189.95 and is manufactured by Palomar Engineers, Box 455, Econdido, CA 92025 (619-747-3343).



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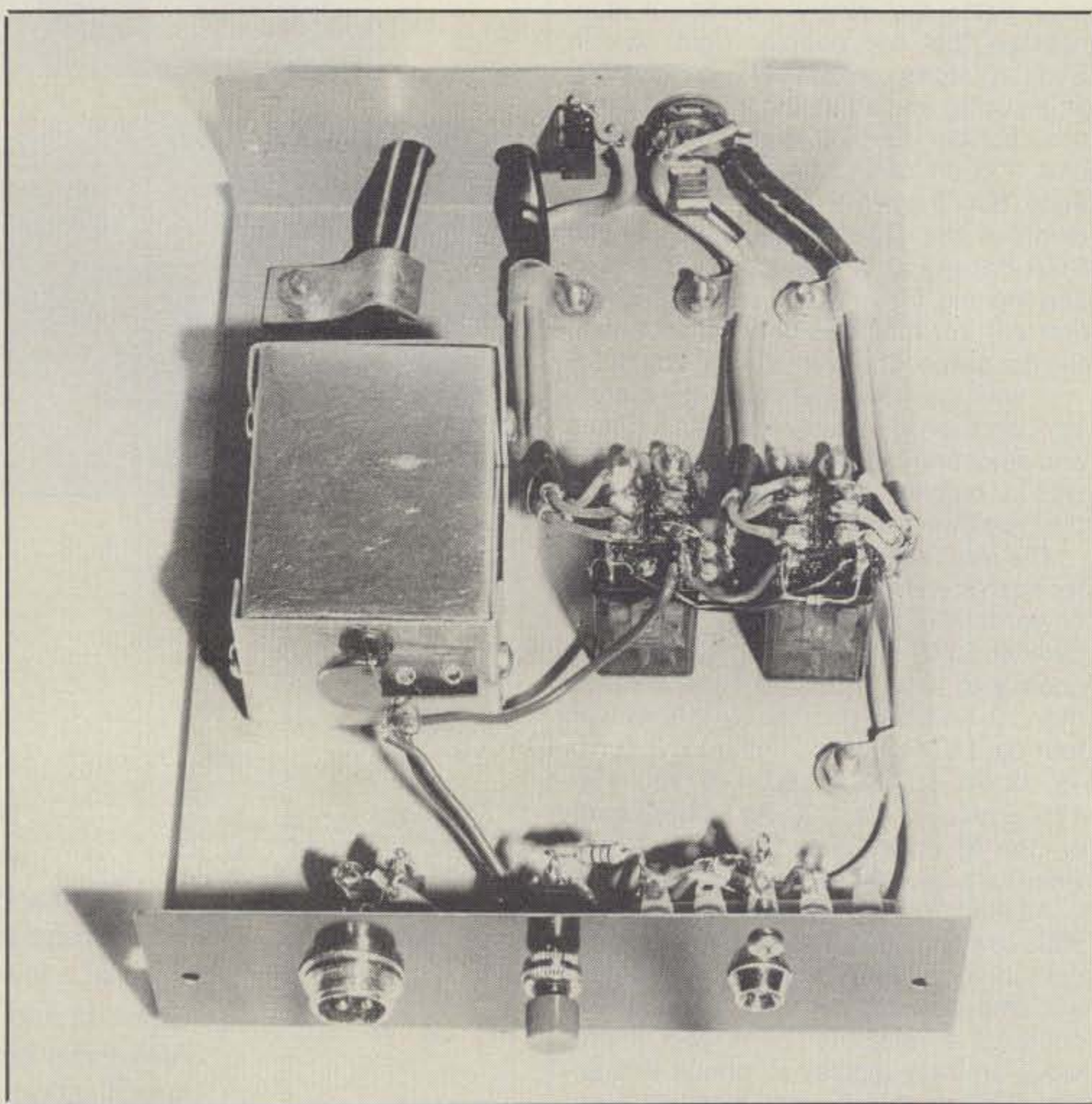
BY HOWARD CERVANTES*, W2DB

Not long ago I bought myself one of the new, sexy radios with lots of bells and whistles. I kept my old radio in the line as a backup. Although changing over from one radio to another is simply a matter of plugging and unplugging connectors, I figured there had to be an easier way! I wasn't looking for anything pretentious. All I wanted was a simple switchbox that would transfer the antenna, speaker, key, and microphone from one radio to another, and do it simply by pressing a single pushbutton.

Over the years I have become a confirmed advocate of the well-known KISS method (keep it simple, stupid) of design and construction. I wanted to try to do the job without using any costly parts, particularly an expensive coaxial relay for the antenna change-over function.

The switchbox I have come up with does the job quite well using inexpensive 12 volt DC relays. I am sure there will be some raised eyebrows at my use of other than costly coaxial relay for the antenna switching function. I can imagine the cries of dismay: "By golly (a favorite expression of some radio amateurs), you're gonna lose a lotta power 'less you use a coax relay. You're gonna have a big impedance bump in your feedline!"

Maybe so, but I decided to make a test to find out for myself just how much the power loss would be. I fed the output of a transceiver into a dummy-load wattmeter over a 3 foot length of coax and recorded the power indications. Next I connected the relay in the circuit between the transceiver and wattmeter and checked power output. I made this test on all bands from 10 through 160 meters and didn't notice a bit of difference; there



Looking down into the completed switchbox you can see the relays and the shielded internal aluminum box for the antenna relay. The front panel has the microphone connector on the left, the selector switch in the center, and the dual-color (red and green) LED indicator on the right.

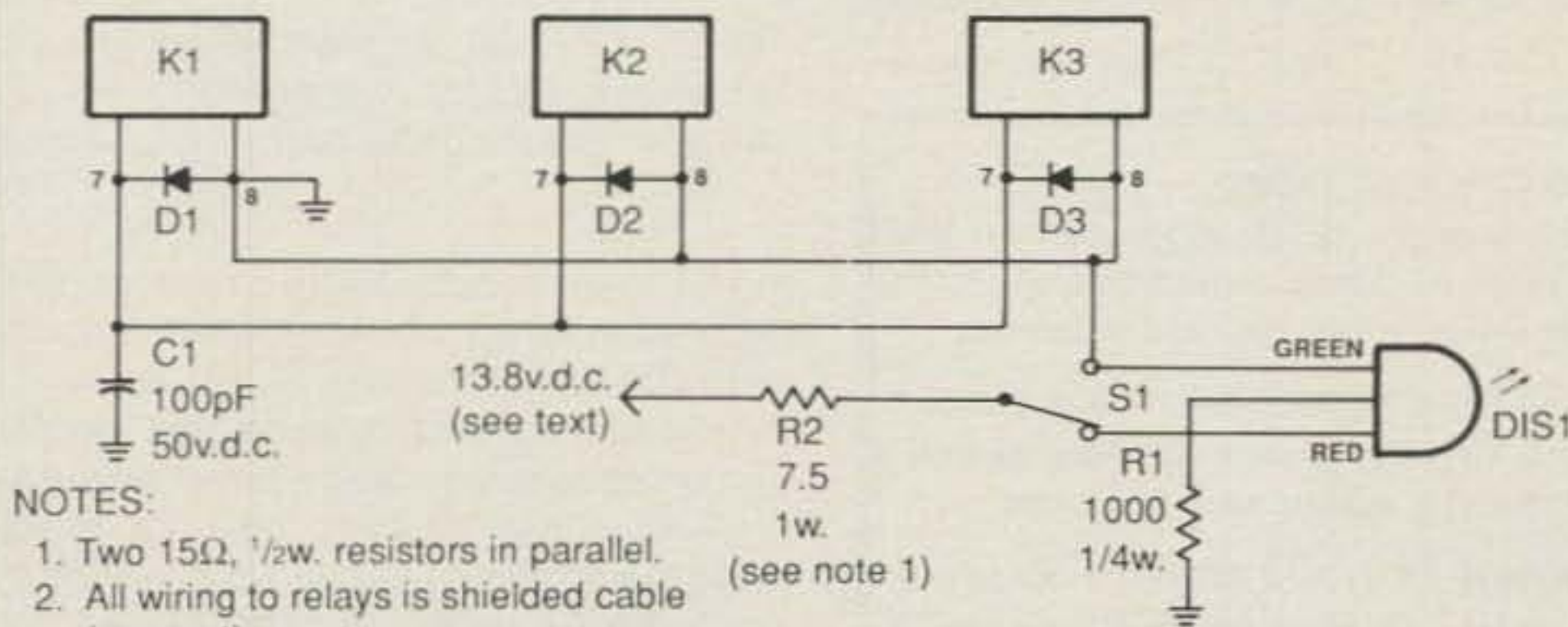
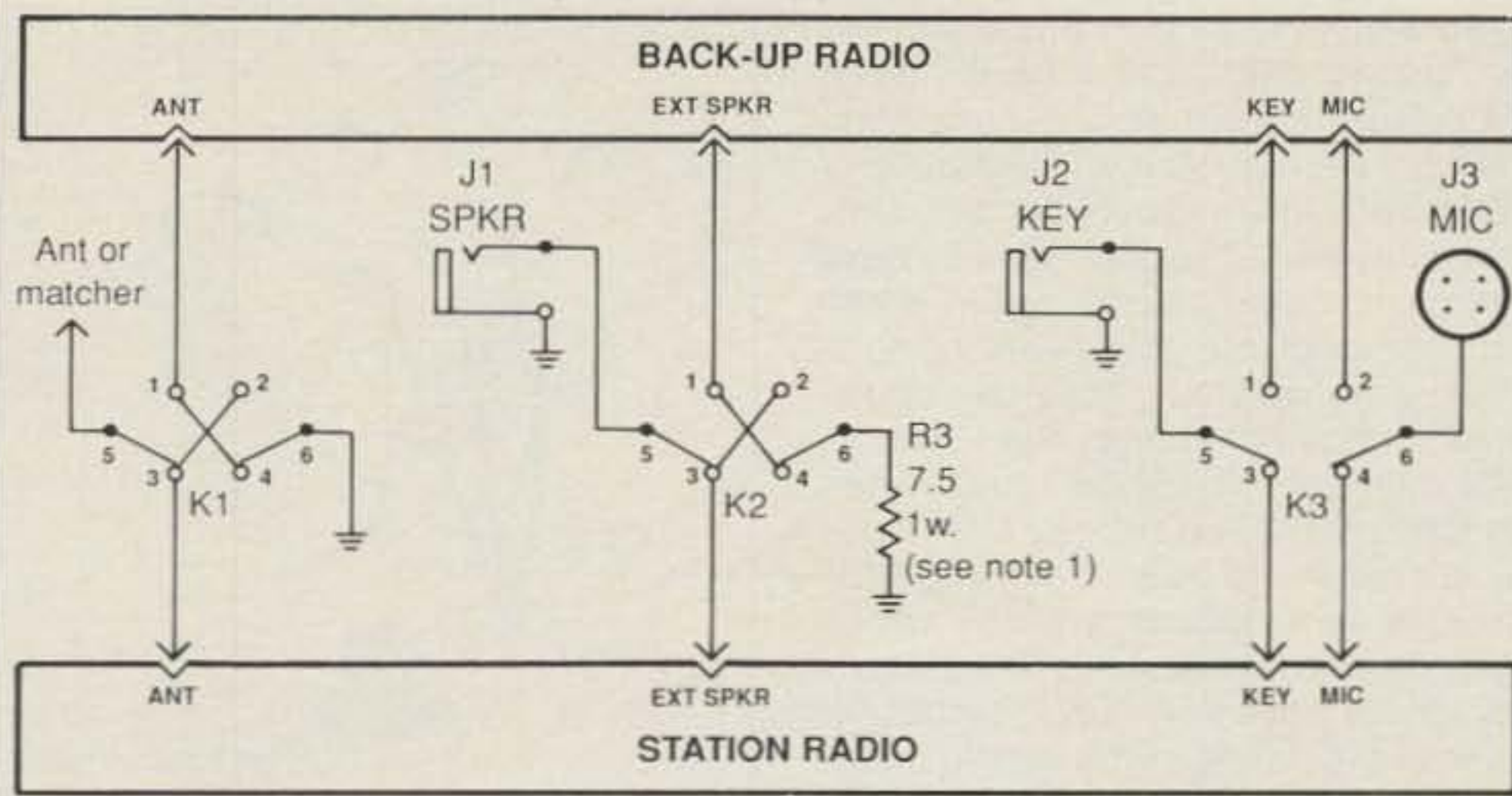
was no noticeable change in the indications on the wattmeter!

I am quite aware of the need for coaxial relays on the higher frequencies where impedance discontinuities are of serious concern. However, I concluded from the test I've described that for all

practical purposes the inexpensive relay I had tested was quite adequate for the intended application.

I used a 2" x 8" x 16" metal cabinet to house my switchbox, and cemented the relays, bottoms-up, to the base with a drop of Crazy Glue. For RF shielding pur-

*305 Daffodil St., Inverness, FL 32652



NOTES:
 1. Two 15Ω, 1/2w. resistors in parallel.
 2. All wiring to relays is shielded cable (see text)

Fig. 1—Circuit diagram for the switchbox. All parts are available at Radio Shack.

poses the antenna relay, K1, is enclosed in an aluminum mini-box. Its solder lugs are bent down a bit to clear the top of the mini-box.

I considered mounting connectors at the rear of the cabinet in the conventional manner, but this would have violated good KISS practice! Besides, the switcher was intended to be used as a permanent accessory at my station, so I saw no reason to use connectors. I soldered the cables directly to the relay lugs and put appropriate connectors on the cable opposite ends. I then labeled them with either red or green tape to correlate with the red-green LED indicator, DS1, on the front panel—red for the station radio and green for the backup. Shrink tubing was used on the cable groups as they exit the holes at the rear of the cabinet.

My microphone cord had a four-prong female plug, so the mic receptacle on the front panel is a four-pin type. Since I use VOX exclusively, I have made no provision for push-to-talk or up-down operation. Obviously, other types of connectors may be substituted to accommodate different microphones.

The major part of the wiring—except that to K1, the antenna relay—is done with shielded audio cable. Wiring to K1 is type RG-58 coax. Some may feel that the use of shielded cable is a bit much in the

application, but it should not be overlooked that RF, AF, and DC are being switched within the confines of a small cabinet. I feel the use of ordinary unshielded insulated wire in this project would have resulted in serious feedback problems. There are too many opportunities for intercircuit coupling. Fig. 2 shows how the shielded cable is dressed at the relays to ensure short leads, and how the cable sheaths are grounded to the cabinet base.

The electrical circuit diagram (fig. 1) shows how the relays are wired. K1, the antenna relay, switches the antenna from one radio to the other with contacts 1, 3, and 5, while contacts 2, 4, and 6 put the input of the inactive radio (the receiver of which would otherwise be wide open) hard to ground.

Relay K2 is the external speaker-switching relay. Contacts 1, 3, and 5 switch audio outputs between radios, while contacts 2, 4, and 6 switch R2 across the speaker output of the inactive radio and serve to load its audio output transistor in the absence of a speaker.

Relay K3 contacts 1, 3, and 5 switch the key between the two radios and open the keying line to the inactive radio to prevent accidental keying of the latter. Contacts 2, 4, and 6 of K3 switch the station microphone.

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No separate power supply is needed to operate this switchbox. The 13.8 volt DC auxiliary output of one of the radio power supplies provides the energizing voltage for the relays. Resistor R3 drops this voltage to 12 volts. The total current drain for the three relays is only 225 milliamperes. A 20 amp radio power supply will never notice this slight additional load.

This little box had performed exactly the way I intended it to. There have been no problems. I have had no reports of noise, feedback, or hum on my signals. And surprisingly enough there are none of the "plops" or "clicks" when switching back and forth between radios that you might reasonably expect from switching transients. The two radios can be set on the very same frequency with-

out any sign of ringing. I can do this and even switch back and forth between word groups without arousing any comment from the operators of the station or stations with which I am in contact. Only if I announce what I am doing will I have some sharp-eared listener report an almost imperceptible change in tone quality. Listening carefully, I too can detect this difference on receive, due I suspect to the difference in the selectivity characteristics of the two radios.

I attribute the satisfactory performance of this switchbox to the use of shielded cable wiring, a shielded antenna relay, direct and short leads to the relays, and solid grounding of the cable sheathing. Also, I believe that shorting the input of the inactive radio to ground and load-

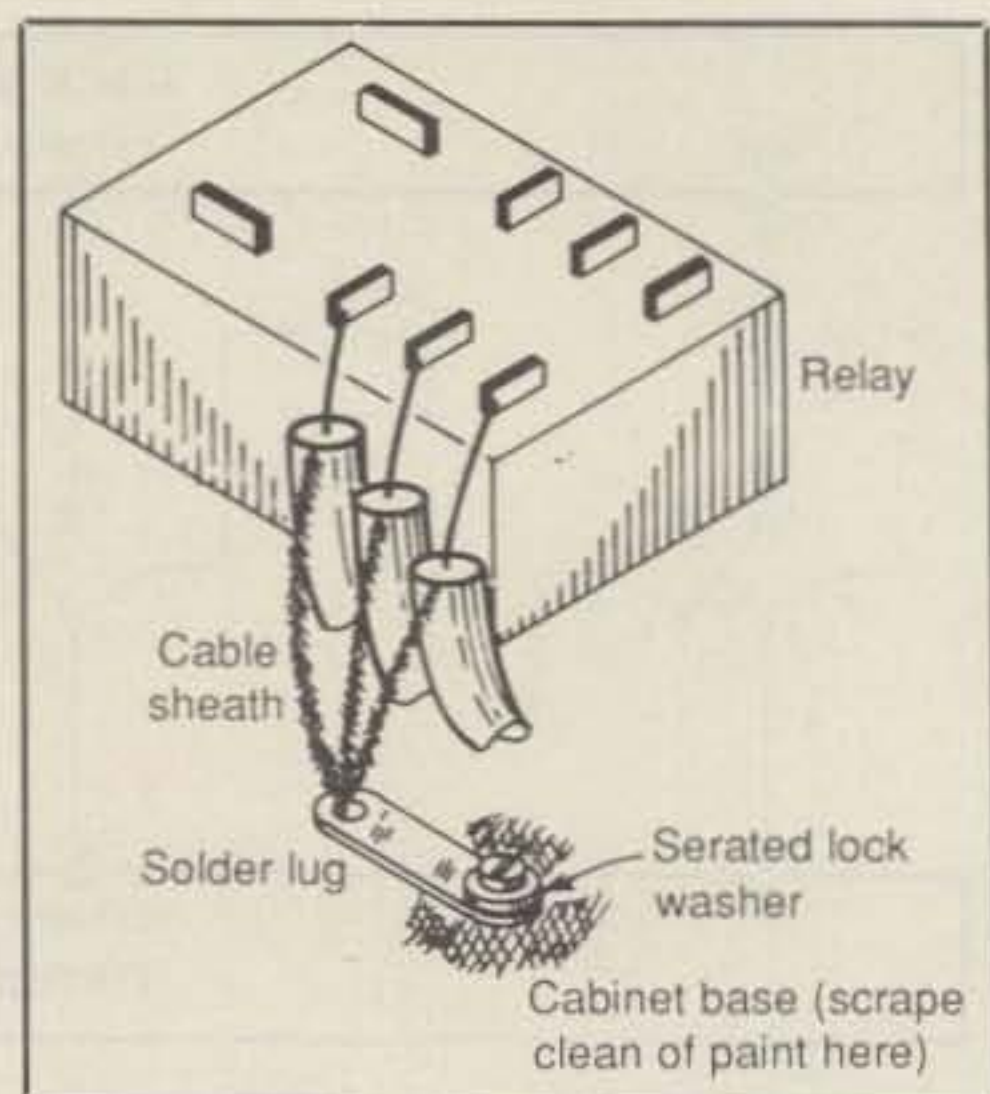


Fig. 2- Pictorial diagram showing how the shielded cable is dressed at the relays and how the cable braid is grounded.

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ing its speaker output with a resistor contributed in large measure to the smooth performance of the unit.

In planning and building this simple station accessory it was a pleasure not to have to chase all over the country for parts! Everything I needed is available at Radio Shack stores, and the whole thing can be assembled for under \$60—less, of course, if you have a well-stocked junk-box.

Before doing any construction work I drew a full-size pictorial of the parts layout and wiring. Anyone interested may have a copy free of charge in return for an SASE. Many thanks to my friend Ralph Walk, N4ORW, for the photography.

Parts List

- K1, K2, K3—DPDT, 12 volt DC relays, RS #275-218c.
- Metal cabinet, 1 $\frac{5}{16}$ " x 8 $\frac{1}{4}$ " x 6 $\frac{1}{8}$ ", RS #270-272.
- Aluminum box, 2 $\frac{3}{4}$ " x 2 $\frac{1}{8}$ " x 1 $\frac{5}{8}$ ", RS #270-235.
- J1—Open circuit $\frac{1}{8}$ inch jack, RS #274-297.
- J2—Open circuit $\frac{1}{4}$ inch jack, RS #274-1536.
- J3—Four-pin, chassis-mount socket, RS #274-002.
- R1—1000 ohm, $\frac{1}{2}$ watt resistor.
- R2, R3—7.5 ohm, 1 watt resistor (two 15 ohm, $\frac{1}{2}$ watt resistors in parallel).
- DS1—LED dual-color (red and green) RS #276-025.
- SW1—Push-on-push-off mini switch, RS #275-1555.
- D1, D2, D3—Diode, 1N914/4148, RS #276-1122.
- C1—Disc capacitor, 100 pF, RS #272-123.
- Coax cable, RG-58, 9 feet, RS #278-1326.
- Shielded cable, 1 spool, RS #278-1277.



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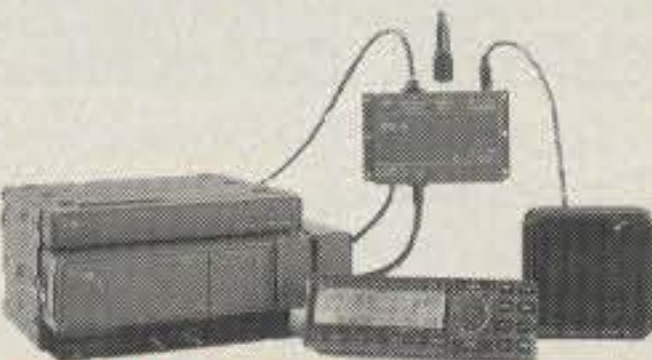
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Results of the 1990 CQ 160 Meter DX Contests

BY DONALD McCLENON*, N4IN

Conditions for CW and Phone were better than expected for this poor time in the sunspot cycle. Aurora wiped out a lot of the northern stations a good part of the time. Snow static caused a few hours of near blackouts for others. The southern QRN was not as bad as usual, but was still plenty bad. Total participation was a lot lower than last year (4359 stations on CW and about the same [4529 stations] on Phone). A strange result of all this is that most of the big guns ran higher scores than last year, while everyone else ran considerably less.

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

CW	Country	Phone
187	DL	29
—	EA	26
20	F	15
66	G	78
14	HB	—
26	I	87
164	JA	—
—	LZ	12
15	OE	14
22	OH	—
149	OK	35
14	PA	21
17	SM	—
170	UA	847
65	UA9	184
176	UB	768
13	UC	33
—	UF	10
—	UI	10
—	UL	18
10	UQ	20
69	VE	89
2876	W	1965
37	Y	—
25	YU	12
224	other	256
4359	Total	4529

Almost everyone who seriously tries to work all states on 160 has the most trouble QSOing Alaska. It is just about hopeless for most of us with present conditions. Even with 12 stations on from there, the few who worked them seemed to miss some other state. Without a thorough check, it looks like AB4RU, KY0A, and W9AZ on CW, and WB9Z on Phone were the only ones to make WAS in this year's contests.

Just as last year, all states were on, but Montana was scarce in eastern logs, and Mississippi in western ones. No claims stood up for VO2, VE8, or VY in either mode. There were 95



Czechoslovakian OK5TOP was second World-high multi-op and seventh World high on phone. OK2PZW is shown operating and OK1FCW is listening.

countries on CW and 80 on Phone, both down from last year. Some of the rarer prefixes on CW were 5H, 9H, 9M, 9Y, AH0, CN8, DU, EA8, FG, FM, GD, HL, HR, HZ, IS, IT, J6, J8, JD, KG4, KL7, LU, PZ, T7, TA, UD, UF, UH, UI UJ, UM, VP2V, VU, YB, and ZS. The similar Phone list includes 5H, 9H, A9, CT3, D4, HZ, IS, J8, JT, LU, LX, SV, V7, VU, YS, and ZS.

CW Contest January

Last year's world high scorer, GW3YDX, decided to "retire" and make only a token effort this time. He was still the only GW multiplier for most eastern US stations. YT2R* (asterisk denotes multi-op throughout story) has been high in the score lists for many years. This time they have the World high of 273,440. Runner-up was VE6OU/3, who worked nearly everyone in WVE for 272,298 and is the world single-operator trophy winner. They were followed by OK5TOP* 259,292, KP2A (K4TEA Op.) 250,268, J37XT* 248,976, UG6GAW 246,574, YT3T* 226,662, W2GD* 224,874, PJ9JT 210,715, K2WI* 200,430. Again KP2A was the only WVE DX contact for many of the smaller stations.

Top 10 scores in the WVE 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 winners box. Runners-up may be shown as winners if the highest scorer in that category received a trophy last year. (This is the last contest in which a runner-up is awarded a trophy. As of the 1991 contest the trophy will be awarded to the winner in that category whether or not he won the trophy the year before.—ed.)

QSO leaders were W2GD* 880, K5NA 735, AA4S 730, W2WI* 729, W9AZ* 722, W3KG 718, AA1K 710, W0ZV 708, AB4RU 705,



Top West German CW multi-op DK5WL antenna and shack. Other op was DK5WN, and they had a packet connection. They were tenth World-high multi-ops.

VE6OU/3 685, W00G 674. W2GD* was the only one to top last year's leader. Outside WVE, QSO leaders were OK5TOP* 565, J37XT 551, YT2R* 537, YT3T* 511, ES2WX 502, KP2A 497, UA1DZ 456, PA0ERA* 454, GM31GW* 453. High contact totals outside NA/EU were UG6GAW 428, PJ9JT 318, UZ9CWA* 305, UA9AQN 272, 4X4NJ 259, V73AZ 227, KN0E/KH3 197, UW9CYA* 188, UA9MR 162, AH0F 148.

Multipliers were harder to get with this year's conditions. W2GD* was outstanding to get the world high of 93, only 4 below last year's record. He was followed by K3KG 91, K2WI* 90, KP2A 89, AA1K 88, AB4RU* 86, W3BGN 84, J37XT* 84, OK5TOP* 83, K5NA 82, AA4S 81, YT2R* 80. DX multiplier leaders not shown above were LZ2DF 75, DK5WL* 74, YT3T* 74, OK3KAP* 73, OK1KSO* 73, GM31GW* 70, PA0ERA* 67, PJ9JT 67, OK1KQJ* 67. These ran much above last year's similar figures; the equipment and the operators must be getting better.

OK5TOP* tied last year's countries-worked record of 59. The leaders were UG6GAW 57, UA1DZ 56, OK1KSO* 54, OH1AF 54, ES2WX* 53, YT2R* 53, DK5WL* 53, GM31GW* 52, YT3T* 52. WVE country leaders were almost a carbon copy of last year: K2WI* 41, W2GD*

*3075 Florida Ave., Melbourne, FL 32904

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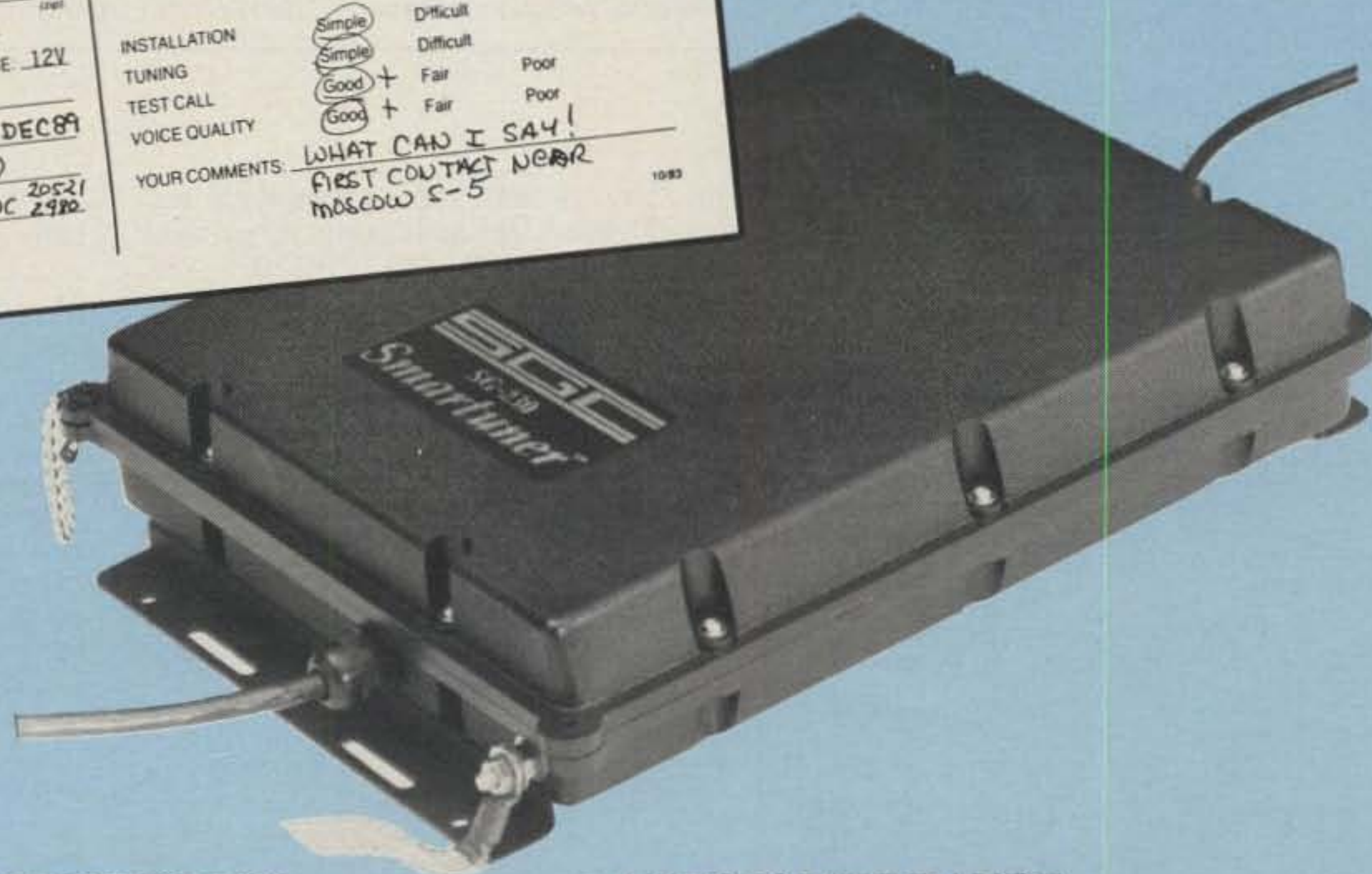
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40, K3KG 39, W3BGN 38, AA1K 37, AB4RU* 33, K5NA 33, AA4S 30, K1IK 29, KY1H* 29, N6TR 28.

Selected best-hour QSO rate producers were AA4V* 102, UA1DZ 98, W2GD 89, K5ZD 83, LZ2DF 80, AA1K 80, HA8DZ 75, KV8Q 75, K4PI 73, K3KG 72, YT3AA 70, VE6OU/3 70. As noted last year, one super hour does not have much bearing on one's final score.

Single and multi-op winners in each state, province, and country will receive CQ certificates. In very close races runners-up will also receive one, as will all in the top 10 group.

Phone Contest February

We keep hearing complaints of lack of a DX window, but no one has yet come up with where it should be located or how it would be policed. It's sort of like too much splatter and too much power. Peer pressure, technical assistance, and gentlemanly behavior seem to do the most good. Of the 80 active phone countries, any of the following could cause pile-ups: 5H, 9H, A9, CT3, D4, HZ, IS, J3, J8, JT, LU, LX, SV, V7, VU, YS, ZS.

World high score of 373,796 was made by UG6GAW. It was almost equal to last year's best. VP9AD* (again asterisk denotes multi-op), using an excellent computer program, was next with 326,560. For many W/VE "little pistols" he was the only DX worked. Next in order were top U.S. scorer WB9Z* 205,902, K5NA* 167,783, YZ1E* 163,659, YV1CP 142,618, LZ2DF 134,784, K3KG 133,663, AB4RU* 116,094, K2WI* 112,815, OK5TOP* 112,612, WB8IFP* 112,329, K3TUP 106,020, WD9INF* 102,297, KD9SV 100,688. This is a few more over 100K than last time.

WB9Z* just beat last year's QSO record by making 1073 valid contacts. He was followed by K5NA* 911, UG6GAW 871, K3TUP 805, WB8IFP* 804, K3KG 803, AB4RU* 800, WD9INF* 773, VP9AD* 771, KD9SV 743,



Adjusting top load of OZ1FTE 25 meter high vertical. When operating, there were many radials fanning out from where the top of the tall ladder shows. This station posted the highest Denmark phone score.

TROPHY WINNERS

Single Operator CW

World by K5AAD: Winner John Sluymer, **VE6OU/3** (The David Busick, N5JJ Memorial)
U.S.A. by K4TEA: Winner Jon Zaines, **AA1K**
Zone 3 by KM4MG: Winner Paul Gordon, **N6LL** (WA6CDR Op.)
Zone 4 by K5NA: Winner William R. Tippet, **W0ZV**
Zone 5 by WA4CUG: Winner Ron Bailey, **AA4S**
Africa by K4SB: Winner Stephen G. Hawley, **CN8FC** (WA4UAZ)
Asia by NE4S: Winner Robert Grigoriyan, **UG6GAW**
Europe by K4UEE: Winner Mike I. Petkoff, **LZ2DF**
Oceania by K4TKM/6: Winner Roi-Namur Radio Club, **V73AZ** (NZ8B Op.)
South America by K4JAG: Winner John H. Thompson, **PJ9JT**

Phone

World by K5AAD: Winner Robert Grigoriyan, **UG6GAW** (The David Busick, N5JJ Memorial)
U.S.A. by K4JRB: Winner Jack Satterthwaite, **K3KG**
Zone 3 by N4ONI: Winner Jack Morgan, **W1FEA**
Zone 4 by KC4MJ & KM4IH: Winner Gary R. Nichols, **KD9SV**
Zone 5 by K4ODL: Winner John Kanzius, **W3TUP**
Africa by WB4ZNH: Winner Thomas J. Warren, **5H3TW**
Asia by W4LVM: Winner Sheridan K. Street, **A92BE**
Europe by N4NX: Winner Mike I. Petkoff, **LZ2DF**
Oceania by K4DLI & KB4SSS: Winner Jack Wheeler, **KH6CC**
South America by KL7JAR/4: Winner Cedric Puchalski, **YV1CP**

Multi-Operator CW

World by N4RJ: Winner Radio Club RTV Zagreb, **YT2R**

Phone

World by Southeastern DX Club: Winner Jerry Rosalius, **WB9Z**

K8MJZ 731, K2WI* 700. Outside W/VE high contact totals not previously listed were YZ1E* 596, LZ2DF 529, OK5TOP* 462, OK1DXS 404, IO4YSS 300, LZ1KWZ 269, LZ5W* 250, YV1CP 238, RF6FM 234. Outside NA/EU contact leaders were UG6GAW 871, YV1CP 238, RF6FM 234, A92BE 167, HK4DUM 156, UA9MR 155, KH6CC 149.

The highest multiplier of 81 was made by WB9Z*. This is only 5 short of last year's top, and is remarkable, considering so many fewer were available. VP9AD* was right behind with 80. Next in order were K5NA* 77, K3KG 73, AA4MM 70, K2WI* 69, AB4RU* 66, WB8IFP* 63, YV1CP 61, WD9INF* 61, AA1K* 60. DX leaders not shown above were HK4DUM 54, KZ3H/KP2 54, IO4YSS 52, YZ1E* 51, LZ5W 50, XE1VIC 50, LZ2DF 48.

IO4YSS with 49 countries led the parade in this category, with 8 more than last year's winner. Next in line were YZ1E* 47; LZ5W* 46; OK5TOP*, UG6GAW, and LZ2DF all 46; OZ1FTE 45; EA3ALD and OK1DXS both 43. W/VE country leaders were WB9Z* 29; K5NA* 25; AA4MM 24; K3KG 22; K2WI* 18; AA1K* 17; KY1H* 15; AB5RU* 15; WB8IFP*, W2FCR, and N4IN all 14.

By far, the best-hour QSO rate of 153 was made by W9RE, who waited several hours to get on and quit when his hour was up. Other top rates noted were AA4V* 115, K3WW* 114, W2GD* 106, UG6GAW 105, KD9SV 105, K3ZO 104, K4PI 103, WB8IFP* 102, W0ZV 99, WB9Z* 99.

Sponsors and trophy winners for various categories are shown in the trophy winners box. Single and multi-op winners in each state,

province, and country will receive CQ certificates, as will top 10 and close seconds.

Miscellaneous

We repeat the plea to be sure your submitted log is legible. Fix faded calls on xerox copies. Make sure we can tell the difference between N and W, D and O, etc., on written logs. If the call is unreadable, you lose it. Include a stamped, self-addressed card if you want assurance that your log arrived. Leave dupes in the log and mark them as such. The other guy might delete the other one, and you could lose a multiplier on the "not-in-log" check. Make a careful dupe check so you don't lose penalty points for claiming any. Above all, don't change a dupe call to a similar unique one. This could be an honest mistake, but there should be a small number of them. This time we will not list border-line disqualification cases, but they will be carefully checked in 1991.

Club Competition

The Frankford Radio Club was again in first place, with a bigger score than last year, even under poorer conditions. The Southeastern DX Club was again runner-up with a score only a bit below last year. They were the only club other than Frankford to have a seven-figure score. The Yankee Clipper Contest Club was third, moving the Society of Midwest Contesters to fourth this time. There were 82 clubs reporting, nearly the same as last year. It's a lot of work to

TOP 10 SCORES

Top 10 W/VE Single Op. CW		Top 10 W/VE Single Op. Phone	
VE6OU/3	272,298	K3KG	133,663
AA1K	184,624	K3TUP	106,020
AA4S	171,558	KD9SV	100,688
K3KG	170,079	K8MJZ	93,279
(K4BAI Op.)	KB4WQO		82,740
K4NA	166,952	W0ZV	78,120
W3BGN	153,636	K1IK	76,676
VE3DO	149,358	AA4MM	75,040
W0ZV	138,972	K4LLQ	65,968
K1IK	124,564	AA4NU	60,262
VE3KP	122,960		

Top 10 DX Single Op. CW		Top 10 DX Single Op. Phone	
KP2A	250,268	UG6GAW	373,796
(K4TEA Op.)	YV1CP		142,618
UG6GAW	246,574	LZ2DF	134,784
PJ9JT	210,715	OK1DXS	88,193
LZ2DF	184,575	HK4DUM	81,702
UA1DZ	132,888	IO4YSS	75,816
OH1AF	129,151	(I4YSS Op.)	
4X4NJ	128,804	A92BE	63,294
I3VHO	119,770	KZ3H/KP2	60,858
V73AZ	116,176	RF6FM	55,848
(NZ8B Op.)	LZ1KWZ		55,760
DK8ZB	115,164		

Top 10 Multi-Op. CW		Top 10 Multi-Op. Phone	
YT2R	273,440	VP9AD	326,560
OK5TOP	259,292	WB9Z	205,902
J37XT	248,976	K5NA	167,783
YT3T	226,662	YZ1E	163,659
W2GD	224,874	AB4RU	116,094
K2WI	200,430	K2WI	112,815
GM3IGW	188,510	OK5TOP	112,612
PA0ERA	173,597	WB8IFP	112,329
OK3KAP	173,302	WD9INF	102,297
DK5WL	169,978	WZ8D	86,420

gather CW and Phone data from hundreds of logs and combine it for this tabulation, so from now on we will require at least two logs from a club before listing it.

Next Time

The CW contest will be held the last full weekend of January 1991 (January 25, 26, 27) and the Phone contest will be held the last full weekend of February 1991 (February 22, 23, 24). 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 log sheets or make up your own, 40 QSOs per page, with Universal Time (Z), station, info sent and received, sequentially numbered multipliers as each is first worked, and claimed points. Typed or computer lists are very helpful, and there is no restriction on QSOs per page, but either number the QSOs or put a separation between groups of ten. Separate the pages of fan-fold paper, and clarify any calls written on the folds. Include a summary sheet showing your name, address, call, and state, province, or country of operation. Multi-ops show who was operating at all times.

If you make over 200 QSOs, include a check



Gregory, UA2EC, was in both the CW and Phone sections of the contest, providing a fairly rare multiplier.

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. Be sure you have enough postage on your entry. Good photos of your setup are especially desirable. They may be sent after log deadlines.

Hope to meet in both 1991 contests!

73, Don, N4IN

Soapbox CW DX

Rained the whole weekend . . . C6A/N4FD. Communist police severely beat up our computer expert, OK1FUA. Computer paper all used up for various revolution printings, and couldn't get any for this log until early March. Big thrill to work west coast WVE . . . OK5TOP. Our Beverage hears WVE much better than they hear us . . . DK5WL. Had to use a backup site with antennas inferior to last year. Conditions much better than expected . . . PA0ERA. 80 MPH wind meant no kite-borne vertical. Static-charged rain blew a receiver. It's still a great contest . . . GM3IGW. Twelve KL7's on, and conditions so bad, we couldn't even work each other . . . KL7Y. Amazed I could work EU without an amplifier . . . JP1DMX/HI8. Aboard CMV "Koeln Atlantic" passing the Grand Banks/New Foundland . . . DJ4SO/MM.

Hurricane Hugo meant 60 foot inverted L rather than 170 foot vertical, and lots of noise from haywire power lines . . . KP2A. Last 160 operation from here before leaving . . . CN8FC. Temporary antenna at new QTH. Hope much better next year . . . 4X4NJ. DX stations please listen JA frequency 1907-1912 . . . JR1JV. Couldn't join GM3IGW this year so did the best I could from home . . . G3BBD. Had to quit



VE3CUI relaxing at his neat station after participating in both the CW and Phone contests.

much too soon. Will return next year . . . OY9JD. Amazing signals from Caribbean. Worked 8 new ones . . . OH1AF. Please note that anything above 1830 is jammed by Loran. See you next year on 1824 . . . AH0F. Was encouraged by nearly 200 QSOs first night, but after 30 QSOs in 7 hours, gave up second night . . . V73AZ.

Soapbox CW W/VE

My work keeps getting in the way of my contesting . . . WC7S. The insulated vertical played well after working on it all summer . . . WD8LLD. Thrill to have 4 multipliers answer my CQs . . . KV8Q. Low-band contesting is interesting; will enter again . . . N0BNG. My poor showing was only matched by Denver in the Super Bowl . . . KD0EE. First year with amplifier; 7 dB power increase only boosted score 3 dB . . . K0RW. Lots of sunspots cause ecstasy to HFers and agony to "cellar dwellers" like me on 160 . . . VE3CUI. Spent hours calling Europeans, but this is always an enjoyable contest . . . VE3DO. Linear quit just before contest, and vertical quit halfway through. Next year has to be better . . . VE4JB. Last year equipment problems, this year job deadline, so next year should be great! . . . VE2DJI.

Real thrill to have DX call me. Will sure be in future contest . . . WA3LFY. Snow shut down airport Saturday nite, and static shut me down. Taped whole contest and corrected 2% on playback . . . K3TUP. Surprisingly good condx this time in sunspot cycle . . . W3BGN. Friendly and efficient operators made this one a real pleasure . . . K3EI. Again, using packet and local nets ahead of time, we got about 100 stations to get on and work us. Most of them would not have done so otherwise, and many stayed on and provided lots more activity . . . W2GD. Balloon antenna tuner kept arcing and finally burned up . . . AB4RU. Good contest, courteous operators, enjoyed the DX and good band condx . . . NC1R. Equipment problem limited power to a few watts first night. No EU at all second night . . . N4IN.

Terrible 110,000 volt power line noise, but enjoyed contest anyhow . . . W4ROM. Just got the vertical going for the contest and with 100 W it worked great . . . K4TO. Bad enough that friends came over to play cards, but I never won a game! . . . AA4NJ. Lots of fun. Too bad we must wait a whole year for the next one . . . N4FHD. This contest is more relaxed than those on other bands. I look forward to another next year . . . K4WJV. Wow! 29 Europeans on Saturday night. So this is what I'm missing on the west coast . . . N6TR/5. Wife scheduled a Friday night party, so Saturday night was extra busy . . . KB5UK. A great contest for us little guns . . . KB5GON. Balloon vertical worked fine until 50 MPH wind broke the wire . . . N6DX. Thanks to CQ for providing this great fun event each year . . . WC7S. Put up dipole in dark Saturday. Enjoyed easy-going, no-pressure operation . . . K6GNX. A real challenge in these conditions . . . KS7T. Good food, good company, lousy condx . . . W7DG. First time on computer software; it's the only way to go . . . W0ZV.

Soapbox Phone DX

This contest is always a wonderful experience. Poor propagation limited DX contacts this time . . . IO4YSS. Very high noise level as always.

AGGREGATE CW AND PHONE CLUB SCORES

Club Name	Total Score	CW	Phone	Club Name	Total Score	CW	Phone
Frankford Radio Club	2,362,314	W2GD	VP9AD	Northern Calif. Contest Club	43,551	K6MO	—
Southeastern DX Club	1,301,759	KP2A	K3KG	Punto Fijo DX Club	40,350	—	YV1EQW
Yankee Clipper Contest Club	883,047	K5NA	K5NA	Outaovais Contest Ops. Association	37,281	VE2OJ	—
Society of Midwest Contesters	610,726	W9AZ	WB9Z	Western Washington DX Club	35,780	W7BYK	KA7AUH
Contest Group OK5TOP	371,904	OK5TOP	OK5TOP	Boiled Owls of New York	35,378	NA2M	—
Potomac Valley Radio Club	369,417	W3GG	KZ3H/KP2	Sun Country Amateur Radio Club	35,365	K4UBR	—
North Coast Contesters	332,153	K5ZD/3	K3TUP	Rendsburg Club Station	31,730	DL0FJ	—
Carolina DX Association	317,438	AA4S	AA4V	Fraser Valley DX Club	31,239	—	VE7WJ
Radio Club RTV Zagreb	273,440	YT2R	—	Utah Contest Club	31,206	K6XO	WT7D
Michigan DX Association	248,976	J73XT	—	Radio Club of OK2KRK	30,498	OK2KRK	—
Mile High DX Association	246,750	W0ZV	W0ZV	Hoosier Contesters	28,989	K9FW	—
Ivan Cankar Radio Club	226,662	YT3T	—	Radio Club of Prerov	28,980	OK2KJU	—
Mad River Radio Club	188,354	—	WD9INF	Central Virginia Contest Club	28,623	K4BAM	—
Radioklub OK3KAP	173,302	OK3KAP	—	Radio Club of Nejdek	27,370	OK1KMC	—
Saar-Pfalz DX Club	169,978	DK5WL	—	Kaunas Poly. Institute Radio Club	23,929	LY3BU	LY2BTD
Academy RC Mihailo Pupin	163,659	—	YZ1E	Ukrainian Contest Club	23,577	UB3MP	—
Radio Club Chomutov	156,877	OK1KSO	—	Providence Radio Association	23,361	W1OP	—
Radio Club Liaz	154,904	OK1KQJ	—	Radio Club of Mez Vsetin	21,886	OK2KJT	—
Viimsi Radio Club	148,446	ES2WX	—	Kansas City DX Club	21,726	KB0G	—
YV DX-Pert Team	142,618	—	YV1CP	Albany A.R.A. of New Jersey	16,830	NW2J	—
Tartu Radio Club	131,319	ES5RY	ES5MG	Kettle Moraine Radio Club	16,634	N9KS	N9KS
North Texas Contest Club	120,018	K5WXZ	K5WXZ	Tokyo University Amateur Radio Club	15,687	JA7YAA	—
Southern California Contest Club	113,250	N6DX	—	Nikolaev Radio Club	15,544	UB5ZME	UB5ZME
Dixie DXers	113,209	C6A/N4FD	KM4GW	French Fovel Radio Club	15,364	NE3F	—
Bavarian Contest Club	107,965	DL8OH	—	Vorosmilovgrad Radio Club	15,312	—	UB4MXR
Radio Club DK0BN	105,840	DK0BN	—	Big River Club	13,566	—	KN5S
St. Louis Amateur Radio Club	103,739	K0LIR	K0LIR	Arrowhead Radio Amateurs	11,430	W0RXL	—
Derby City DX Association	99,234	N4XA	—	Un. Metro Sans Felistes de Montreal	10,143	—	VE2HLS
Club UZ2FWA	98,302	UZ2FWA	—	Petaluma DX Society	8,511	WB6EGE	WB6EGE
H.I.C.K.S.	92,661	K9UWA	—	Northern Rhode Island Radio Club	7,453	NZ1H	—
Northern Ohio Amateur Radio Club	81,094	—	K8SVT	Club UB4IZH	6,749	UB4IZH	—
YU DX Club	80,850	YT3AA	—	Columbia Amateur Radio Club	5,828	—	AB4MG
South End Snobs	71,649	—	K8EX	Zaporozhne Radio Club	3,598	RB5QOS	—
Grand Mesa Contesters	71,296	KJ0G	K0GAS	Canton Amateur Radio Club	1,932	W8IM	—
Utica Amateur Radio Club	70,406	NA2A	NA2A	Club RB4IWX	1,840	RB4IWX	—
Hadju County Radio Club	67,158	HG0D	—	Mienurinsk DX Group	1,490	—	RA3ROT
Radio Club Kobrin	65,790	UC1LWN	—	Ham Club of Kyushu Tech	1,392	JA6YJS	—
R.A.C. of Greater Milwaukee	55,098	WA9TZE	WA9TZE	Radio Club of OK3KFO	1,350	OK3KFO	—
Polish DX Club	52,096	SP5INQ	—	Hamfesters Radio Club	1,020	—	W9CA
Snake River Club	52,026	—	NK7U	Radio Club of OK1OFM	891	OK1OFM	—
Willamette Valley DX Club	50,098	A17B	—	Canadian International DX Club	660	—	VE6SWL

Over-modulated off-frequency Russian calls difficult to identify. The work of putting up a 160 antenna was well worth it . . . *A92BE*. Biggest thrill was working UG7 and UL7 when the noise let up . . . *KZ3H/KP2*. As usual some got OZ1BTE and OZ1FTE confused. Hope nobody deleted either of us from his log . . . *OZ1FTE*. First time on 160. Several North American stations were all mouth and no ears. Better luck next time . . . *OZ1ADL*. We had to do some fancy doctoring of K1EA's computer program for the contest, but we can't say enough good about it . . . *VP9AD*. It was fun on phone, which we can't do in Japan, but we sure need an amplifier . . . *JP1DMX/H18*. With two other locals only four blocks away, I missed several weak stations . . . *YV1CP*. Couldn't work Europe thru local station QRM . . . *YV1EQW*.

Soapbox Phone W/VE

Excited to be called by 28 DXCC countries. Biggest help was having KA9TNZ and his great ears . . . *WB9Z*. Lots of fun, but rain here cut my rate . . . *K3TUP*. Saturday daytime lull allowed me to clear the snow that made all that Friday night noise . . . *K1IK*. Wife and neighbors now resigned to accept the 160 antenna that works so well . . . *WC7S*. Missed Maine in both CW and Phone contests . . . *W0ZV*. Already looking forward to next year . . . *KD0OZ*. One station



Most CW operators owe their Oklahoma multiplier to this K5CM multi-op. Left to right are K5CM, WM4Z, and N5CG. N5KW must have taken the picture, as he was also on the team.

MFJ's Deluxe 300 Watt Tuners

... gives you ham radio's most popular tuner with *built-in dummy load*, a *peak* reading (and average) Cross-Needle meter, *full* 1.8-30 MHz coverage, antenna switch, balun and a full one-year *unconditional* guarantee for only ... \$149.95

Made in U.S.A.

MFJ-949D

\$149⁹⁵

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



You won't find all the MFJ-949D features in any other 300 watt tuner, not even at twice the price — or twice the size.

Put the most power into your antenna

The MFJ-949D Deluxe 300 watt tuner matches your rig to virtually any antenna from 1.8-30 MHz so you get maximum power out.

It tunes out SWR on verticals, dipoles, inverted vees, random wires, beams and mobile whips fed by coax, balanced lines and wire.

Lighted peak reading meter

MFJ's *peak* (and average) reading Cross-Needle meter shows you SWR, forward and reflected power — all in a glance. Shows peak SSB power.

The meter is illuminated for easy reading in dim light. Has light switch. Lamp requires 12 V.

Built-in dummy load

A built-in 300 watt 50 ohm dummy load makes tuning up your rig soooo easy. It reduces needless QRM and saves your finals.

You'll find it handy for testing and repairing your rig, setting power level, adjusting your mike gain and more.

An external dummy load can cost you *another \$30* — plus it takes up valuable space at your operating position and requires another cable.

Full 1.8 to 30 MHz coverage

Make sure the tuner you're considering covers *all* the HF bands ... the MFJ-949D does.

Plus more ...

You get an antenna switch that lets you select 2 coax lines (direct or thru tuner), random wire

or balanced lines and built-in dummy load. You get a 4:1 balun for balanced lines.

Unconditional Guarantee

You get a full one year unconditional guarantee. We will repair or replace your MFJ-949D (at our option) *no matter what* for a full year.

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

SWR and maximum power into your antenna. After all, isn't that why you use a tuner?

High efficiency and a compact size

The MFJ-949D uses a single high-Q airwound coil that takes up a minimum of space without mutual coupling problems.

You get a highly efficient tuner that puts maximum power into your antenna *and* a compact 10x3x7inch size that 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.*

Easy to tune

With the MFJ-949D once you select the correct inductance, you can turn on your transmitter and tune *both* capacitors for minimum SWR.

Tuners with *two* tapped coils make tuning clumsy, slow and tedious.

You have to turn off your transmitter *each time* you adjust either of the two inductors. Then turn it back on to readjust the capacitor and to check for acceptable SWR.

MFJ tuners — Made in the USA

You get the most tuner for your money because MFJ tuners go directly from our factory to your dealer. We're not just an import-er adding profits, tariffs and import charges.

Get yours today!

Why settle for an imitation when you can own an MFJ original? Get your MFJ-949D today!

New MFJ Deluxe 300 Watt Tuner



MFJ-948

\$129⁹⁵



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

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

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

Precise control for minimum SWR

The MFJ-949D gives you more precise control for minimum 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 precise control to get minimum

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

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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.

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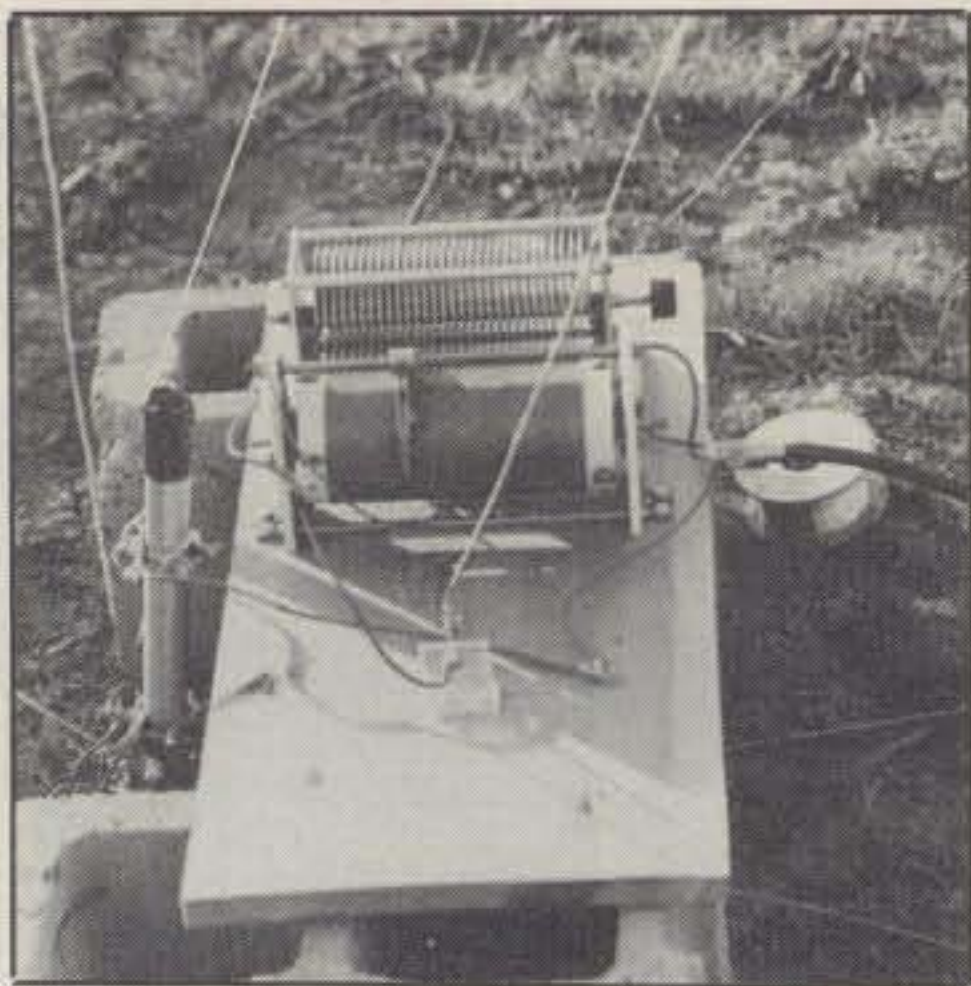
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For a few extra dollars the MFJ-962C lets you use your barefoot rig now and have the capacity to add a 1.5 KW PEP linear amplifier later. It covers 1.8 to 30 MHz.

You get MFJ's new peak and average reading Cross-Needle SWR/Wattmeter.

You also get a 6-position antenna switch and a teflon wound 4:1 balun with ceramic feed-thru insulators for balanced lines. Measures just 10 3/4 x 4 1/2 x 14 7/8 inches.



Balloon-supported vertical antenna tuner at top Georgia multi-op AB4RU. It didn't survive the contest, but AB4RU and AA4GA had other antennas and ended up with 705 contacts in 33 countries. They were one of the very few who worked all 50 states. They had the eleventh World-high CW multi-op score.



This is what kept multi-op K4UBR going on CW (N4TSV on the left and N2DCP on the right).

kept calling "QRT Contest." That's what late-night contesting can do to you... NE1I. Never entered phone test, because didn't think there was much activity and I probably couldn't make many contacts. Boy was I wrong. Great contest, great fun, CU next year... KZ1M. After 4 hours, I figured I needed an amp, so I built one between contacts... KN2T. I and several

other stations had snow imposed blackouts... K2WI. Wind blew hard all weekend, so couldn't use the balloon... AB4RU.

Third straight year of having surgery a week prior to the contest. This has to stop!... KF4HK. Friday night water pump quit. Saturday night big club dinner. Still made about same score as other years... W4TMN. Thanks to my wife for the loan of her computer... NX9T. Almost as much fun as Field Day. Operators are some of the best. Awaiting next year... WD8KOI. Bad head cold made everyone sound like they were under water... W8WEJ. Trying for best hour award (153 does it)... W9RE. Couldn't understand why band was so dead Saturday nite until my wife called me to come up and look at the "beautiful aurora"... KJ0B. Strong wind broke my sloper. Climbed tower and fixed it with sub-zero wind chill... K0RW. Heard east coast for 25 minutes Friday evening, but couldn't work anyone. Band dead till 0400, then a few signals. Even worse Saturday. Got a new linear for this; should have let the money earn interest till next year... VE6JY. Put up a beverage Saturday PM in snowstorm, but would have been better off sleeping, for all the good it did... VE3NXA.

K0ET, KA0YFN, K0LIR: AA0A, KE0YO, KB0KK, N0IS, W0HBH, WD0CHW, WD0FPY. VE20J: VE2FLD, VE3NJ, VE30M. C6A/N4FD: N4FD & NQ4I. J37XT: W0CD, K8GG, W8SEY, W8UVZ. JA7YAA: JJ3CNL & Net. JA3YKC: JF3VXV, JG3MRT, JG3WDN, JR5PDJ. JA6YJS: JF4ETK, JI6KYZ, JR5BMM, JS1PWV. UZ9CWA: UA9CR, UA9CGA, UV9CAF. UW9CYA: UB5FFZ, UW9CK, UW9CZ. OK5TOP: OK1AUT, OK1DFP, OK1DIX, OK1DQW, OK1DWC, OK1FCW, OK1FOW, OK1FQL, OK1FUA, OK3TCW, OL1BRA, OK1-31506. OK3KAP: OK3CWQ, OK3PA, OK3TPV, OL8COS, OL8CUT, OL8CVU, OL8CWB. OK1KSO: OK1AEZ, OK1CF, OK1JJB, OK1JKT. OK1KQJ: OK1DXA, OK1DXK, OK1DXS. OK2KRR: Not shown. OK2KJU: Not shown. OK1KNC: OK1DWG, et al. OK2KJT: OL7BTX, et al. OK2KBA: OK2PMA, et al. OK10FM: OK1DRQ, OK1-22847. DK5WL & DK5WN, Packet. DL80H & DF3CB, DK3NV, DK6QX, DL2NB, DL4NAC, DL5RBU, DL6NBU. DK0BN: DK5PD, DK7PE, DL1KS, DL6WT. DL0FJ: DK8LN, DL4LV. DL5TV/P & DL3SAU. DL8NBE & Y22KK. HG0D: HA0DR, HA0HG. PA0ERA & PA3DQW, PA3EYZ. PA3BAS & PA3AUC, PA3CLH, PA3DSB, PA3BPL. GM3IGW: G3IGW, G4GLL, G4MH. YT2R: YU20G, YU20H, YU2RA. YT3T: YU3BQ, YU3HR, YT3EW. UC1LWN: 2 Ops. ES2WX: ES2RJ, ES2RR. UZ3AXX: RA3DUU, UA3-170-210, UA4-131-410. UZ6LWZ: UB4JEZ, UV6LPL. UZ6LWB: RA6LW, UA6-150-1125, UA6-150-1443. UZ2FWA: UA2FC, UA2FEA, UA2FJ, UA2FX. UB4IZH: Ivanchenko, Bezsmertny, Ivanchenko. RB4IWX: Parokhin, Ashadulin, Kravchenko.

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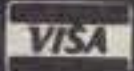
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CW Multi-Op Station Crews

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Phone Multi-Op Station Crews

KY1H & NS1M, Packet. NE1I & KA1USE, WA1Z. K2WI & N2NU, WA2IUO. K5NA & KU2Q, WB2Q. AA1K & Packet. K3WW & Packet. K3UA & Packet. AB4RU & WS4F. WB4ZNH & KA4HNE, N4UOG. K4PI & Packet. KC4MJ & Packet. AA4V & Packet. W5MPX & WD0CEN, WD5ICM. N6LL & WA6CDR. W6UE: KA6SAR, N6URH. WB6EGE: N6QC, WB6WPO. NK7U & NI7T. WE8Z & K8AQM, KB8ECG, N8IVQ, NU8Z. K8EX & KB8QF, KE8KW, N8KBW, N8KMD, NS8V, WJ8T, WM8C. WB8IFP & KA8POM, KD8FO, KD8YR, N8EYM, WD8ROD, WF8N. WD9INF & KN8R. WZ8D & W9VNE, WA8NJR, WD8ISK. WB8J & K8IP, WB8S. WB9Z & KA9TNZ. WA9F & NU9T. KA9CLP & WB9GOJ. WM9M & N9HDF, NY9L, WD8LLR, WF9B. N0BSA & N0BLU. K0LIR: AA0A, KB0KK, KC9AL, KE0YO, N0IS, NZ0V, W0HBH, WD0CHW. VE2HLS & VE2GBY, VE2JYC, VE2YLB. VP9AD & W3MA. JP1DMX/HI8: JP1DMX & Nonaka. LZ5W: Iglev, Uzunov. OK5TOP: OK1DFP, OK1DQW, OK1DWC, OK1FCW, OL1BRA. YZ1E: YU1MSK, YU1ZB, YU6AR, Slavko, Vel. UC1AWC: Pereprava, Skokov, Sologob. UZ4YWY: UA4YGM, UA4YGT. UB4MXR: UB4MLD, UB4MLP, UB4MVK. UB3IWA: UB5-073-3135, UB5-073-4235. UB4LWA: UB5LPZ, RB5LTG.

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MFJ-422B

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

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

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

Deluxe 300 W Tuner



MFJ-949D
\$149⁹⁵

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

Antenna Bridge

MFJ-204B
\$79⁹⁵

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

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



Super Active Antenna

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

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

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

VHF SWR/Wattmeter

MFJ-812B
\$29⁹⁵

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



MFJ Coax Antenna Switches



\$34⁹⁵ MFJ-1701



\$21⁹⁵ MFJ-1702B



\$59⁹⁵ MFJ-1704

Select any of several antennas from your operating desk with these MFJ Coax Switches. They feature mounting holes and automatic grounding of unused terminals. They come with MFJ's one year unconditional guarantee. MFJ-1701, \$34.95. Six position antenna switch. SO-239 connectors. 50-75 ohm loads. 2 KW PEP, 1 KW CW. Black alum. cabinet. 10x3x1 1/2 inches. MFJ-1702B, \$21.95. 2 positions plus new Center Ground. 2.5 KW PEP, 1 KW CW. Insertion loss below .2 dB. 50 dB isolation at 450 MHz. 50 ohm. 3x2x2 in. MFJ-1704, \$59.95. 4 position cavity switch with lightning/surge protection device. Center ground. 2.5 KW PEP, 1 KW CW. Low SWR. Isolation better than 50 dB at 500 MHz. Negligible loss. 50 ohm. 6 1/4 x 4 1/4 x 1 1/4 in.

"Dry" Dummy Loads for HF/VHF/UHF



MFJ-260B
\$28⁹⁵

MFJ-262
\$69⁹⁵

MFJ-264
\$89⁹⁵

MFJ has a full line of dummy loads to suit your needs. Use a dummy load for tuning to reduce needless (and illegal) QRM and save your finals. MFJ-260B, \$28.95. VHF/HF. Air cooled, non-inductive 50 ohm resistor. SO-239 connector. Handles 300 Watts. Run full load for 30 seconds, derating curve to 5 minutes. SWR less than 1.3:1 to 30 MHz, 1.5:1 to 150 MHz. 2 1/2 x 2 1/2 x 7 in. MFJ-262, \$69.95. HF. 1 KW. SWR less than 1.5:1 to 30 MHz. 3x3x13 in. MFJ-264, \$109.95. Versatile UHF/VHF/HF 1.5 KW load. Low SWR to 650 MHz, usable to 750 MHz. Run 100 watts for 10 minutes, 1500 watts for 10 seconds. SWR is 1.1:1 to 30 MHz, below 1.3:1 to 650 MHz. 3x3x7 inches.

MFJ Ham License Upgrade Theory Tutor



MFJ Theory Tutor practically guarantees you'll pass the theory part of any FCC ham license exam. Versatile MFJ software is the best computer tutor ever tailor-made for ham radio. You can study the entire FCC question pool, selected areas and take (or print) sample tests. Auto. saves each study session (ex. sample tests), gives you all FCC test graphics (ex. mono.), explanations of hard questions, pop-up calculator, weighted scoring analysis, color change option and more. Order MFJ-1610-Novice; MFJ-1611-Tech.; MFJ-1612-Gen.; MFJ-1613-Adv.; MFJ-1614-Ex. for IBM compatible. For Macintosh: MFJ-1630-N; MFJ-1631-T; MFJ-1632-G; MFJ-1633-A; MFJ-1634-E, \$29.95 per license class.

MFJ Speaker Mics

MFJ-284 or MFJ-286
\$24⁹⁵

MFJ's compact Speaker/Mics let you carry your HT on your belt and never have to remove it to monitor calls or talk.

You get a wide range speaker and first-rate electret mic element for superb audio on both transmit and receive.

Earphone jack, handy lapel/pocket clip, PTT, lightweight retractable cord. Gray. One year unconditional guarantee.

MFJ-284 fits ICOM, Yaesu, Santec. MFJ-286 fits Kenwood.

MFJ-1278 Multi-Mode Data Controller

MFJ-1278 Use computer to transmit/receive in all 9 digital modes: Packet, AMTOR, ASCII, CW, RTTY, FAX, SSTV, Contest Memory Keyer and Navtex receive. Easy-Mail™ Personal Mailbox, Built-in printer port, 20 LED tuning indicator, AC power supply, Host/KISS, 32K RAM, Multi-gray level FAX/SSTV modem, CW key paddle jack and tons more. Options include 2400 baud modem (MFJ-2400, \$79.95) and software starter packs with computer cables, \$24.95 each, for IBM compatible, Commodore 64/128, Macintosh and VIC-20.



12/24 Hour LCD Clocks



\$19⁹⁵ MFJ-108B \$9⁹⁵ MFJ-107B

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

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

Cross-Needle SWR/Wattmeter

MFJ-815B
\$69⁹⁵

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

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

Deluxe Code Practice Oscillator

MFJ-557
\$24⁹⁵

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

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

MFJ Multiple DC Outlet

MFJ-1112
\$29⁹⁵

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

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Number groups after calls denote score, total QSOs, multiplier, countries worked. Multi-op scores follow single-op listings. State, province, and country certificate winners are shown in boldface.

**CW
SINGLE OPERATOR
NORTH AMERICA**

UNITED STATES

Connecticut

K3HVT 54,634 398 59 16
N4XR 10,332 94 41 11

Maine

KN1M 13,571 142 41 9

Massachusetts

K5MA/1 25,069 169 43 15
W1FJ 14,280 123 40 14
K01V 11,025 138 35 8
NJ1T 9,044 148 28 2

New Hampshire

WA3ECT 57,767 352 61 20

Rhode Island

KS1J 66,185 412 61 20
K2MN 6,642 111 27 4

Vermont

K1IK 124,564 573 76 29
W3LPR 7,775 142 25 3
K1LPS 7,018 102 29 6
WA1GUV 3,612 77 21 3

New Jersey

WA2SRQ 101,814 572 71 26
K2SG 101,780 554 70 26
KZ2S 56,876 299 59 25
W2CVW 21,630 222 42 11
W2BN 16,262 137 47 10
K2FL 11,427 125 39 9
K2SB 6,216 102 28 5
WB2R 5,670 84 30 5
K2PH 4,050 72 25 4
W1GD 4,023 63 27 5
WB2K 3,952 63 26 5
K2DM 2,622 54 23 2

New York

K5NA 166,952 735 82 33
WF2W 35,472 333 48 9
NA2M 35,378 312 49 12
KW2J 32,487 286 49 10
NW2J 16,830 178 34 6
W2KTF 14,472 176 36 7
W2XL 5,611 83 31 4
NA2Q 4,966 88 26 3

Delaware

AA1K 184,624 710 88 37
NW3Y 6,615 109 27 4

Maryland

W3GG 58,410 443 59 12
K3EI 21,022 200 46 10
W3CDG 7,922 103 34 7
WABMAZ 3,973 64 29 4

Pennsylvania

W3BGN 153,636 583 84 38
W3TS 76,545 526 63 16
W3QM 64,538 471 61 12
K5ZD/3 63,650 371 67 21
K3TUP 50,133 442 51 9
WA3LFY 45,135 306 59 18
W3UM 38,555 249 55 17
NN3Q 34,700 296 50 12
K53F 20,115 192 45 10
K3CP 18,447 201 43 6
KU3X 17,160 195 39 7
K3VW 16,125 167 43 8
NE3F 15,364 128 46 12
K3ANS 13,212 155 36 7
K3UA 13,188 145 42 5
NK3U 10,659 148 33 5
W3EHZ 6,210 106 27 3
K3YD 5,564 101 26 3
K3LVO 4,239 74 27 2
K2DOX/3 3,278 67 22 2
W3DIR 2,736 51 24 3

Alabama

K4IQJ 36,040 312 53 9

Florida

N4IN 33,165 254 55 12
W4ROM 16,128 165 42 9
W8IM 1,932 40 21 5

Georgia

K3KG/4 170,079 718 91 39
(Op. K4BAI)
KX4R 38,940 298 59 10
N4UZ 36,994 317 53 9
K4SB 31,850 290 49 9
W4DMB 27,897 250 51 9
KB4GID 25,568 250 47 8
W4DXI 22,542 188 51 10
WA4CUG 20,941 230 43 4
AA4VD 8,785 121 35 3
K4ODL 6,176 81 32 7
AB4HF 5,616 52 39 9

Kentucky

K4TO 65,593 410 67 18
AA4NJ 37,638 310 54 9
KM4FO 4,089 66 29 2

North Carolina

AA4S 171,558 730 81 30
K4PB 57,171 422 59 15
KA2CDJ/4 10,800 116 40 8
N4HEK 2,220 54 20 2

South Carolina

N4FHD 28,944 274 48 8
K4BAM 28,623 271 47 9
K4WJV 11,556 147 36 6

Virginia

W4YE 15,664 160 44 6
W4KMS 10,647 112 39 8
N4MM 1,900 44 19 3

Arkansas

WASVBE 12,000 138 40 4
W5KL 11,200 137 40 2

Louisiana

NA5G 17,732 181 44 8
KB5GON 7,004 90 34 6
N0SH 6,808 83 37 7

New Mexico

KB5UL 36,568 306 56 6
K2IGW/5 14,306 122 46 10

Texas

N6TR/5 121,502 539 79 28
W5FIX 60,522 386 66 15
K5WXZ 55,424 384 64 14
WN4KKN* 9,960 45 24 24
WK5K 6,664 92 34 5

California

N6LL 77,694 397 69 20
(Op. WA6CDR)
WA6AUE 46,620 305 60 13
K6MO 30,745 185 55 15
W6ZPE 17,955 174 45 9
N4ARO/6 15,580 158 41 9
W6BIP 12,806 130 38 10
W6PM 9,430 76 46 9
KG6AO 5,070 72 30 5
WB6ITM 4,930 63 29 8
K6HIH 4,131 72 27 3
KH6DW/W6 3,950 57 25 7
N6JM 3,404 60 23 5
AA6EE 1,938 50 17 4

Arizona

N6SS 74,620 396 70 19
W6SYM 2,288 41 26 3
NF7E 854 26 14 4

Montana

W7LR 18,518 169 47 7
KS7T 11,585 139 35 7

Nevada

W7TVF 25,256 175 56 13
KG7D 16,465 152 37 10
K6GNX 10,179 107 39 7

Oregon

A17B 48,373 323 61 14

Utah

W7HS 16,338 149 42 11
K6XO 9,724 123 34 7
K7DA 2,640 63 20 3

Washington

K7LED 23,940 218 42 7
(Op. WA7UVJ)
KR7G 11,592 120 36 8
W7BYK 10,724 131 28 7
W7MCU 5,423 54 29 9
N7OT 1,725 45 15 3
AK7F 12 3 2 1

Wyoming

WC7S 36,795 287 55 11

Michigan

K8CV 25,542 273 43 6
K8LWP 7,712 107 32 4
W18W 4,775 88 25 2

Ohio

KV8Q 70,211 522 61 12
NG8D 36,995 348 49 8
W8CAR 19,350 199 43 9
K8IP 18,492 172 46 9
W8PN 14,001 159 39 7
WA8TMK 7,320 113 30 2
K8MR 1,184 31 16 3

West Virginia

K80QL 2,530 52 23 2

Illinois

W9YYG 33,813 308 51 8
W9PNE 29,870 212 58 13
W9LNO 21,330 184 54 6
W9HOT 7,128 99 33 2
W9CA 4,186 76 26 2

Indiana

N9GT 24,885 253 45 7
K9FW 17,960 211 40 4
W9JOO 11,628 159 34 4
WB9CIF 11,029 117 41 7
NA9N 7,680 114 32 2

Wisconsin

WA1UJU 57,081 507 53 4
WA9TZE 30,212 270 52 7
K9OSH 26,117 250 49 5
W9GXR 18,495 192 45 4
WB9HRO 16,008 162 46 4
N9KS 13,734 150 42 5
WD9IAB 3,082 61 23 2

Colorado

WBZV 138,972 708 74 22
KJ0G 34,440 277 56 10
KI0G 7,888 106 34 5

Iowa

K0RW 34,119 304 51 8
N0BB 14,760 152 45 4

Kansas

W8UY 29,044 240 53 9
KB0G 21,726 177 51 10

Minnesota

KJ0B 45,201 367 57 7
W0HW 42,688 337 58 6
W0RXL 11,430 115 45 4
N0AT 10,101 129 37 3

Missouri

W0BG 106,330 674 70 18

North Dakota

NT0V 9,324 120 37 3

South Dakota

KD0EE 13,244 138 43 7

CANADA

Quebec

VE2DVI 1,498 22 14 4

Ontario

VE6OU/3 272,298 685 78 27
VE3DD 149,358 448 66 17
VE3KP 122,960 430 58 11
VE3PN 79,585 270 55 18
VE3ABG 66,915 302 45 9
VE3CUJ 40,160 208 40 7
VE3NBE 7,820 71 23 3

Manitoba

VE4JB 22,386 114 41 2

Alberta

VE6BKB 5,566 55 22 3
VE6JY 2,080 35 13 2
VE6GK 776 20 8 2

British Columbia

VE7BS 24,255 135 35 7

Alaska

KL7Y 2,328 38 12 6

AL7CQ 2,198 28 14 5
KL7HFA 120 8 4 3
WL7E 72 4 3 3
AL7BL 6 3 1 1
NL7MW 4 2 1 1

Anguilla

VP2EXX 11,532 74 31 9

Dominican Republic

JP1DMX/HI8 26,117 112 41 13

Maritime Mobile Zone 5

DJ4SQ/MM 13,800 67 30 13

Mexico

XE2GAT 16,445 141 23 5

U.S. Virgin Islands

KP2A 250,268 497 89 44
(Op. K4TEA)

AFRICA

Morocco

CN8FC 22,940 75 31 30

Tanzania

5H3TW 1,365 20 7 7

ASIA

Israel

4X4NJ 128,804 259 52 50

Japan

JA7UMT 3,432 59 13 9
JR1JLV 336 30 4 4
JA3BCT 270 7 5 5
JR0XQJ 228 19 4 4
JA1SJV 180 22 3 3
JA4GXS 56 10 2 2

Malaysia

9M2AX 7,410 44 19 18

USSR ASIA

Armenia

UG6GAW 246,574 428 62 57

Asiatic Russia

UA9AQN 102,438 272 42 42
UA9MR 38,808 162 28 28
UA9WOK 22,014 144 18 18
UW9CZ 16,902 115 18 18
UA9YJP 16,120 104 20 20
UA9YNC 4,437 30 17 17

Kazakh

UL7MBL 31,394 154 22 22

EUROPE

Balearic Islands

EA6ET 77,877 286 51 46

Belgium

ON4XG 3,655 43 17 17

Bulgaria

LZ2DF 184,575 402 75 52
LZ10Q 45 3 3 3

Czechoslovakia

OK2PZW 87,776 353 52 47
OK1DRU 65,328 292 48 44
OK2BMU/P 53,079 298 39 38
OL1BSP 50,466 294 39 37
OK1FZY 46,710 226 45 38
OL7BTG 36,993 255 33 33
OK1DWJ 34,153 137 49 42
OK3IAG 33,784 176 41 38
OL8CWI 32,300 218 34 34
OK1DTC 28,735 192 35 33
OK1DIG 28,458 219 31 31
OL1BVR 25,740 185 33 33
OL9CSW 20,387 170 29 29
OK2PCN 20,031 146 33 33
OK2BXR 17,550 160 27 27
OK1MNI 14,716 138 26 26
OK1DQT 14,514 52 41 37
OK1DXW 13,048 112 28 28
OK1DZB 10,670 121 22 22
OL9CWR 10,465 116 23 23
OK2PPM 9,936 105 24 24
OK2BPG 9,672 101 24 24
OL9CVC 9,198 98 21 21
OL1BUY 8,372 77 26 26
OL9CUZ 8,360 100 22 22
OK1DOW 7,520 95 20 20

OK2PBG 6,820 74 22 22
OL4BRC/P 5,840 73 20 20
OK2BDR 4,335 63 17 17
OK2BBQ 4,176 69 16 16
OK1ONI 4,020 71 15 15
OK2BWC 3,834 57 18 18
OK2PAW 3,825 60 17 17
OK1FMX 3,318 69 14 14
OK2ABU 3,122 53 14 14
OK1FFC 2,832 48 16 16
OK1KZ 2,580 44 15 15
OK1FPG/P 1,944 42 12 12
OK3KFO 1,350 45 9 9
OL3BVB 1,020 27 10 10
OK1FSJ 950 19 10 10
OK1DRQ 250 16 5 5
OK3PC 46 10 2 2

Denmark

OZ1DPW 10,230 92 22 22

England

G3BBO 31,140 128 45 37
G3TXF 26,559 123 39 32

Faroe Islands

OY9JD 62,436 270 43 43

Finland

OH1AF 129,151 395 59 54
(Op. OH1NOA)
OH6NIO 32,488 202 31 31
OH2BYS 28,611 168 33 33
OH6YF 17,584 118 28 28

France

F6BEE 49,770 201 45 38
FD1NRG 35,784 199 36 36
F3AT 23,125 113 37 30
F6EPO 12,208 86 28 28
F1JDG 9,250 77 25 25
F9BB 5,214 48 22 22

Germany (FRG)

DK8ZB 115,164 331 63 46
DK6AS 96,066 342 54 44
DJ6TK 65,660 267 49 44
DL1JF 28,453 159 37 34
DL5MAE 18,354 93 38 37
DL9OE 9,150 80 25 25
DL1RB 6,363 71 21 21
DJ4KW 2,132 30 13 10
DL1SBF 1,342 28 11 11
DJ3TF 282 10 6 6

Germany (GDR)

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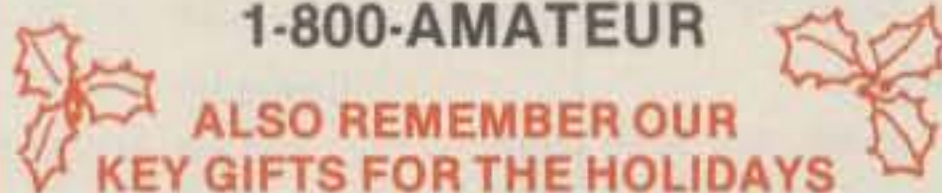
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KD80Z	41,028	369	52 5
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W8HW	5,920	88	32 4
Missouri			
K8LW	28,050	270	50 6
North Dakota			
K8ZFX	3,886	67	29 1
South Dakota			
W8ACT	10,815	153	35 3
CANADA			
New Brunswick			
VE1ANH	5,733	57	21 3
Ontario			
VE3NXA	50,736	249	42 6
VE3CUI	26,796	165	33 5
Alberta			
VE6SWL	660	14	10 3 (Op. VE6JY)
British Columbia			
VE7WJ	31,239	163	39 6
Costa Rica			
TI2KD	25,499	114	43 12
Dominican Republic			
H18VMA	18,886	96	38 8
Mexico			
XE1VIC	34,700	138	50 8
XE2GAT	5,175	68	15 3 (Op. K6J0)
U.S. Virgin Islands			
KZ3H/KP2	60,858	211	54 21
AFRICA			
Tanzania			
5H3TW	5,040	28	18 18
ASIA			
Bahrain			
A92BE	63,294	167	42 42
USSR ASIA			
Armenia			
UG6GAW	373,796	871	46 46
Asiatic Russia			
UA9MR	19,057	155	17 17
Georgia			
RF6FM	55,848	234	26 26
EUROPE			
Bulgaria			
LZ2DF	134,784	529	48 46
LZ1KWZ	55,760	269	40 40
Czechoslovakia			
OK1DXS	88,193	404	43 43
OK1DQT	39,165	227	35 35
OK1DWJ	17,080	95	35 35
OK1DXW	888	16	12 12
Denmark			
OZ1FTE	38,250	162	45 45
OZ1ADL	13,520	107	26 26
OZ7DX	10,530	83	26 26
OZ1BTE	9,860	68	29 29
OZ3SK	9,280	64	29 29
England			
G3NAS	27,880	126	41 39
Germany (FRG)			
DL8PC	38,702	213	37 37
DL7MAE	1,782	32	11 11

Germany (GDR)			
Y28AL	8,671	76	23 23
Italy			
I04YSS	75,816	300	52 49 (Op. I4YSS)
I6FLD	23,104	122	38 37
IK5IY	6,336	59	24 24
I8KHP	2,952	34	18 18
The Netherlands			
PA8IJM	5,334	52	21 21
Poland			
SP5INQ	32,376	161	38 38
Portugal			
CT1A0Z	32,007	111	47 36
CT1TM	12,800	63	32 22
CT1AVR	1,596	28	12 12
Spain			
EA3ALD	48,081	201	47 43
EA5JC	7,130	61	23 21
EA5AEN	6,622	57	22 19
EA5EFV	1,188	22	11 11
Yugoslavia			
YU3QI	14,619	87	33 33
USSR EUROPE			
Estonia			
ES5RY	31,911	179	33 33
European Russia			
RA4CC	27,240	181	30 30
UV6LAP	18,216	165	23 23
RA3RQT	1,490	28	10 10
Kaliningrad			
RA2FF	18,720	121	30 30
UA2EC	8,350	65	25 25
Lithuania			
LY28TD	19,159	165	23 23
LY28TA	10,992	91	24 24
Ukraine			
RB5EKI	29,946	197	31 31
UB5WFG	7,975	68	25 25
RB5IOV	6,762	50	23 23
RB4INR	6,048	56	18 18
UB5ZME	5,632	51	22 22
RB5QRW	5,454	62	18 18
UB5EPV	2,080	26	16 16
OCEANIA			
Hawaii			
KH6CC	35,328	149	24 6
SOUTH AMERICA			
Colombia			
HK4DUM	81,702	156	54 15
Venezuela			
YV1CP	142,618	238	61 19
YV1EQW	29,070	87	34 7
YV1DRK	11,280	49	24 10
MULTI-OPERATOR NORTH AMERICA			
UNITED STATES			
Massachusetts			
KY1H	75,980	574	58 15
New Hampshire			
NE1I	12,810	171	35 4
New Jersey			
K2WI	112,815	700	69 18
New York			
K5NA	167,783	911	77 25
Delaware			
AA1K	48,240	313	60 17

Pennsylvania			
K3WW	31,960	361	40 5
K3UA	8,745	125	33 3
Georgia			
AB4RU	116,094	800	66 15
WB4ZNH	65,892	530	57 11
K4PI	49,706	375	58 11
KC4MJ	30,315	332	43 7
South Carolina			
AA4V	52,923	397	59 12
Texas			
W5MPX	10,578	114	43 7
California			
N6LL	38,610	319	54 9
W6UE	15,327	185	39 4
WB6EGE	4,611	74	29 3
Oregon			
NK7U	52,026	357	58 11
Michigan			
WE8Z	75,520	606	59 7
K8EX	71,649	585	57 9
Ohio			
WB8IFP	112,329	804	63 14
WD9INF	102,297	773	61 10
WZ8D	86,420	689	58 10
WB8J	70,281	566	57 9
Illinois			
WB9Z	205,902	1073	81 29
WA9F	45,845	390	53 8
KA9CLP	4,710	77	30 2
Indiana			
WM9M	46,710	398	54 8
Colorado			
NB8SA	17,010	186	45 3
Missouri			
K8LIR	62,755	529	55 7
CANADA			
Quebec			
VE2HLS	10,143	90	23 3
Bermuda			
VP9AD	326,560	771	80 32
Dominican Republic			
JP10MX/H18	3,680	33	20 8
EUROPE			
Bulgaria			
LZ5W	67,700	250	50 46
Czechoslovakia			
OK5TOP	112,612	462	47 46
Yugoslavia			
YZ1E	163,659	596	51 47
USSR EUROPE			
Byelorussia			
UC1AWC	34,895	186	35 35
European Russia			
UZ4YWY	8,211	74	23 23
Ukraine			
UB4MXR	15,312	99	29 29
UB3IWA	13,804	91	28 28
UB4LWA	8,944	64	26 26

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TX472	22 Ft.	72 Ft.	18 Sq'	2279
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HDBX48	48 Ft.	18 Sq'	363	689

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CQ REVIEWS:

The Kantronics Version 3.0 Firmware

BY BUCK ROGERS*, K4ABT

In one of the recent "Packet User's Notebook" columns I referenced the Kantronics firmware version 2.85. But while I was talking about the Kantronics version 2.85 firmware, the new version 3.0 was about to be released.

The package containing the firmware arrived soon after the order was placed. A few minutes with a screwdriver and the super-duper EPROM extraction tool (a huge, $\frac{3}{8}$ inch blade of a straight screwdriver) and I was in the 3.0 business.

Here is a word of caution that may save you some time. Before you begin the installation of firmware version 3.0, I suggest that a "dump" or copy of the current KAM or KPC parameters be saved to disk or hardcopy. The reason for this maneuver is because the present settings of the Kantronics Kontroller will be lost after the "Hard Reset" is performed.

That's correct! A "Hard Reset" is to be performed so the new features and commands of the version 3.0 firmware are enabled. Regardless of which KPC you own, *be sure to perform this "Hard Reset."* Afterwards, the configuration files that you save to disk or to hard-copy can be reloaded to your KPC or KAM.

Read the version 3.0 upgrade documentation carefully. Some of the old parameters may perform better by changing to new settings.

There are several new features that may become your favorite, but here is one that quickly captured my attention.

Software Carrier Detect

Software Carrier Detect (SCD) is now a part of version 3.0 for the KAM and KPC-4. The reason I like this improvement is because we can operate with an "open squelch." We now have an edge over other kinds of signal detection because signals are easier to detect with an open squelch. With the new SCD addition



The Kantronics All-Mode KAM TNC.

to the KAM and KPC-4, a signal is only read or detected when it is a packet signal. Random noise does not activate the carrier detect.

Direct Entry and Local Control

The KAM and KPCs equipped with this new version 3.0 firmware update will enable access and control of all the KAM and KPC features while operating in the packet mode. For instance, we can now use our own mailbox to upload a message to another station or one to be forwarded to the local BBS later.

We simply access and use the BBS feature of our KAM or KPC as if we were addressing a remote system. There is no need to use long commands such as PBL, PBR, PBK, and PBS to LIST, READ, KILL, or SEND messages from our personal BBS.

Reroute

The new commands related to the PBBS

of the KAM or KPC access are local only and will not be transmitted while making entries. This makes it easy for us to build message files for other stations to access and download later. To enhance this feature, Kantronics went a step further and gave us the ability to make a change in the routing, or the "TO" field of a message that has already been placed into the BBS portion of your Kantronics Kontroller. This could come in handy in the event you are in an area where the BBS is a regional BBS access system that recognizes only specified NTS forwarding stations. Here you are given the tool that enables a "Reroute" of certain messages to another system which allows incoming forward files and messages.

NAVTEX and AMTEX

With the NAVTEX and AMTEX modes becoming more popular, these command/feature enhancements have been added to the firmware of the KAM. The NAVTEX support within the KAM will hold in mem-

506 Pheasant Ridge Drive, Warner Robins, GA 31088

ory the last 256 messages received. Up to 50 of them can be from just one station. The ARRL is transmitting the daily bulletins in AMTEX, and they are sent at various intervals. The AMTEX feature in the KAM will allow you to capture only the messages that might be of interest to you. It will automatically disallow duplication of league bulletins.

AMTOR 625

AMTOR has always been one of the high points of the KAM. With version 3.0 firmware, the KAM now supports AMTOR 625. That is the latest Part 97 Rules addition, to allow CCIR 625 AMTOR within the amateur bands. Not only does the KAM support this new mode, it also allows the use of a seven-character or nine-digit SelCal.

For those of us familiar with the **RELink** command in other Kantronics KPCs, there is a similar feature now supported in the AMTOR mode. The AMTOR version of **Relink** is called **Rephase**. The nemonic is **REP**, and we soon discover the effectiveness of this command when **Lock** is lost, or we lose "phase" with a "connected" station. Another enhancement that is added to the AMTOR mode is the "busy signal" that is sent to other stations when there is an attempt to obtain **Lock** to an already "linked" station.

Mode B (FEC) AMTOR

A **TXDFEC** command has been added for use in the AMTOR FEC mode. This allows the user to add extra phasing time (characters) to the beginning of our mode B transmissions. This addition helps other stations by adding more time for them to tune to your signal and obtain **Lock** before actual data transfer begins.

Beacons

The **Beacon** command used to have settings as frequent as every 10 seconds. It comes as no surprise that Kantronics has moved to one minute intervals for the setting of the **Beacon** command.

Because of all the "node noise," overhead node updating, and beacons, the LANs are in need of every second that can be made available to the users. Therefore, *I would like to see the **Beacon** command set to a minimum of half hour intervals.*

At one time beacons served a useful purpose, letting others know that someone else was on the air, and allowing the beaconing station to be used as a digi. With the many nodes and switches now available to the users, and with the MHeard feature in the packet controllers, we now have enough resources for digipeating or determining our presence on

the frequency. Kantronics has made a move in the right direction.

A KAM-related feature that is added to version 3.0 is the **MYAUTOSTRT**. This feature and command is active in the RTTY and ASCII modes. It is especially useful to the MARS operators, and it will accept up to seven characters per field.

Restore D

The **Restore D** command saves some time and allows the user to "restore" previously **Permed** commands. The biggest advantage to the **Restore D** command is that it allows us to reset the KAM to the original (default) factory parameters.

Six digit fields are now accepted in the KAM and KPCs that are equipped with version 3.0 firmware. With the earlier 2.85 firmware and prior versions, you may have experienced the "EH?" when trying to enter a six digit field. This problem occurs when attempting to connect

to, or via, a route in the ROSE switch.

Here is an example:

```
cmd:C K4XA V K4ICT-5,912888
cmd:EH?
```

The problem is also evident when another station tries a connect from a KA-NODE to a ROSE switch or an address field that had a six digit number in it. Example (this connect request was issued from a KA-NODE):

```
*** CONNECTED TO BUKNOD
### CONNECTED TO WILD NODE
BUKNOD (K4ABT) Channel A
ENTER COMMAND B,C,J,N,X, or HELP
?
```

I type the following, and (enter)

```
C WA4PQK V K4ABT-4,404461
```

I receive the following reply:

```
Invalid command:
ENTER COMMAND B,C,J,N,X, or HELP
?
```

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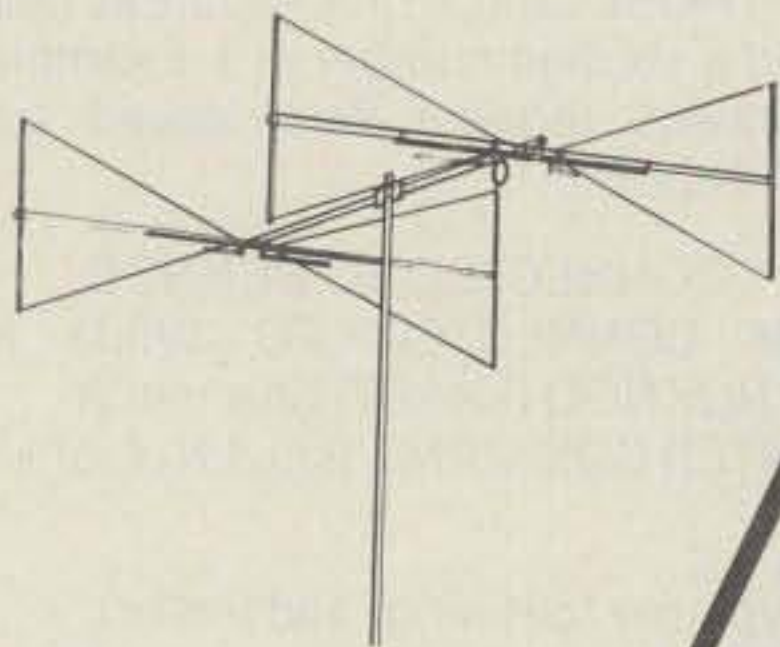
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To circumvent this problem I substitute an "i" for the one (1) in the first example. Thus it would read:

C K4XA V K4ICT-5,9i2888

In the second example we can substitute an "o" (OH) for the 0 (zero) as in this example:

C WA4PQK V K4ABT-4,4o4461

The ROSE switch is designed to accept these changes, and when used in the six digit fields, they will look at the "i" and the "o" as if they are ones and zeros.

The new Kantronics firmware version 3.0 has removed this problem from the firmware. Henceforth, a connect from a KAM, KPC, or KANODE is readily accepted with no argument.

More Good News

All units purchased after July 1, 1990 are entitled to a free upgrade to firmware version 3.0.

The update to 3.0 for the KAM, KPC-1, and KPC-4 is priced at \$25. For the KPC-2, and KPC-2400, EPROM, the cost is \$20. The "SmartWatch" is \$30, and the Battery Backup is \$20.

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The KM-2400, along with the other products mentioned here, is available from Kantronics dealers, or directly from Kantronics Inc., 1202 East 23rd Street, Lawrence, Kansas 66046.



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CA-2X4M	140-155 MHz 440-460 MHz	4.5dB 7.0dB	150W	5'	MOBILE
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
CX-801	146 MHz 446 MHz 1.2 GHz	3.0dB 6.8dB 9.6dB	100W	3' 3"	MOBILE
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CQ REVIEWS:

The Alinco DR-110T Transceiver

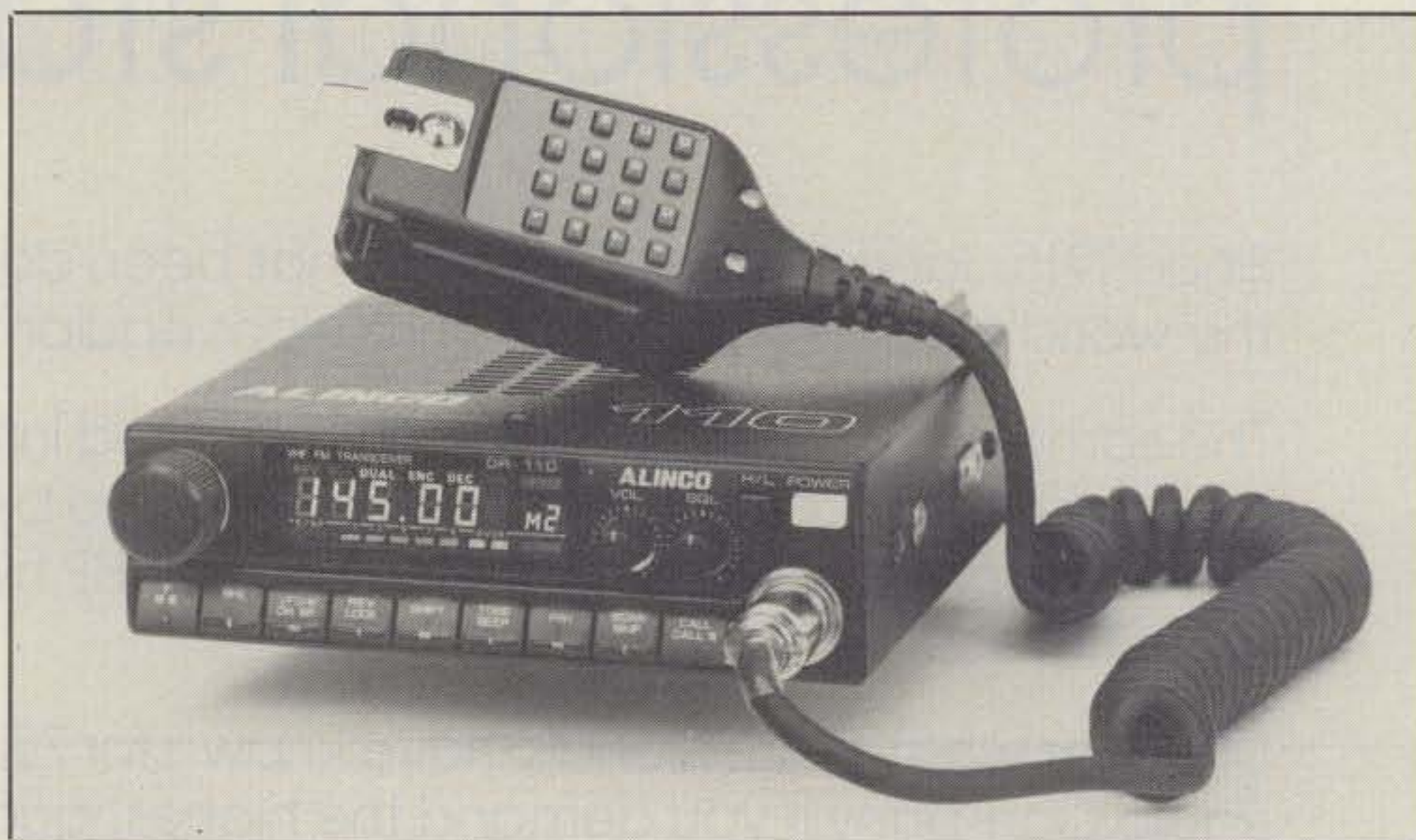
BY BUCK ROGERS*, K4ABT

It was a hot day in July atop Mt. Cheaha (the highest point in Alabama). I had traveled there to deliver a pair of 433.8 MHz BandMaster quads and assist with the installation of the 433.8 MHz, 2400 bps Georgia to Alabama trunk. Mike, N4NAU, Charlie, N6IFL, Ty, WB4CCY, Jack, N4RPX, and several other packeteers were finishing the installation of three AAE six-element BandMaster quads. Mike was climbing down the tower, and the rest of us were cleaning the grounds. We ran a few tests of the 433.8 MHz system to assure the flatness of the antennas (VSWR), and then loaded the Blazer in preparation for the trip back to central Georgia.

Charlie, N6IFL, who owns an amateur radio repair service near Heflin, Alabama, asked me to stop by for a slice of homemade lemon pie and a glass of iced tea. He told me it was on my way back to Georgia. His invitation was accepted, and by more takers than just me.

For those amateurs who live in the east Alabama area, I'm here to tell you not to go looking for Tierod's Amateur Radio Service (belonging to N6IFL) unless you have a detailed map to the QTH of his store or someone is directing you via 2 meters. That place is so far back in the woods that you become concerned for your welfare, especially after a bobcat crosses the road ahead of your car. I followed the leaders, and after several miles through these winding mountain roads, we turned onto a gravel road. Shortly thereafter we were sitting in front of a sign which read "Booger Hollow" Amateur Radio Service. Now I know where the *Legend of Sleepy Hollow* originated.

At this point I wasn't sure if I really wanted to stay for tea, but the lemon pie was the catalyst. My taste buds had won, so I went inside. The tranquil environment and cool mountain air had a relaxing effect on us. As I got out of the Blazer, I heard a quavering female voice say, "Hello, Charlie," but the origin of the voice was obscure. I looked for the wo-



The Alinco DR-110T transceiver.

man, but there was no one to be seen. We continued on toward the door, and the voice again came out of nowhere "Hello, Charlie." Charlie Bynum, seeing that I was about to retreat from his humble abode, pointed to a very large cage with a raven inside. There was the mysterious voice! Not only could that raven call to Charlie, but when Charlie gave the command, it could give out a loud whistle and call the dogs out of the forest, calling each one by name, no less. Wow! Was this place for real, or had I stepped into some kind of time warp? The lemon pie (thanks, Carol) was from some planet other than Earth, and the iced tea was nectar from Heaven.

As hams often do, we gathered in the showroom of the Booger Hollow Amateur Radio Service and proceeded to discuss the topic of most interest to packeteers—*packet!*

Someone wanted to know if there was a means to improve the throughput on packet beyond the parameter settings. I said, "Yes, if we could use a transceiver with 'true' FM, it would improve considerably."

With that remark, Charlie told us about a new radio from Alinco which uses

"true" Variable Reactance Frequency Modulation. Suddenly it was my turn to listen. Charlie pointed to a brochure hanging on the wall and said, "There are the specs on it." TRUE FM! One of the first lessons I learned while building nodes, backbones, and trunks for packet is that radios with "true" frequency modulation are by far the best data handlers.

The transceiver Charlie was referring to is the Alinco DR-110T, which had been introduced only a few months earlier.

While the camaraderie of the session in that showroom wandered from one subject to another, the phrase about "TRUE FM" lingered in my mind. It was time for me to go, so I asked Mike, N4NAU, to stay on 146.520 simplex and direct me out of this "Alabama Eden" onto a nearby paved highway that would get me to the interstate highway system.

Finally, I was on my way back to south central Georgia. The next weekend was the Atlanta Hamfest, and I was going over the high points I would talk about in the packet forum I was to conduct there. Meanwhile, the idea of a 2 meter rig with true FM kept me thinking about the Alinco DR-110T transceiver. I figured I'd look into the prices and pick up some "propa-

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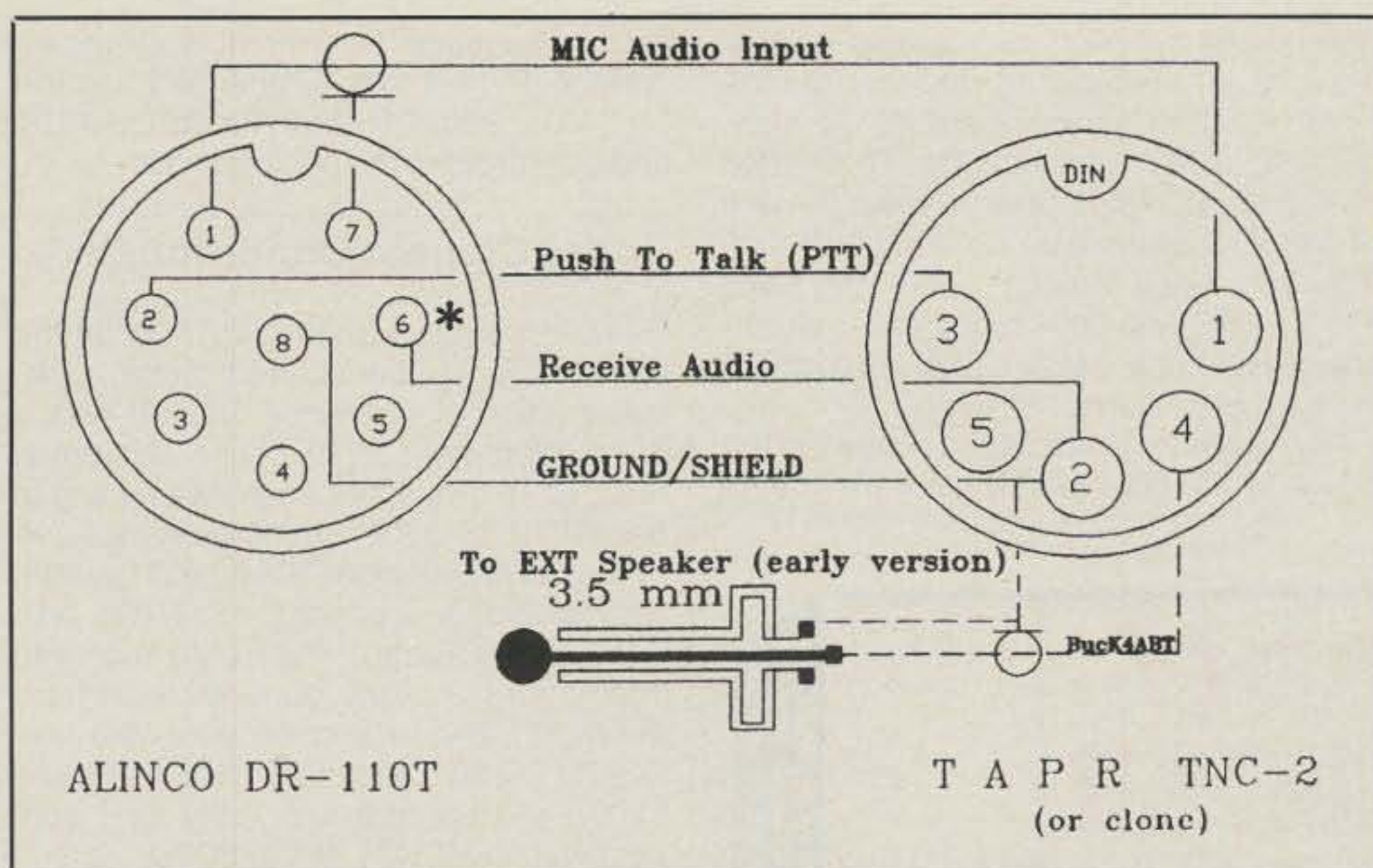


Fig. 1- The latest version of the Alinco DR-110T has receive AF at pin 6 of the mic connector (see the operator's manual).

ganda" sheets on it at the hamfest.

Friday, July 6 I arrived early at the Hyatt Airport Convention Center. I checked in, went up to my room on the fifth floor, and set up my portable packet station. I watched the local BBSes for a while, and

then went down to the exhibit hall to look over the early arriving dealer exhibits.

While I was there, I found that Alinco had already set up their booth. I gathered some of the "spec" sheets on the DR-110T and went to the restaurant for din-

ner (that's where I do some of my reading).

The specs were even better than I had been told: Power output 45 watts high and 5 watts low. Receiver sensitivity at 12 dB SINAD is better than 0.16 uV, and the selectivity skirts are +/- 6 kHz at the -6 dB points. Emission mode 16F3. Modulation is variable reactance FM. Fourteen multi-function memory channels, with scanning of programmed or VFO frequencies. DTMF microphone included. And more.

It had been a long drive and a long day, so I retired to my room for a good night's rest before the next day's festivities.

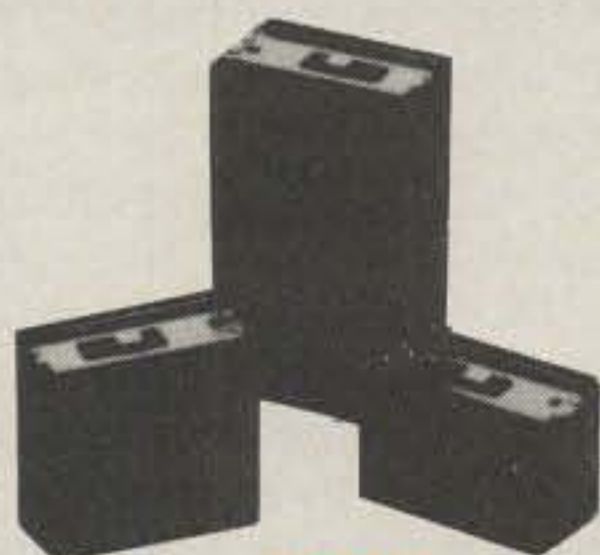
Saturday morning I was up early and had coffee and breakfast with Alan Dorhoffer, Editor of CQ, Lew McCoy, the living legend and Technical Editor for CQ, and Glynn, WB4RHO, my son and SYSOP of many nodes in Alabama. We discussed everything from DC to daylight and still made the opening bell for the great Atlanta Hamfest. The throngs of amateurs who came through those doors made the dealers think that Christmas had arrived early!

I began my tour of the inside fleamarket area and picked up a couple of items and 400 feet of "4XL" super VHF coax from Press, The Wireman. My next purchase was going to be an Alinco DR-110T. I began the chore of "shopping the dealers" for the best price. Best price! Hey, I was in heaven with the deals!

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found. I made the purchase, and since it was nearing lunchtime, I decided to go up to my room and give this new toy a toss at the ether.

Now this is the time to tell you about another nifty device that I use at my QTH as well as carry with my portable packet system. It is the MFJ-1272B TNC/Mic Interface, and it is prewired for virtually all the rigs that use the popular 8-pin connectors.

I use several different transceivers

which have different microphone configurations. There are four leading brands which all use (thank goodness) the standard 8-pin microphone plug. To change from one radio to another without the use of a tool kit and soldering iron is a blessing, and once you've used the MFJ-1272B TNC/Mic Interface, you'll understand why I use it exclusively throughout my packet systems.

The diagram I had placed inside the top cover of the MFJ-1272B gave me the lo-

cations to insert the movable strapping options. In less than 5 minutes I had the TNC connected to the Alinco DR-110T and operating in the packet mode.

Under Combat Conditions!

I was in my room on the fifth floor of the Hyatt Airport Convention Hotel, 140 miles north of my home QTH. It was a good thing my 12 volt gel-sel system is rated at 16 amps, because I was going to need it. At 45 watts output the Alinco DR-110T draws just under 10 amps of current.

I issued a connect to THO1 VIA WB4GQX-1. Bingo! First try I was into Thomaston, Georgia, about 60 miles from my home. Next I connected to the MA-CON1 (145.010 MHz port of the 01/05 and 1200/2400 bps gateway). My next connect was to MCN24, the 2400 bps port on 145.050 MHz. From here I issued a connect request to the WB4EZL BBS. In less than 60 seconds the familiar *** **CONNECTED TO WB4EZL** appeared on the screen of the Toshiba 1000 LapTop PC/clone.

I was in! The MSYS BBS Version 1.08 told me, "You have mail waiting" from K4XA in Albany, Georgia. I read the mail and deleted it from the BBS. No tries, this Alinco DR-110T was smooth, and even better, it had the punch to support the clean audio.

I simply had connected the DR-110T to the gel-sels and the MFJ-1272B TNC/Mic Interface. I set the volume to 9 o'clock and left the squelch open. My TNCs operate in the "open squelch" mode.

One of the first nice features you notice about the Alinco DR-110T is the clarity of the receive audio. The extra power, clean receive audio, and "true" FM tell me that I have found a real winner for use on packet communications.

Before the Atlanta Hamfest was over, I had purchased five—yes, five—Alinco DR-110T's. Three of them are in use at my QTH, one is now part of my mobile packet system, and the fifth is in use in south Alabama. Shortly after I told Frank, K4ICT, about the DR-110T, he placed an order for two of them to use with his stations in Macon, Georgia.

The Word is Out!

The word is out about the new Alinco DR-110T 45 watt transceiver. Both the transmit and receive audio in the DR-110T seem to have been tailored for data, since it is pure with very little distortion. As we have observed with the nodes that use true FM in the radios, they outperform the ones with phase and other types of modulation.

The Alinco DR-110T is priced at under \$300, and is produced by Alinco Electronics Inc., 20705 S. Western Avenue, Suite 104, Torrance, CA 90501.



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"One of the top Morse Code trainers available", Gordon West, WB6NOA, West Radio School

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BY CHUCK STEER*, WA3IAC

In recent years the microwave bands above 2304 MHz have shown rapid growth. More parts have become available from surplus, and as a result more amateurs have been building equipment for all bands above 900 MHz.

I'd like to promote activity on 10 GHz by showing how I built an SSB/CW transverter for less than \$200. The project didn't require much time or test equipment. A block diagram of the transverter is shown in fig. 1. The completed unit is shown in photo A.

Local Oscillator

You may wonder if an inexpensive local oscillator will provide good service. I found units from Frequency West and California Microwave were about the best (see photo B). Both were made in the 1980s and depending on the unit have outputs between 5 dBm and 20 dBm. All are stable enough for SSB, CW, or FM.

*7148 Montague Street, Philadelphia, PA 19135

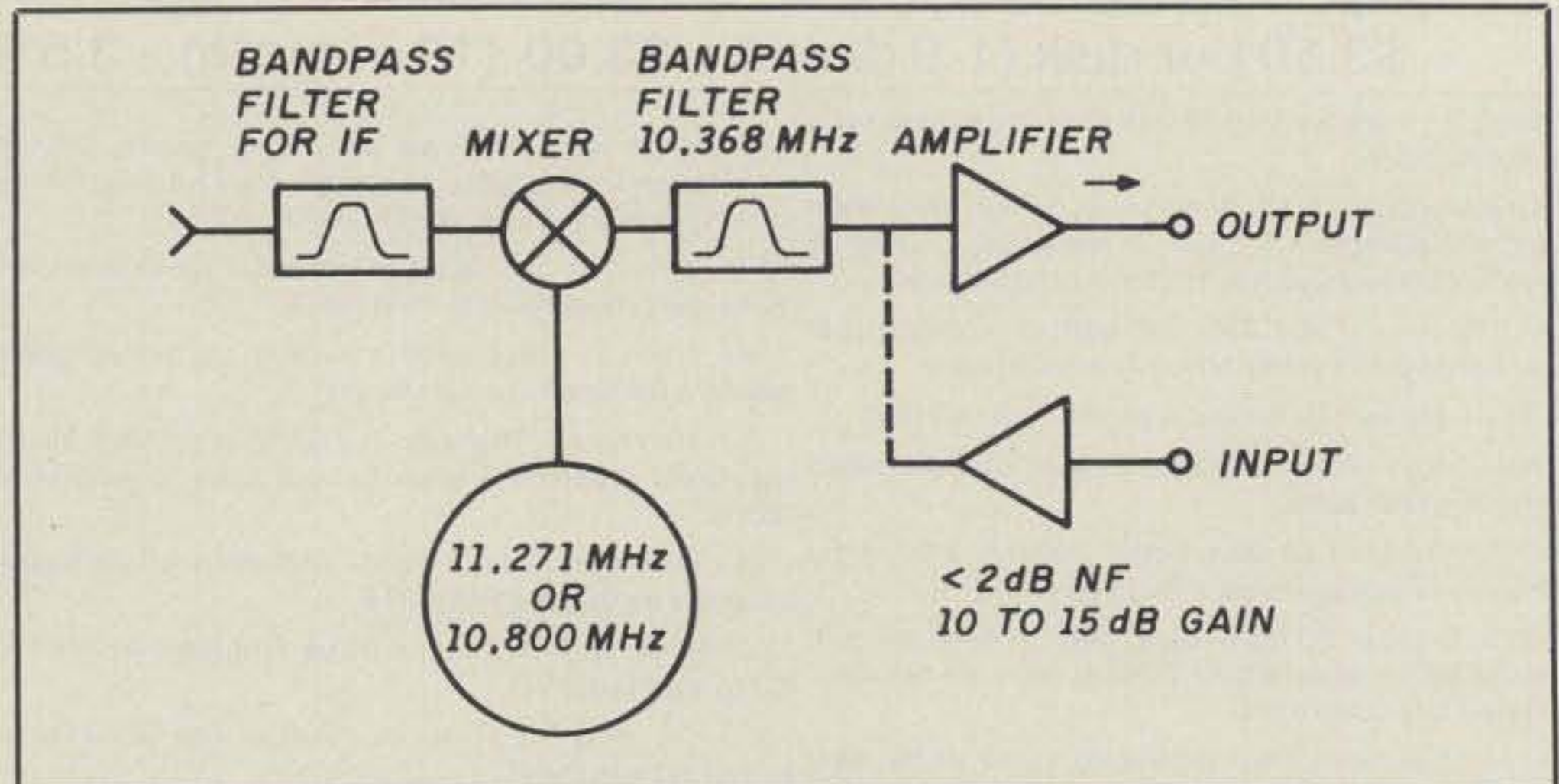


Fig. 1- Block diagram of the transverter.

Some of the oscillators have inputs for FM use and require -19 volts at 400 mA for operation. Most of the output ports are WR75 waveguide, but some use SMA output connectors. The units I acquired had WR75 waveguide ports, and after removing the assembly, I found that there were holes to mount an SMA connector

under the waveguide. The units are dielectric resonating oscillators (DRO) locked to a crystal reference. The drift at 11,200.000 MHz is measured at less than 500 Hz after a 30-minute warm-up.

The units will have to be retuned for the amateur band. To do so, lock the oscillator to the new crystal and adjust the

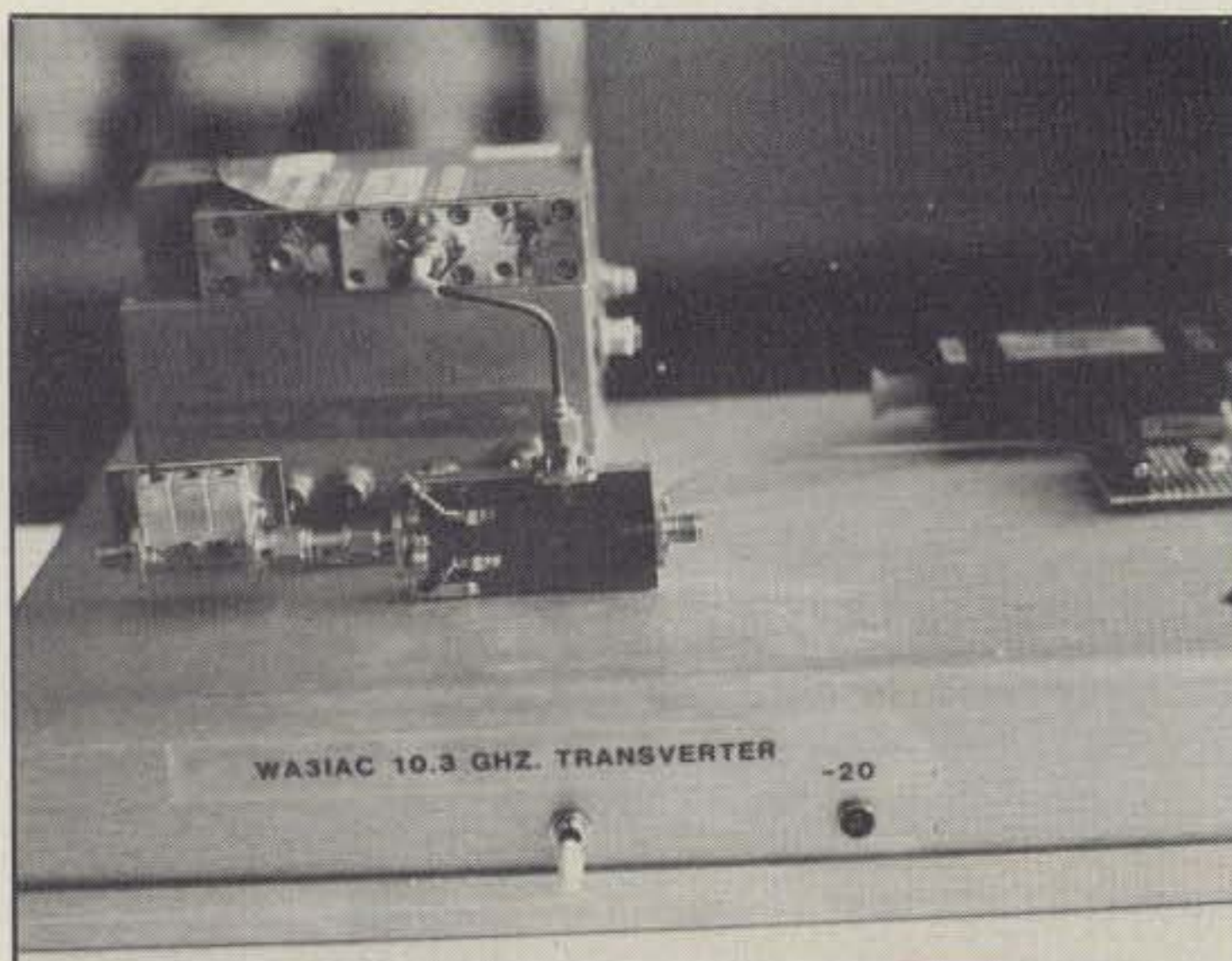


Photo A- The 10.3 GHz transverter.

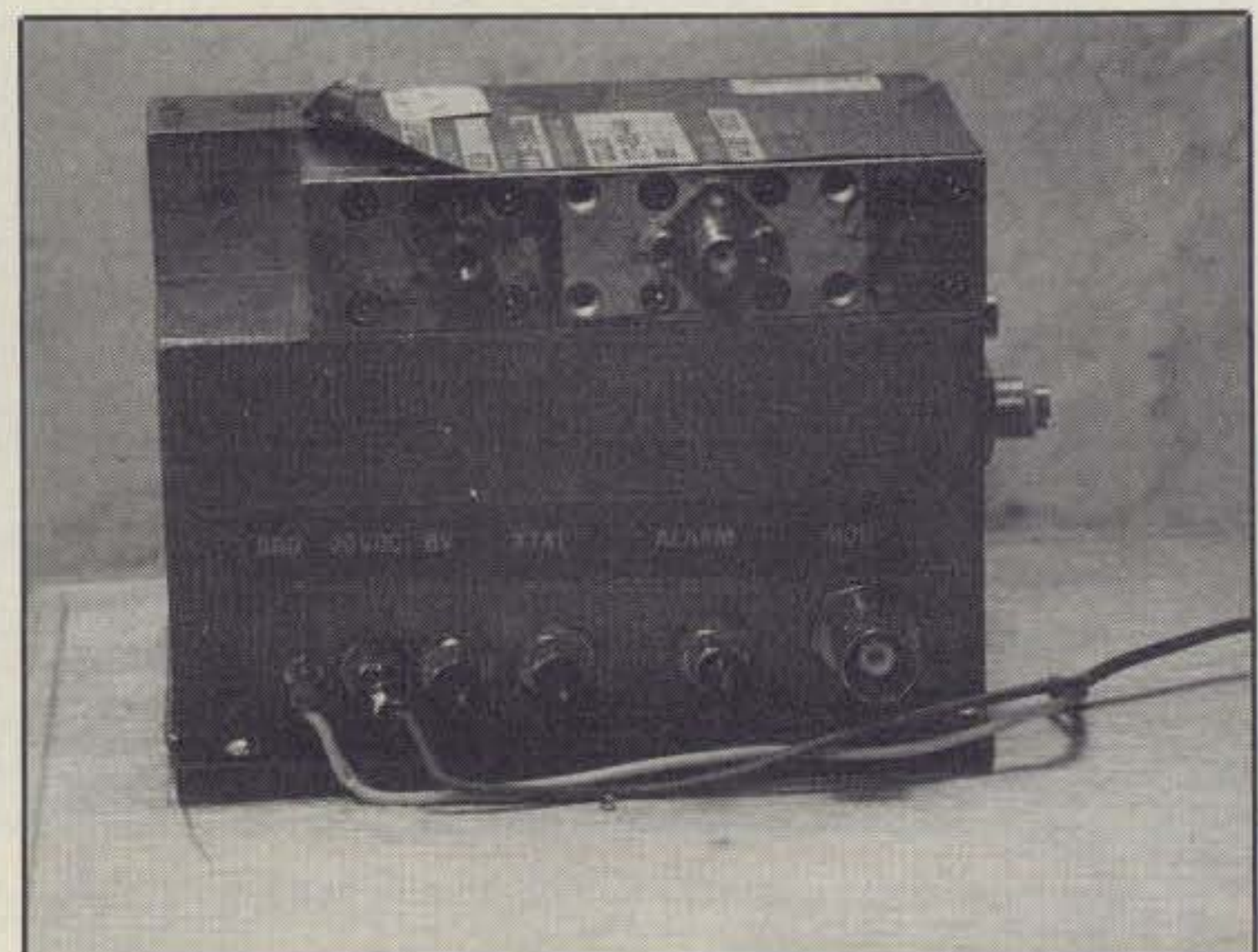


Photo B- Frequency West oscillator used as the L.O.

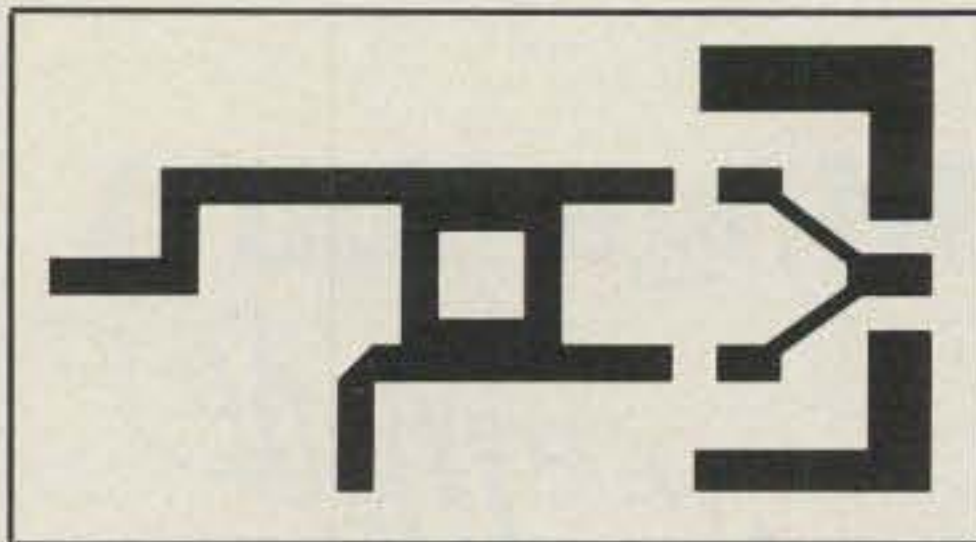


Fig. 2- Board layout of the mixer.

comb-line filter for maximum output. Loosen the lock nuts holding the set-screws in place to gain access to the filter. A power meter is a must here. A spectrum analyzer will let you ascertain that the oscillator is locked.

Intermediate Frequency

Locating a new crystal isn't difficult. You can obtain one from ICM, Bliley, and others for about \$17. For an IF of 432 MHz, the LO should be set to 10,800.0 MHz; for a 903 MHz IF it should be 11,271.0 MHz. Some of the oscillators divide by 108 MHz and some by 118 MHz. To find out which type you have, divide the output frequency (marked on the unit) by the crystal frequency.

Most of the units can't be tuned low enough to use an IF of 2 meters. Consequently, I used an IF of 432 or 903 MHz. This means you must use high injection. By choosing an IF of 903 MHz, I was able to build a transverter for a 10.3 GHz project (see photo C) and another for a 903 MHz project. The 903 MHz IF assures the mixer images will be well outside the passband of most filters. This means that the output filter doesn't have to be as sharp as it does for an 144 MHz IF. For the output filter I used part of the x6 assembly from another unit less the SRD device. Again, because 11,271.0 MHz is farther away from 10,368.0 MHz, the output filter doesn't have to be sharp.

Mixer

Finding a mixer for 10.3 GHz can be a problem, so I tried to develop my own. Fig. 2 shows my PC board layout and photo D shows the parts placement. The board was laid out on ROGER DORID 5787. All capacitors were 10 pF and type ATC 100. The diodes were Hewlett-Packard 5082-2200. I chose these because they are designed for stripline and microstrip mixers and detectors, have a test frequency of 9 GHz, and have a burn-out rating of 125 mW of CW RF power.

After etching the board, I mounted it on a block of brass (copper could be used as well) by heating the block on my kitchen stove. When the block was hot enough to melt solder, I coated it with sol-

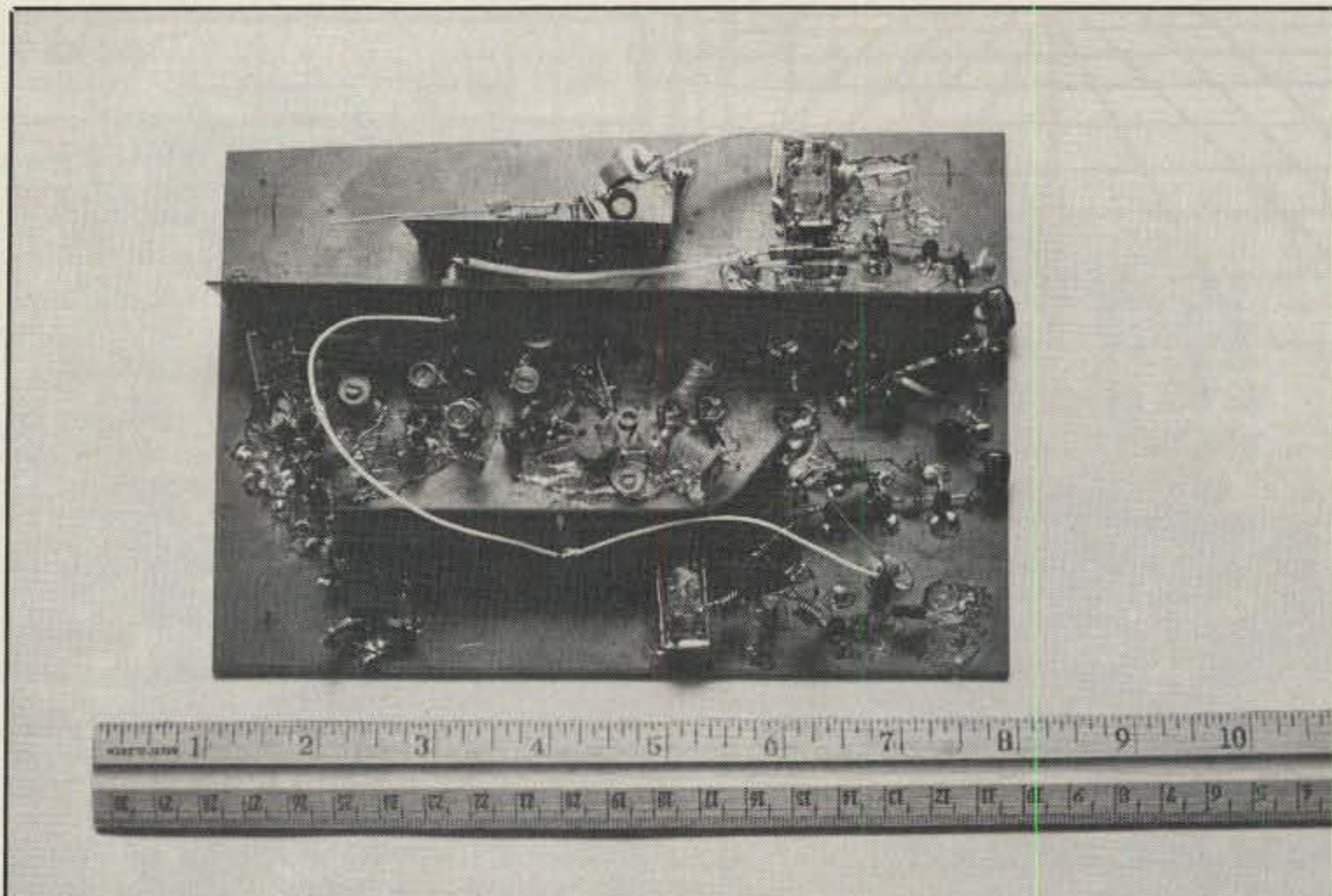


Photo C- The 903 transverter to drive the 10.3 GHz transverter.

der and dropped on the mixer board.

I used a heavy heat sink to keep the board from "bowing up" as it cooled. You'll need to let the mixer cool for about 30 minutes before handling it. After cooling is complete, mount the components and SMA connectors. Building your own mixer can save you money, as a mixer for this frequency can cost about \$400. I tried the HMXR-5001 mixer from Hewlett-Packard. It worked well, but mixers like that don't show up at swap meets.

The input power to the mixer's IF port was 0 dBm (1 mW) and the LO power was 10 dBm (10 mW). The insertion loss was about -9 dB, with LO-to-RF isolation about of -20 dB. I laid out the mixer with a lowpass filter at the IF port. I added a bandpass filter to this to suppress any

spurious oscillations generated by my 903 MHz transverter.

Power Amplifiers

Power amplifiers for this band are hard to come by. One source for parts is Surplus Sales of Nebraska. They had a 7 to 11 GHz amplifier with 34 dB gain and a noise figure of 4.5 dB for \$125. The noise figure may be higher than you wish, but at this price you can still use it for a power amplifier or driver. I found some preamps with layouts by WB5LUA in Microwave Update 88. The GAsFets used for the amplifiers are the Avantek ATF 13135 purchased from Pennstock for \$33 each. Under test the amplifiers measure about

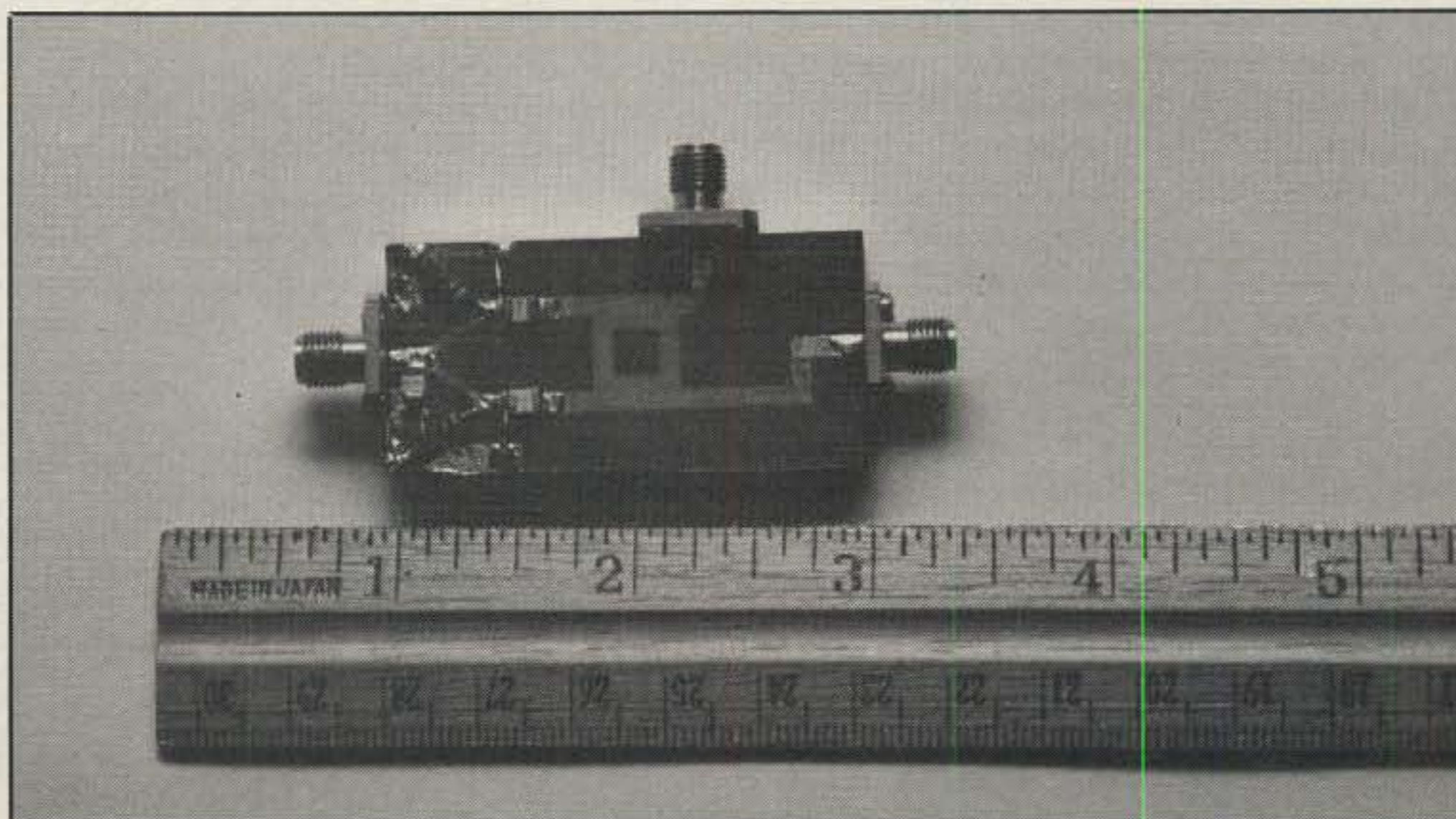


Photo D- The 10.3 GHz mixer showing parts placement.

Keyers



The Morse Machine MM-3 Keyer

The Morse Machine has all the features you need in a memory keyer, including 2 to 99 WPM speed selection and over 8,000 characters of soft-partitioned memory. Twenty memories store your messages...as short or as long as you like. Memory can be expanded to 36,000 characters. All memory is backed up by an internal lithium battery.

Comprehensive Morse training facilities are built-in. **A Proficiency Trainer** for random code group practice. **A Random Word Generator** which generates four-letter words and **A QSO Simulator** which allows you to call stations, answer a CQ or listen to realistic on-the-air QSO's.

The MM-3 also features automatic serial number insertion and incrementing in any memory message. 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 expedited by having parts of your message sent at a higher speed. You can even add remote switches for four of the memories to send your response or call CQ. The MM-3 can also be programmed for automatic beacon use. The RS-232 compatible serial I/O port provides computer control of the MM-3 and monitoring of the Morse training features.

Packet



PK-88 Packet Radio TNC

Unique operating features with a proven hardware and software design make AEA's PK-88 your best choice in packet radio--now with MailDrop, an 8KByte efficient personal Mailbox. The PK-88 also allows multiple single frequency QSO's, digipeating and networking. It's a superb value, packed with all the most needed packet radio features such as direct interface capability with NET/ROM and TCP/IP. In addition to all the features of a "standard" TNC, the PK-88 offers features not found in any other TNC:

- **WHYNOT** command - Shows reasons why some received packets are not displayed.
- **"Packet Dump Suppression"** - Prevents dumping unsent packets on the radio channel when the link fails.
- **CUSTOM** Command - Allows limited PK-88 customization for non-standard applications.
- **Enhanced MBX** command - Permits display of the data in I- and UI-frames, without packet headers and without packet headers or retried frames.
- **Enhanced MPROTO** command - Suppresses display of non-ASCII packets from Level Three switches and network nodes.

Multi-Mode



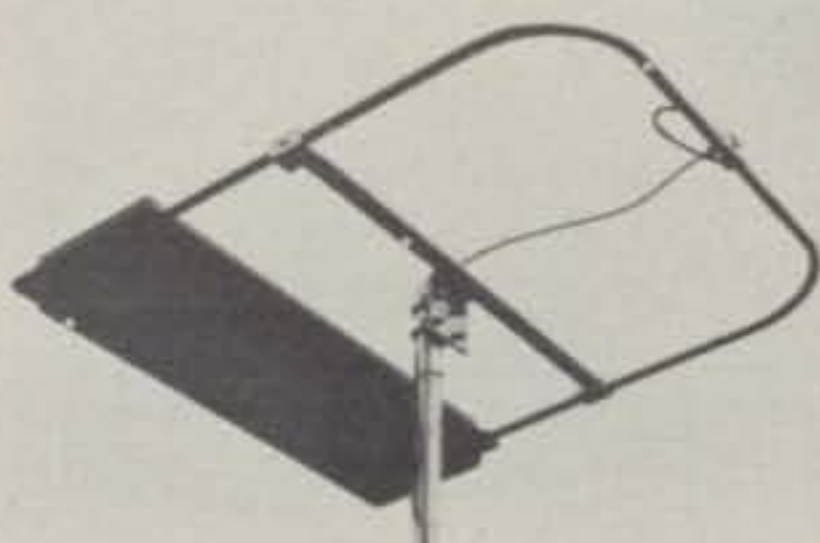
PK-232MBX Multi-Mode Data Controller

With over 40,000 units sold worldwide, the PK-232MBX is the world's leading multi-mode data controller. Combining all amateur data communication modes in one comprehensive unit, the PK-232MBX offers Morse Code, Baudot, ASCII, AMTOR/SITOR 476 and 625, HF and VHF Packet, WEFAX receive and transmit, TDM, as well as commercial standard NAVTEX automated marine information services.

All software is on ROM.

- 20 front panel status and mode LED indicators
- RS-232 compatible
- Exclusive SIAM™ Signal Identification and Acquisition Mode
- TDM Time Division Multiplex decoding
- PakMail™ mailbox with selective control of third-party traffic
- FAX printing - supports most printers
- Two radio ports
- Host mode for efficient program control of the PK-232MBX
- KISS mode for TCP/IP networking protocol compatibility
- 32K RAM lithium battery-backed
- Many features for the digital SWL

Antennas



IsoLoop™ 14-30 MHz Compact HF Antenna

AEA brings you the breakthrough in compact HF antenna design with its high-performance, low-profile IsoLoop HF antenna. Designed specifically for hams with limited space or antenna restrictions, the 32"-square IsoLoop covers all frequencies from 14 to 30 MHz, at up to 150 watts continuous.

No ground radials are needed and its balanced, shielded feed-loop isolates the antenna from the feedline. This ensures that your signal is radiated by

the antenna, not the feedline, which helps eliminate TVI and stray RF in the shack.

The inherent hi-Q of the IsoLoop makes it like a very sharp tunable filter that radiates. The narrow bandwidth suppresses harmonics from your transmitter, and also attenuates out-of-band signals that could overload your receiver.

The omni-directional IsoLoop makes an excellent attic or balcony antenna, and because it weighs only 12 pounds is also perfect for portable use.

Better Experience

Dummy Load

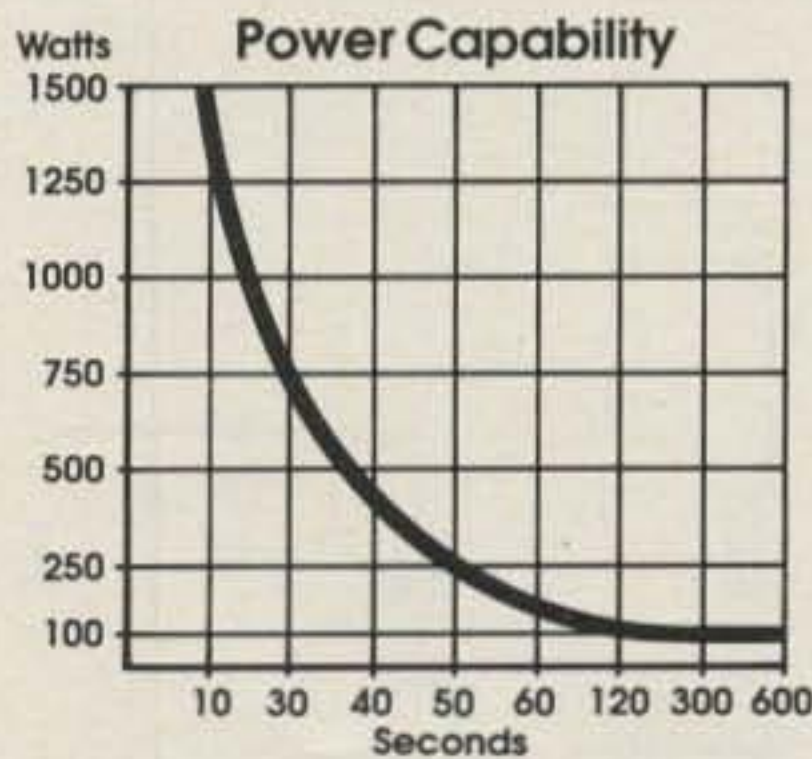


DL-1500

DC-650 MHz Up to 1500 Watts

AEA's dry dummy load simulates a perfect 50 ohm antenna up to 650 MHz so you can test your transmitter without radiating a signal on the air.

- DC-650 MHz
- Simulates matched 50 ohm transmission line to test your transmitter
- Handles short-term RF power up to 1500 watts
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- Compact and lightweight
- Air cooled dry load



EconoTuner



ET-1 Antenna Tuner

300 Watts of All-Band Tuning

Meet your match with AEA's new ET-1 Econo-Tuner™. A quality, economical antenna tuner for under \$150, the ET-1 Econo-Tuner is designed to match virtually any receiver, transmitter or transceiver from 1.8 to 30 MHz with up to 300 watts of RF power.

Compatible with almost ANY antenna including verticals, dipoles, inverted vees, beams and mobile whips that are fed by coax cable, balanced lines or a single wire. For easy connection to balanced lines, a 4:1 balun is built-in.

A front panel switch control allows you to switch between two coax-fed antennas (direct or through the tuner). You can also switch to a balanced line or wire antenna. The BYPASS position allows you to switch to a dummy load (such as AEA's DL-1500 dry dummy load) or a direct connected coax antenna. In the BYPASS position, COAX 1 OUT or COAX 2 OUT can be selected so that the tuner is bypassed, but not the meter circuit.

The ET-1 features a precision dual-movement meter to simultaneously monitor power and SWR.

Unique engineering designs have made AEA one of the leading innovators in the amateur radio industry. That same quality and superior technical support make the ET-1 your best deal for an antenna tuner.

Antennas

IsoPole™ Omni-Directional VHF and UHF Base Station Antennas

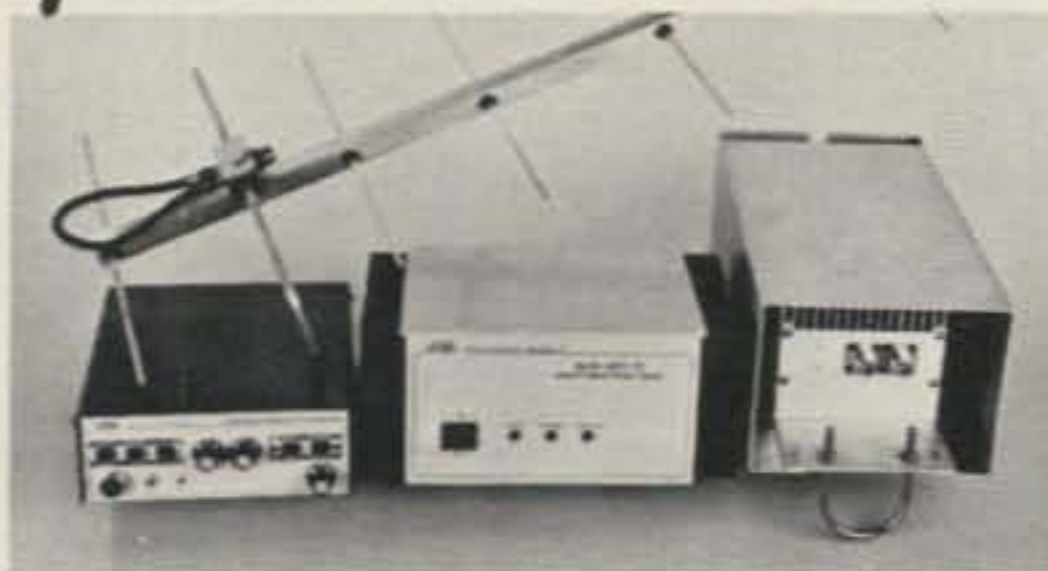


An outstanding mechanical and electrical design make the IsoPole the best choice for an economical omni-directional VHF or UHF base station antenna. All IsoPole antennas yield the maximum gain attainable for their respective lengths and a zero degree angle of radiation which puts the most signal on the horizon. Exceptional decoupling results in simple tuning and a significant reduction in TVI potential. Decoupling cones offer great efficiency over obsolete radials which radiate in the horizontal plane. The IsoPoles also have a broader frequency coverage than any comparable antennas. Typical SWR is 1.4 to 1 or better across the entire band!

All mounting hardware is stainless steel. The decoupling cones and radiating elements are made of corrosion-resistant aluminum alloys. Aerodynamic cones are the only appreciable wind load and are attached directly to the support (a standard TV mast, not supplied).

IsoPoles are ideal for packet radio. The decoupling cones stop computer hash picked up by the outer shield of the coaxial cable from being passed to the receiver.

Amateur TV



AEA's New ATV System

Add a new dimension to your amateur radio communications with AEA's Amateur Television (ATV) system. If you hold at least a technician-class license, you can transmit and receive live or taped audio and video Fast-Scan TV (FSTV) information that rivals broadcast quality. Now you can share more than conversation over the air with this new mode of "personal communications."

It's Easy and Inexpensive. If you have a video camera or camcorder and a standard TV set, you may already own the most expensive components of an ATV system. AEA's ATV system includes a transceiver and antenna. Simply connect the camera, TV and the antenna to the transceiver, and you're on the air LIVE with one watt P.E.P.! If you want to broadcast with more power, AEA also offers a 50 watt mast-mounted linear amplifier and GaAsFET preamp with power supply. Your TV set will monitor your transmitted and received pictures.

Amplifier Now Available.

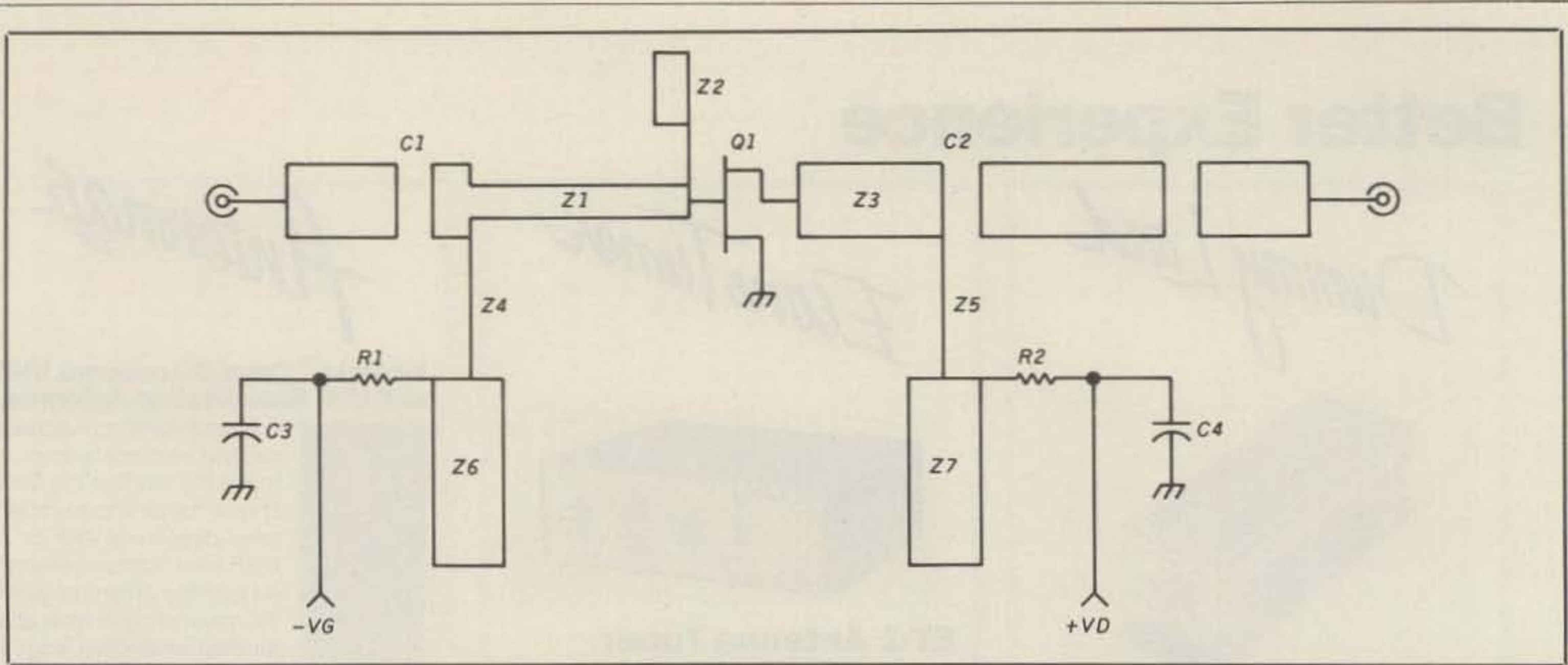


Fig. 3- Schematic of the 10.3 GHz preamplifier.

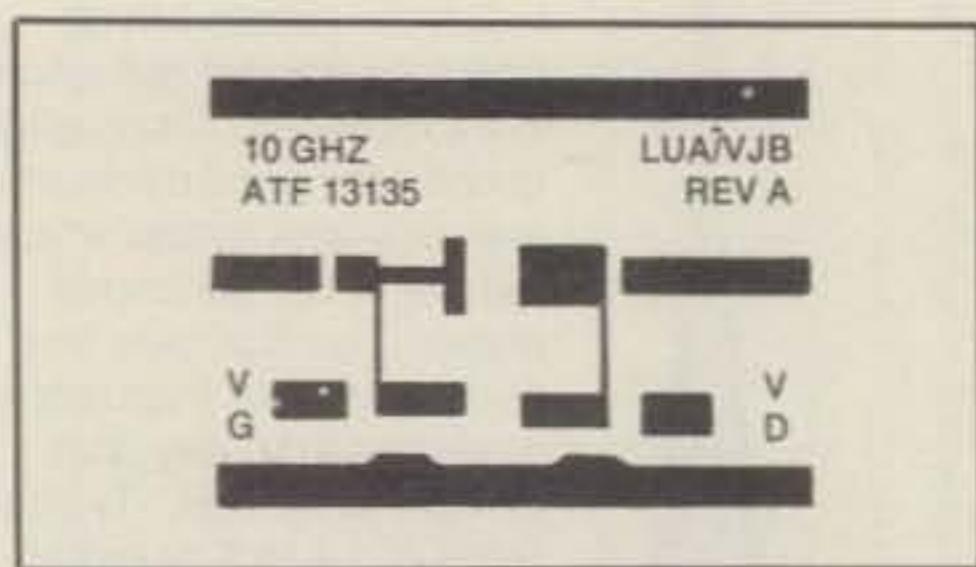


Fig. 4- Preamplifier 1:1 board layout.

8 dB gain and have a noise figure of 1.3 dB for the single unit, with about 17 dB gain and a 1.5 dB noise figure for the double unit. The 1 dB compression point may be about 10 to 20 mW. Fig. 3 shows the amplifier schematic; a one-to-one PC board layout appears in fig. 4.

The traveling-wave tube (TWT) is another power source you may wish to explore. Outputs of 50 to 100 watts are now being used on the band for EME. TWTs

have gains on the order of 30 to 40 dB, so you need only a very small amount of power to drive most of them to full output. For a 10 watt TWT amplifier, 100 microwatts may be all that is required for full output.

The 10.3 GHz part of the transverter was mounted above an aluminum chassis. The 903 MHz transverter, built to drive the 10.3 GHz transverter, was mounted below. The output was about 5

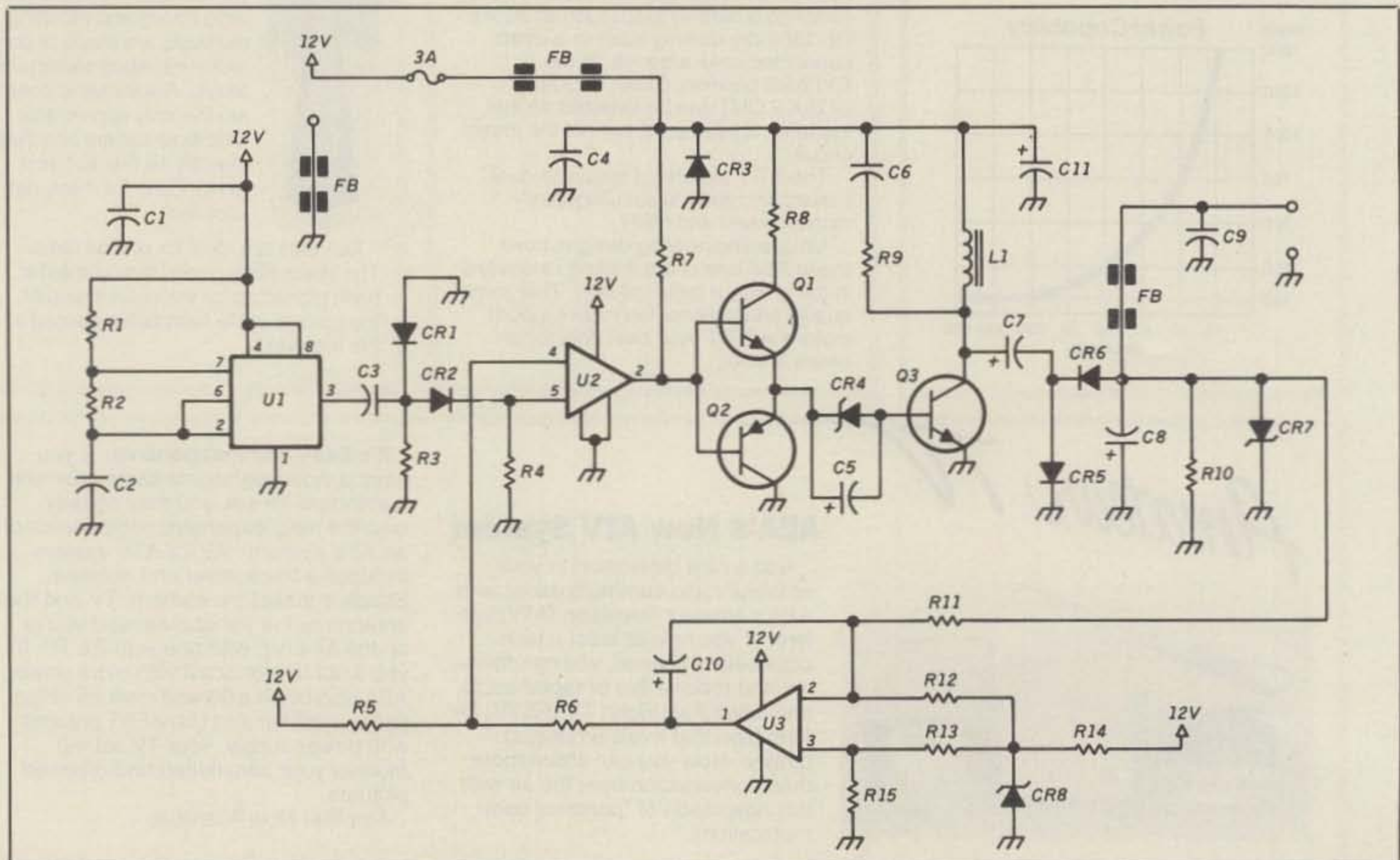


Fig. 5- Schematic of the +12 to -20 volt power supply.

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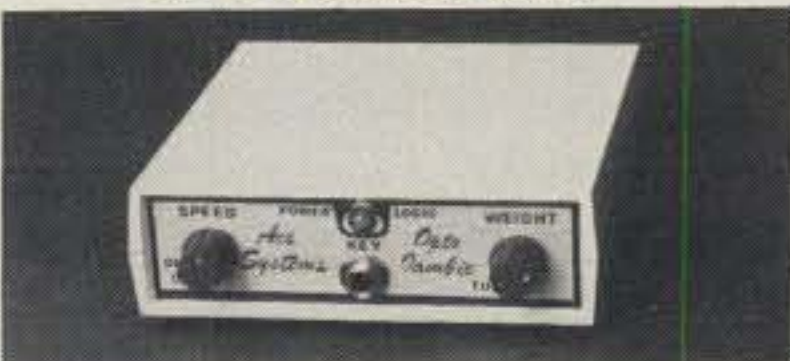
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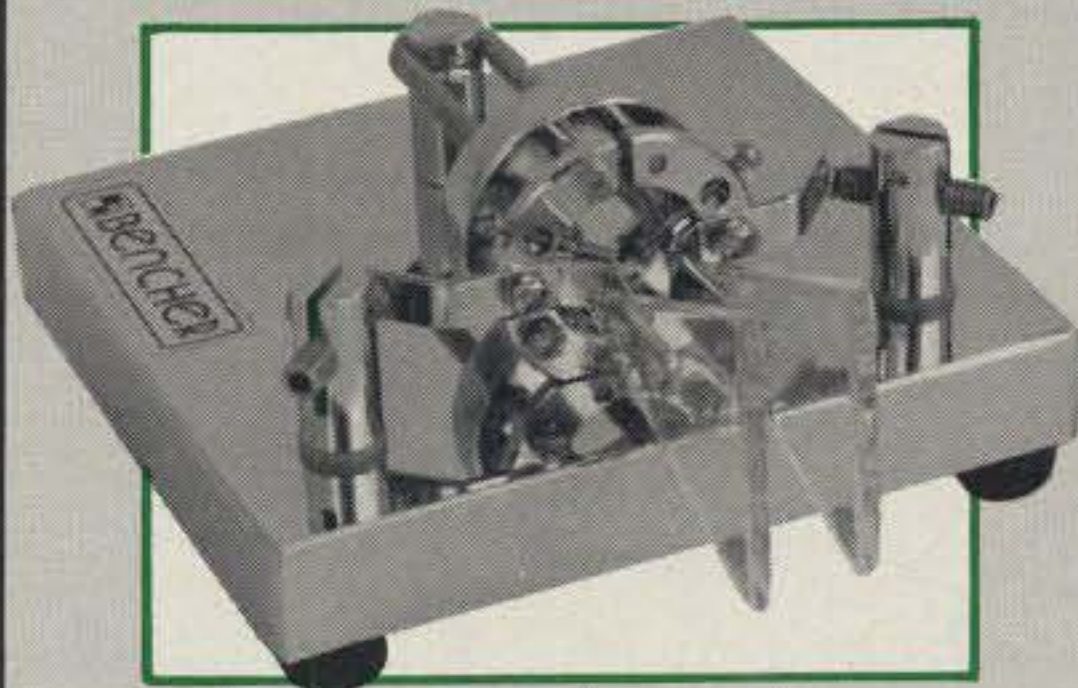
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MN & MNjr are up to 10 times faster than standard MININEC implementations. Comprehensive antenna design library, easy-to-use full-screen editor, and extensive documentation included. Add 6.25% CA, \$5 over-seas. U.S. check, cash, or money order. For IBM PC, 3.5" or 5.25" disk.

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the ULTIMATE

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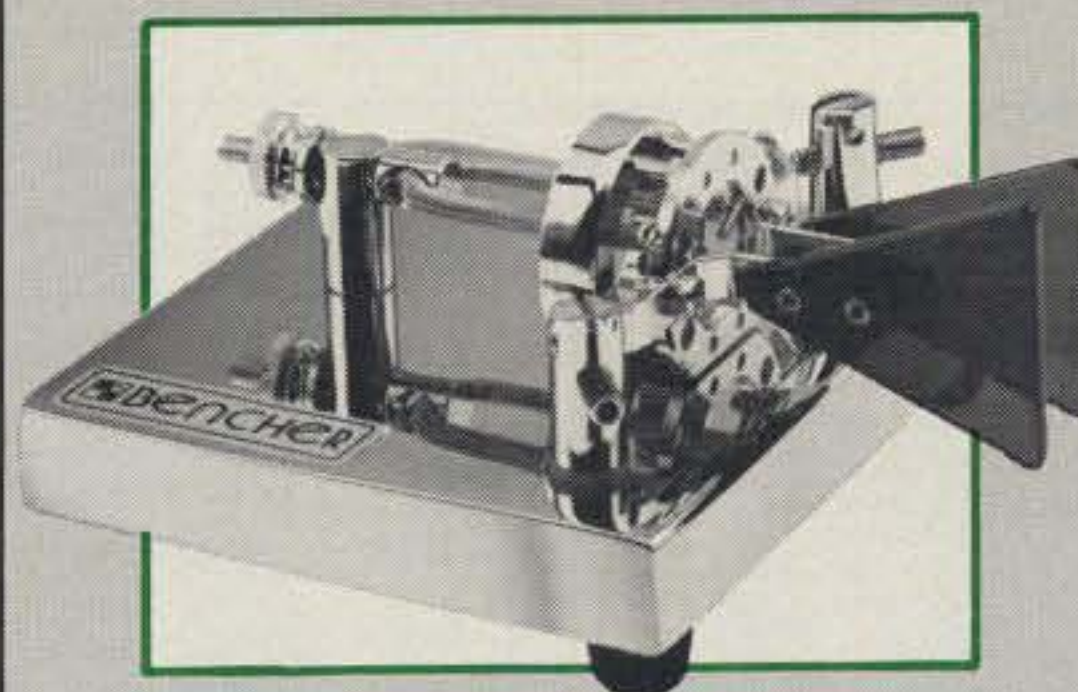


The Bencher Iambic Paddle, the Finest Available

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

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
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- Unmatched Responsiveness



The Bencher Single Lever, Non-Iambic Paddle

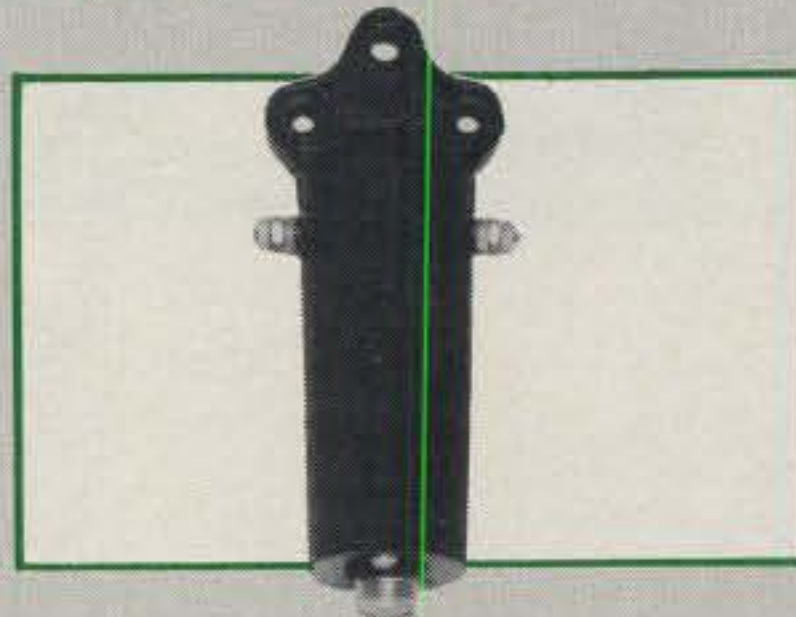
—For the amateur who prefers the more traditional approach to electronic keying.

ST-1	Black Base	69.95
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CW is the language of amateur radio—and no one speaks it better than Bencher!

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
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- DC grounded for lightning protection
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- Amphenol coax connector
- Rated 5KW, works with antenna tuners



The Bencher Engineered 1:1 Balun

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

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Working Range:	1.8 to 29.7 MHz	
Impedance:	50 ohms	
Power Rating:	15kw continuous, 5kw peak	
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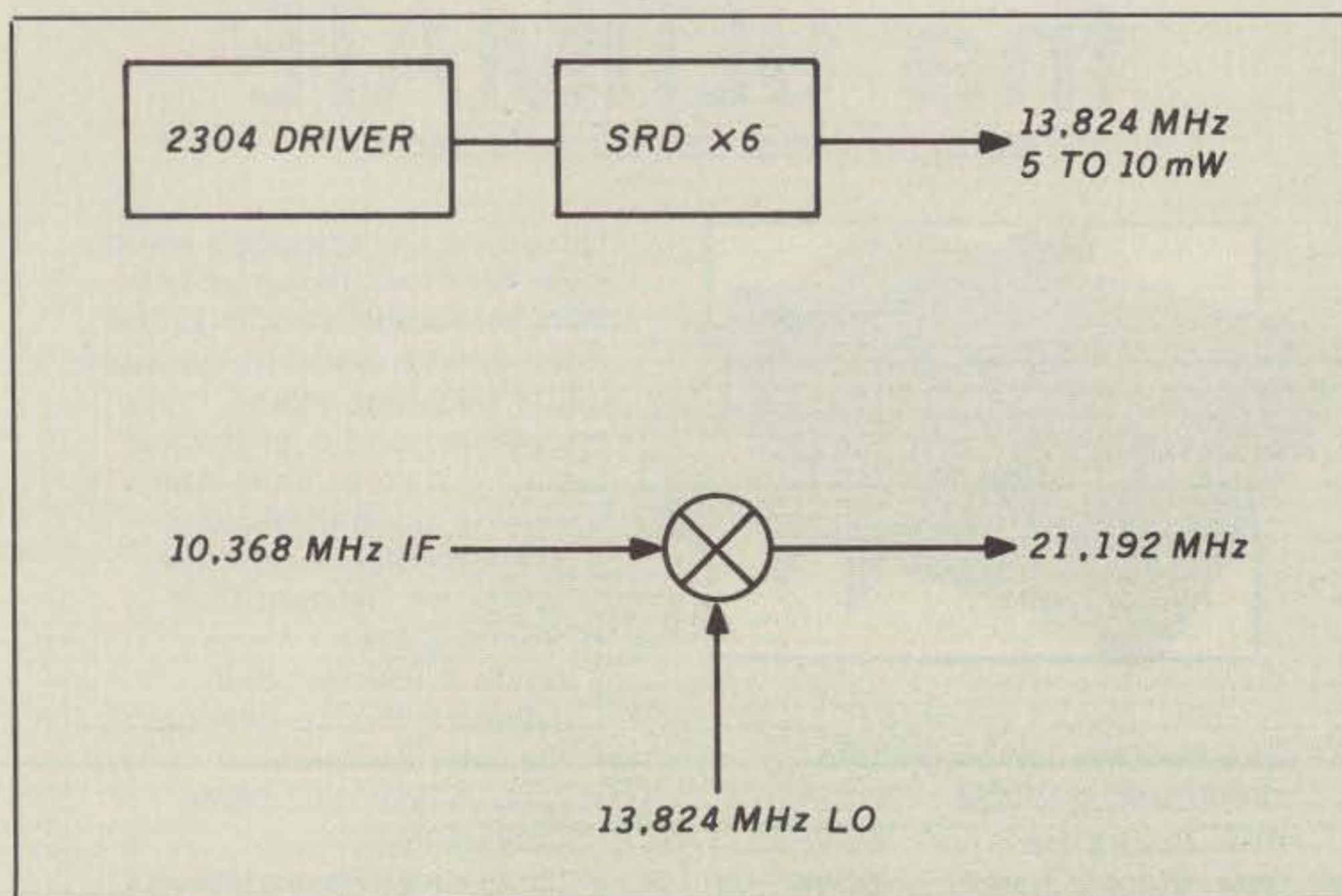


Fig. 6- 24 GHz block diagram.

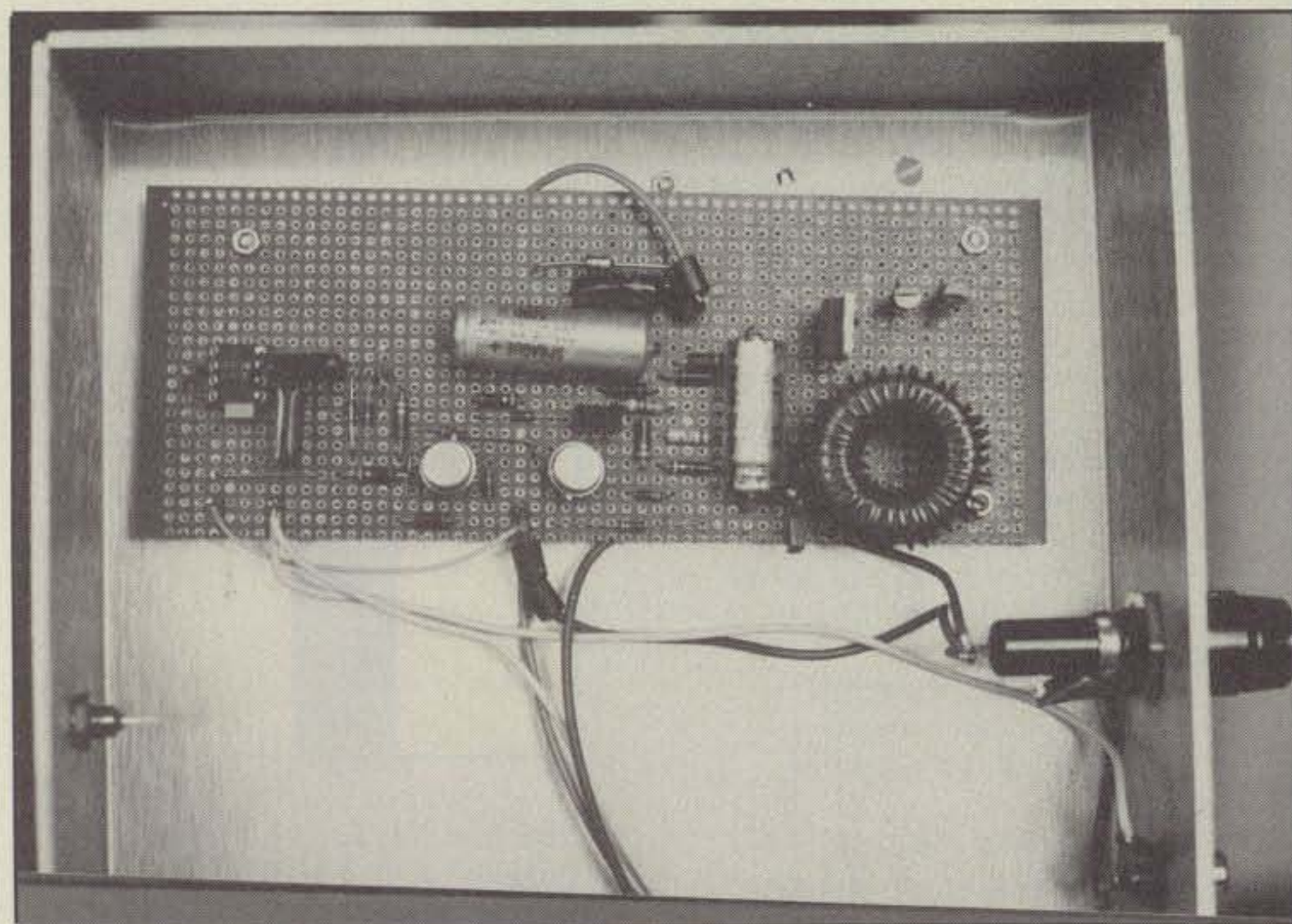


Photo E- The +12 to -20 volt power supply.

mW, with about 3 dB cable loss and 0.5 dB loss in the 903 MHz bandpass filter. I built another transverter with an output of 5 watts just for 903 MHz.

Tune-up is easy because you test all subassemblies before putting everything together. The IF bandpass filter need be tested only once; the oscillator is then locked onto the new frequency. You'll need an RF generator, HP432 power meter, and a spectrum analyzer for all of the alignments. A spectrum analyzer aids in tuning the filters, locking the oscillator, and looking for spurious responses from the amplifier.

Power Supply

Power for this project is 12 volts at 0.2 amps and -20 volts at 0.4 amps. This meant I needed to build a power supply (see photo E). Al Ward, WB5LUA, and Greg Raven, KF5N, built a +12 to -20 volt DC-DC converter power supply using inexpensive parts. Fig. 5 shows the power-supply schematic. You can find most of the parts at Radio Shack or other parts outlets. For L1, use a T-106-26 iron-powder core from Amidon Associates with 37 turns of #18-or 20-gauge wire. The 9.1 k ohm resistor that I used may not

be easy to find, but you can parallel a 10 k and 100 k resistor. I didn't use a PC board here, as the overall layout isn't critical.

24.192 MHz Transverter

Though I concentrated on building a 10.3 GHz transverter, it's only a matter of adding another mixer and LO for 13,824 MHz to go from 10.368 to 24.192 MHz. Fig. 6 shows the basic idea. This project is still on the drawing board, but could work like this:

- Start with any CW source that will give you 2304 MHz output.
- Remove a x6 stage from an 11 GHz brick and retune it for maximum output at 13.824 GHz ($2304 \times 6 = 13,824$).
- Make or buy a mixer for 13 GHz.
- Make a bandpass filter for 24 GHz.

The 11 to 12 GHz bricks will be hard to tune. Use them as is, so only the output portion is utilized. The cost of just the output multiplier, in working order, was \$8. I haven't yet built the 24 GHz unit.

Conclusion

With improved technology and increased parts availability, 10.3 GHz and beyond are within the reach of all amateurs. Finding others in your area with the same interest may be a bigger problem than building the equipment. But don't give up. Some day soon we may see a DXCC on 10.3 or 24 GHz.

Parts List

Power Supply

R1—4.7 k	C1—0.05 uF
R2—1 k	C2—0.01 uF
R3—1 k	C3—0.05 uF
R4—2 k	C4—0.05 uF
R5—3 k	C5—1 uF
R6—1 k	C6—0.01 uF
R7—1 k	C7—100 uF/25 V DC
R8—100 ohm	C8—220 uF/25 V DC
R9—200 ohm	C9—0.01 uF
R10—10 k	C10—1 uF
R11—9.1 k	C11—2200 uF/25 V DC
R12—1 k	
R13—1 k	CR1—1N914
R14—1 k	CR2—1N914
R15—1 k	CR3—1N4001
	CR4—5.1 volts
	CR5—1N4001
	CR6—1N4001
	CR7—26 volts
	CR8—5.1 volts
	FB—Ferrite bead
L1—100 uH	
U1—555	
U2—LM339	
U3—714	
Q1—PN2222 (RS 276-2009)	
Q2—PN2907 (RS 276-2023)	
Q3—TIP 3055 (RS 276-2020)	

10.3 GHz Preamplifier

C1,C2—2.7 pF 0.05 inch square-chip capacitors
C3,C4—1000 pF chip capacitors
R1,R2—51 ohm chip resistors
Z1-Z7—Etched microstrip circuitry
Q1—ATF 13135



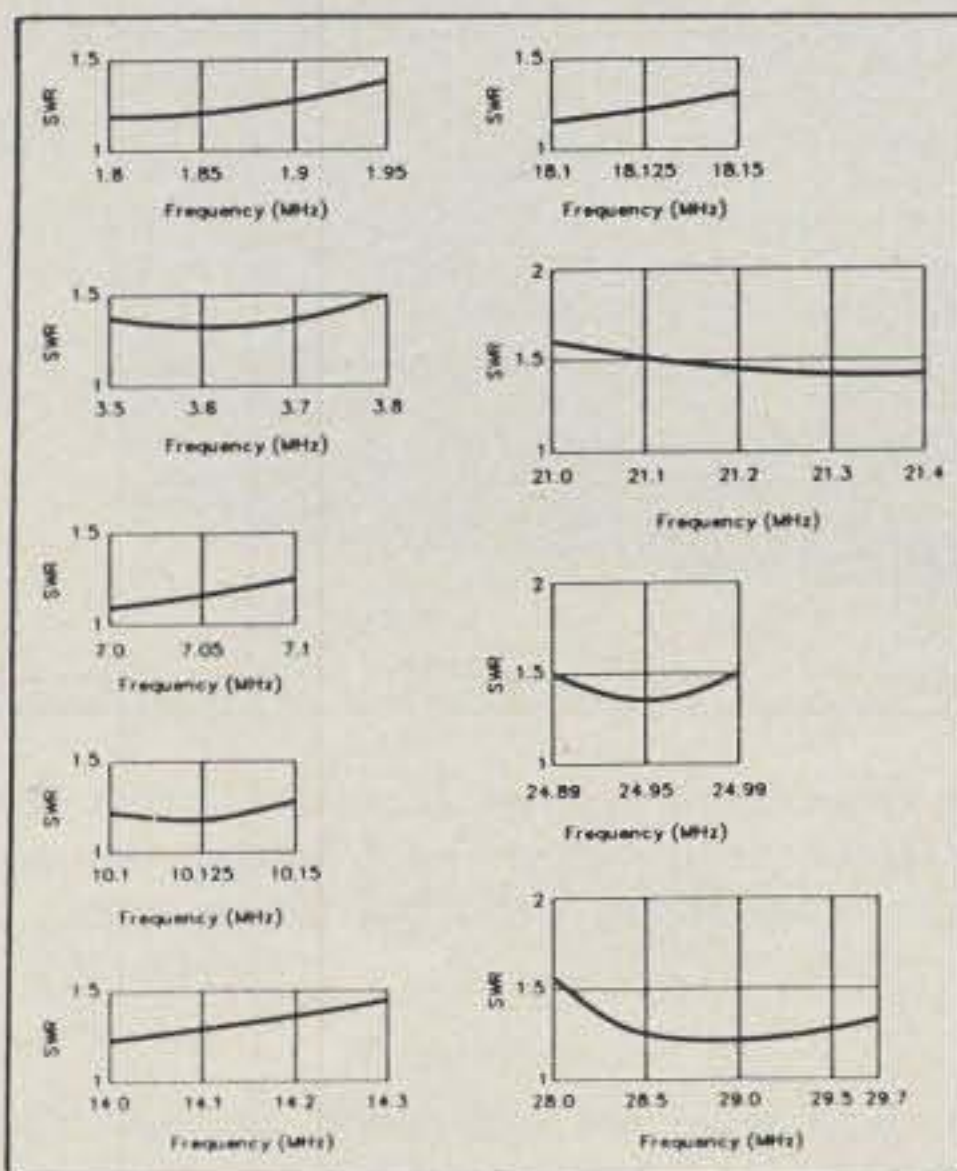
1 Garant Antenna for all 9 HF bands

Amateur radio operators all over the world realize the advantages of the almost famous Garant Windom Antennas. With proper installation, there is no need for a transmatch. The typical SWR is 1.5:1 or less in most cases as a recent article in QST showed.

The Garant Windom Dipoles are modified windom antennas. To match the low-impedance 50Ω coax feedline to the high-impedance antenna feedpoint a proper-ratio balun comes with each antenna. No, it is not a 1:4 balun. Those will not do the trick.

AS SEEN IN QST

In August 1990 on pages 28 to 34 QST Magazine published an informative article on off-center-fed dipoles which are in fact modified windom antennas. This article also depicted the Garant Windom Antennas model GD-8/500W and model GD-9/2KW. Due to space limitations, we can only print the SWR values for our very popular nine-band GD-9/2KW as seen in QST.



As you can see, the bandwidth with an SWR of 1.5:1 or less is very broad, therefore there is no need for a transmatch, as countless hams have testified in writing to the manufacturer, Garant Enterprises.

10-Day No-Risk Money-Back Guarantee

Not all our customers can come to Thunder Bay and inspect our products. For your convenience, we'll mail you any of our Garant Windom Antennas with a 10-Day Money-Back Guarantee. If you don't like what you see we'll gladly refund the full purchase price. We did so far in the past.

3-Year Limited Warranty

To prove to you that we believe in our merchandise, we sell all our Garant Windom Antennas with a 3-Year Limited Warranty. We don't know of any other antenna manufacturer who does that. We only can do that, because we know that our products are excellent.

12 Models To Select

You can pick from a wide selection of different models. If you have the space, you should install our GD-9 double windom or our GD-7 single windom which have a max. length of 255'. The GD-9 covers 160-80-40-30-20-17-15-12-10M, while the GD-7 covers 160-80-40-20-17-12-10M.

Not all hams can install 255' of antenna wire. Lots of hams select our GD-8 or GD-6 models which have a max. length of 137'. The GD-8 is a double windom, while the GD-6 is a single windom. The GD-8 lets you work on 80-40-30-20-17-15-12-10M and the GD-6 works on 80-40-20-17-12-10M.

For hams with very small lots we have the models GD-3 and GD-5 available. Those antennas have a max. length of 67'. The GD-5 is a double windom and the GD-3 is a single windom. The GD-5 enables you to work 40-30-20-15-10M and the GD-3 works on 40-20-10M. These two models may cover only a limited amount of bands, but that is still better than a one-band dipole or no antenna at all.

500W or 2KW PEP

Our model numbers explain how many bands an antenna covers, i.e. a GD-6 works on six bands, while a GD-9 works on nine bands. You may select between baluns with different power ratings - 500W PEP or 2KW PEP. On request, we supply you also with our commercial balun which has a power rating of 5KW PEP. Our 500W PEP balun is a voltage balun, while our 2KW PEP balun is a current balun.

First Class Quality

All our baluns are custom designed. The case is injection moulded. We don't supply you with run-of-the-mill baluns that are cut from plastic pipes. Our cases are made out of black polystyrol which is UV resistant. Our 500W PEP balun can handle up to 1,700N tension while our 2KW PEP balun can handle up to 4,500N. We use only stainless steel hardware to guarantee you peace of mind for years to come. Both our baluns use ferrite toroids for better performance. Our baluns are designed that you can hardly see them, especially the little one. The 500W PEP balun weighs only 120 grams (4.25oz.). The 2KW PEP balun weighs 300 grams (10.6oz.).

Customer Satisfaction Is Our First Priority

From time to time, we survey our customers and ask them how our antennas perform at their QTH. Here are a few of the many customer comments we have received in the past. All those letters are real. We guarantee it. We even show the name and call of each writer who has given us permission to do so.

Adrian, KC4MTP wrote, "I am well pleased with my GD-6/500W antenna. I have a Kenwood TS140 and running 50 watts. I have contacted hams coast to coast. It is so simple. Just turn on the transmitter and start sending. No tuner needed."

Steven, N6RYA commented, "Although I had to compromise on the ideal installation, the antenna performs as well as I could hope for with my modest station (TS-430S). I am more than satisfied with the GD-8."

Colin, WB3CZP told us, "My GD-8/500W performs better than I ever anticipated. I receive good signal reports and the SWR is well within specs. Also, it (the antenna) is

almost invisible and was easy to put up."

Ted, N6SQI stated, "I am very pleased with the GD-9/500W antenna. Both for DX and local. I can usually contact anything I can hear. I also like the ease of switching bands."

John, W0HBE wrote, "I was impressed by the low SWR on all bands and comparison tests have proved to me that the Garant GD-8 is far superior to any other wire antenna."

Wilf, VE3MNJ, "The service from your organization was fine. The GD-8/500W works well. Its main advantage, from my point of view, is that it eliminates the need for a transmatch on all bands."

John, KA3SDQ on his GD-8/500W, "Prompt delivery, helpful phone ordering and information, combined with a quality product. Garant truly has an unbeatable combination."

Harry, N8GEC on his GD-6/500W, "This antenna is bringing in all the bands 10 thru 80 meters with less than 1.2 SWR and in most cases less than that. I have mounted it as an inverted-V on a 40ft tower. I think the antenna is excellent. It is light in weight and no traps to worry about."

James, VE7JN wrote, "I purchased a GD-6/500W last year and have been very pleased with the results over the past fall and winter. The performance is quite outstanding. I am mainly interested in 80 and 40, and this antenna does an extraordinary job on these bands with very low SWR across both bands. The reports have been amazing. I have used it on 20M with almost as good reports as with the TA-33 beam and better VSWR across the band. I work 18 and 24MHz bands using the GD-6 with very good results. On 28MHz the VSWR is quite good, in fact it goes nearly to 1:1 around 29MHz. The balun looks good and I like the way it is constructed to keep the rain from getting into the coax. Your service and products are very good."

Bob, VE1ANY, "My antenna is a GD-8/2KW, 25' center, 20' at ends. Neither a dipole nor an inverted-V, but it works well. Not bothered by wind, rain, snow or heat. SWR is quite low. Love an antenna you can put up and forget about. Bottomline is IT WORKS."

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CQ REVIEWS:

The Yaesu FT-1000 HF Transceiver

BY JOHN J. SCHULTZ*, W4FA

I find absolutely fascinating the number of interesting features incorporated in the latest generation of HF transceivers. They really do stretch the technical imagination. I sort of feel sorry for the people who write the advertisements for these new products. No matter how small you make the print size in the advertisement, you really cannot cover all of the features. And if you make the advertisement too long or too detailed, it doesn't catch the reader's attention. I guess writers such as myself fill a need in this type of situation. Hopefully, you do have a bit of time to read this article leisurely as we explore the FT-1000.

The FT-1000 is indeed a fascinating new generation of HF transceiver. Its "menu" of operating features is very long indeed, but I'll try to break them down into small enough portions such that they hopefully can easily be understood.

An Overall View

The FT-1000 is an outgrowth of the FT-One and FT-980 transceivers, but it has vastly improved specifications in almost all aspects. Although the FT-1000 is a very sophisticated transceiver, it is, after all, basically a receiving and transmitting device. If the "core" performance of the receiving and transmitting functions is not on the "cutting edge," the addition of all the sophisticated "add-ons" is not going to make it a basically better transceiver.

Hence, a brief look at the specifications of the FT-1000 as shown in Table I can be a useful exercise. The FT-1000 is a fairly large, heavy transceiver (51 lbs.). However, it is completely self-contained with a built-in 100/220 VAC power supply and automatic antenna tuner. A hand microphone comes with the unit. Therefore, for basic SSB operation all you have to do is connect an antenna. For CW operation, you do need a key. However, the FT-1000 has a built-in keyer.

The transmitter side of the FT-1000 includes all modes as standard, and besides the usual 170, 425, and 850 Hz shifts for FSK, there are also 200 and 1000 Hz shifts for packet. The various suppression and distortion specifications are excellent. The power output of 200 watts (100% duty cycle at 100 watts output) doubles that found in most solid-state transceivers. The 1050 VA power consumption at a



The main tuning and sub-receiver tuning knobs stand out on the front panel of the FT-1000. The digital display field includes the frequency readout for the main receiver, RIT/XIT offset, memory channel number, frequency readout for the sub-receiver, and various small annunciators.

full 200 watts output poses no problem for most AC power lines as long as a station doesn't have too many accessory items or lamps in use on the same AC line.

The receiver side is very impressive. The sensitivity, dynamic range, and selectivity figures (all somewhat understated) are more than adequate for today's needs. Eight IF filters are supplied as standard, and five optional filters are available for cascading purposes if you really want to go in for ultimate selectivity. Unfortunately, Table I is so condensed that it doesn't even mention the 99 tunable memories and selectivity controls such as continuously variable **IF Width**, variable **Audio Peak Filter**, **Notch Filter** tuning, etc. Perhaps more surprisingly, no details are given for the second receiver in the FT-1000 which can be tuned over any frequency range totally independent of where the main tuning is set. I'll try to cover some details as we go along.

General and Specific Circuitry

I was tempted to present a block diagram of the FT-1000. It contains well over 250 blocks and would take hours to understand. Yaesu does include one in their operating manual for the FT-1000, and perhaps it is a nice illustration of the idea that no matter how complex a modern transceiver is, all the circuitry can be

broken down and understood, at least by its general function.

The FT-1000 follows the fairly well-established idea for synthesized transceivers of having a quite high-frequency first IF (73.62 MHz) and then introducing the real signal selectivity in the lower-frequency IFs (8.215 MHz and 455 kHz). A separate 100 kHz IF plays a role for the FM mode only. The mixers for the higher IFs are driven by two 10-bit and three 8-bit DDS units (Direct Digital Synthesizers) acting as local oscillators. Each DDS unit is referenced to a single temperature-compensated crystal oscillator. The signal purity of the DDS outputs plus the linearity characteristics of the amplifiers and mixers in both the receive and transmit signal chain are critical to performance. The DDS units in the FT-1000 are not detailed beyond house-numbered ICs, so there is not much I can present about them.

The second receiver is frequency *independent* of the main receiver. Normally, the input to the mixer of the second receiver is taken *after* the main RF preamplifier. This means that although the second receiver can be tuned at will, its input also passes through the bandpass filter associated with the RF preamplifier of the main receiver. This is no problem when both receivers are used in the same bandpass filter's frequency range, but if the second receiver is tuned to 80 meters while the main receiver is on 10 meters, there is bound to be signal attenuation.

*302 Glasgow Lane, Greenville, NC 27858

Yaesu offers a rather unique option for the second receiver—the BPF-1 Bandpass Filter Module. This module fits into the back panel of the FT-1000 and contains 11 separate bandpass filters just for the second receiver. When installed, the RF input to the second receiver goes through its own band of input filters. The input to the filters comes either from the same antenna used with the main receiver or from a completely separate antenna input jack (front-panel selectable). Under these conditions the second receiver is truly an independent unit, when desired. Data and RX/TX operating modes can be transferred back and forth between the second and the main receiver's VFOs. The second receiver has independently selectable IF bandwidths for AM and SSB and an optional 600 Hz bandwidth filter for CW. The main receiver has a wider range of standard and optional IF bandwidths. Without any optional filters, the filter in the 455 kHz IF remains constant while the 8 MHz IF filters change as you go through 11 of the bandwidth positions except for AM wide/narrow. Thus, there is quite a good selection of filters for all modes built-in. The optional filters for the 455 kHz IF work in cascade with the 8 MHz filters, and you can install as many as desired. I personally found the optional 2 kHz and 500 Hz filters to be excellent.

The front-panel filter selection is independent of the mode in use except for the AM and FM modes. On AM you can select only between wide and narrow (2.4 kHz) positions. On FM the IF bandwidth is fixed at 25 kHz.

The **IF Shift**, **IF Width**, and **AF Notch** controls are active on all modes, while the **APF** (Audio Peaking Filter) is active only on CW. The use of these controls varies somewhat from mode to mode, but they are all effective either against QRM or just in shaping the received "audio" to a preferred sound. Unlike the other controls, the **IF Shift** and **IF Width** controls have detent positions which make them especially easy to set/reset.

Tuning the FT-1000

Basic tuning of the FT-1000 is quite simple if you just follow a few simple procedures. The FT-1000's operating manual has a two-page chapter called "Getting Started Tutorial" which is the best succinct description I have seen of how to get a sophisticated transceiver operating properly. It doesn't introduce you to all of the sophisticated features of the FT-1000, but it immediately alerted me to one mistake I made in initially using the transceiver.

The main tuning knob is labeled **Main VFO A** and the secondary tuning knob is labeled **Sub VFO B**. I assumed the VFO A/B scheme used in the FT-1000 was the same as that commonly found in most transceivers where you have one "VFO A" and one "VFO B," either of which can be set to any frequency within any amateur band or to two frequencies within a specific amateur band. In fact, the FT-1000 has two completely independent VFOs for each band. Each of the VFOs can be set up to store mode and filter selection. This rather interesting feature is activated by a dual depression of the *band* key on the keypad. For instance, I was on 75 meters and just pressed "21" on the keypad; 21.044 MHz, CW mode, 500 Hz bandwidth appeared on the main display. If I had again pressed "21" on the keypad, 21.346 MHz, USB, 2.4 kHz would have ap-

General

Receiving frequency range: 100 kHz — 30 MHz

Transmitting frequency ranges:
 160-m band, 1.5 to 2.0 MHz
 80-m band, 3.5 to 4.0 MHz
 40-m band, 7.0 to 7.5 MHz
 30-m band, 10.0 to 10.5 MHz
 20-m band, 14.0 to 14.5 MHz
 17-m band, 18.0 to 18.5 MHz
 15-m band, 21.0 to 21.5 MHz
 12-m band, 24.5 to 25.0 MHz
 10-m band, 28.0 to 29.7 MHz

Frequency accuracy: $< \pm 0.5$ ppm at room temperature

Frequency stability: $< \pm 2$ ppm from 0 to $+50^{\circ}\text{C}$ (except FM, $< \pm 200$ Hz),
 $< \pm 0.5$ ppm from -10 to $+60^{\circ}\text{C}$ w/TCXO-1 option (FM $< \pm 150$ Hz from 0 to $+50^{\circ}\text{C}$)

Emission modes: LSB/USB (J3E), CW (A1A), FSK (J1D, J2D), AM (A3E), FM (F3E)

Basic frequency steps:
 10 Hz for J3E, A1A and J1D;
 100 Hz for A3E, F3E and J2D

Antenna impedance: 16.5 to 150 Ω , 50 Ω nominal

Supply voltage:
 100, 110, 117, 200, 220 or 234 VAC, 50/60 Hz

Power consumption (approx.):
 95 VA receive, 1050 VA for 200 watts transmit

Dimensions (WHD): 420 x 150 x 375 mm

Weight (approx.): 25.5 kg. (51 lbs)

Transmitter

Power output:
 adjustable up to 200 watts (50 watts AM carrier)

Duty cycle: 100% @ 100 watts,
 50% @ 200 watts (FM & RTTY, 3-minute tx)

Modulation types
 SSB: Balanced, filtered carrier
 AM: Low-level (early stage)
 FM: Variable reactance
 FSK: Audio frequency shift keying

Maximum FM deviation: ± 2.5 kHz

FSK shift frequencies: 170, 425 and 850 Hz

Packet shift frequencies: 200, 1000 Hz

Harmonic radiation: at least 50 dB below peak output

SSB carrier suppression:
 at least 40 dB below peak output

Undesired sideband suppression:
 at least 50 dB below peak output

Audio response (SSB):
 not more than -6 dB from 400 to 2600 Hz

3rd-order IMD: -36 dB @ 150 watts PEP,
 -31 dB @ 200 watts PEP, or better

Microphone impedance: 500 to 600 Ω

Receiver

Circuit type:
 quad-conversion superheterodyne
 (triple conversion for FM)

Intermediate frequencies:
 73.62 and 8.215 MHz, and 455 and 100 kHz

Sensitivity:
 (With preamp on, for 10 dB S/N, 0 dBu = 1 μV)

Frequency \Rightarrow Mode (BW) \Downarrow	100 - 250 kHz	250 - 500 kHz	0.5 - 1.8 MHz	1.8 - 30 MHz
SSB, CW (2.4 kHz)	$< 1.25 \mu\text{V}$	$< 1 \mu\text{V}$	$< 2 \mu\text{V}$	$< 0.25 \mu\text{V}$
AM (6 kHz)	$< 10 \mu\text{V}$	$< 8 \mu\text{V}$	$< 16 \mu\text{V}$	$< 1 \mu\text{V}$
29-MHz FM (for 12 dB SINAD)	—	—	—	$< 0.5 \mu\text{V}$

Selectivity ($-6/-60$ dB):

Button	Modes	Minimum -6 dB BW	Maximum -60 dB BW
2.4 kHz	all except FM	2.2 kHz	3.8 kHz
2.0 kHz	all exc. AM, FM	1.8 kHz	3.6 kHz
500 Hz	CW, RTTY, Packet	500 Hz	1.2 kHz
250 Hz	CW, RTTY	240 Hz	700 Hz
—	AM (wide)	6 kHz	14 kHz

Dynamic range (typical):
 108 dB (@50 kHz, 500-Hz BW, RF amp off)

Squelch sensitivity:
 1.8 — 30 MHz (CW, SSB, AM): $< 2.0 \mu\text{V}$
 28 — 30 MHz (FM): $< 0.32 \mu\text{V}$

IF rejection (1.8 — 30 MHz):
 80 dB or better

Image rejection (1.8 — 30 MHz):
 80 dB or better

IF shift range: ± 1.12 kHz

Maximum audio power output:
 2 watts into 4 Ω with $< 10\%$ THD

Audio output impedance: 4 to 8 Ω

Table 1—Specifications of the FT-1000.

peared on the display. I could have operated immediately on or independently tuned about from either initial frequency setting. I had previously programmed those 21 MHz settings, but they are automatically changed as I retune either VFO or change a filter selection. New frequencies can also be entered from the numeric keypad. This feature of having two VFOs always available for each band does not involve the use of any memories. It's ideal if you like to use one VFO for operating in the CW segment of a band and the other VFO for operation in the phone segment.

The tuning feel of the main tuning knob is excellent; it ranks among the best I have used. Fig. 1 shows the tuning steps for various modes. A **Fast** button changes the tuning rate, but unfortunately, while in use it has to be held depressed. **Up/Down** pushbuttons are also available, and their effect is detailed in fig. 1.

The only feature I miss is a control that would change the tuned frequency in 5 kHz steps; this is very handy when listening around the SW broadcast bands.

Now back again to the main and sub-receiver tuning. Both frequency displays can display down to 10 Hz, although the 10 Hz digit on both displays can be switched off. Both displays have a soft orange color which is easy on the eyes and reminds me of the FT-107. The sub-receiver display is just slightly smaller in size than the main display. The tuning knob for the sub-receiver is smaller than that of the main tuning (1 1/2 inch diameter versus 2 1/4 inch), but the tuning steps are the same as shown in fig. 1, and the tuning feel is quite smooth.

Frequency data can be moved between the two receivers' VFOs in much the same manner as the VFO A/B functions on other transceivers. Again, however, I made a mistake in as-

Tuning Steps

Control ↓	Mode ⇒	LSB, USB, CW, RTTY, PKT-LSB	AM, FM, PKT-FM
Tuning knobs, Mic Up/Dwn Keys	Normal	10 Hz	100 Hz
	w/FAST button	100 Hz	1 kHz
DOWN/UP Pushbuttons	Normal	100 kHz	100 kHz
	w/FAST button	1 MHz	1 MHz
One rev of Tuning knobs	Normal	10 kHz	100 kHz
	w/FAST button	100 kHz	1 MHz

Fig. 1—Tuning steps and dial rotation speeds. They are the same for both the main and sub-receiver.

suming that those functions in the FT-1000 were as restricted as in some other transceivers. An **A to B** pushbutton transfers frequency, mode, and filter data from the main to sub-receiver. An **A = B** key actually *exchanges* all of the data between the two receivers. So if you hear on the sub-receiver an interesting frequency on which you would like to operate, you can depress the **A = B** key, wait a second or two for the automatic tuner to cycle, and be ready to operate. You can also enter frequencies into the VFO of the sub-receiver from the numeric keypad if preceding entry, a key marked **Sub**, is momentarily depressed. The tuning possibilities are rather enormous. You can be using the main receiver and set up the sub-receiver for any other frequency/mode and then mix the audio outputs of both receivers as desired. When split operation is activated, the sub-receiver VFO automatically becomes the transmit VFO. By toggling the **Split**

key, you can easily *hear* the activity around the frequency you intend to use as a split transmit frequency.

Memories

The FT-1000 has 99 tunable memories. Frequencies can be entered into a selected memory channel by transfer from VFO A or by direct keypad entry. Mode, filter, and RIT/XIT information are also stored. Recalled memory channels appear on the main display, and all VFO A/B transfer functions are possible.

Stored memory frequencies can be checked via the VFO B display (without losing any data in VFO B). When an **MCK** key is pressed, the VFO B display shows the frequency, mode, etc., of data in each memory channel as the memory-channel selector switch is rotated.

Memories can be scanned in sequence

(with the provision to "blank out" any specific memory), but scanning will only pause on any channel where the signal level exceeds a previously set level controlled by the squelch control. I found this system awkward and the scanning rate (non-adjustable) far too fast, although it may be useful if you want to very quickly lock on to a memory channel where a very strong signal is present. I preferred to use "manual" scan just by rotating the memory channel control.

On the very positive side, the tunable memory feature is excellent. If you recall a memory channel it is immediately available for tuning, and you can transmit on the recalled frequency or a retuned frequency (as long as they are within an amateur band) *without* any further control manipulations. The original contents of the memory channel are not erased unless you take steps to do so (pressing the **VFO-A/M** switch). Therefore, you have available the rather dazzling number of over 100 VFOs, considering the tunable memories and the dual VFOs per band!

For CW/RTTY/Packet Buffs

Besides the inclusion of a keyer and narrow IF filters for CW, the FT-1000 has various other features which might be of interest. The front-panel controls associated with CW operation have been kept fairly simple—a keyer on/off switch, full/semi break-in switch, a **Spot** switch, and continuously variable keyer **Speed**. The **Spot** control produces a tone that is exactly the same frequency as the IF center frequency and display frequency offset from the true carrier frequency for zero-beating purposes. A **CW Tune** LED is also on the front panel, and provides, at least for stronger signals, a confirming indication that a received signal is at the center of the IF passband. It's not too effective on weak signals, but it is a good training aid on stronger signals as you get used to the various CW tuning controls.

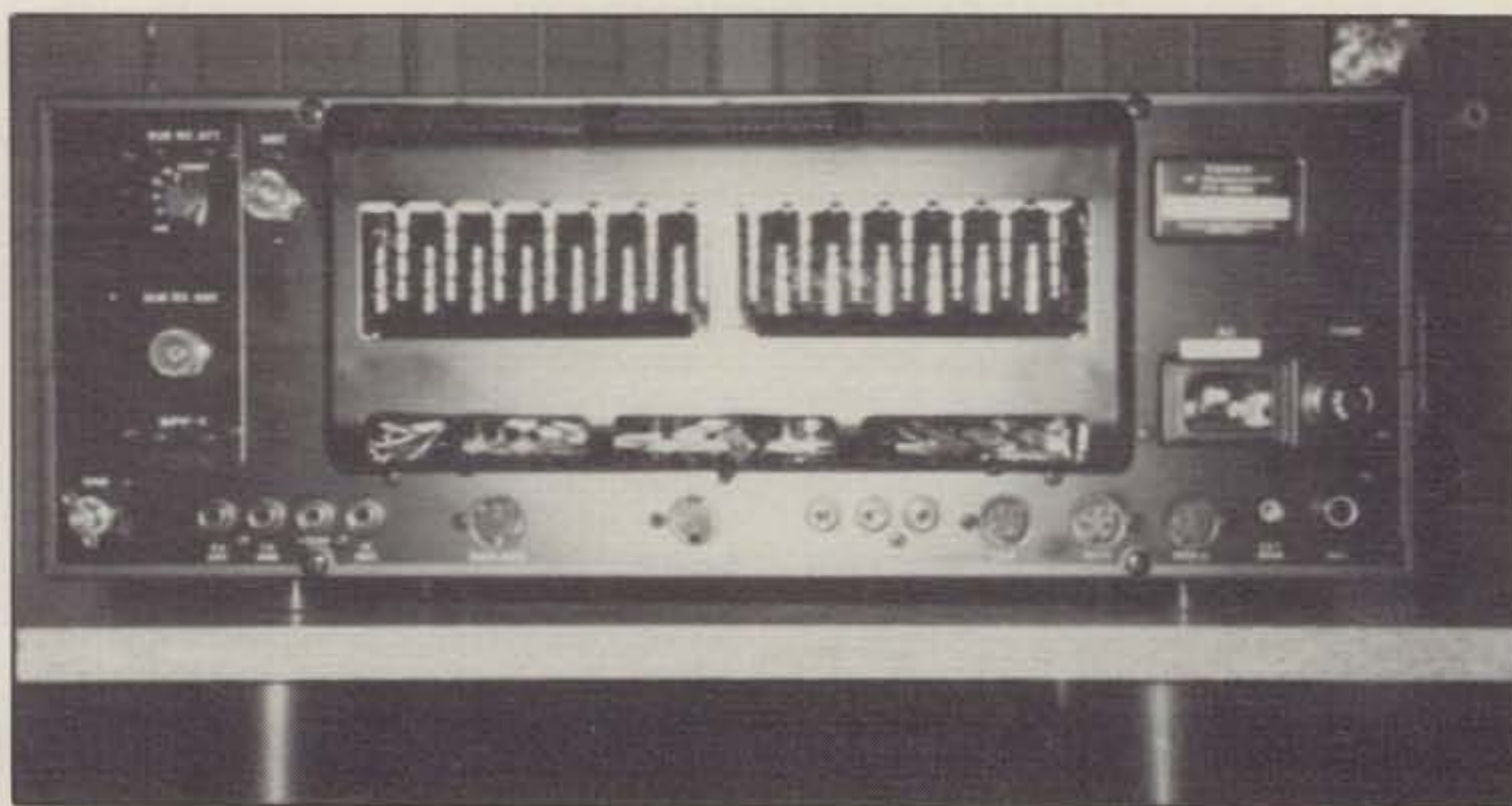
There is a top-cover access panel which has several DIP switches which effect various parameters for CW/RTTY/packet operations. The meaning of these parameters will be familiar to those engaged in using the various modes. Therefore, rather than going into any discussion on them here, I'll just present the "menu" as shown in fig. 2. About the only information not conveyed is the 18 ms transmit/receive turn-around time and the 300/1200 baud packet capability of the FT-1000. The reason for the detents on the IF **Shift** control, by the way, is related to resetability for perfect IF centering while receiving packet—a very nice touch, indeed.

Computer Control

The "CAT" system in the FT-1000 provides control of frequency, mode, VFOs, memories, and various other settings via a PC. Serial data is passed at TTL levels at 4800 bits/s. To control the FT-1000 from an RS-232C serial port on a PC, the optional FIF-232C interface is required.

Test Results

The maximum power output of the FT-1000 (CW) varied very slightly between 200 and 210



The rear panel has interconnection possibilities for just about any need. The use of 5 DIN-type connectors keeps down the clutter. The BPF-1 option is shown installed on the left. It includes a switch which allows its input attention to be ganged to that of the front-panel control for the main receiver or to be independently controlled.

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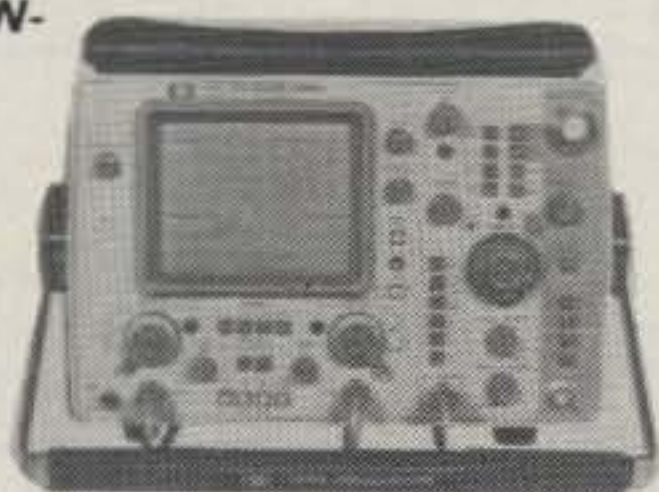
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- LABORATORY-QUALITY VIEWING PLUS PORTABILITY!
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- 5 mV/DIV TO 100 MHz
- THIRD CHANNEL TRIGGER VIEW
- SELECTABLE INPUT IMPEDANCE



The 1740A features an 8x10 cm CRT that is extremely bright and crisp. Also, both vertical channels provide 1 mV/div deflection factors with DC to 40 MHz bandwidth performance; the full 100 MHz performance is achieved with deflection factors of 5 mV/div to 20 V/div. A X10 horizontal magnifier provides main and delayed sweep speeds to 5 nsec/div, allowing full use of the 100 MHz bandwidth amplifiers. A great price for such a quality scope!

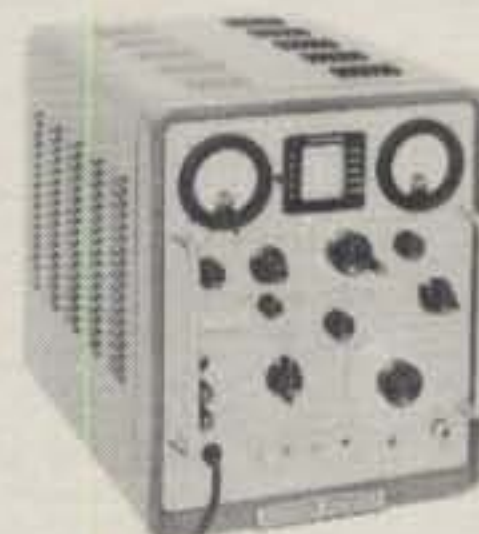
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Ohms	Power	Length	Price
10 Ω	125 W	12"	\$ 20.00
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20 Ω	125 W	12"	\$ 20.00
20 Ω	60 W	6"	\$ 10.00
22 Ω	15 W	2 1/2"	\$ 4.00
50 Ω	100 W	6"	\$ 19.00
110 Ω	100 W	6"	\$ 17.00
110 Ω	150 W	10"	\$ 25.00
200 Ω	100 W	6"	\$ 17.00
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350 Ω	150 W	8"	\$ 20.00
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Will handle much greater power if immersed in oil.



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- 4 1/2 DIGIT LED READOUT
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- 0.03% ACCURACY
- 1 M Ω INPUT IMPEDANCE

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- FREQUENCY RANGE IS 0.5 MHz -225 MHz
- 50 Ω IMPEDANCE
- 10, 100 W & 1kW RANGES
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This is a complete instrument consisting of a coupler equipped with type N connectors and an indicator calibrated directly in W. Both incident and reflected power can be read on any of the three ranges via a selector switch on the front panel.

HP 434A CALORIMETRIC POWER METER ONLY \$ 175.00



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- 0.01 W TO 10 W IN SEVEN RANGES
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- ACCURACY IS 3% OF FULL RANGE
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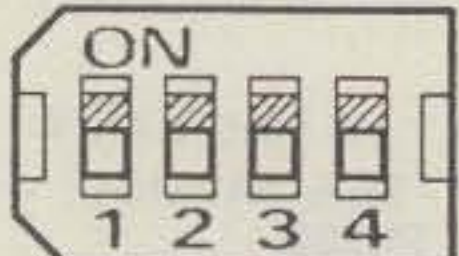
These All solid-state power meters are the building blocks of any RF Lab. The HP 431C has a calibration factor control for setting thermistor mount efficiency.

HP 230A TUNABLE POWER AMPLIFIER \$ 150.00

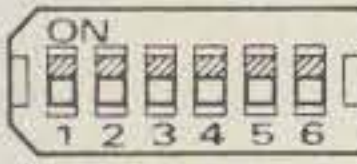
Frequency is 10 MHz to 550 MHz in six bands. Output up to 4.5 W. Gain is 30 dB. Up to 15 V out into a 50 Ω load.



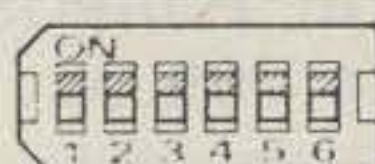
Keyer Weight Settings

Dot:Dash Ratio	DIP Switch				Dot:Dash Ratio	DIP Switch			
	1	2	3	4		1	2	3	4
1:3.0	0	0	0	0	1:4.0	0	-	0	-
1:3.1	-	0	0	0	1:4.1	-	-	0	-
1:3.2	0	-	0	0	1:4.2	0	0	-	-
1:3.3	-	-	0	0	1:4.3	-	0	-	-
1:3.4	0	0	-	0	1:4.4	0	-	-	-
1:3.5	-	0	-	0	1:4.5	-	-	-	-
1:3.6	0	-	-	0					
1:3.7	-	-	-	0					
1:3.8	0	0	0	-					
1:3.9	-	0	0	-					

Packet FSK Tone Pairs

TNC Tone Pair	DIP Switch		
	1	2	
1070/1270-Hz	0	0	0
1600/1800-Hz	0	-	-
2025/2225-Hz	-	0	-
2110/2310-Hz	-	-	-

RTTY DIP Settings

Shift Frequency	DIP Sw.		Nor/Rev	Sw. 5	Mark Freq.	Sw. 6
	3	4				
170-Hz	-	-	Rev	-	2125-Hz	-
425-Hz	0	-	Nor	0	1275-Hz	0
850-Hz	-	0	Rev: LSB Keydown = Mark Tone Nor: LSB Keydown = Space Tone			
						

CW Pitch DIP Settings

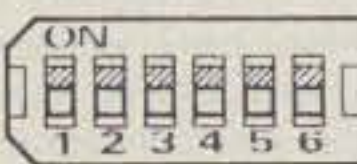
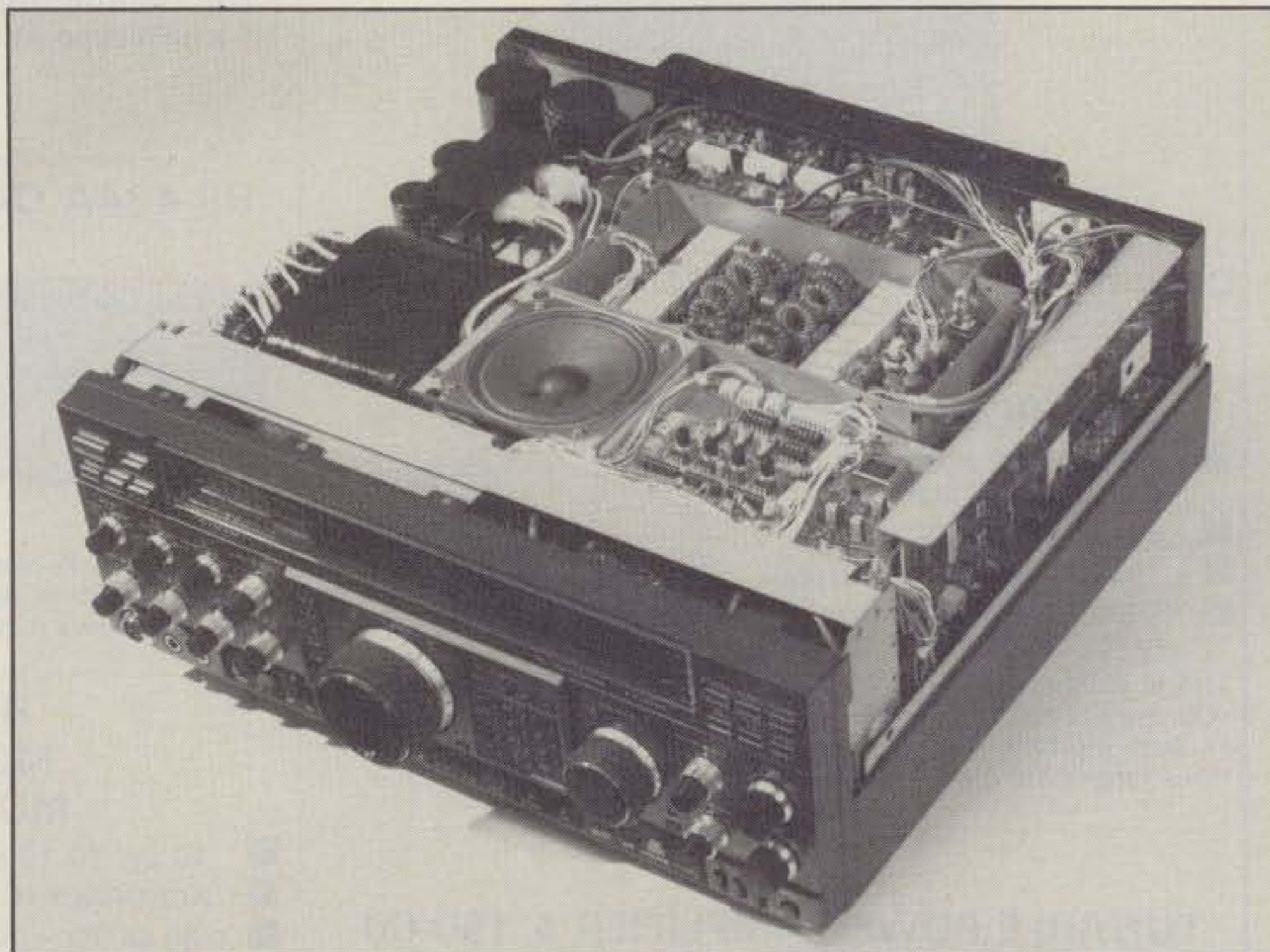
CW Pitch	DIP Switch						
	1	2	3	4	5	6	
400-Hz	-	-	-	0	0	0	0
500-Hz	-	-	0	-	0	-	-
600-Hz	-	0	-	-	-	0	-
700-Hz	0	-	-	-	-	-	-

Fig. 2- The effects of various DIP switch settings for keyer weight, packet tone pairs, RTTY shifts, and CW pitch. All of the switches are located behind a small latch cover in the top cover of the transceiver.

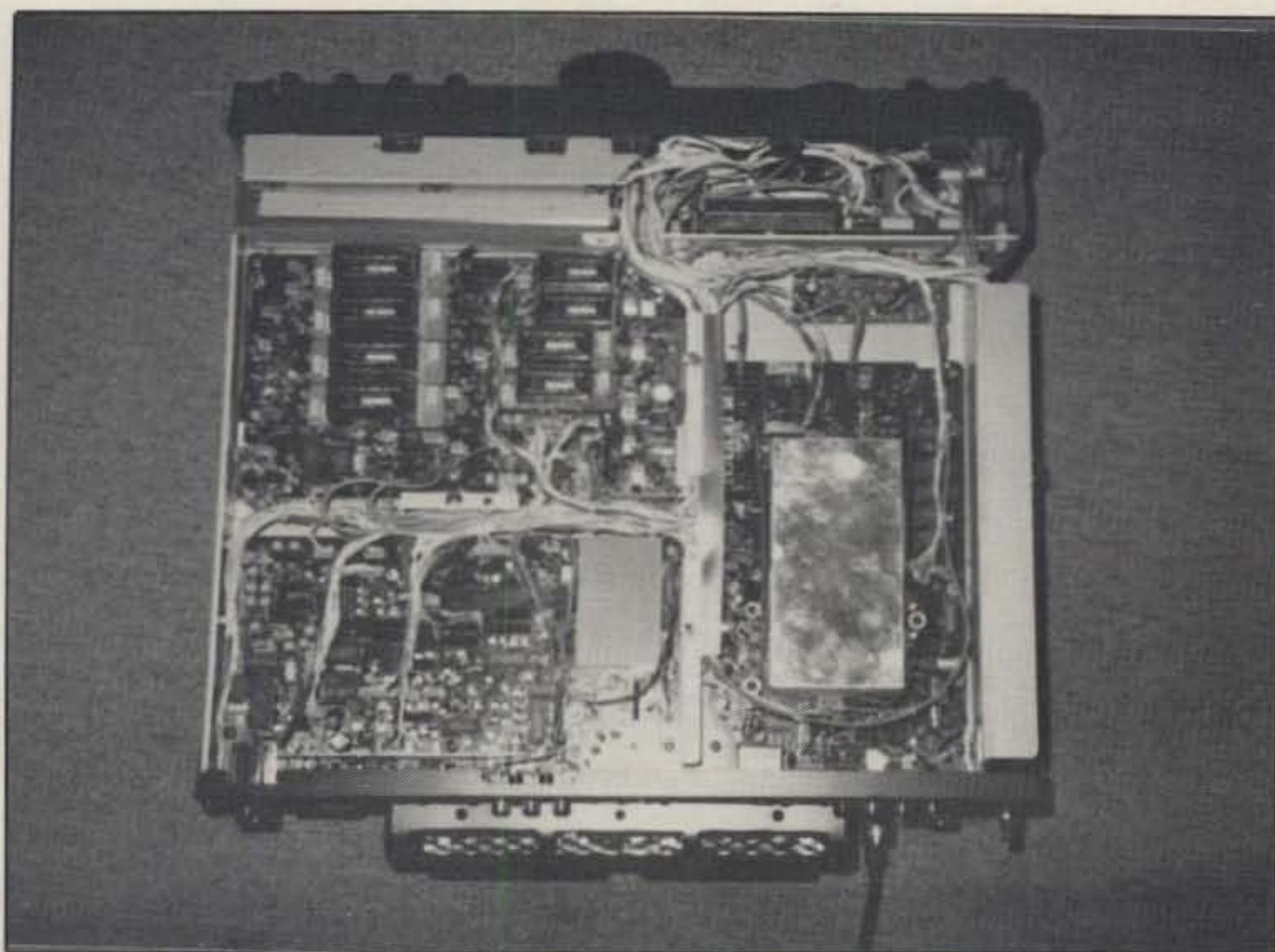
watts over its entire transmit range. I held it key-down at the 100 watt output level for well over 30 minutes and nothing seemed to happen, so I gave up on that test. The cooling fan did switch to a higher speed after some time, but its noise level was quite acceptable. The automatic antenna tuner responded within a few seconds to simulated SWRs of 1:5 on all bands. The tuner does remember previous band settings. It does "self-correct" quickly if you move to another operating frequency such that the SWR rises slightly. The tuner is not super-fast, which is probably just as well considering the wear on the mechanical components, but I found it perfectly adequate for any operating need.

The transmit distortion products (third-order IMD) are excellent at about -35 dB at full output. That factor combined with the very clean RF speech processor in the FT-1000 allows you to develop very powerful transmit audio that is sharp and cutting but not distorted. How far you want to process the audio is a matter of choice, but even using the maximum levels, I never did detect or receive any reports of distortion. The monitor circuit in the FT-1000, which is a separate mini-receiver, allows you to hear the full effect of using different microphones, processor settings, etc.

Transmit/receive switching is fast and clean on CW. Full QSK at 20+ WPM posed no problem, and although I didn't try AMTOR operation, the specified 18 ms turn-around time



Taking off the top covers you can see a rather solidly packed grouping of circuitry. The sub-receiver circuitry is mostly contained on the vertical PC board on the right. The output low-pass filter assembly (shield removed) is to the right rear of the loudspeaker. The final amplifier and antenna tuner are to the rear. The heavy-duty power supply is to the extreme left.



Looking under the bottom cover, you can see the impressive two filter banks (upper left) for the 8.2 MHz and 455 kHz IFs. In this case all of the optional filters have been installed. Installation of the optional filters is quite simple. A diode has to be cut and then the optional filter is pushed into its connectors. The only exception concerns the optional CW filter for the subreceiver.

seemed very conservative.

The main receiver in the FT-1000 has extremely good dynamic-range characteristics, which is pretty much what you would expect with so much detail having been paid to the "front-end" design. The blocking dynamic range was close to 120 dB on all amateur bands and was not noise limited. The third-order intercept was an outstanding +20 dB even with the preamplifier on (two signals spaced 50 kHz, 500 Hz bandwidth). As a consequence, the receiver held up extremely well even under band conditions providing very crowded conditions with very strong signal levels. Of course, a complex interrelationship is involved when testing receive performance on the air. However, on SSB, considering that S9+ signals were the QRM and that they had reasonably clean distortion, I could still copy other SSB signals at the S3 to S5 level with less than 2 kHz carrier separation. Although the inherent dynamic range characteristics of the FT-1000 "set the stage," the use of the filter options for the FT-1000 really adds the "comfort factor."

As far as other technical specifications were concerned, I tested as many as I could and found no deviation from the published specifications.

Operating Experiences

The FT-1000 is a very comfortable transceiver to operate. There are plenty of controls and pushbuttons, but the main ones are obvious and clearly labeled. You can "ease" into learning the sophisticated features of the transceiver while readily and easily enjoying the "core" performance of the transceiver. The dual frequency displays are well separated and easy on the eyes for long operating

periods. The analog meter's scales are a bit crowded, but all of the readings seemed to be quite accurate. I would have preferred dual analog meters or a multi-display LED bargraph meter, but it is a minor point.

The automatic antenna tuner pulls no punches. If the **RF PWR** control is set at maximum, the tuner will cycle until a full 200 watts key-down of output power is produced! That's good and bad. It's quite good in the sense that once the tuner finds its setting you know you are operating at 200 watts output. It's only bad in the sense that you have to be careful not to cause unnecessary QRM while the tuner adjusts itself. The **RF PWR** control can be reduced, and the tuner seems to tune perfectly well with about 10 watts of RF output.

On the air I had nothing but very pleasing results with the FT-1000. As my first QSO, I called CQ on a very quiet 10 meter band one evening. An LU5 came back with a 57 report, and he immediately began complimenting me on my good audio. It was a very pleasant start—and it continued. I only used the FT-1000 "barefoot," but I could rapidly sense that the 200 watt output level of the transceiver did make a difference on the transmit side.

On the receive side I found the FT-1000 to be extremely versatile. Its frequency manipulation possibilities are enormous, but not too difficult to use and have fun with once you begin exercising them a bit. An extremely simple example: participating in an old timers' net on 75 while simultaneously monitoring a DX pile-up on 15 meters. Once the DX pile-up seemed to quiet down a bit, I could almost immediately transmit on 15 meters and get the DX contact. I really enjoy chatting with the old timers on 75. But between "overs" I told them I had worked a 9L1, and that really impressed them.

The optional CW and IF filters available for the FT-1000 really do make a difference. The shape factor for the supplied 2.4 kHz SSB fil-

ter, for instance, is about 1:2 and narrows to 1:1.4 when the optional XF-D filter is installed. The 80 dB isolation factor for the filters is excellent. I would suggest the optional XF-D main receiver 2.0 kHz SSB filter and/or XF-E 500 Hz CW filter as being "best buys." The sub-receiver has only two bandwidth choices—2.4 kHz and 600 Hz with the optional XF-455MC filter. The optional CW filter comes close to being a necessity if you are going to make serious use of the sub-receiver for CW. The fact that the IF Shift and IF Width are active in all modes provided some interesting selectivity possibilities, especially for general shortwave listening.

I only briefly tried the FT-1000 on 10 meter FM, but it does have a few special functions for that mode which seemed to work well. An **RPT** button can be used to set the transmit frequency 100 kHz below or above the receive frequency, and a low-level 88.5 Hz sub-audible tone is automatically transmitted for repeater access. The sidetone monitoring remains active on the FM mode, which is a nice convenience feature.

Diversity Reception

A unique capability of the FT-1000 is that it can provide dual-diversity reception, especially if the BFP-1 option is installed. This is because both receivers in the unit can exercise independent sideband selection and IF selectivity (with restrictions as mentioned for the sub-receiver) and can have separate antenna inputs. Some diversity effect is provided by using a different sideband in each receiver while receiving AM signals and a different IF bandwidth in each receiver while receiving signals in any mode, except FM.

Generally, however, antenna diversity provides the most dramatic effect. This requires that a separate antenna be used with each receiver. The antennas can be widely spaced to provide space diversity or of different polarizations to provide horizontal/vertical polarization diversity. The classic antenna manuals go into the subject quite deeply, so there is no need to repeat the information here. The point is that fading and/or noise pickup effects can vary quite dramatically between two different antennas depending upon the size, placement, gain, polarization, etc., of the antennas. A simple loop antenna, for instance, can sometimes provide far better reception on the lower frequency bands than a larger antenna because of its lower noise pickup.

Many amateurs have experienced the effect that the antenna used for transmitting purposes is not always the best one for reception. The FT-1000 allows you to experience some startling effects when diversity reception is used. The best way to experience it is to use stereo headphones, since the phone jack on the FT-1000 is set up to provide the audio of each receiver to separate outputs on the jack. You can then blend the audio output from each receiver, and your brain functions as the "combiner" network for the overall composite audio.

The Manual

You can't ignore the FT-1000 manual when you first see it. The covers are a deep, glossy



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The DSV-2 is a small (2½ x 4 x 1 inch) solid-state digital voice recorder/playback unit. It interfaces with the FT-1000 via a single cable/connector and provides off-air recording, recording from the microphone used with the FT-1000, and the on-air playback or recorded messages.

blue with deep, gold printing. It sort of makes you wish you could afford QSLs printed like that! The manual is, however, extremely well organized and extremely clear in its presentation. It contains 43 pages plus some fold-up diagrams. By a combination of easy-to-read text and a good number of tables and illustrations, it covers every operating detail. There is an excellent discussion of CW Pitch Setting and Spotting and a separate small but excellent sub-chapter on digital modes that was obviously written by someone who really knows digital modes.

In spite of all the complexity of the transceiver, you can set it up for initial operation very quickly by reading through a two-page sub-chapter entitled "Getting Started Tutorial."

Accessories

There is a whole host of microphone, speaker, phone patch, etc., accessories available for the FT-1000 which also interface with other Yaesu products. However, the DVS-2 Digital Voice Recorder accessory so far seems to be unique to the FT-1000, although it probably will interface with other Yaesu products in the future.

The DVS-2 serves as either a continuous receive audio recorder with instant pushbutton playback, or recordings can be made from the station's microphone for on-air playback. The unit plugs directly into a dedicated jack on the FT-1000. Essentially, it is the electronic equivalent of a 16 second "endless tape" recorder/playback unit. However, the total 16 second period can be broken down into two 8 second periods or four 4 second periods for transmitting messages.

For receive recording you simply depress the **Rec** button. Pressing the **Stop** button ends recording. If **Play** is pressed, the recording will initially playback from the point where the recording was started (assuming you stay within the 16 second recording limit). If you stop the playback (depressing **Stop**) and then resume playback, the playback will continue from the point where the playback was stopped. If **Stop** is depressed twice and then **Play** is pressed, the electronic tape "rewinds" and playback will start from the initial recording point. The

recording feature can, of course, be left on continuously. There are no mechanical parts to wear out. You could then always have access to a 16 second recorded period as you settle down on a frequency and try to sort out calls during a pile-up, for instance.

Separate circuitry is used for transmit record/playback. Recordings can be made from the microphone used with the FT-1000. Recordings can be made with or without actually transmitting at the same time, and playback can likewise be made. To transmit a recorded message you only have to depress a 4 or 8 second segment playback key. PTT action is automatic. The 4 second segments sound very short, but they are actually quite long enough to contain messages such as "is this frequency in use, please," a short CQ, a tune-up tone, or even a contest response. The 8 second segments allow for a longer or directional CQ, for instance.

The DVS-2 is sort of a phone person's equivalent of a memory keyer except that you can also use it for recording. I found the fidelity of the unit to be very good. In fact, recorded playbacks sounded crisper and cleaner than the original audio. I haven't really explored all the merits of the unit. I'm sure, for instance, there must be some easy way to re-transmit receiver recorded audio. It's a fascinating unit.

Summary

Once you get to know the features of the FT-1000 just a bit, it becomes a very "comfortable" transceiver to operate. The displays are clear and unambiguous. The controls are well spaced and well dimensioned. The basic frequency manipulation/memory functions are easy enough to learn, although a bit of practice is necessary if you wish to fully utilize the agility of the transceiver. I could find nothing lacking in either the transmit or receive audio. The dual-receive capability is unique not only because it exists, but because of the data transfers that can be made between the receivers.

The optional filters add a great deal to the performance of the transceiver, as does an optional temperature-compensated crystal oscillator (TCXO-1). The FT-1000D includes the TCXO-1 plus the BFP-1 sub-receiver bandpass filter and all of the optional filters (XF-A/B/C/D/E). It's a bit of an expensive package, but everything that can be packed into the transceiver is included.

On the other hand, the basic FT-1000 is not different from the FT-1000D except for the optional items just mentioned. The FT-1000 can easily be turned into an FT-1000D, either entirely or partially, by the addition of the optional items as you feel inclined to do so. None of the optional items are difficult to install. No soldering is required, except for the installation of the XF-455MC CW filter in the sub-receiver, and that requires just the soldering of a few leads on a PC board.

Price Data

The following prices are amateur net: FT-1000 \$3,399; FT-1000D \$4,399; BPF-1 \$159; TCXO-1 \$229; XF-A \$99; XF-B \$99; XF-C \$149; XF-D \$149; XF-E \$149, and DVS-2 \$299. These units are manufactured by Yaesu U.S.A., 17210 Edwards Rd., Cerritos, CA 90701.

Holding on to "the original carton" is an obsession for some of us. Here's W2OC's view of this plight.

Empty Boxes

BY BILL FISHER*, W2OC

There is a unique trait among amateurs that borders on obsession. We tend to acquire and hold on to things for long periods of time. To put it another way, a lot of us are what are known as "pack-rats." One specific item that we all like to hold on to is "the original carton," whereby if we ever think of disposing of something, it can be shipped or transported in "the original carton." There is also a subtle inference that the holder of "an original carton" took care of and maintained the item being disposed of. Since the item comes with "the original carton" it must somehow be pristine and exactly like the day it was made. Most of us do it. I don't know why. The other day when I received the poem printed below, it struck a chord in me and I knew just how Bill felt.

—K2EEK

If you go down to my basement, you will stare in amazement, At the collection of boxes you'll see. From ceiling to floor, empty cartons galore, Every size, every shape there can be.

There's one from a Kenwood that works really well, And one from a Yaesu that I'm trying to sell There's a printer, a disk drive, a monitor too, And of course a computer (the one called Big Blue).

There's a microwave oven, and a wireless phone, And yes, another computer (but this one's a clone). Three power supplies, one electronic key, Two VCRs and a color TV.

There are many more boxes, the list doesn't end, And I'd better stop now, not to bore you my friend.

But they're piling up higher and higher each day, And to walk in my basement, well there just is no way.

Since these boxes are empty, I can hear you all shout, Why keep them around? Why not throw them all out? Well here is the fear that I live with each day, That compels me to keep on collecting this way.

What if something should fail and be sent back for repair, What would I do if the right box isn't there? I never could handle the pain and the stress, Of not being able to ship U.P.S.

But I now have the answer to this worrisome plight, And it came from my spouse, as she told me last night. "The solution is easy and plain as can be, Get rid of those boxes, it's those cartons or me."

MI

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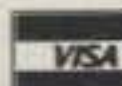
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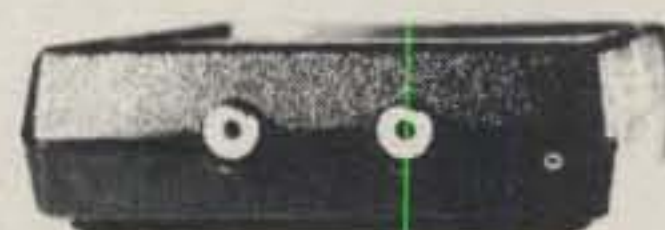
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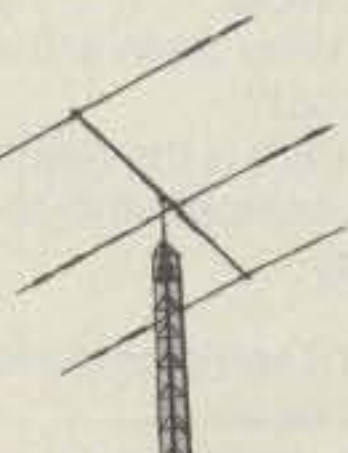
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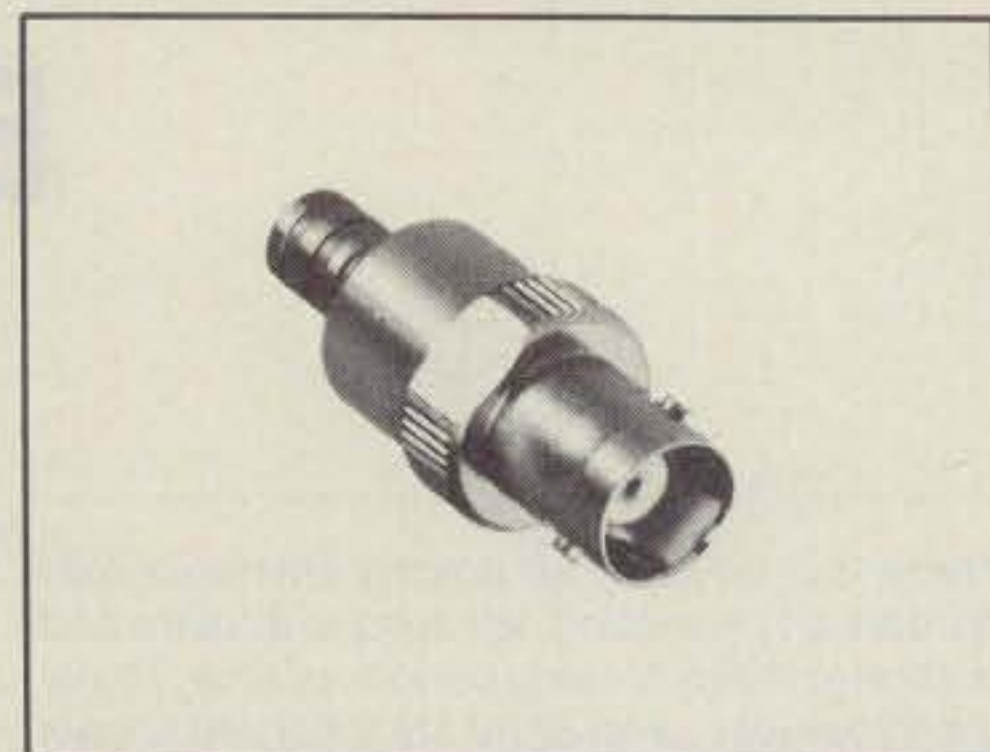
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ACC PatchMaster 200

Advanced Computer Controls has introduced PatchMaster 200, a radio-telephone interconnect (phone patch). Installed at a home station, it allows amateurs to place and receive telephone calls from their mobile and portable VHF and UHF FM radios. PatchMaster supports simplex sampling, VOX, full-duplex and repeater operation. The patch includes autodial, toll-restrict, synthesized and recordable voice prompts, and support for two phone lines. A telephone set can be plugged into PatchMaster as a "base radio extender," allowing operation of the base radio throughout the home through a twisted pair connection. PatchMaster also offers selective call (paging) and remote-control capabilities. It is fully programmable locally and remotely using DTMF entry and voice response, or through its built-in computer serial port and modem.

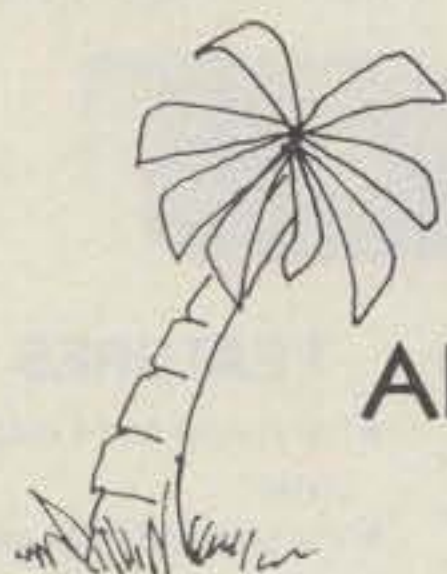
For additional information, contact Advanced Computer Controls, Inc., 2356 Walsh Avenue, Santa Clara, CA 95051.



Pasternack Enterprises Coaxial Adapter

A 50 ohm coaxial adapter has been introduced by Pasternack Enterprises. The model PE9137 type BNC jack to type SMB plug coaxial adapter features low loss over the frequency range of DC to 4 GHz. The adapter has a brass nickel-plated body, utilizes teflon insulation, has a gold-plated contact, and has an operating temperature range of -65° to $+165^{\circ}$ C. The adapter will mate with any type BNC plug and type SMB jack connector that meets the interface requirements of MIL-39012.

The PE9137 is priced at \$20.76 each at the 100 piece quantity. Minimum order is \$100.00. For additional information, contact Pasternack Enterprises, P.O. Box 16759, Irvine, CA 92713-6759, or circle number 108 on the reader service card.



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Japan Radio Company JST-135HP Transceiver

Japan Radio Company has introduced the new JST-135HP, a high-performance version of the standard JST-135 high-frequency amateur transceiver. The JST-135HP includes the following standard features: bandwidth control utilizing two direct digital synthesizer ICs to narrow the bandwidth of any selected IF filter in 10 Hz steps; passband shift adjusting center frequency of filter passband to reject unwanted interfering signals; notch follow filter keeping notch frequency locked onto offending heterodyne interference, requiring no re-tuning if VFO is adjusted; AM ECSS in which phase lock detection enhances reception of AM signals and allows selection of upper or lower sideband without critical zero-beat tuning; high stability crystal oscillator; variable RF tuning; one-chip DDS IC; low-distortion power amp; and more. External power supply and deluxe hand microphone are supplied.

Optional equipment for the JST-135HP includes external speaker, headphones, automatic and manual antenna tuners, microphones, and crystal IF bandwidth filters. For more information on the JST-135HP, contact Japan Radio Company, Ltd., Attn: Paul T. Lanuier, 430 Park Ave. (2nd Floor), New York, NY 10022, or circle number 102 on the reader service card.



Digitech Concepts DR-3 Digital Voice Recorder/Announcer

The Digitech Model DR-3 digital message recorder/announcer is a fully digital (no tape) voice recorder which can instantly play back or cancel any message loaded into three different message locations. The DR-3 will also automatically key your transmitter when in the play mode, or when in the monitor mode you can review the messages without keying your transmitter. There are auxiliary input and output jacks for recording directly from your radio or other source, and to download information to a tape recorder or other storage device. The DR-3 includes a built-in speaker with volume control, and a repeat circuit to automatically repeat a message.

There are four different message lengths to choose from. The microphone input and output ports are standard 4-position microphone connectors. An optional accessory interface kit IFK-1 can be purchased separately. This in-

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Sensor Instruments Wind Monitor

Sensor Instruments Co. has introduced the Nimbus™ Wind Monitor. It records average speed, prevailing direction, and peak gust with its direction for every hourly interval for 10 days. It also provides current 5 and 15 minute averaging. The average wind speed for each of the 16 compass points is computed. It uses lexan anemometer cups and a reed switch directional vane.

An optional RS232 interface provides the ability to down-load to a computer. The monitor is portable, having six weeks of battery backup. The base price is \$735, including cups, vane, and cable. For more information, contact Sensor Instruments Co., Inc., 41 Terrill Park, Concord, NH 03301, or circle number 101 on the reader service card.

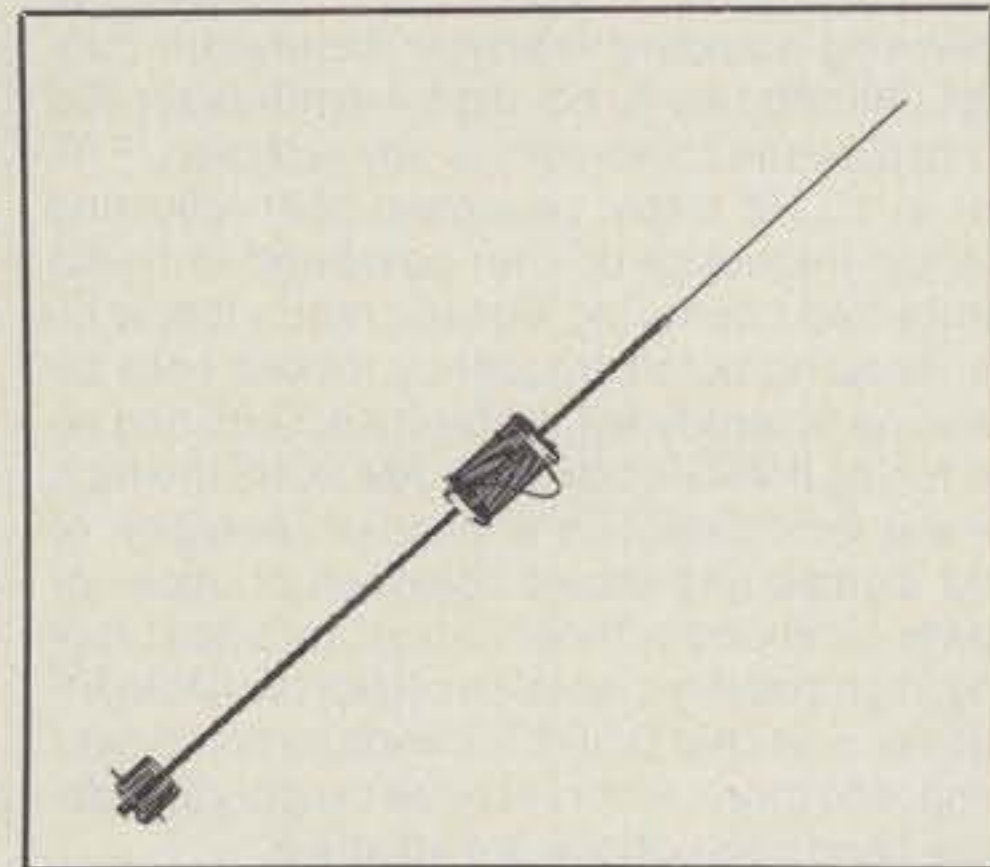


Kenwood Compact FM Mobile Transceivers TM-241A/TM-441A/TM-541A

Kenwood has announced a line of compact FM mobile transceivers—the TM-241A, TM-441A, and TM-541A. The TM-241A receives from 118–173.995 MHz. Transmit range is 144–148 MHz (modifiable for MARS and CAP operation, permits required). The TM-441A covers 438–449.995 MHz, and the TM-531A covers 1240–1299.995 MHz. (The TM-331A is still available for 220 MHz operations.) The CTCSS encode is built-in, selectable from the front panel. (TSU-6 programmable decoder optional.) The TM-241A provides 50 watts; TM-441A 35 watts, and TM-541A 10 watts. There are three power positions—5, 10, and full. The TM-541A has two power positions—1 and 10 watts.

Twenty full-function memory channels store frequency, repeater offset, sub-tone frequencies, and repeater reverse information. Re-

peater offset on 2 meters is automatically selected. There are four channels for "odd split" operation. The DTU-2 option enables the Dual Tone Squelch System (DTSS), allowing selective calling and paging using standard DTMF tones. A digital recording system option is available. Also featured are multiple scanning functions, large LCD display with four-step dimmer control, mounting bracket, DC cable, fuses, and multi-function DTMF mic. Suggested retail price: TM-241A \$469.95, TM-441A \$479.95, and TM-541A \$579.95. For more information, contact Kenwood U.S.A. Corporation, 2201 E. Dominguez St., Long Beach, CA 90810, or circle number 105 on the reader service card.



Lakeview Company Carolina Bug Katcher

The Carolina Bug Katcher (CBK-40) mobile antenna combines Lakeview's "Ham Stick" technology with a Hi-Q, air-wound, center loading coil that operates from 7.000 MHz to 30 MHz. Overall length is under 8 ft. After initial setup band changes require only moving an alligator clip from one established point to another. The antennas come equipped with a heavy-duty quick disconnect and Lakeview's IM-1 to ensure a 50 ohm match at the feed point.

Price is \$79.50 (plus \$4.00 s&h continental USA). For more information, contact Lakeview Company, Inc., Rt. 7 Box 258, Anderson, SC 29624, or circle number 104 on the reader service card.

PASS Publishing CW Hypnosis Tapes

PASS Publishing has added two tapes for would-be contesters and DXers to its line of "hypnosis" tapes. The tapes induce a state of deep relaxation and "condition" the user to hear the code character and associate it with its English counterpart. The Contest Code High Speed cassette conditions the alphabet, numerals, and commonly used signals at 30 wpm on one side and 40 wpm on the other. The Contest Code Ultra High Speed cassette is similar except that the code is conditioned at 50 wpm and 60 wpm.

The company also offers their CW Mental Block Buster program (for those who do not believe they can learn the code or improve their skills) and CW Lite (for basic training in code). CW Mental Block Buster is in the \$25 price range, and the other tapes are in the \$15 range. For more information, write to PASS Publishing, Box 570, Stony Brook, NY 11790, or circle number 103 on the reader service card.

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*PK1 adds Program & Control of Ultra via Packet or Tel line + Packet to Voice BBS, Req. 2nd C64 & PK8, Inc. 4 ft. data cable to PK8...PK1...\$99.95

*Rotor control Analog to digital converter; use with CS8; voice bearing +/- 5 deg. for all rotors HM1...\$69.95

Ultra Com Shack 64 Manual all schematics, diagrams, how to operate & set up remote base. Refund with purchase of CS64S.MN.\$25.00

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All above to match 50 ohm transmitters and antennas.

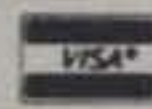
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Just about a year ago, during the CQ WW DX Contest, VK9LV came on the air and caused a stir. Here's the story behind that operation.

DXpedition To Lord Howe Island

BY JOSEPH S. BLINICK*, K1JB/VK9LV

What a combination! Take a semi-tropical island deep in the South Pacific, give it separate country status, make it easily accessible from the Australian mainland, find a picture-perfect lodge the owner of which thinks amateur radio is great, and you have the ingredients for a great DXpedition!

It all started in February 1989 at a meeting of the local DX group when Mike, KD2EU, announced that he was going to Lord Howe Island for the 1989 CQ WW SSB contest in October. He had picked Lord Howe Island for three reasons: it is far away, relatively rare (the two resident amateurs were not very active and didn't like to operate contests), and civilized (tenting on a crab-covered or bug-infested island with a balky generator delivered by helicopter was definitely out).

Boy, did he strike a responsive chord! I had wanted to go on *some* kind of DX trip for many years, but had just never done it. I half-jokingly asked Mike if he wanted company and was surprised when he gave me an enthusiastic yes!

Getting to Lord Howe Island turned out to be fairly easy in theory. Both of us had enough frequent-flyer miles on Delta Airlines to get us from Portland, Maine to Sydney, Australia (and back) via Delta and its partner, Air New Zealand. From there Norfolk Airlines could fly us out to Lord Howe and back. In practice, there were a couple of details which had to be taken into account.

Not the least of these details were the time differences and the International Date Line. The contest weekend fell on the same weekend that the U.S. went *off* daylight savings time and Australia went *on* daylight savings time (it being their springtime). New Zealand (into which Air New Zealand flies) would be going into daylight savings time the week before, and although normally Lord Howe Island is a half-hour ahead of Sydney, they would both be on the same time once



The VK9LV/VK9AE QSL card.

daylight savings time went into effect. Furthermore, the time difference between east coast U.S. and Lord Howe was large enough that it was easy to confuse night and day. The contest, which started at 0000Z, thus began Friday night at 8:00 PM on the east coast but Saturday morning at 10:30 AM on Lord Howe. In fact, our first attempt at making reservations had us leaving Lord Howe about two hours before the contest was over!

With a lot of phone calls and much help from the reservations staff at both Delta and Air New Zealand we finally got that part of the trip straightened out. Next we had to get lodging on Lord Howe and make connections with Norfolk Airlines.

Eric, K3NA, was consulted and proved very helpful. Eric had been to Lord Howe several years earlier and had lots of useful information. One key element was the name of a travel agency in Sydney that specialized in vacation packages (flights and lodging) to Lord Howe. He also gave us the name of the lodge at which he had stayed, the Seabreeze. He commented that the owner was tolerant of amateur radio operators. As it turned out, that was a considerable understatement.

Next it was time to get passports, visas, and our licenses. The passports and visas were pretty straightforward, and since we were both applying early in the year, before the summer rush, we both got ours back in just a few weeks. The perceptive reader will have picked up on the fact that neither of us had a passport before this, and will wonder about the wisdom of taking such a long trip as a first try. Well, we wondered, too.

Getting the licenses was a bit different. We called the ARRL and asked for current information on reciprocal licensing in Australia. They sent us a "kit" which contained forms, fee information, and instructions. Unfortunately, the forms were incomplete, the fees were out of date, and the instructions were incorrect. A couple of additional calls got us complete forms, and we ended up calling Australia to talk to the licensing people directly.

The clerk who answered the phone did seem a bit surprised when I said I was calling from the States, but he rallied quickly and gave me all the necessary information (what form to use, what the fee was, where to send the form, etc.). He also tantalized us by saying that if possible

*P.O. Box 10067, Portland, ME 04104



Mike, KD2EU/VK9AE (left), and Joe, K1JB/VK9LV, at Mike's QTH just before leaving for Lord Howe.

they would grant us special callsigns if requested, and we could ask for up to three choices.

Well, Mike went crazy. We knew that the Australian callsigns had been revised recently, and that VK9L was reserved for Lord Howe Island. We also knew that VK9LH and VK9LA were taken, as were several others. Mike really wanted VK9LHI, and secondarily asked for a couple of others just in case. I figured VK9LX or VK9LZ would be nice, so I asked for them. Mike got VK9AE (AE?) and I got VK9LV. We have absolutely no idea why Mike got VK9AE. Both applications arrived the same day and both licenses have the same date. After some debate we decided to use VK9LV for the contest because of the recognition factor, and to use VK9AE outside the contest. For the most part we stuck to this plan.

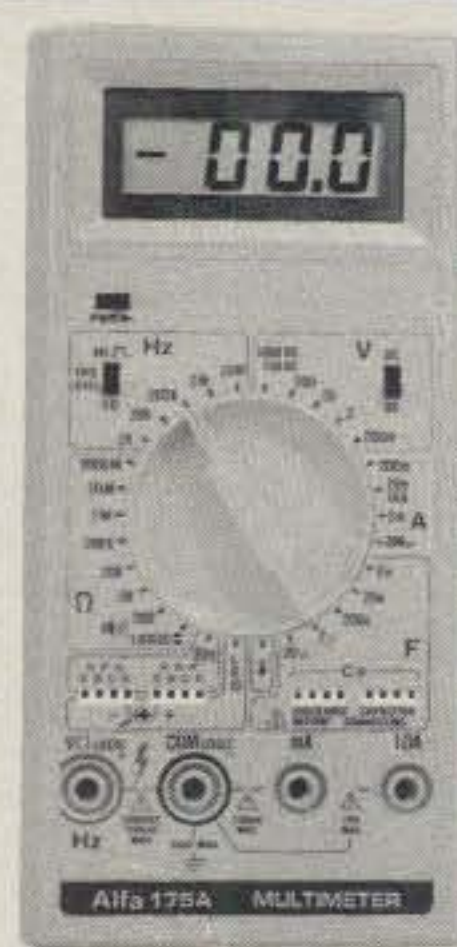
Our next task was to decide what to take in the way of equipment. We decided to take an ICOM 751 and a Kenwood TS-430. The biggest decision concerned the antenna. K3NA reminded us that there was a lot of water (and therefore long distances) between Lord Howe and anything else, and that dipoles probably would not be very useful. Many people we talked to said that a beam was a necessity, but beams mean tall masts or towers to get them up high enough to work well, and we weren't sure we could get all that stuff out there. Therefore, we decided to use a vertical. Our choice was the Butter-nut HF6V, and as it turned out it was a great choice. The entire antenna could be put inside a 6 inch diameter PVC pipe about 53 inches long, which theoretically could have been carried on the plane, although we ended up shipping it out ahead of time. We spent a lot of time deciding what else to take.

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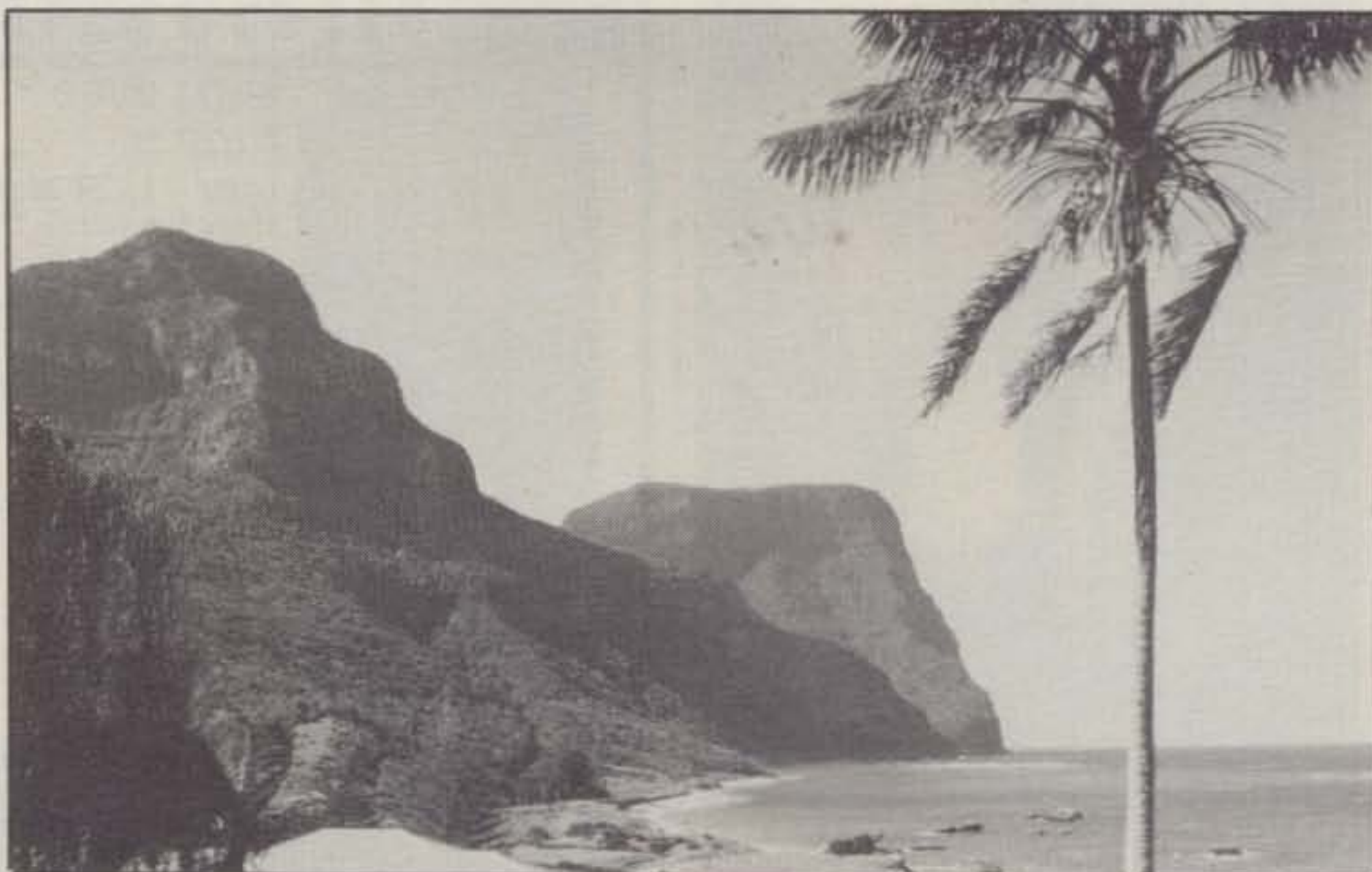
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CIRCLE 89 ON READER SERVICE CARD



Looking south toward Mt. Lidgbird (left) and Mt. Gower from the porch of the Seabreeze Lodge.

We made numerous lists of stuff to take: tools, hookup wire, log sheets (contest and other), keys, keyers, headphones, microphones, and a G5RV wire antenna in case something happened to the vertical, extra lengths of coax—you name it. The pile grew steadily and so did the weight! Maybe experienced DXpeditioners can do better, but our feeling is no matter how many lists you make, something will be left out, and a lot of stuff will be unnecessary. This certainly was the case with us.

Mike works for a company that has offices in Sydney, so he arranged with the company's traffic department to send the power supply, vertical antenna, and the tuner ahead by Federal Express. That way we would know ahead of time if they got there, and if something happened we could get replacements before we left. They were supposed to be transferred at Sydney to Norfolk Airlines and delivered to the Seabreeze Lodge on Lord Howe. Boy, were we naive! There is a minor technicality called customs that we neglected to take into account.

The package arrived in Sydney a month ahead of our departure, and we got back word that everything was just fine, which we assumed meant they had been sent to Lord Howe. Guess what? Right! When we arrived in Sydney, they were still at the shippers awaiting customs release. You have to picture the scene. We left Boston at 0630 (EDST) on Monday morning, got to Los Angeles early in the afternoon, and had a 7 hour layover. Then we left at 1930 (PDST) for a 14 hour flight to Auckland, arriving early Wednesday morning (the plane, needless to say, was crowded). Then we had 4 hour layover before the final 3 hour leg to Sydney. (Some modest arithmetic will reveal



View of the Butternut HF6V vertical and the southern part of Lord Howe.

that we had been *en route* about 40 hours with little sleep.)

In Sydney we decided to check in at Norfolk Airlines. Did they have our reservations?

"Yes, no problem, we have you on our 1:00 PM flight tomorrow (Thursday)."

Would they be able to carry all the baggage?

"Yes, no problem, although you know there is a charge for extra weight."

"And you did ship the freight that was sent down earlier?" we asked.

"What freight?"

I thought Mike was going to have a stroke right then and there. A few phone calls revealed the fact that the shipper

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CIRCLE 152 ON READER SERVICE CARD

was waiting for someone to claim the package and take it through customs.

"Fine," we said. "Here we are."

"Fine," they said. "Just come on over, sign the papers, and you can pick it up in three days."

THREE DAYS? Mike left immediately for the shippers, and I called every electronics store, hardware store, and everything-else kind of store I could find in the telephone book to look for replacements. None were to be found, although one place did have a *kit* for a 20 amp power supply. I even called the Wireless Institute of Australia (and got their answering machine), and tried several calls on 2 meter FM. All to no avail. Fortunately, Mike was able to get the original shipment through customs and returned triumphant several hours later. He never did say exactly how he did it.

The next day we returned to Norfolk Airlines bright and early and found that the plane they had originally planned to use was otherwise occupied, so we would get a smaller one.

"Only thing is," they said, "we might not be able to carry all your luggage."

K3NA had warned us about this, saying that they have to be very careful about weight for the 400 mile flight over water to Lord Howe, and that other than a fortnightly visit by ship, all supplies go by air. We quickly figured out what we *had* to take, and what could wait a day or two, if necessary. In the end we were able to take it all. Normal baggage limit is 15 kg (33 lbs) per person *total*. We had over 100 kg (220 lbs). Excess baggage costs were \$A 3.00 per kg, or about \$A 210.00 in all. But everything (including us) fit, and shortly after 1:00 PM we were on our way.

The flight was uneventful, and two hours later we could see Lord Howe appear as a small dot on the horizon. It soon grew, and shortly thereafter we touched down and were met at the terminal by Dick, VK9LH. His welcome was very warm, and right after checking in at the Seabreeze Lodge he took us on a short tour of the island.

Since Lord Howe is only 6 miles long and 1/2 to 1 mile wide, the tour didn't take long. However, we could see enough to know that it was a beautiful, peaceful place, deserving of more exploration later. Dick could see that we were anxious to get back and set up the equipment, so he returned us to the lodge and we got to work.

We chose the end room for our operations so we would be less likely to disturb other guests staying at the lodge. The owners of the lodge, the Schicks, were very helpful and told us we could rearrange the room to suit our needs. We pulled a table over to the foot of the bed and set the TS-430, tuner, and key on it.

We then went up the hill behind the lodge to set up the vertical. It was a steep



The VK9LV/VK9AE "shack" on the left and sleeping quarters on the right. Note vertical and coax running down 100 feet through knee-high grass.

climb up about 100 feet or so through knee-high grass to a ridge where a bulldozer had recently carved a road for a soon-to-be-erected satellite dish. But for now we had it to ourselves, and the turned-over soil made it fairly easy to push the base of the antenna into the ground. The vertical was quickly erected, and the radials (the four radials in the kit supplied by Butternut were all we used) were laid out at 90-degree angles as straight as we could make them.

At the ridge we were about 200 feet above sea level with a completely open path to . . . the west. We had no trouble raising mainland Australia. To the north (and Japan) we had a fairly open path with only a few higher ridges in the way. The path to the east was mostly blocked by two middle-sized mountains, but there was an opening to the northeast (and home). Two 2500 foot high mountains (Mt. Lidgbird and Mt. Gower) were directly south of us, but we didn't expect much propagation from that direction. As it turned out, we never knew from what direction signals might come. At times we were hearing JAs, Europeans, and Stateside stations all at the same time. Praise the vertical!

Once the antenna was up we ran (tumbled) back down to the "shack" and found that our coax reached the rig with at least 6 inches to spare. We quickly made all the connections, fired up the TS-430 on 20 meters, and were on the air. Now the big question would be answered. Would we have propagation? During the week before we left there had been a

Class X solar flare and polar-cap absorption event and the bands had been dead for days. In fact, this had been our greatest fear all along (more rational people might have worried about plane crashes or missed connections; we worried about sunspots!). Conditions had been so bad the previous weekend that we missed a planned schedule with Dick, VK9LH, since we couldn't even hear the west coast, much less Australia.

To our happy surprise, however, the bands sounded pretty good. The first contact was with VK3AO at 0722Z (1752 LHI standard time), followed quickly by AH2BE/KH9 (where was he when I was home?!), and several JAs. K6HD was our first Stateside contact, followed shortly thereafter by K1CQ in Vermont.

We took a short break for dinner and returned to try to keep some skeds with the local DX group at home. Over the next hour we worked about 15 Maine stations and passed word to our families that we were okay.

Although most of the initial contacts were on 20, we had promised to try to work other bands and CW as well, since both of the resident amateurs tended to stay on 20 SSB. As time went on, we fell into a comfortable rhythm, each of us operating for a few hours and then turning over the rig to the other.

Early Friday afternoon I was rolling along working through the pile-up when all of a sudden the rig went dead. No receive, no transmit—nothing. I was sure I had blown the power supply, but no, it was only the main fuse for the three end



Mike, KD2EU/VK9AE, operating during the contest (it has to be during the contest, because he has his hat on).

rooms. Not that that made it any simpler, for as we discovered, in Australia you don't just plug in a new fuse. You wind your own! We asked the proprietor to call an electrician, and I overheard her tell him later to make sure he fixed it right because her guests were going to be in a radio competition, and it wouldn't do for them to have trouble during it.

As time for the contest drew near, we began to get nervous. Would we do well? Would we be heard? Would the bands hold up? Would the fuses hold? Would the trip be worth it? Finally 0000Z (1030 local LHI time) rolled around, and we started with Mike at the mike on 10 meters (first rule of any competition—start with the best). His first "Hellooooo Radio, Victor Kilo Nine Lima Victor" was met with silence. So were his second and third. Finally KJ6WD called. Several minutes later he worked a VK.

After two hours of trying 10, 15, and 20 we had a grand total of 27 QSOs. What was going on? Were the sunspots on the rampage again? We didn't know, but the same thing happened each morning. It really puzzled us, because back home mornings are usually one of the best times to work DX. On Lord Howe, though, propagation was terrible from about 2200Z to 0200Z (0830 to 1230 local) each day. At the time we were convinced the sky had fallen, and we might as well go swimming and look at the fish.

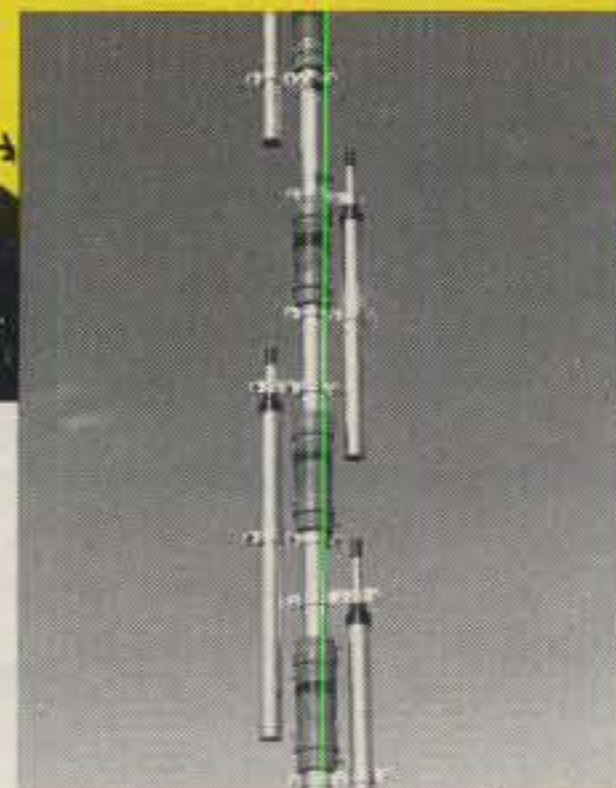


Joe, K1JB/VK9LV, operating during the contest.

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Things then began to pick up, and it wasn't long before the pile-ups grew to a huge, angry buzz. At times we were working three to four per minute, and the supply of new stations seemed as if it would never end. We were called by stations for which we had to fight tooth and nail back home on the east coast—BY, BV, VS6, V8, DU, 9V, 9M2, 9M6, KH2, KH9, JT, VU, AP, 5W, CE0, YJ, 3D2, P29, and A35 are just some of the prefixes we logged. For a couple of country boys from Maine this was pretty heady stuff, and we loved it!

From time to time it became clear that stations on the other end were having trouble hearing us because of the pile-up, so we had to go to split operation. And there were times when the number of stations calling was so large that we couldn't copy any of them, so we had to spread them out. At one point Mike was tickled to hear an OH tell him to stand by so they could move a JT off our frequency! We quickly discovered what many others have reported: the JAs are terrific! We

worked over 2500 Japanese stations, and at all times they were disciplined and polite. At one point we had a short opening to Europe and asked the JAs to stand by. There wasn't a peep from any of them, but when the band faded and we asked for any station, there they were again, in force.

In contrast, some, but by no means all, Europeans, particularly in the south of that continent, were very aggressive and would continue to call even if asked to stand by while we tried to hear another station. They frequently slowed us down, but it was usually temporary.

Stateside operators were somewhere in between. They tended to be opportunists. They would stand by if we asked for 2s, for example, but if we forgot to specifically say 2s (even after 10 times in a row), they would jump in with both feet. Even so, we had very little trouble with excessive zeal, and everyone was very understanding when we asked for Maine stations and talked to our families.

We also had little trouble with the few stations that tried to deliberately interfere with us by using carriers, etc. At the worst, they were a minor irritant, since there was always a station somewhere we could hear above them, and there was always someone who could hear us.

We also saw first-hand the effect of other stations sending partial calls. It really does slow down things! Most of the time we could pick out an entire call. Occasionally, we would only catch part of a call if the pile-up was really deep, but it was really irritating to have a strong, perfectly readable station send "Uniform Charlie," for example, and then have to go back for a fill.

Tony, VK9LA, amazed us several hours into the contest when he showed up with a Kenwood TL922 amplifier on his shoulder. He carried it down on foot from his house about a mile away and wasn't even breathing hard! Once again we couldn't believe our luck, but we quickly wired it in and went back to the contest with 400 watts (Australia's legal limit for SSB) instead of the 80 watts we had been getting from the 751. This definitely helped.

Because of the pile-ups we spent little time looking for multipliers, and when we did find one, they still had trouble hearing us even with the amplifier. So we did the best we could and figured the score would take care of itself. As it turned out, we probably didn't set any records, but we did make about 3500 QSOs in 35 zones and 109 countries, which seems respectable. We had figured earlier that if we made 2000 QSOs in the contest, we would consider it a rousing success, so by that standard we far exceeded our expectations.

Following the contest we resumed making contacts under the call VK9AE for the rest of the day and then took a break for a cookout at VK9LH's house. We operated some more through the night and into the next morning, when we finally had to quit to get the antennas down and our equipment packed. We left both the vertical and the extra G5RV antenna we brought with VK9LH and VK9LA in the hope they would get on other bands and modes in the future.

Finally it was time to go, and we said our goodbyes and took the plane back to Sydney. We couldn't go so far away from home and not at least see part of mainland Australia, so we stayed in Sydney for three wonderful days to rest and see the sights. It was nowhere near enough time, and it whetted our appetites to return for another visit soon.

We are especially indebted to Dick, VK9LH, and his wife Noel, and to Tony, VK9LA, and his wife Darlene for their hospitality and assistance during our trip. We are also indebted to the owner, staff, and other guests at the Seabreeze Lodge for putting up with a couple of crazy Yanks and their radios for five days.

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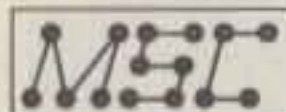
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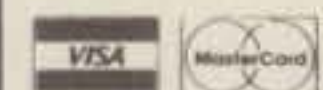
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- **SP-430** external speaker
- **MB-430** mobile mounting bracket
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- **YK-88S-88SN** 2.4 kHz/1.8 kHz SSB filters
- **MC-60A/80/85** desk microphones
- **MC-55** (8P) mobile microphone
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A LOOK AT THE WORLD AROUND US

New Goodies and Gifts for Holiday Cheer

SeaSon's Greetings to our outstanding friends and supporters everywhere! May the holidays fill your life with happiness, and may your shack overflow with fabulous goodies to enjoy for many years hence. Reflecting those wishes of long life and good fortune, we once again make our traditional column diversion to feature new items and attractive Christmas gifts especially for hams. Featured items are ideal self-rewards for a hard year's effort, so lean back and enjoy the views while noting addresses or telephone numbers. Remember, too, the items are available from dealers listed in CQ's advertising pages, not from me.

I am simply your guide on this mini "what's new" tour. Since many of you recently purchased a new transceiver to enjoy sunspot cycle 22's great DXing conditions, this year's focus is on elegant "toppings" and neat accessories for you and your setup. Future columns will continue with more discussions of topics such as OSCAR satellites, WARC-band updates, more classic rigs and keys, etc. There's more exciting news, but let's shift it to the column's end and jump right into the Christmas gift views—and they are terrific!

Elite Accessories

We begin with the new style of pure leather case for your ICOM 2SAT or 24AT hand-held talkie shown in photo 1. This hand-crafted item differs from ordinary leather cases in several ways. First, it is soft and flexible, like the finest leather coat or glove, rather than stiff like other cases. It also looks and feels like top quality, and the inside is suede-lined without any rough edges to scratch your prized talkie. Knobs extend through top cutouts for easy rig operation, and a Velcro®-retained front hatch gives quick keypad access for autopatching.

There are two case styles: one fits the IC-2SAT with its tall BP85 battery pack; the other holds the IC-24AT with a BP85. Sponge padding can be placed in the case's bottom if you use a shorter battery pack. Although the cases are made by a private group in Canada, they have become a standard ICOM item and are now

4941 Scenic View Drive, Birmingham, AL 35210



Photo 1— This soft leather handie-talkie case is hand-crafted and is truly marvelous. A great holiday gift for sure!

available at amateur equipment dealers nationwide.

Next is KB2MB's beautiful 14-karat-gold callsign pins shown in photo 2. A picture, however, cannot do justice to the sheer glamour of this jewelry. It is magnificent. Wearing one of these gold pins is definitely not limited to hamfest and club meets. They dress up everything from knit shirt collars to suit coat lapels. You might even consider getting two of the pins—one for sports wear and one for dress wear. And why not? This jewelry reflects you rather than being something simply purchased off a shelf. The pins are available in deluxe gold-plated and economical gold-filled versions with 1/4 inch high or 3/8 inch high letters, with optional diamond chips. Order them directly from H & M Jewelry Co., 26 Edgecomb Rd., Binghamton, NY 13905 (or telephone 607-797-5458).

While writing this year's "gifts" column another great item joined H & M Jewelry's amateur radio line: the watch shown in photo 3. This watch is made by the well-known manufacturer Telux. It is water resistant, super scratch resistant (case and crystal), and has quartz accur-



Photo 2— H & M Jewelry's new gold call-sign pins are beyond beautiful. They are magnificent.



Photo 3— H & M's new amateur radio watch reads local time on its analog dial plus 24-hour time in GMT. An optional bezel also calculates time in 24 world zones.

acy. H & M inscribes your name and call on the dial at time of purchase. You can set the analog dial for local time and the inset 24-hour LCD readout for GMT. If you prefer a DXing bezel rather than beam headings (shown), an alternate bezel shows/calculates time in all 24 world time zones. This watch is also available from H & M Jewelry. Ordering early is encouraged.

Another unique and attractive gold item is the ham radio medallion shown in photo 4. This first-in-a-series of gold-plated coins makes a terrific gift for yourself or a good friend. The "heads" side of this silver-dollar-size item has a great circle map of the world plus a tri-band beam and classic bug showing. The "tails" side is inscribed with "amateur radio, 1990" around its circumference, plus your name and call letters (plus a couple more



Photo 4- This Bonelli amateur radio medallion is available in gold or bronze, and can be engraved with your name and call.

lines/words, if desired) engraved in the middle.

The coin is being made by Mike, N3FDU, of Bonelli Industries, P.O. Box 1227, Alpharetta, GA 30239 (telephone 404-343-9528) in two versions, gold and bronze. The gold version has a loop at the top, and includes a long neck chain plus storage pouch to minimize scratches. The more rugged bronze version is a solid, round coin without a loop or chain. These neat items are available directly from Bonelli Industries.

For The Shack

Coffee and early morning hamming is truly living the good life, and D & S's person-

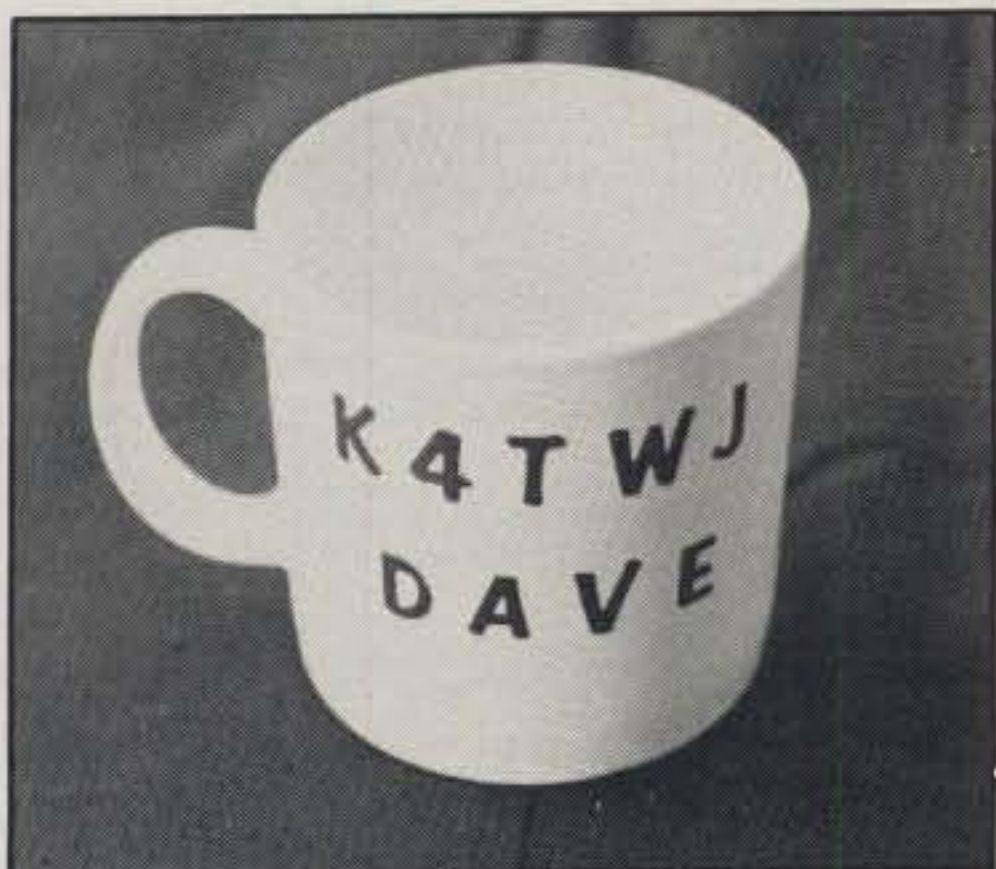


Photo 5- Every shack needs a personalized amateur radio mug, and this one from D & S Sales carries a one-year replacement warranty.

alized mug shown in photo 5 brings it together perfectly. No, it does not calculate gray line, read GMT, or show QSL routes. It just sits by your rig and holds comforting warmth for good DXing. The mugs are available in 10 ounce stoneware or clear glass with your name and call. They also carry free replacement for one year if broken. My mug has survived almost a year of daily use and automatic dishwashing and, as you can see, the labeling is still like new. The mugs are available from D & S Sales, P.O. Box 17012, Munds Park, AZ 86017 (phone 602-286-1236).

You've surely seen the handy CW memory keyers that store prepro-

grammed data for contesting or DXing. Now a voice equivalent is available for SSB operations. This new Digitech Concepts DR-3 digital voice recorder/announcer is shown in photo 6. It has three programmable message memories with a combined/total storage time of 128 seconds. That is more than ample for CQing, calling, transmitting data and QSL info, plus more. The unit also sports a repeat function with an adjustable delay of 5 to 30 seconds between repeats for CQing. Standard four-pin connectors are used for audio in/out and a 1/8 inch phone jack is included for recording off the air. (Thanks to digital audio, you can now let the other

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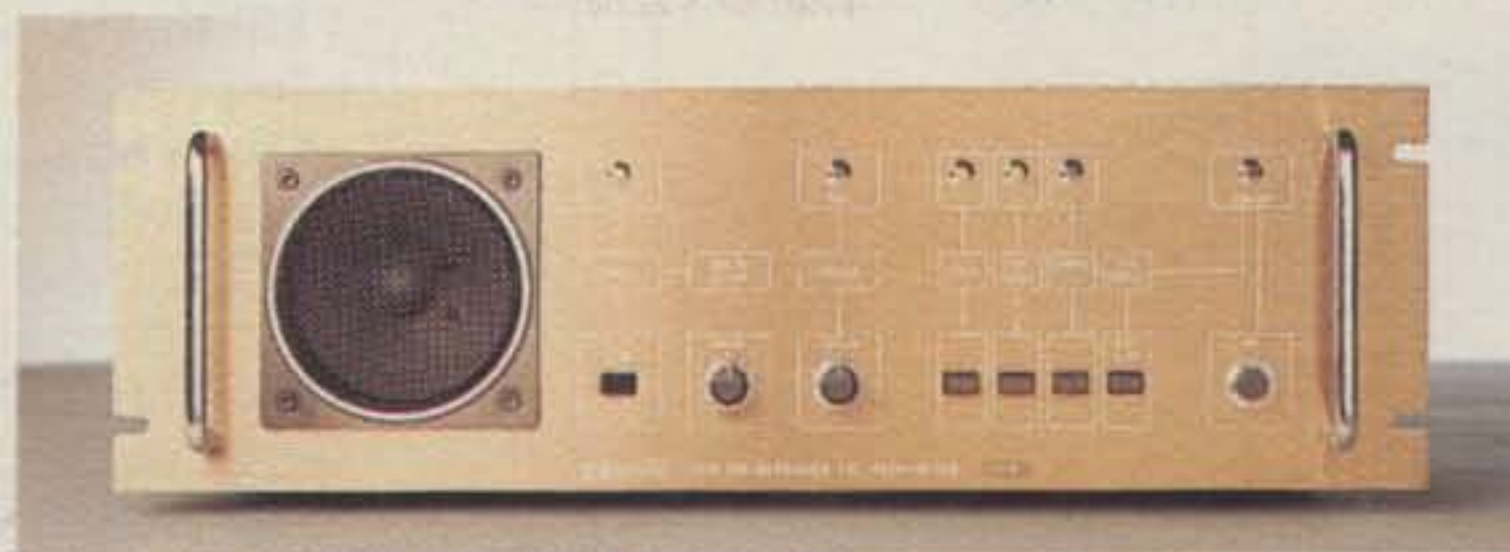
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CIRCLE 154 ON READER SERVICE CARD



Photo 6- This new digital voice recorder/player is the SSB equivalent of a CW memory keyer. Press one button and it makes those DX calls for you.

Photo 7- G4ZPY's new hand-crafted high-speed paddle. This key really shines at speeds above 40 wpm.



chap hear exactly how he sounds!) Combine this unit with D & S's mug, and you can really lean back and relax while working the pileups with your finger (or toe!). These digital messaging units are available from Digitech Concepts, 200 W. Main, Roberts, WI 54023 (phone 1-800-736-3960).

If your interests lean more toward big-time CW, G4ZPY's new super paddle shown in photo 7 should prove appealing. This is not a regular electronic keyer paddle, but a special version made for high speeds. It still operates fine at slow speeds, but it "comes alive" above 40 wpm. The base and oval fingerpieces are

extra-heavy, and the arms are non-flexible for real "go-to-it" action. The key's workmanship and quality are exquisite. Gordon Crowhurst hand-makes these keys, so expect a delay if Christmas orders are heavy (they are worth the wait). You can order the key directly from G4ZPY, 41 Mill Dam Lane, Burscough, Ormskirk, Lancs. L40 7TG England. (*Hint: Use your Visa or Master Card and let their computer make the dollars-to-pound exchange.*) If you desire only information and pricing at this time, write his to U.S. liaison, Charles Tryor, N4LMY, at 7809 10th Ave. S., Birmingham, AL 35206.

Looking Ahead

That winds up this year's Christmas gifts special, and I trust you enjoyed overviewing the goodies as much as I enjoyed writing about them. Thanks to your supporting letters and on-the-air encouragements, 1990 has been another banner year. Looking back through the logs, I see that approximately one out of four of you answering my calls or CQs return with "Hi, Dave" and other kind greetings. That, friends, is the greatest Christmas gift of all! Thanks!

73, Dave, K4TWJ

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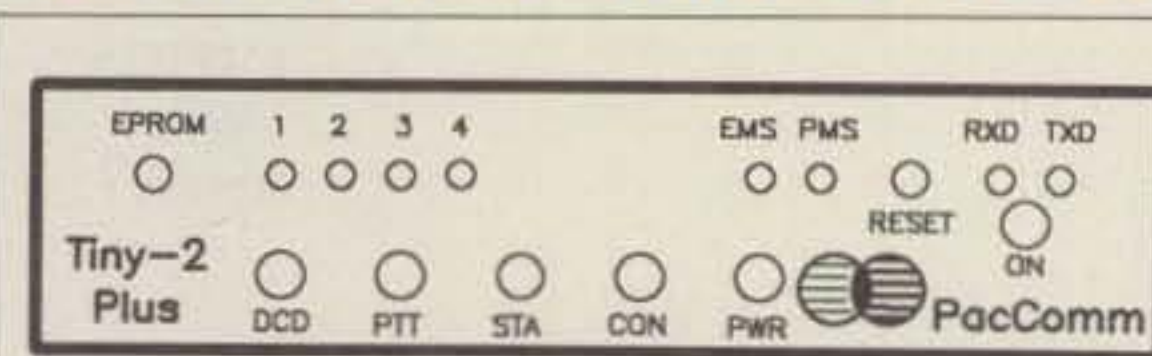
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CIRCLE 149 ON READER SERVICE CARD

OUR READERS SAY

A Cheap and Clean Parts Picker

Editor, CQ:

Are your fingers too fat for retrieving or holding those tiny screws, washers, and nuts in those hard-to-reach places? Check your local grocery store or drug store for the "Pickle Picker." It's available in the "grocery tools" section.

It's a nice plastic, 5½ inch long, spring-loaded tool and is ideal for the workshop. Granted, it won't pick up ¼ inch bolts, but those tiny #00, #2 size screws and washers always seem to have mounting locations where your fingers or long-nose pliers won't fit.

It works great and costs about \$1.49. Just put it into the grocery cart. Your wife won't even notice it at the checkout counter.

John W. Swancara, WA6LOD
El Segundo, CA

Thanks, W8FX

Editor, CQ:

I want to tell you how much I enjoy Karl T. Thurber, Jr., W8FX's column, "Antennas & Accessories." I find the software reviews the best written among several other magazines I read regularly. When I am finished with a Thurber review, I have a good idea what practical use the program would offer me. Could you devote more space to Karl's reviews?

By the way, I have purchased several software packages as a result of Thurber's reviews. I have even called him to ask his advice. He has always been patient and courteous.

Keep up the good work.

Robert A. Barrow, K3WPI
Stroudsburg, PA

The Worst QSLers Are . . .

Editor, CQ:

I know everyone has heard this theme before, but I would just like to add my two-cents worth.

I enjoy working the Sweepstakes contests, and afterwards I usually QSL people I need for new counties. This year I did exceptionally well, sending out 74 cards to USA stations with SASE included in all. Four people had moved with no forwarding address and these cards were returned. Fifty-three QSLs have been answered, many with nice notes encouraging me about county hunting and thanking me for providing return postage. Almost 4 months since I sent the first batch, I'm still waiting for 17 QSLs. Folks, if you plug in your calculators, that's almost 25% no response!

Of course there are those who don't QSL, don't have cards, don't collect QSLs, etc., but I think it only courteous to at least write the QSO info on a slip of paper, sign it, and put it in my return envelope.

I'm also a DXer, and I've heard the complaints about slow or nonexistent QSLing from the Soviet Union or South America, but I'm beginning to believe that Americans are the worst QSLers in the world.

Tom Fitzpatrick, WB4FOT
Lexington, KY

It "Tain't" Necessarily So

Editor, CQ:

The recent revelation that the study which identified oat bran as lowering cholesterol was faulty reminds me of another faulty study printed in the October 1989 issue of QST. In this issue a Dr. Shulman reported that in a study which he conducted he found a cancer link in the deaths of 1691 amateurs. He associated this with exposure to RF radiation.

Dr. Shulman did not take into account that roughly 50% of amateurs are not active, a sizable error, not did he take into account that for such a study to have merit all amateurs would have to be exposed to radiation of the same intensity, for the same period of time, and at the same frequency. Hardly a possibility.

Unfortunately, this report has damaged the amateur community at a time when we are seeking increased growth. As an amateur radio instructor, I can state that parents pulled students from my class when they read this report in the newspapers.

Art Rideout, WA6IPD
Fallbrook, CA

A Happy WPXer

Editor, CQ:

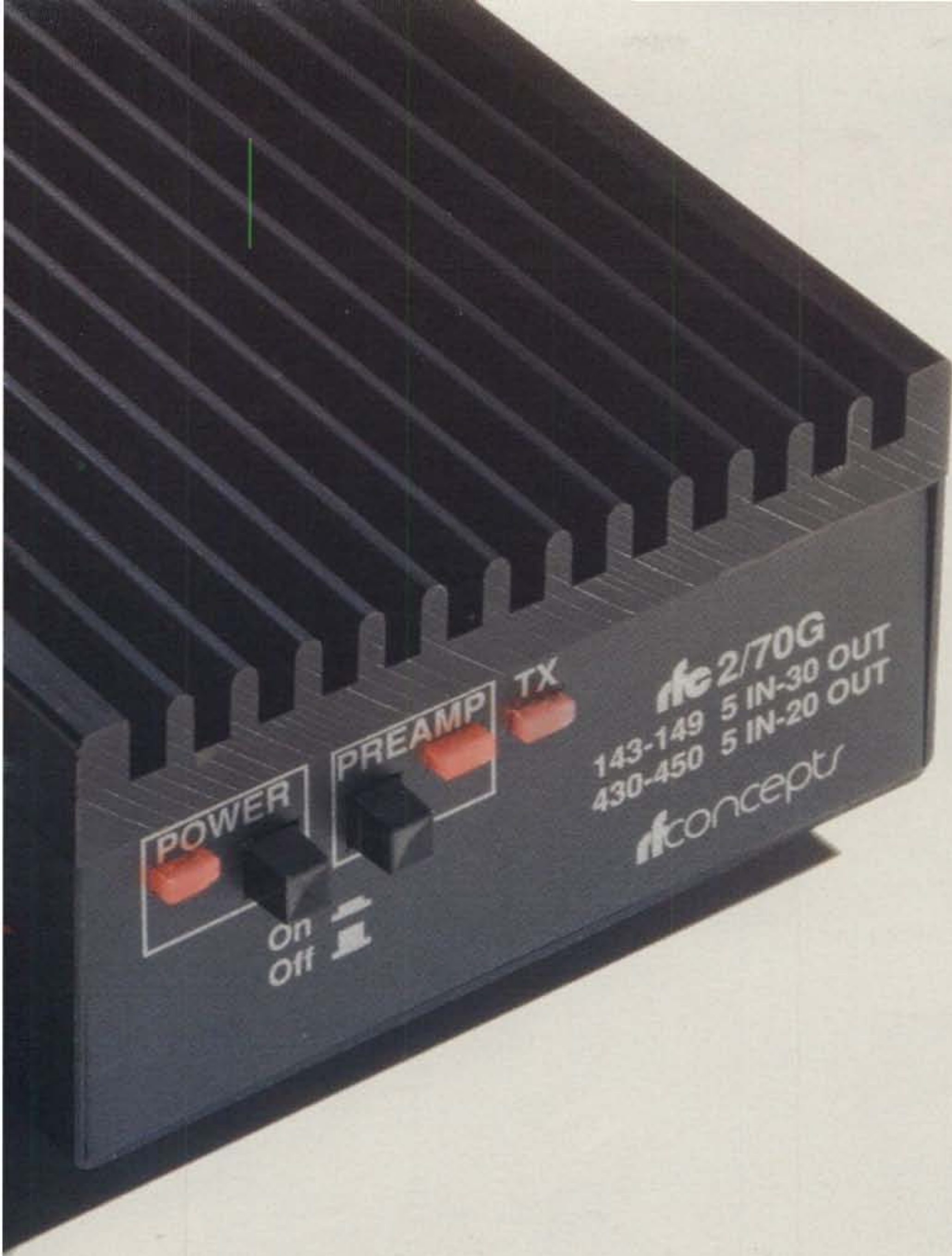
Well, here I am again! This may be the last WPX Award application for awhile. I trust that these additional prefixes will suffice for the Continental (North America) endorsement. Enclosed is my application and one (\$1.00) dollar for the endorsement.

Although I still haven't received the WPX-CW Award I have enjoyed sending in the prefixes for the WPX CW Award and its endorsements. It has been great fun and I really appreciate CQ for having this award to work toward. As I've said before, CQ makes it fun!

Since I'm not a "big gun" operator, this award means a lot to me. I realize I can't fight the powerful, high-wattage stations, but this is where the challenge and fun comes in. By using my J-38 straight key and 100 watts output or less I still believe that your operating skills have a lot to do with the amount of contacts made, especially on DX! I have a Vibroplex (Original) semi-automatic key, but haven't used it in years, for the straight key is my main love. To me this is "HAM" radio! I may be living in the dark ages using the straight key, but to each his own, I say!

I'm just a beginning DXer and I don't know all the "ropes" about DXing, but I'm learning as time goes by. I have been pleasantly surprised many times by having DX stations answer my call. What a thrill! You can't describe the feeling. I'm sorry to say, but I haven't been a subscriber to CQ for a number of years, but I still buy them at the stores. At least I have them to read. Over the years I have given these magazines to libraries. I can't begin to throw them away when someone can get a wealth of information by reading them or maybe even start a youngster on becoming an amateur. CQ magazine is very easy to read and understand, and besides, I like its format! It is a great magazine and one that I truly enjoy reading. Long live CQ and amateur radio. They belong together!

Carl H. Larson, WA0DFD
Bedford, IA



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DR-510T

Best Dual Value on the Market!

The Alinco DR-510T has most of the outstanding features of its sister the DR-570T, including 14 memory channels, cross band duplex and cross band repeat. The multi color LCD display, and simple tune control panel makes simplicity the key word. The DR-510T with 45/35 watts is the best, featurepacked dual bander on the Amateur market today. See the DR-510T along with the other Alinco "Magnificent" ones at your favorite dealer today!

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DJ-500T

Power-Packed Dual Handil

20 Memory channels, subtones, built-in DC to DC, 700 mah nicad battery, LCD readout with 6W on 2M and 5W on 70cm (with optional battery) call channels, DTMF Touchtone, and direct keyboard entry, are just the few winning features of the Alinco DJ-500T Dual Band Handheld. Easy to use, and Value Priced at your Alinco Dealer.



DJ-160T & DJ-460T

2M H/T is here! And wow!

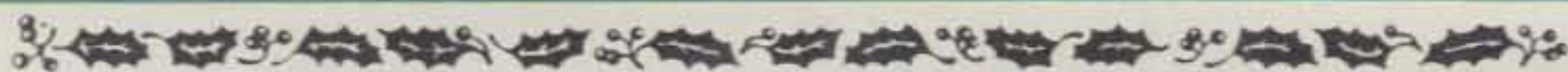
"Bells & Whistles" is a tame word to use for the new DJ-160T, newest "Magnificent" one from Alinco. Keyboard entry is just one of four ways to enter a frequency in the extended receiver (137-173.995 Mhz) of the DJ-160T. You can store duplex /simplex pairs in any of 20 Memories, or Call Channel, with offsets, and any of 38 encoding subtones. Choose one of 3 scan modes, "Band" "Program" or "Memory" and one of five step ranges in VFO. Priority mode can be used in VFO, Memory or Call. "Dual Watch" allows the DJ-160T to scan 3 seconds alternately on CALL, VFO or one MEMORY. "Pager" is for group or single person alert. Other features include: Auto "Battery Save", Auto "Power Off", and 2-Memory Autodialer. Get 3-watts on standard 700 mah battery, or increased power from built-in DC to DC, or optional 12V battery. The Alinco DJ-160T, now the "Top Gun" with the competition today! DJ-460T for 70 cm.



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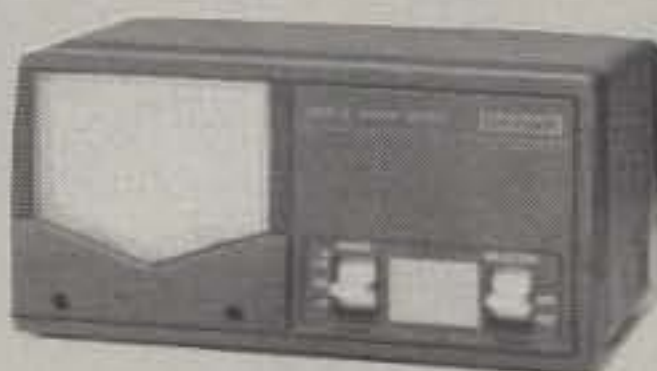


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Circuit Protection	32 A
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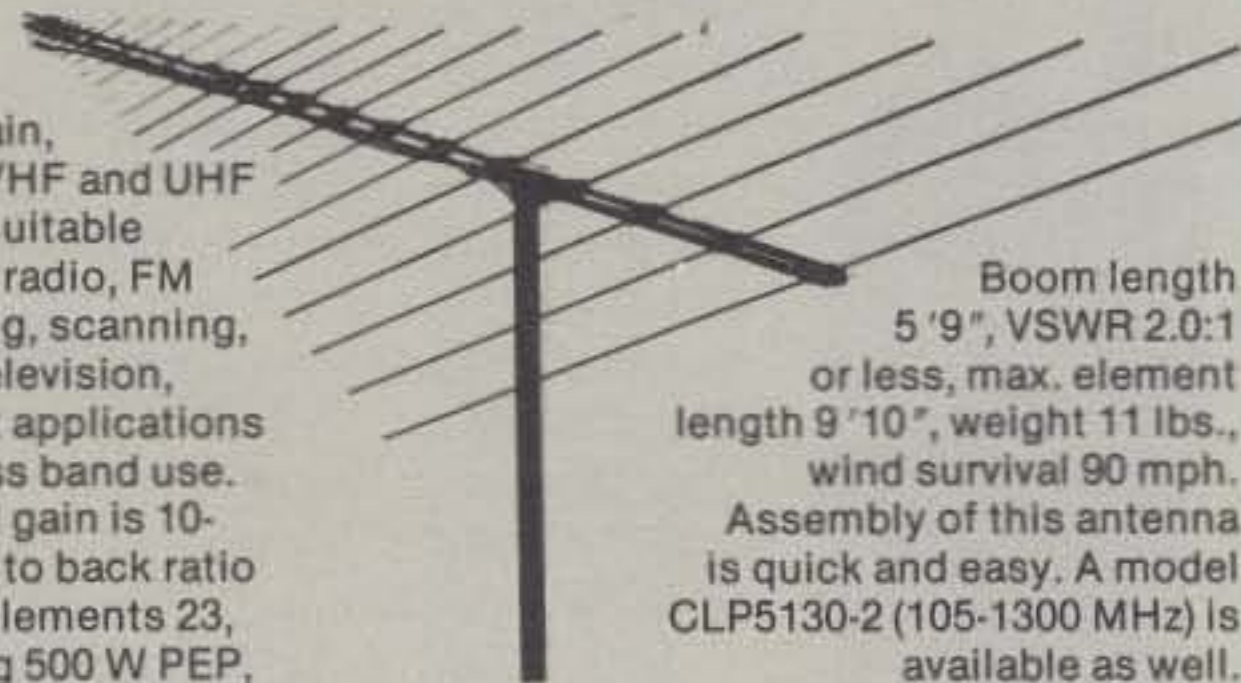


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Boom length 5'9", VSWR 2.0:1 or less, max. element length 9'10", weight 11 lbs., wind survival 90 mph. Assembly of this antenna is quick and easy. A model CLP5130-2 (105-1300 MHz) is available as well.

EMOTO ROTATORS

Model	Wind Load	Max. Load	Stat. Torq.
201SAX	7.6	660	108
105TSX	10.9	660	215
747SRX	21.8	1100	502
1105MSAX	27.3	880	717
1200FX	27.3	1760	1290
1300MSAX	32.7	1760	1792
1800FSX	38.2	2200	2150

1105 MSAX



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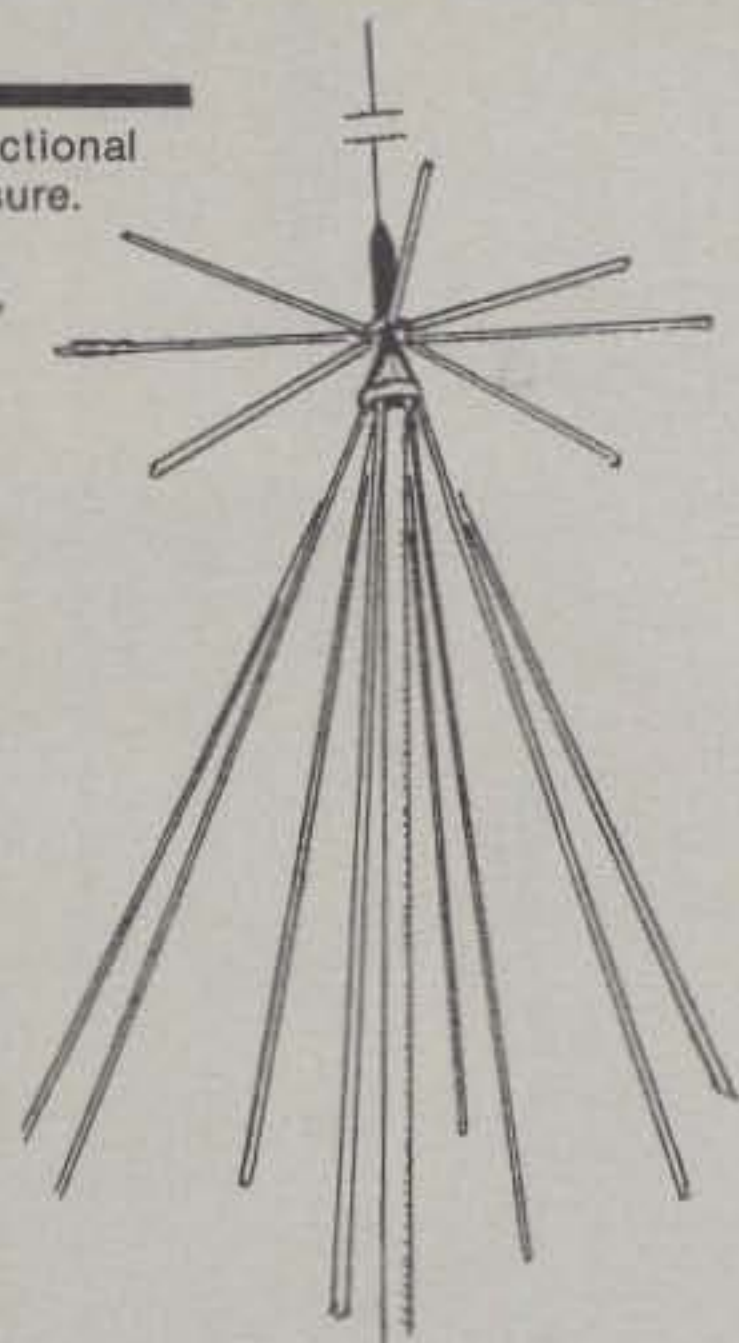


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THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

A Compact 2-Element Yagi For 10 Meters

Ten meters has come out of the summer doldrums. A lot of newly-licensed amateurs are joining the old timers on this exciting band. That's good! They are having a lot of fun making new friends and working DX. Many of them start out with a dipole or ground-plane antenna, but the urge to work bigger and better DX compels the new amateur to think about a rotary beam.

There are plenty of good Yagi beams on the market, but it's possible to build one at home from scratch. The amateur with a lean purse will be interested in the simple beam described here. It is a 2-element design built on a boom that is only a little over 4 feet long! That means a low-profile installation that will not unduly excite the neighbors! The design is derived from the ON4UN Yagi Design computer program. If you have a Novice friend, you might join him in this antenna project. Since much of the assembly information is described in various handbooks, only general information is given here.

The compact beam is shown in fig. 1. The design frequency is 28.4 MHz. The little antenna compares favorably with a conventional 3-element beam on a much longer boom. Power gain is about 4.2 dBd and the front-to-back ratio is about 11 dB. Those are very impressive figures for a beam of this size. The beam is light enough so that it may be mounted above an existing beam. About 8 feet of separation between the arrays is recommended.

Beam Construction

The beam is built on a 4 foot 6 inch length of 2 inch OD aluminum tubing. The elements are composed of 12 foot center sections made of 1 inch aluminum tubing having a .058 inch wall. Tip sections of $\frac{7}{8}$ inch diameter tubing slip nicely inside the center sections, which are slotted at each end. Hose clamps are used to make a good mechanical joint. Anti-oxidizing compound ("Penetrox," or the equivalent) is coated over the overlapping section of the tips before the joint is clamped.

The elements are mounted to the boom by means of aluminum plates measuring 8 inches by 2½ inches. Galvanized U-bolts mount the elements to the plate and the plate to the boom. This type of construction is described in detail in the *Beam Antenna Handbook*.¹

The overall length of the elements is affected by element taper and mounting hardware. The elements must be lengthened about 1 inch to compensate for this. The final dimensions are shown in the drawing.

The Feed System

A gamma match system is used which permits the driven element to be grounded to the boom. Details of the match are shown in fig. 2. This is a coaxial design, the .375 inch diameter gamma rod serving as the outer conductor of a capacitor made up of a length of RG-8A/U or RG-213/U coax. The outer jacket and braid are removed from the coax and the insulated inner conductor is slipped within the aluminum tubing. Adjustment of the overlap determines the value of series capacitance required by the match. In this case, the capacitance is about 48 pF. High-quality coax runs about 29.5 pF per foot, so the overlap comes to about 20 inches. In order to make the match work properly, the driven element must be shorter than resonance, as shown in fig. 1.

Antenna Adjustment

Using the dimensions given, the antenna is very close to optimum. It may be neces-

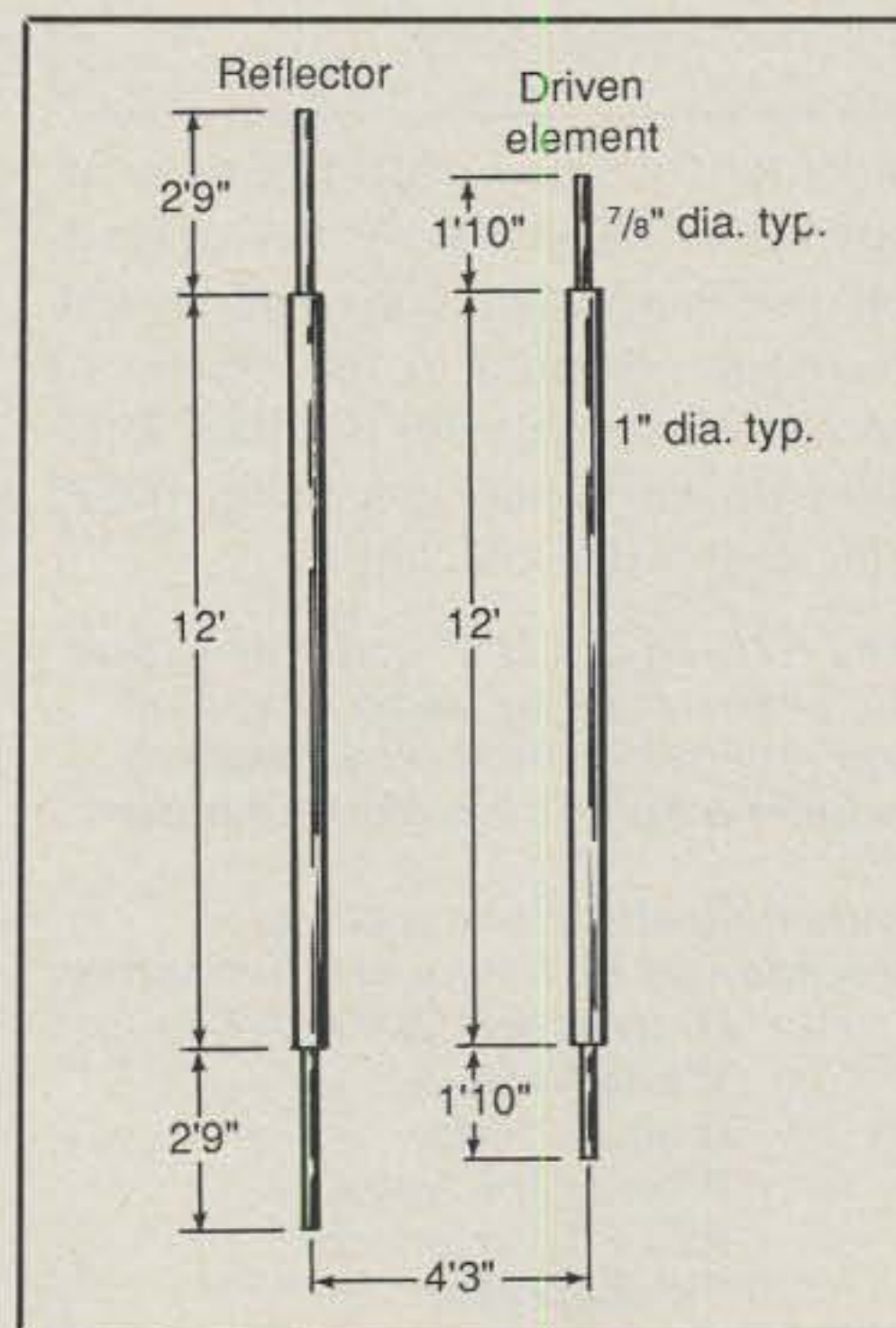


Fig. 1 - Dimensions of the 10 meter Yagi.

sary to touch up the gamma match a bit to obtain the lowest value of SWR at the design frequency. This can be done atop the tower, or the antenna can be temporarily placed atop a high stepladder. The beam should be tilted so that it points up at about 45 degrees to lessen the effect of the ground (driven element higher than the reflector). The length of the gamma rod and overlap of the coax capacitor are adjusted for lowest SWR when low power is applied to the antenna. If an acceptable

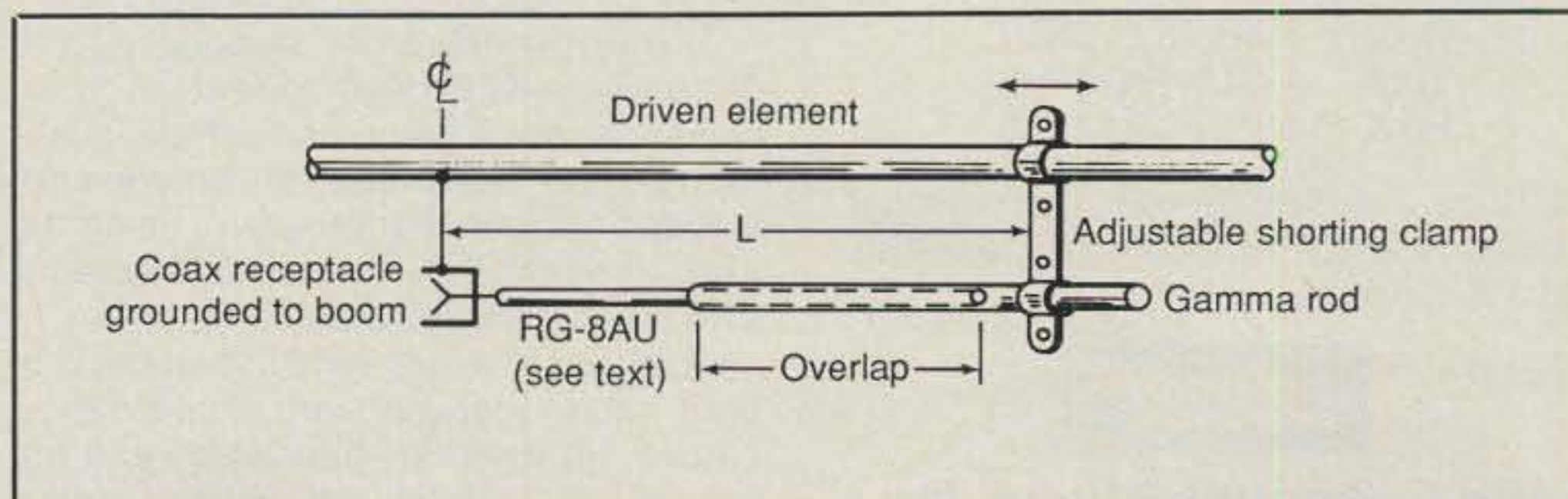


Fig. 2 - Coaxial gamma match. Center-to-center spacing of rod to antenna is 2 inches. Length L is about 23 inches. Seal ends of gamma rod against moisture.

¹48 Campbell Lane, Menlo Park, CA 94025

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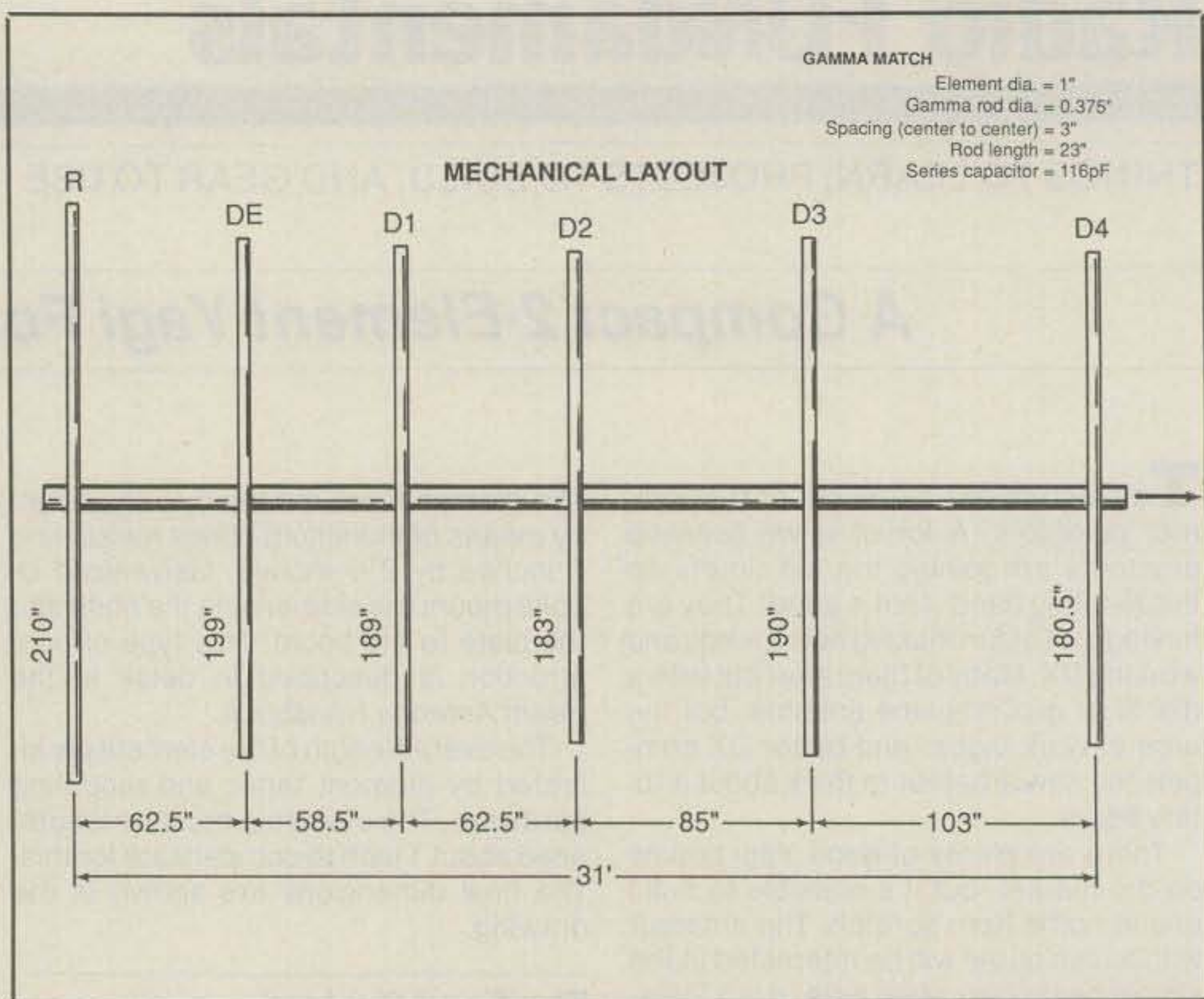


Fig. 3— Assembly of "big gun" Yagi. See fig. 1 for element assembly. Feedpoint resistance is about 30 ohms.

minimum value of SWR is not attained, the length of the driven element is adjusted slightly. A change in length is applied equally to each tip. The interlocking adjustments are element length, gamma rod length, and gamma capacitance. You'll find out that the antenna is probably on-the-nose and requires little, if any, tuning to achieve a good value of SWR at the design frequency.

A "Big Gun" Yagi For 10 Meters

So much for the little array. How about a big-gun design that will really bore a hole through a pile-up? Since the Yagi computer-modeling programs became readily available, it is possible to model antenna designs to fit the application. Trade-offs between gain, front-to-back ratio, operating bandwidth, and input impedance are easily and quickly accomplished.

The best-known antenna modeling program is MININEC, developed at the Naval Ocean Systems Command at Point Loma (San Diego), California. This antenna design is based on that program, using the K6STI and ON4UN versions suitable for IBM PC clone-type home computers.

Contrary to a long-held belief, the programs show that improved results can be had in the areas of bandwidth and improved front-to-back ratio without suffering a loss of gain when staggered director elements are used. That is to say, the di-

rector lengths are not constant, nor do the lengths decrease in an orderly manner with respect to distance from the driven element.

Characteristics of the Antenna

This beam provides a power gain of 9 dBd (11.14 dBdi) over a dipole with a front-to-back ratio of 23 dB at the design frequency. SWR is less than 2-to-1 over the range of 28.0 to 28.8 MHz. Gain remains within 0.1 dB of the maximum figure over the operating range. For simplicity, the antenna is fed with a gamma matching system so that all elements can be grounded to the boom.

The "big gun" is shown in fig. 3. Note that directors 1 and 3 are longer than directors 2 and 4. Boom length of the array is 31 feet, and the elements are mounted on small plates above the boom. The center sections of the elements are 1 inch aluminum tubing having a .058 inch wall. The tip sections are 7/8 inch tubing with a .049 wall. This combination makes a light, rigid element.

The boom is made of 2 1/2 inch diameter tubing having a .083 wall. Sections of tubing are spliced together and supported by a top strut and bracing guys run to the boom tips. Each guy has a turnbuckle in it and is broken up at two points by strain insulators. The turnbuckles place the boom under slight tension, which helps to keep the array from weaving around in a heavy wind.

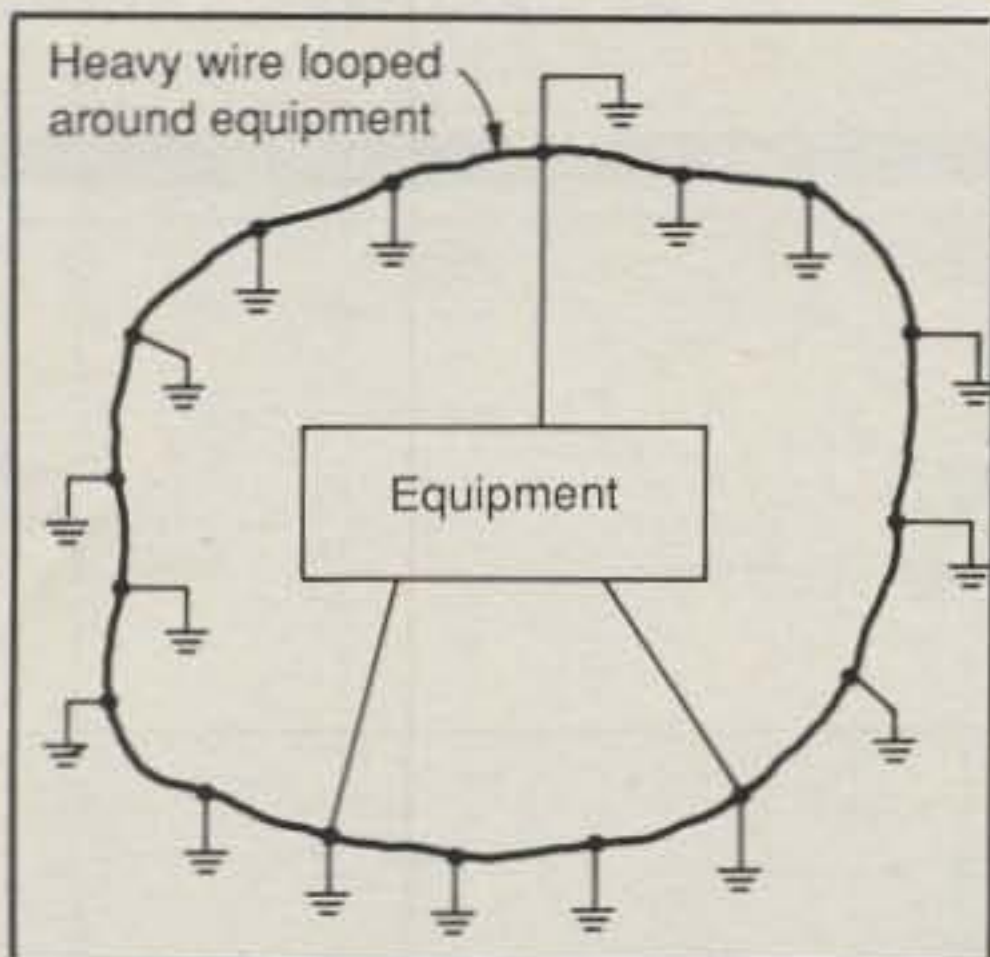


Fig. 4—SWG wire is looped around equipment and grounded at 15 to 18 points.

For the gamma match to function properly, the driven element must be shorter than resonance. Element taper requires that all elements be about 1 inch longer than a constant-diameter element; the driven element must be shortened as shown in the drawing.

It is difficult to adjust the gamma match when the beam is atop the tower. A close adjustment can be made when the beam is atop a temporary support, with the boom elevated at a 45 degree angle to the ground (reflector closest to the ground). If you can place the beam on a 20 foot high support in this fashion, you can adjust the gamma match at your leisure. A little effort in this adjustment will pay big dividends in operational bandwidth of the array.

Improved Grounding Techniques

George Riddle, W6FMZ, brought to my attention an article in the March 1988 issue

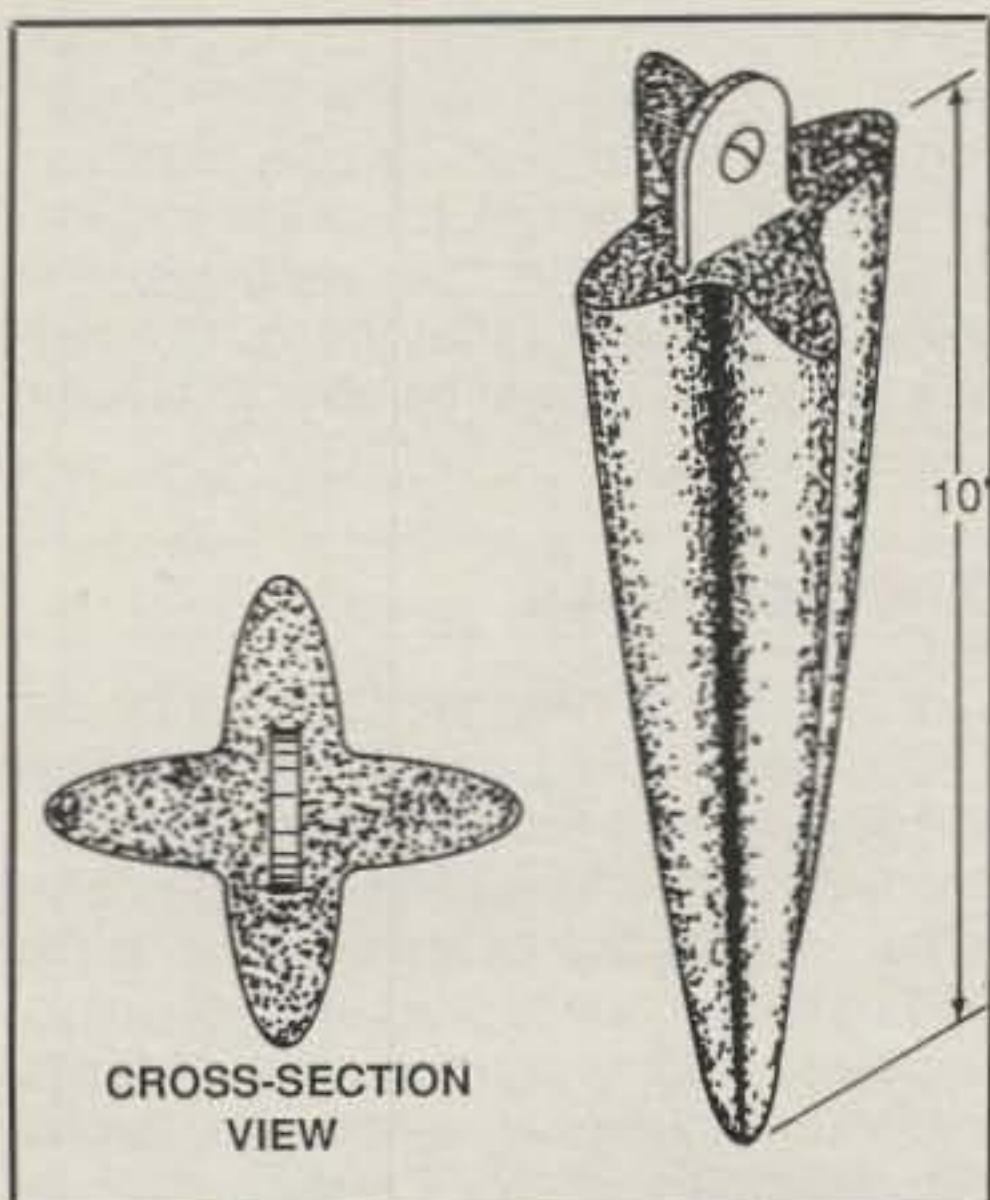


Fig. 5—Ground stake is cruciform (star-shaped) with connecting bolt at top.

of *Signal* magazine. It concerns ground measurements conducted by the Army Material Systems Analysis Activity, Aberdeen Proving Ground, Maryland.²

Ground resistance measurements using a 6 foot ground rod were taken in a number of locations. The military has used such ground rods for the past 50 years. Ground resistance measurements for a single rod ranged from 13 ohms in moist soil at Fort Story, Virginia to over 7,000 ohms at Fort Lewis, Washington (10 ohms is considered the upper limit of acceptability).

Continued testing on various grounding schemes led to the surface-wire-ground (SWG) technique. The early SWG consisted of a number of 6 inch long stakes used to secure a 100 foot long, 1/8 inch diameter cable to the earth in a straight line.

In the final design the wire length is reduced to 70 feet, the wire being grounded along its length by 15 stakes, each 10 inches long. The wire is looped around the equipment, and three heavy connecting wires ground the equipment to the SWG (fig. 4).

The SWG has been tested against a conventional 6 foot ground rod in a number of locations in the continental United States, Alaska, and Germany. In all cases the SWG offered improved performance, with values ranging from 2:1 to 10:1 better than the ground rod.

The short ground stake is a tapered, star-shaped design (shown in fig. 5) that provides enhanced soil contact and can easily be inserted into or removed from the ground.

Now here's an interesting idea that 160 meter enthusiasts using an end-fed Marconi antenna should investigate! Ground loss plays a big role on this band, and anything that can be done to decrease it should be a great help!

The Dead Band Quiz

This little brain teaser is an easy one. The reader who sends me correct identification of the three missing words, identification of the quote, and the best background review concerning it will receive an autographed copy of the new second edition of the *Beam Antenna Handbook*. Hint: The quote is extracted from a manuscript dated 1742:

"I counsel you by way of caution to forbear from _____ in those dark hours when the powers of evil are exalted."

Footnotes

1. *Beam Antenna Handbook* is available from CQ's Book Shop.
2. This system was briefly mentioned in "Technical Correspondence," by Dave Talley, W2PF, *QST*, January 1989, page 41.

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ACQ-17

NEWS OF COMMUNICATION AROUND THE WORLD

Those [Deleted] Countries

Many DXers will see their DXCC country count drop soon. The DX Century Club program will delete some countries from the current country count. Countries to be deleted include East Germany, North Yemen, and South Yemen. In addition, Abu Ail may be deleted early next year.

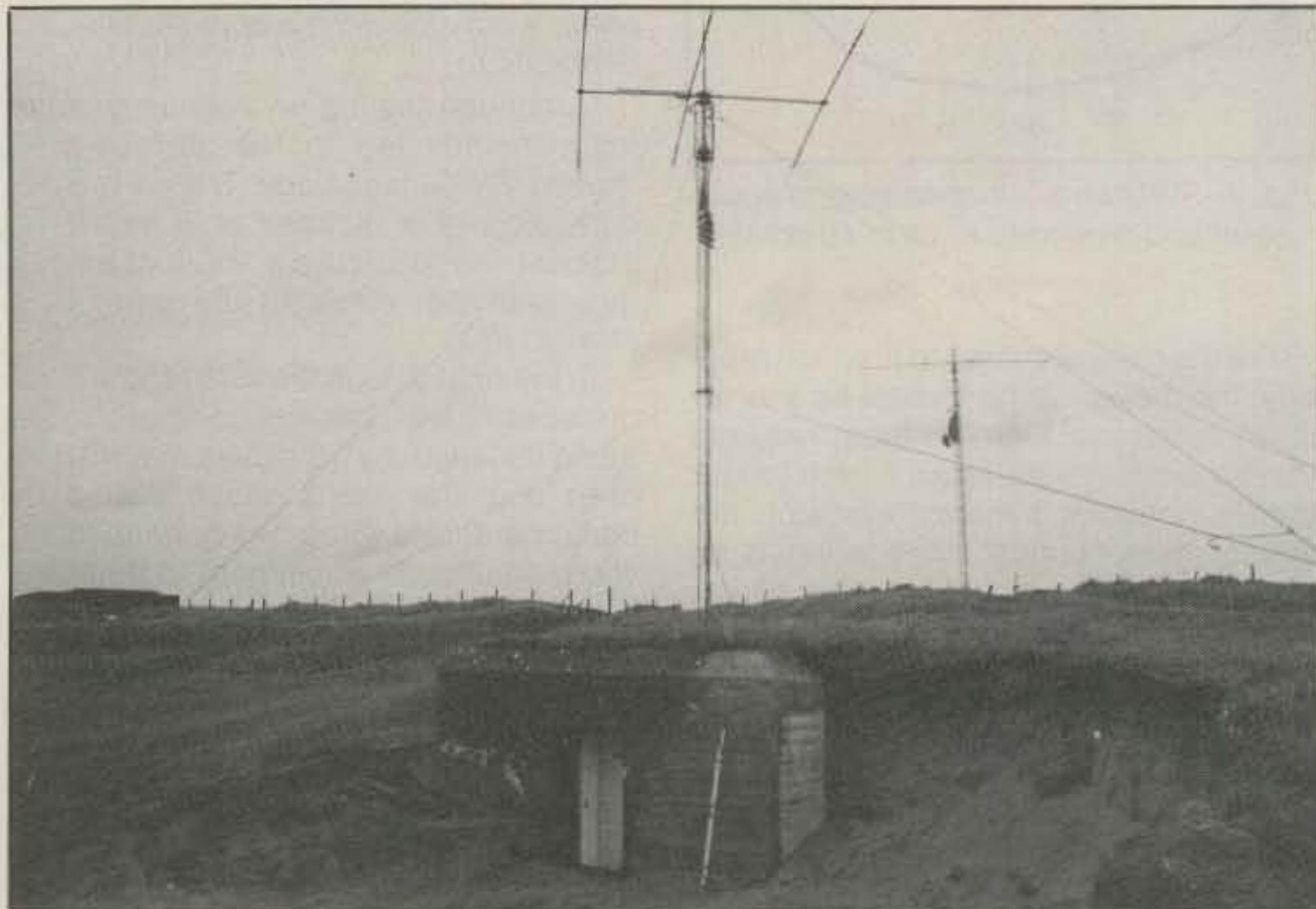
When a country is [deleted] from the DXCC, the number of current DXCC countries drops, and every DXer who has confirmed that country has his or her confirmed current country count drop as well.

No DXer likes to see his or her confirmed current country count decline, but [deleted] countries are part of the post-war DXCC program, just as New Ones are. There are more than 50 countries on the [deleted] list, including entities such as Minerva Reef, the Panama Canal Zone, and Germany.

The DXCC program deletes countries from its current list when political changes make existing DXCC country boundaries obsolete. For example, when the US returned the Panama Canal Zone to Panama in 1979, there was no longer a distinction being operating from the Canal Zone and operating from the rest of Panama. Amateur licenses for personnel in the Canal Zone were issued by the Panamanian government. Thus, the DXCC program [deleted] KZ5.

The first [deleted] country was Newfoundland and Labrador. This was a separate country from Canada in postwar DXCC, but dropped from the DXCC list in March 1949, when Newfoundland and Labrador became provinces of Canada. The number of [deleted] countries climbed rapidly in the 1960s and 1970s, as colonial powers granted independence to possessions around the world. In recent years the pace of [deleted] countries has slowed to a trickle. In the past ten years only three countries have been [deleted]: Bajo Nuevo HK0, The Saudi Arabia/Kuwait Neutral Zone 8Z4, and Kamaran Island 7O.

Amateurs who started their serious DX quest after 1982 haven't had to endure the dreaded [deleted] country problem, until now. The last country to be deleted



Every year some French amateurs operate from Utah Beach in Normandy on the anniversary of D-Day, June 6. In 1990 station HY6JUN transmitted from an old German bunker, under an American flag that had flown over the US Capitol on June 6, 1989. (FB1LDX photo)

from the DXCC list was Kamaran Island, off the coast of Yemen, in March of 1982.

The Yemens

As mentioned previously in this column, the former People's Democratic Republic of Yemen (South Yemen 7O) merged with the Yemen Arab Republic (North Yemen 4W) on May 22, 1990 to form a new country called the Republic of Yemen. The US State Department has recognized the Republic of Yemen, with an effective date of May 22.

Under the DXCC Deletion Criteria the two former Yemens will be [deleted], and a New One will be added to the DXCC list. The Deletion Criterion reads: "When two or more entities that have been separate DXCC countries under Point 1 [Government] unite or combine into a single entity under a common administration, one new DXCC country is created and two or more DXCC countries become deleted." This is clearly the case with the Yemens.

The DX Advisory Committee (DXAC) will forward a recommendation to the

ARRL Awards Committee to delete the old 7O and 4W, and add the Republic of Yemen 7O to the list. The current DXCC country count will drop by one. All three recent 7O operations will count for the new Republic of Yemen: 7O1AA, 7O8AA, and the club station 7O7AA. (An interesting piece of good news: 9K2CS, organizer of the 7O1AA operation, is alive and well in Saudi Arabia after the Iraqi invasion of Kuwait. He reports that the 7O1AA logs are safe, and he will be able to resume QSLing soon.)

The Germanys

On October 3, 1990 the German Democratic Republic (East Germany Y1-9) became part of the Federal Republic of Germany (West Germany DL). This merger is different from that of the Yemens, as the FRG will continue to exist after the merger, essentially unchanged except for its borders. This appears to fall under the Annexation part of the Deletion Criteria: "When an area that has been recognized as a separate country under Point 1 is an-

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2184 K3YBJ 2190 N3BGA
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2187 I1XOL

CW

2646 K1CVF 2649 GI4SNC
2647 SV2AJX 2650 N4XRH
2648 W2QUV 2651 YB2OK

WPX

255 KC6EYZ

Endorsements

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SSB: 350 KD5HO, F6AFA, HP6AYV, CT1CDP, I6YEF, IK2AVH, KA1SPO. 400 KD5HO, F6AFA, HP6AYV, I6YEF, IK2AVH. 450 KH5HO, KW0U, YB2OK, F6AFA, HP6AYV, ZS6BCR, IK2AVH. 500 KD5HO, N9ICH, YB2OK, F6AFA, HP6AYV, ZS6BCR, IK2AVH. 550 W9GCH, YB2OK, F6AFA, HP6AYV, ZS6BCR, IK2AVH. 600 YB2OK, ZS6BCR, IK2AVH. 650 YB2OK, ZS6BCR, IK2AVH. 700 WA4PMF, YB2OK, ZS6BCR, IK2AVH. 750 YB2OK, IK2AVH. 800 YB2OK, IK2AVH. 850 IK2AVH. 900 IK2AVH. 950 IK2AVH. 1000 I8IYW, IK2AVH. 1050 I8IYW, IK2AVH. 1050 I8IYW, IK2AVH. 1100 I8IYW, IK2AVH. 1150 I8IYW. 1200 I8IYW. 1250 AC3T. 1350 WA1JMP. 1400 WA1JMP. 1500 KD9OT. 1750 IBRFD. 1950 IT9TQH. 2000 IT9TQH. 2050 IT9TQH. 2100 IT9TQH. 2150 I6ZJC, IT9TQH. 2200 I6ZJC. 2250 I6ZJC. 2300 I6ZJC.

CW: 350 SV2AJX, W2QUV, YB2OK. 400 SV2AJX, YB2OK. 450 SV2AJX, JF6TUU, G4MVA, YB2OK. 500 SV2AJX, G4MVA, W7JH, YB2OK. 550 SV2AJX, G4MVA. 600 W8LRY, G4MVA, G2AKK. 650 G4MVA, AH6JF. 700 G4MVA. 750 G4MVA. 800 G4MVA. 850 G4MVA, ZS6BCR. 900 G4MVA, ZS6BCR. 950 G4MVA, ZS6BCR. 1000 G4MVA, ZS6BCR. 1050 ZS6BCR. 1100 IS0MVE, ZS6BCR, I2IWM. 1150 IS0MVE, ZS6BCR, I2IWM. 1200 I2IWM. 1250 W8IQ, K4MF. 1300 W8IQ, K4MF, W9PWM. 1850 W3TVB. 1900 IT9TQH. 1950 IT9TQH. 2000 IT9TQH. 2050 IT9TQH. 2100 IT9TQH. 2200 N2AC.

10 Meters: I6YEF
80 Meters: ZS6BCR

Asia: KM5R, IK2AVH
Africa: KD9OT, ZS6BCR, IK2AVH
No. Amer.: KM5R, IK2AVH
Europe: KM5R, IK2AVH
Oceania: JF6TUU, KM5R, ZS6BCR, IK2AVH

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Award of Excellence Plaque Holders with 160 Meter Endorsement: N4NX, VK9NS, DE0DXM, VE7IG, K9BG, AB9O, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, HI8LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, K9QFR, NN4Q, W4UW, NX0I, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ.

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.

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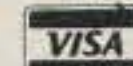
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nexed or absorbed by an adjacent Point 1 country, the annexed area becomes a deleted country." While the DXAC might consider the merger of the two Germanys a "Unification," the terms of the merger would seem to indicate an annexation. At the least, this would mean that East Germany will be [deleted] from the DXCC current country list, dropping the total current country count by one.

Abu Ail

Baldur, DJ6SI, led a DXpedition to Abu Ail at the mouth of the Red Sea in late March using the callsigns A15AA, A15AW, and A15AC. At the time Baldur suggested that Yemen was taking over control of the islands and their navigation lights, and thus Abu Ail would be [deleted] from the DXCC list, as an annexation. However, Baldur was premature, by about one year. On April 1, 1990 the United Kingdom resigned as the Managing Government of

the multi-nation group that controls Abu Ail and operates the Red Sea Lights. Yemen, as a member of that multi-nation group, assumed the responsibility for operating the lights. However, Yemen did not take control of Abu Ail. Although the UK has resigned as Managing Government, the multi-nation team retains control over Abu Ail until March 31, 1991, at a minimum. If by that date no successor country takes over the job of Managing Government, then control over Abu Ail reverts to Yemen. So the earliest Abu Ail will be deleted from the current DXCC countries list is April 1, 1991. Abu Ail will remain a separate country for DXCC purposes after that date, if a new Managing Government steps forward.

Does anyone care about [deleted] countries? The average DXer cares little, as dropping a current country count from 170 to 169 doesn't make much difference. And it even makes the quest to "Work Them All" easier by reducing the total number of countries. Some DXers

actual welcome the deletions. If a DXer is only one or two countries off the Honor Roll, and that DXer has *not* worked the countries to be [deleted], he or she stands to gain from the deletions. As the total number of current DXCC countries drops, so does the cut-off for the Honor Roll. For example, if our hypothetical DXer is only one country from the Honor Roll and hasn't confirmed North or South Yemen, he or she will "back" onto the Honor Roll as the current country count drops by one.

For many top DXers, however, deletions are far from welcome. After going through all the effort to work and confirm

a rare country, one that relatively few other DXers have confirmed, a DXer does not like to see current DXCC credit for that country disappear. In fact, a DXer can fall off the Honor Roll because of a deletion. If a DXer at the bottom rung of the Honor Roll has both North and South Yemen confirmed, but missed the recent 70 activity from the Republic of Yemen, he or she will lose two current credits, while the current country count drops by one. That DXer will then no longer qualify for the Honor Roll.

Of course, [deleted] DXCC countries, and credit for working same, don't simply disappear. The [deleted] countries still

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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, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

matter in two areas. First, the listing in QST of Honor Roll members includes the all-time country count, as well as the current count. Thus, it's possible for a dedicated old-time DXer to have worked more than 360 countries! The only other place where all-time country counts matter is in DXCC countdowns at conventions. For those who have never attended such a function, here's how it works. First, everyone who has earned DXCC stands up. Then the master of ceremonies "counts down" DXCC country totals. All those DXers who have less than 200 countries sit down. Then those with less than 250, etc. At the end a few old-timers remain standing, with all-time DXCC country counts of 350 or more.

Sometimes at DX forums a relatively young DXer will suggest that the DXCC ignore all-time country counts and publish only current country totals. If the forum moderator takes a straw vote on the question, response is usually equally divided between retaining and eliminating all-time country counts. However, those

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LA4HW, 199	W0PGI, 198
PY7ZZ, 199	VE7AHA, 198
DL9WW, 199	SM6AHS, 198
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673 Stations have attained the 150 zone level as of August 31, 1990.

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countries, and asked each one to stand and list their accomplishments. I thought to myself, 'There is one man who could really turn this place upside down if he were here and could tell us of all the places that he has been.'

"Then, over to my left, my gaze stopped upon a familiar countenance. My heart skipped a beat. They passed the microphone quickly down the aisle to where he stood, almost hidden by the huge throng present in the hall. Yes, the hair was grayer (and maybe a little thinner), but the voice was still strong and those old eyes for a split second once again sparkled like we remembered them from a long

ago era. He spoke of some of his visits, such as Sikkim, Bouvet, Aldabra, Desroches, and countless other of the rare and exotic. Then the fellow announced in that all too familiar sweet Southern drawl that he had held some 169 call signs during his DXpeditioning career.

"The applause started as a low rumble from across the room, and built into a shattering crescendo as the much-traveled one received a long standing ovation. There was hardly a dry eye in the house when the tribute ended and the old gent silently slipped from the room, disappearing into the Dayton crowd. I guess there are those who were with me in the

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current solutions to current problems

wanting to retain the all-time listing are invariably older than those favoring current country totals.

Retaining the all-time country counts is a way of recognizing those DXers who have been chasing DX for 30 years or more, and not missing much. For the rest of us, [deleted] countries are an annoyance.

DX Notes

Gus Browning, W4BPD, died on August 21 after a long illness. He was 82. Gus was one of the first multi-country DXpeditioners. He traveled throughout the world, activating rare countries for the Deserving. One of Gus's trademarks, in addition to his ability to handle the pile-ups, was a Coca-Cola next to his rig. Gus described many of his interesting adventures in his *The DXers Magazine*, which he edited until illness forced him to resign. Ten years ago the following tribute was published in *CQ*. It bears repeating now.

"For Those Who Remember: At the Saturday DX Forum at Dayton this year [1980], a scene took place that stirred the hearts of many of the Deserving. Before the day's program began, the moderator canvassed the audience for those individuals who had operated from other



Yuri Baltin, YL1XX, is very active on the new bands. He asks DXers to use only UTC on their QSL cards and to double-check the UTC date.

audience that day who until now still do not know who our visitor was. His being there took us back several years, back to a time when chasing the new one was somehow more fun that it is now.

"Thanks, Gus, for helping us remember."

And thanks to Dan McLean, WA4JTI, for his thoughts.

In other news, the Northern California DX Foundation has started to up-date their world-wide beacon network. Beginning with the W6WX/B beacon at Stanford, California the beacons are adding 15 and 10 meters to the existing 14100 kHz transmissions. After the W6WX/B transmission on 14100 kHz, the beacon switches to 21150 kHz for one minute, and then to 28200 kHz. On all three bands the beacon message consists of four 9-second dashes at various power levels, from 100 watts to 0.1 watt. The prototype three-band beacon was designed by W6QHS and N6EK. The NCDXF hopes that all nine 14100 kHz beacons will upgrade to three-band capabilities in the next few years.

Speaking of the NCDXF, that non-profit organization has committed nearly \$80,000 in support of DXpeditions in the past year. Operations such as A51JS, 3Y5X, 3C1AG, AH3C/KH5, XU8CW and XW8CW, PA3CXC/ST0, and 1S0XV were on the air thanks, in part, to the help from the NCDXF. The NCDXF also supported the World RadioSport Team Championship in Seattle, Washington in July. Donations to the NCDXF are tax-deductible and go to support future DXpeditions and resident operators in rare countries.

DXers can help by sending their donation to the NCDXF at P.O. Box 2368, Stanford, CA 94309.

Holiday Gifts

As we approach the giving (and receiving) season, DXers might consider sharing some holiday cheer in the form of a DX-related gift to a fellow ham, or an overseas correspondent. (Or maybe the DXer can drop a not-too-subtle hint to a loved

5 Band WAZ With All 200 Zones

1. ON4UN	59. OK1MP	117. DF7NM	175. ZP5JCY	232. JH1XYR
2. K4MQG	60. W1NW	118. UA3TT	176. W4VQ	233. YT7DX
3. SM4CAN	61. OE1ZJ	119. OK1DDS	177. RT5UN	234. SP8EMO
4. AA6AA	62. HB9AHL	120. YU2TW	178. LZ2KK	235. JR3HZW
5. W8AH	63. HB9AMO	121. EA8QL	179. K4CEB	236. PY1OL
6. W6KUT	64. LA6OT	122. I1APQ	180. EA5AD	237. I8GS
7. EA8AK	65. UR2QD	123. G3TJW	181. DL6WD	238. JA1GV
8. LA7JO	66. UK2RDX	124. NW5K	182. JA1IFP	239. IN3DEI
9. EA3SF	67. ZS5LB	125. AB90	183. JA7GLB	240. KB0U
10. OH1XX	68. F6DZU	126. DF9ZP	184. DJ4PI	241. JH7FMJ
11. EA80Z	69. DL4YAH	127. RB7GG	185. G4GIR	242. EA4BVE
12. W0SD	70. LA7ZO	128. HK3DDD	186. IT9TQH	243. NS7Z
13. K0ZZ	71. W9ZR	129. W6GO	187. LU9FFA	244. TG9VT
14. ON6OS	72. W1NG	130. F6BEE	188. SM7BYP	245. KD7P/KH2
15. OK3TCA	73. VK9NS	131. SP7KTE	189. G4LJF	246. UA9CBO
16. K6SSS	74. N4KG	132. W3GG	190. W0ZV	247. VE1NG
17. ZL3GQ	75. YU7DX	133. DL8AN	191. OK3CSC	248. SV1JG
18. OK3CGP	76. DL8MAG	134. G3GIQ	192. HB9RG	249. OK1RD
19. SM0AJU	77. OK3DG	135. LA9GV	193. F6BLP	250. K1VKO
20. OZ3PZ	78. ZL1BOQ	136. OZ7YY	194. DJ2YA	251. JA0DAI
21. I3MAU	79. EA9IE	137. ON7EM	195. W8UVZ	252. OH3RF
22. I2ZGC	80. DL7HZ	138. SM7FIG	196. I1HAG	253. G3UML
23. 4Z4DX	81. DJ9RQ	139. YB0WR	197. JA1SVP	254. AA4V
24. N4KE	82. EA5SP	140. LZ2JF	198. DJ8NK	255. W0JLC
25. K5UR	83. EA2IA	141. JA3EMU	199. SM6CST	256. WA2TMP/7
26. K9AJ	84. SP3BQD	142. JA3CSZ	200. GW40FO	257. K1MM
27. SM3EVR	85. LZ1NG	143. JA0CWZ	201. JA4IKD	258. K6SIK
28. LA5YJ	86. N4JF	144. JA1BWA	202. OK2DB	259. I6FLD
29. DL3RK	87. CT2AK	145. JA3FYC	203. DL7AFV	260. I1ZEU
30. N4WJ	88. HB9CIP	146. JA5DQH	204. SM6CTO	261. ON5WQ
31. G3MCS	89. OK1MG	147. JA2AAQ	205. OZ7OP	262. KC7EM
32. SM5AQD	90. CT4BD	148. JA1ELY	206. SM7DZZ	263. K9JF
33. W0MLY	91. VK6HD	149. JA1GTF	207. EA4DO	264. YU2CBM
34. I0RIZ	92. EA6ET	150. DL7AA	208. OH3TQ	265. OH7KI
35. ON5NT	93. VK3QI	151. AA4LU	209. 5B4TI	266. G4IUF
36. OH6JW	94. LZ2DF	152. UP1BZZ	210. ZS5MY	267. OH2EE
37. OK1AWZ	95. ON4QX	153. IT9ZGY	211. F6EXV	268. N2MF
38. IV3PRK	96. SM0DJC	154. K8NA	212. DF3GY	269. K8EJ
39. DJ6RX	97. CT3BM	155. JA6LCJ	213. JA4MRL	270. K5TSQ
40. OH3YI	98. K2TQC	156. JA2BL	214. SV1ADG	271. CT1TM
41. I4RYC	99. EA8XS	157. DJ9ZB	215. JA4VUQ	272. DL1YD
42. ZL1BIL	100. HA9RE	158. N6DX	216. PY1APS	273. YO3CD
43. I4EAT	101. SM4CTT	159. DJ5JH	217. JT1BG	274. ON6HE
44. ZL1BQD	102. A71AD	160. JA3MNP	218. YT3AA	275. IV3YYK
45. TG9NX	103. LZ2CC	161. N6AR	219. K8EJ	276. LA2GV
46. XE1J	104. SM5CLE	162. HC5EA	220. HG19HB	277. I1JQJ
47. F5VU	105. LZ1HA	163. FM5WD	221. UA6JD	278. K1MEM
48. W3AP	106. SM5AKT	164. OH8SR	222. YU2AA	279. JA8EAT
49. YO3AC	107. CT4NH	165. G4BWP	223. I4YNO	280. WB2P
50. K3TW	108. ZL4BO	166. SM0BZH	224. I8SAT	281. F6BKI
51. XE1OX	109. I1BSN	167. UA6JWW	225. JA1FNA	282. HA0MM
52. VE7IG	110. DF6CY	168. JA7IL	226. G4GED	283. I4EWH
53. OK1ADM	111. DK5AD	169. SP5AA	227. N4CC	284. EA1OD
54. CT1FL	112. DL6EN	170. ZS5BK	228. G3XTT	285. DJ7RD
55. WA1AER	113. SM6CVX	171. I4USC	229. SM6BGG	286. UZ2FWA
56. N4RR	114. LU8DPM	172. N0XA	230. SM7CRW	287. EA6NB
57. UW0MF	115. SM6DYK	173. OE2VEL	231. YU1EXY	
58. W4DR	116. DL7XS	174. OA4OS		

one about what he or she would like to find under the tree on December 25th.) Here are some suggestions.

Geoff Watts, editor of the *DX News Sheet* for 20 years, compiles four DX publications: The *CQ* and ITU Zone Guide, the USSR Oblast Guide, the DXCC Countries Guide, and the Prefix Guide. Each of these 15-page guides sells for US \$3.00 (or 6 IRCs) from Geoff at 62 Belmore Road, Norwich NR7 0PU, England (no foreign checks, please).

The 1991 Amateur Radio Calendar includes color photos of DX operations and

DXer, lists major contests and conventions, and includes a host of other features. Calendars are available from Radio Specialties, Box 1015, Amherst, NH 03031.

SSB net enthusiasts will want a copy of the latest DX Net Guide from Dieter Konrad, OE2DYL. The Guide costs US \$3 or 9 IRCs (no checks) from Dieter at Rosengasse 1, A-5020 Salzburg, Austria.

Azimuth Communications offers several DX-related gifts. Their World Radio Sphere is a striking addition to any shack, with countries and CQ zones clearly

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1799	W8URM	1803	K5AOL
1800	NZ7D	1804	I1XOL
1801	JK1PCK	1805	XE1DU
1802	G4ASL		

CW

803	W4TYU	805	W2QUV
804	N7RO		

SSB Endorsements

320	ZL1AGO/324	310	W6SN/317
320	W3AZD/324	310	K9HOM/317
320	ZL3NS/324	310	W6NLG/316
320	N7RO/323	310	W6BCQ/315
320	W9SS/323	310	SM6CST/312
320	K9BWQ/323	310	WA9RCQ/310
320	T12HP/323	300	KZ4V/308
320	VE2WY/323	300	K9TI/306
320	CT1FL/322	275	T12JJP/298
320	YU1AB/321	275	KB7VD/294
320	KB8DB/321	275	NZ7D/285
320	KZ2P/320	275	W8URM/280
310	WA4ECA/319	275	CE7ZK/278
310	N2KW/318	275	XE1DU/277
310	W7FP/318	200	WA4OBZ/249
310	W4UW/318		

CW Endorsements

320	SM6CST/322	300	KZ4V/302
310	N2KW/315	275	K9TI/297
310	K9BWQ/312	275	N7RO/292
310	W6SN/310	275	K2JLA/281
310	WB4RUA/310	250	VE1RJ/255

Total number of active countries is 323. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

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MIXED

4009	YU2AA	2237	YT7DX	1718	SM6DHU	1290	YB0TK	1036	VE3NUP
3658	F9RM	2225	I8YRK	1682	W8UMR	1285	I0AOF	1020	YU1PJ
3564	K2VV	2217	I6SF	1680	K2POF	1276	YU7DR	1002	K9BQL
2978	YU2TW	2199	K9BG	1676	YU2TY	1242	JA6GWU	994	W9IAL
2959	VE3XN	2197	YU7BPQ	1666	WE2L	1241	YU1GR	987	ISZTC
2931	K6JG	2191	KA5W	1665	K9LJN	1238	K7CU	966	YU3PG
2888	EA2IA	2181	4X4FU	1653	W6OUL	1228	A16Z	960	K1BAZ/DV1
2784	W4BQY	2147	PY4OD	1646	WA1JMP	1224	NE6I	917	YB0EMJ
2758	N4NO	2147	YU2NA	1610	K2OLG	1203	YU7RU	903	W5ASP
2724	K6XP	2137	I1EEW	1564	K9QFR	1202	JA1WJ	858	IK2BHX
2720	N6JV	2102	N6CW	1560	I1WXY	1201	NV9S	823	W4USW
2656	PY1APS	2064	I2UIY	1557	YT7WW	1190	PY2DBU	816	N6IBP
2654	N4MM	2041	I2MQP	1545	YU2CQ	1187	VE7EIK	806	RB5MP
2648	W9DWO	2039	K5UR	1511	SM6CST	1184	F1HWB	798	JA7XBG
2612	WA8YTM	2025	HA0DU	1510	KB0G	1184	WB2YQH	797	F6CDJ
2592	YU1AB	1955	IT9QDS	1501	WB8ZRL	1172	DF4ZL	781	NJ1T
2527	N9AF	1940	HA8XX	1473	I2EOW	1166	LZ2JE	776	W4WKQ
2472	I2PJA	1912	W0SFU	1450	4N7ZZ	1158	WD9IIC	774	W6LC
2384	SM3EVR	1880	KF2O	1445	LA7JO	1157	K3UA	739	WK0B
2344	YU7BCD	1858	W2FXA	1402	AC2J	1147	K13L	734	YU7FT
2329	IT9TQH	1851	SM0AJU	1398	W9IL	1130	KS0Z	661	IK2BLA
2304	SM7TV	1850	KL7AF	1370	HA0IT	1126	WB3DNA	638	DL6UQ
2300	YU7SF	1790	W4UW	1351	VE1RJ	1115	I2EAY	638	5Z4BH
2264	N2AC	1755	N6JM	1338	GM4OBK	1105	NX9H	605	W9GCH
2243	PA0SNG	1740	I2DMK	1304	DF6EX	1098	5H3RB	600	VE3OMM
2242	IN3ANE	1737	N6AW	1293	YU3NU	1036	G4SDJ		

SSB

3589	F9RM	1876	YU7BCD	1424	PY4OD	1074	KB0C	875	NE6I
3383	I0ZV	1859	WA4QMQ	1402	AC2J	1072	I8LEL	862	KB0G
3054	K2VV	1805	KA5W	1400	KL7AF	1063	WA2FKF	850	IT9ONV
2927	ZL3NS	1801	WF4V	1397	LU8ESU	1059	I2WZX	806	K3UA
2691	VE1YX	1795	EA8AKN	1394	CT1BY	1044	K2POF	805	KB2DE
2669	K2POA	1787	ISZJK	1359	I2TZK	1041	K8LJG	798	KA0ZFX
2662	K6JG	1778	HA8XX	1356	KK0L	1029	YB3CEV	792	A16Z
2478	I2PJA	1757	I2UIY	1338	IK5ACO	1029	G4SDJ	765	KB4HU
2429	WD8MGO	1741	K5UR	1302	I1POR	1017	EA1AK	758	HR1FC
2420	K6XP	1712	W3ARK	1300	N6FX	1009	W6OUL	752	IK2AEQ
2415	N4MM	1676	EA3AQC	1284	YU7SF	1002	IK2DUU	750	K8MDU
2349	I0AMU	1673	W4UW	1268	KE6KT	1001	W3GXX	749	EA3FHT
2303	W0YDB	1671	YU2NA	1264	EA2AOM	997	IT9JKY	744	IK0EIM
2273	CT4NH	1646	G4CHP	1243	CT1AHU	995	IK7DBB	705	KF7RU
2169	I4ZSQ	1626	W9NUF	1234	K9LJN	989	WN5MBS	698	A41JV
2160	IT9TQH	1608	KF2O	1221	N2AC	989	KS0Z	697	A4XJV
2132	W4BQY	1590	CT1FL	1218	CX6BZ	959	WB6GFJ	696	IK7BDN
2118	OZ5EV	1572	EA4KK	1205	YV1CP	949	LU8DY	676	NM5Y
2110	N4NO	1543	WE2L	1195	AB9O	948	W5AWT	662	KA5YCM
2073	ZP5JCY	1535	K8KCI	1186	IK8GCS	940	K3IXD	650	I6KYL
2072	WA8YTM	1525	PY4OY	1184	F1HWB	934	I3ZSX	643	EA3EQT
2069	EA2IA	1524	K5RPC	1176	WB8ZRL	933	K8ZZU	631	KA5RNH
2030	I4CSP	1524	KD9OT	1174	HK6BER	925	N6CGB	630	SM6CST
1993	I2MQP	1521	KC8YM	1169	SM6DHU	915	WB6SRK	612	K1BAZ/DV1
1986	NJ0C	1507	CT4UW	1153	PY4VX	909	W5ILR	612	KA9MOM
1976	PA0SNG	1482	G4CPJ	1136	KC8CC	908	CT1DIZ	606	K2EEK
1965	I8YZP	1479	XE1OX	1106	IBWYD	904	KC2FC	605	TU2UI
1956	W9DWO	1474	I2EOW	1097	AG2K	891	K9BQL	602	K5HT
1933	I8YRK	1464	SM0AJU	1084	DK5WQ	883	GM4OBK		
1881	I1EEW	1453	K9QFR	1079	W0ULU	878	HA0IT		

CW

2903	K2VV	1611	K5UR	1274	SM0AJU	1096	DL2HBX	857	YU3PG
2779	WA2HZR	1609	W9NUF	1266	I7PXV	1088	HA8XX	845	NE6I
2726	ON4QX	1586	I1ZEU	1252	YU3NU	1078	AK9Z	838	JJ1FSK
2700	N6JV	1546	IT9VDQ	1250	G4MVA	1054	NF5Z	830	YU2GIJ
2412	N4NO	1528	KA7T	1247	W8IQ	1046	W5AWT	813	JA2GCW
2361	VE7CNE	1520	VE7DP	1238	G4SSH	1039	SM5DAC	803	W0JIE
2206	W3ARK	1517	DJ4XA	1234	KF2O	1036	K0BJ	762	YU1PJ
2199	K6JG	1515	N4YB	1208	W6OUL	1033	I2IWM	757	W9IAL
2169	W9DWO	1504	JH3CXL	1203	I8YRK	1024	NN4Q	754	K1BAZ/DV1
2169	W4BQY	1479	KA5W	1198	LA9XG	1008	HA5LZ	753	NJ1T
2166	EA2IA	1444	I2DMK	1194	OK1CZ	1004	OZ5UR	744	IS0FIC
2145	YU7SF	1410	YU2NA	1194	KB0G	993	VE4CE	714	PY4WS
2087	IT9TQH	1396	N6FX	1183	G3VOO	985	A16Z	704	K8UXO
2081	N2AC	1394	SM6CST	1181	YU2CQ	981	GM4OBK	700	WE2P
2042	I1YRL	1378	F6HKD	1177	G4UOL	965	I2EAY	699	IK2ECP
2034	K6XP	1374	I2UIY	1166	SM6AHU	938	K3UA	687	RB5MP
1965	I6SF	1371	K9LJN	1166	ZS6BCR	917	EA1AK	667	AH6JF
1953	WA8YTM	1349	KL7AF	1150	DJ1YH	907	N4RNR	666	W4UW
1933	4X4FU	1342	W9PWM	1134	N2AIF	904	I1EEW	646	JO1QUB
1868	YU7BCD	1334	K2POF	1128	HA0IT	903	VS6UW	623	WB5MTV
1857	LZ1XL	1322	VE1ACK	1127	EA7OH	878	N4IR	604	NU7V
1848	PY4OD	1307	T14SU	1126	G3EZZ	878	WB8ZRL	603	KA9EZM
1752	N4MM	1285	W1WAI	1123	K8LJG	869	KA1CLV	600	4X6DX
1630	VO1AW								



Mauro Pregliasco, 1I1JQJ, earned 5 Band Worked All Zones by finally catching a Zone 1 station on 80 meters, after seven years of trying! Mauro is an avid award chaser, with 5BDXCC, IOTA, Oblasts, and many more DX achievements.

marked on the crystal acrylic sphere. Azimuth also offers QSL Awards Libraries, to save and protect those rare DX QSL cards. Libraries are available for DXCC, Worked All Zones, and WAS. To order call 800-882-7388.

And a subscription to a DX publication is a gift that benefits the recipient all year. My personal favorite is *The DX Magazine*, \$15/year from Box 50, Fulton, CA 95439 (707-523-1001), but that may be because I publish it.

Season's Greetings

As the holiday season approaches, DXers may wish to add a personal note to their DX contacts by sharing season's greetings in the DX station's native language. Ralph Hirsch, K1RH, and others offer these greetings:

Spanish—Felices Navidades y Felix Ano Nuevo.

Russian—Rojestvom Christvom e Novom Godom.

German—Frohe Weihnachten und Frohes Neues Jahr

French—Joyeux Noel et Bonne Anne

Ukranian—Rojestvom Christvom e Novom Hodom.

Czechoslovakian—Pekne Radostne Vanocle vse Nejlepsi Donoveho Roku 91.

Finnish—Hvyaaaa Joulua, Onnellista Vuitta (send the aa's as a single CW character).

Swedish—God Jul, Gott Nyttar.

Norwegian—God Jul, Godt Nyttar.

Dutch—Prettige Kerstadgen, Zalig Nieuwjaar.

Yugoslavian—Veseo Bozic, Sretnu Novu Godinu.

Hungarian—Vidam Karacsonyt, Bol-dog Ujevet.

Happy holidays to all, and good DX in 1991!

73, Chod, VP2ML



From left, DL7AFV, 9K2DR (operator at 7O1AA), Y22XO, 9K2SJ, F6DYG, DJ9ZB, and DK2OC, before the invasion of Kuwait. (DJ9ZB photo)

QSL Notes

5Z4MR QSLs via D.R. Raicha, P.O. Box 898, Kisumu, Kenya.

The recent Oblast 141 UA9G DXpedition, with calls UA9G/UZ9FXA, UA9G/UA9FLZ, UA9G/UA9FBM, and UA9G/UA9FHT can be confirmed via Max Hur-ov, UA9FLZ, Box 230, Berezniki 618418 USSR.

The recent ZK1XY operation from the North Cook Islands should be confirmed via Kiyoko, P.O. Box 3, Tokaimura 31911

Japan, and not via W0RLX. As with most ZK1X calls, ZK1XY has been reissued since 1987.

AT0T has also be reissued. K3ZO can confirm Tom Warren's QSOs using that call, before 1988. QSL 1989 ATT QSOs to W8XM, and later ones direct to VU2TTC, the current holder of ATT.

Fred Laun, K3ZO, also reports lots of "broken" calls from Tom's 5H3TW dit-filled callsign. HH3TW, 5S3TW, HS3TW, etc., are all 5H3TW. Tom's contest call of 5H0T is also 'broken' as HH0T, HS0T, etc.

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QSL Information

3C1EA to EA4CJA
3D2JH to KF7PG
3X1AU to ON6BV
4K#ADS to RW3AH
4K3BB to RB5CB
4K40Q to RA1QQ
4S7CF to 9V1JY
4U1TU to F1JTL
5U7FF to F6FNU
5Z4BI to W4FRU
5Z4RO to KB4EKY
6W1QB to DK3NP
7J7AAU to K3EST
7P8EN/P to ZS5BK
7Q7LA to G0IAS
7Q7RM to K6KII
7Q7XB to LA7XB
7X2CR to IS0LYN
7Z1AB to WB2WOW
8P9HR to K4BAI
9H1FBS to N5APW
9J2FR to I2ZZU
9L1US to WA8JOC
9Q5TE to SM0BFJ
9Q5UN to OH3GZ
9X5HG to DJ3FW
A25AL to G4RUL

A41JV to KJ4GK
AA6LF/KHS to AA6LF
BV2DA to DL7FT
CE7/F2JD to F6AJA
CR1BI to CT1CQK
CR7CWT to CT1CWT
CS9M to DL9XY
CT0B to CT1CWT
EK#AK to UA0KCL
EK#AQ to UA9OBA
FM5WD to W3HNK
FO#IGS to F6EEY
FO4NR to F8ELE
FT4XG to FD1AAS
FW#DD to FK8DD
FW#ET to FK8DD
FY5FP to ON4ZD
FY5YE to W5JLU
GB5SH to GM3YOR
GW/KG9KAN to KG9KAN
GX#IPX to G3ZQS
GX4GT to G3VQO
HB#HB9NL to HB9NL
H18A to JA5DQH
HL9EP to K0VZR
HS#AC to NY2E
HZ1AB to K8PYD

IS8A to IK8HVJ
IZ4CR to IK4JOF
J28NU to F6FNU
J39BS to WB2LCH
JA7FTJ/JD2 to JA7BIJ
JW9MAA to LA7SP
K1RH/1J5 to K1RH
K9EL/VS6 to K9EL
KA3HMS/KH3 to KA3HMS
KC6GV to LA2GV
LR5A to LU8DPM
OD5PL to HB9CRV
OJ#OH2AQ to OH2BVF
OM6#ARDF to OK3MCF
OM7CQR to K3CQR
OY1R to W2KF
P29PL to VK9NS
PA#GAM/ST2 to PA0GIN
PQ5C to PY5CC
RH8AD to UA9AB
RQ9W to UQ1GWW
RY3D/RB5GW to RB5GW
S79X to JA1ARF
ST2/G4WYG to G4OHX
SV#HS to DJ8MT
SV5/OE4BKU to OE4BKU

SV8/I5DCE to I5DCE
SV9/KN8B to K8CW
TG9GI to I0WDX
TR88Y to FF6KGU
TU2OW to F2CW
TU2UI to WA8ZWR
TV1EAB to F1RR
TW2X to F2VX
UA#XAO to UA1DJ
UB5UT/UB6 to UB5UT
UI2U/UZ3YWB to RA3YF
UI9BWF to UA9AB
V47NXX to KB2XR
V63AN to JA2NOG
V73BL to WB4CSK
VP2V/W9VNE to W9VNE
VP8BX to W9ARV
VP9/W1NU to W1NU
VQ9RB to WA4DPU
VS6CM to W0JLC
VS6WU to G0AEO
XE1VIC to KV8U
XT2BW to WB2YQH
XX9XJ to K6JJE
YJ#AMH to KF7PG
YJ8AB to KC4MJ

YL75ID to UQ1GWW
YT9AA to YT3AA
YU9#AA to YU2AA
YU9#TW to YU2TW
YZ9BS to YU2AKL
ZD8CUE to G4ZVJ
ZD98V to W4FRU
ZF2NE/ZF8 to W5ASP
ZK1XK to AA7AF
ZM7AMO to ZL1AMO
ZS1/DL8CM to DL8CM
A41KV to P.O. Box 5616, Muscat, Oman
AH9A/KC6 to Annabel K. Lyman, 523 Punaa, Kailua HI, 96734
AP2AU to Box 224, Lahore
BV2TA to Box 112/16, Taipei
BY4CPA to Box 082-013, Shanghai, PRC
BY4RB to Box 413, Zhenjiang
BZ1AJ to Box 6106-7, Beijing
CE#ZCD to Box 1972, Valparaiso 1, Chile
HR10DA to Box 2299, Tegucigalpa

J73WA to 1430 Rodney St., Portsmouth, Dominica
JY9SR to Ray Shankweiler, Sr., Box 354, Amman, Jordan
PZ1DY to Box 9131, Paramaribo
TG9YV to Box 362, Guatemala City
TJ1RK to Bob Kellogg, Yaounde-DOS, Washington, DC 20521-252
UH1E/UA9SAW to Box 13, Gaj, 462630
V51P to Box 9080, Windhoek, Namibia
VK#CH to GPO Box 52, Canberra 2601, Australia
WB7ALP/J3 to Dennis Bradshaw, 325 Glebe St., Sauteurs, St. Patri
ZD7SM to Box 86, St. Helena
ZD8LII to Box 2, Ascension Island
ZS8MI to Gerard Everett, P.O. Box 13077, Jacobs 4026, Natal

The recent **XU8DX** operation should be confirmed via Sin Onizawa, JA1NUT, at his new address: 200-9 Naka Mohka City, Tochigi, Japan, with US \$1.00 or two IRCs. K4DSE reports getting his XU8DX cards in 12 days round trip—excellent service!

VS6WO's QSL manager is K9EK, not K9EC.

Harry, **HL9RY**, notes his Callbook address is incorrect. QSL via his home call: KG5EG, 3101 Breckenridge Drive West, Colorado Springs, CO 80906.

7X3DA is Djoudi Abdelhamid, Av. des Freres Menaouar, Lot Bouameur 03000, Laghouai, Algeria.

Ray, **W5EW**, reports that the **VK9EW** and **VK9WB** Cocos Keeling QSL cards are in the mail.

Serge Morozov, **UB5QMO**, says that he hasn't received any cards via the bureau in 1990. You might consider QSLing direct to P.O. Box 33, Melitopol, 332312, Ukraine, USSR.

TI4SU, QSL manager of the Radio Club de Costa Rica, reminds DXers that the

bureau cannot forward cards for TI amateurs who have QSL managers outside Costa Rica. Check QSL manager lists before sending your cards via the TI bureau. For example, QSL **TI2CF** and **TI1C** via **W3HNK**; **TI2LTA**, **TE1L**, **TI2L**, and **TI1J** to **K1AR**; **TI2JJP** via **I0WDX**; and **TI8CBT**, **TI88M**, and **TI9M** via **N4THW**. Cards for **TI10E** (**TI4SU**) and **TE81P** (**TI0RC**) can be sent via the TI bureau.

VP2EXX's QSL manager, **KC8JH**, has a new address: Greg Lee, 15290 Hannon Terrace Road, Crown City, OH 45623.



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Model	Description	Price
ST144-28	2m Transverter	\$259.00
ST220-28	220MHz Transverter	\$259.00
WJ-100	2 water cooling jackets with rubber gaskets for 7289 and 7815R tubes	\$20.00
2-way Coaxial Power Dividers (N-connectors)		
SPD2-144/432N	2m/70cm	\$49.00
SPD2-220N	220MHz	\$49.00
SPD2-902N	33cm (902-928MHz)	\$49.00
SPD2-432/1296N	70cm/23cm	\$49.00
6 foot Coaxial (RG213) Jumper Cables		
SJU-NM-NM	N-Male : N-Male	\$30.00
SJU-NM-NF	N-Male : N-Female	\$30.00
SJU-NM-UM	N-Male : UHF-Male	\$30.00
SJU-UM-UM	UHF-Male : UHF-Male	\$30.00

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MODEL VS-50M

SL SERIES

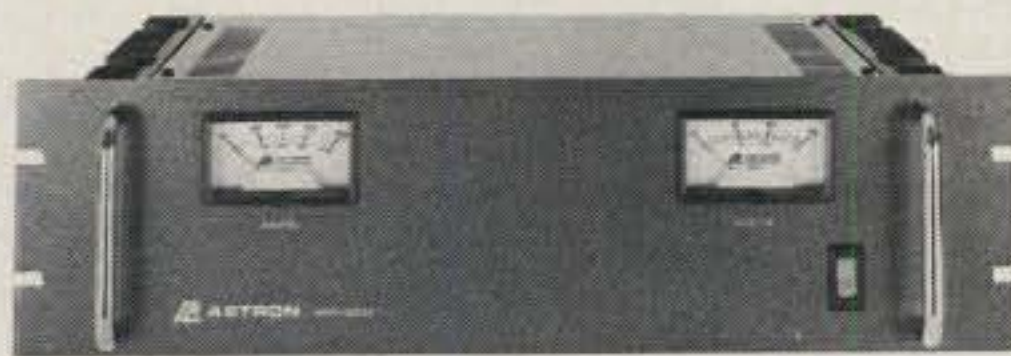


MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
SL-11A	•	•	7	11	2 3/4 x 7 5/8 x 9 3/4	11

RS-L SERIES



MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-4L	3	4	3 1/2 x 6 1/8 x 7 1/4	6
RS-5L	4	5	3 1/2 x 6 1/8 x 7 1/4	7



RM SERIES

MODEL RM-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RM-12A	9	12	5 1/4 x 19 x 8 1/4	16
RM-35A	25	35	5 1/4 x 19 x 12 1/2	38
RM-50A	37	50	5 1/4 x 19 x 12 1/2	50
RM-60A	50	55	7 x 19 x 12 1/2	60
RM-12M	9	12	5 1/4 x 19 x 8 1/4	16
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50
RM-60M	50	55	7 x 19 x 12 1/2	60

RS-A SERIES



MODEL RS-7A

MODEL	Colors		Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-3A		•	2.5	3	3 x 4 3/4 x 5 3/4	4
RS-4A	•	•	3	4	3 3/4 x 6 1/2 x 9	5
RS-5A		•	4	5	3 1/2 x 6 1/8 x 7 1/4	7
RS-7A	•	•	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	•	•	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	•	•	9	12	4 1/2 x 8 x 9	13
RS-12B	•	•	9	12	4 x 7 1/2 x 10 3/4	13
RS-20A	•	•	16	20	5 x 9 x 10 1/2	18
RS-35A	•	•	25	35	5 x 11 x 11	27
RS-50A	•	•	37	50	6 x 13 3/4 x 11	46

RS-M SERIES



MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt. (lbs.)
RS-12M	9	12	4 1/2 x 8 x 9	13
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46

VS-M AND VRM-M SERIES



MODEL VS-35M

MODEL	Continuous Duty (Amps)			ICS* (Amps) @13.8V	Size (IN) H x W x D	Shipping Wt. (lbs.)
	@13.8VDC	@10VDC	@5VDC			
VS-12M	9	5	2	12	4 1/2 x 8 x 9	13
VS-20M	16	9	4	20	5 x 9 x 10 1/2	20
VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13 3/4 x 11	46
VRM-35M	25	15	7	35	5 1/4 x 19 x 12 1/2	38
VRM-50M	37	22	10	50	5 1/4 x 19 x 12 1/2	50

RS-S SERIES



MODEL RS-12S

MODEL	Colors		Continuous Duty (Amps)	ICS* Amps	Size (IN) H x W x D	Shipping Wt. (lbs.)
	Gray	Black				
RS-7S	•	•	5	7	4 x 7 1/2 x 10 3/4	10
RS-10S	•	•	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-12S	•	•	9	12	4 1/2 x 8 x 9	13
RS-20S	•	•	16	20	5 x 9 x 10 1/2	18

1990 CQ WPX CW Contest High-Claimed Scores

The following scores are early-bird high-claimed scores as of 7 September 1990. These are raw scores subject to verification.

UNITED STATES SINGLE OPERATOR ALL BAND

KT3Y	2,616,302
WW4T	2,554,408
K3ZO	2,467,829
KZ2S	2,377,002
NI6W	1,810,171
W2SC	1,703,365
KQ8M	1,549,978
KØRF	1,499,850
KE2PF	1,448,450
N6TV	1,346,834
KW8N	1,340,998
K7UP	1,313,690
KI3V/7	1,109,676
K2PS	1,053,085
K4PQL	1,047,284
N5RZ	1,024,712
WØCG	975,244
NR2H	755,298
N6EK	736,404
AA3B	678,798
KC7V	629,612
W8IQ	499,369
WF5E	481,536
KMØL	479,576
K5ZD/3	402,827

28 MHz

K5RX	43,262
KM5R	22,940
NVØP	2,160

21 MHz

N3GB	784,123
WB2Q	675,906
WN4KKN/5	655,939
NR5M	378,798
NM9H	321,597
N6MU	223,776
K9ZO	184,608

14 MHz

W5FO	847,867
KC2X	797,475
NØBSH/9	402,166
KI6EZ	310,288
NS2K	278,168
NX7K	185,949

7 MHz

NQ2D	1,012,780
K1ZZI	719,280
NW6N	470,304

WU7Q	252,900
WA7FAB	201,042
KV8Q	144,000
W3BGN	131,274
W7CB	113,364

1.8 MHz

K1ZM	4,784
------	-------

QRP/p

N3RS	A	493,427
N7IR	A	144,675
AB4LX	A	116,812
WA3LFY	21	43,952
K9OSH	14	30,800
AA6XX	7	33,600

MULTI-OPERATOR SINGLE TRANSMITTER

WZ6Z	2,872,272
WC4E	2,837,200
N3BB	2,059,489
W1FEA	1,579,200
KS9O	1,235,103
N7TT	961,051
NF8R	655,018
KRØU	339,448
AA4GA	313,626
AA6OG	247,884

MULTI-OPERATOR MULTI-TRANSMITTER

AC6T	2,887,872
NJ8G	1,690,024

DX SINGLE OPERATOR ALL BAND

ZW5B	7,704,720
LR4F	6,787,374
AH3C	4,047,610
YT3AA	3,002,076
GB8FX	2,994,498
TW2C	2,828,908
KE9A/DU3	2,664,014
K3JXO/LU	2,428,794
YU7AV	2,122,220
VU2NBT	2,122,050
CU3AA	1,984,682
XX9TDM	1,930,578
LY3BP	1,892,080
YU3EO	1,789,684
GM4OBK	1,688,005
EX3A	1,606,984
HA1XR	1,548,666
FT5XA	1,524,864
GB6MX	1,478,598
ZF2PF	1,342,656
ZC4CZ	1,295,952

9V1YC	1,273,266
JH7WKO	1,260,042
DK3GI	1,247,780
JG3KIV	1,141,418
JR1IJV	1,111,755
GBØWPX	1,111,548
JH2UVL	1,104,354

28 MHz

YV3A	1,690,383
CT1AHU	655,131
JY9SR	402,384
IR9ITU	387,686
PY1CE	362,872
3W6PY	243,216
YU2MM	138,073

21 MHz

4N3E	3,239,453
ZM3GO	3,192,588
KG6DX	1,720,992
VP2VDX	1,249,563
LU1ICX	1,039,125
IO3JVW	649,702
HYØP	580,168
LZ2TU	426,465
JP1DMX/HI8	416,118

14 MHz

9J2AL	1,333,724
YT3M	1,229,977
JA1YFG	1,174,383
YT3T	1,092,212
JE3ZFS	819,425
VD7C	786,210
ZY5AKW	743,163
UY5EG	687,493
VE7NTT	651,000
SV1RP/SV2	426,422
EA2IF	406,410

7 MHz

V73AS	1,793,840
UA2FJ	1,324,568
YT2R	1,146,780
HWØA	865,592
UZ6LZL	632,596
LU1FTC	565,976
UB5MNM	392,182
JHØZHQ	265,780
JA2EU	252,648
LY2BNZ	223,730

3.5 MHz

4N1A	385,890
ES5RY	268,370
LZ2WF	257,544
YU2WV	234,923
YT4T	205,282
VE6OU/3	153,912
LZ5R	101,258

1.8 MHz

OK5TOP	68,730
OL8CUT	31,200
OK1DRU	24,768
OK1DWJ	23,862
OL7BTG	8,640

QRP/p

DL4YBM	A	303,104
SM5CCT	A	204,982
5Z4FO	A	191,600
FBØX	A	184,050
4F3BAA	28	128,856
ZY2ORF	28	78,120
DJ4SB	21	38,624
OK2SBL	21	27,492
JA3CCX	14	25,080
OK1HR	14	24,500
OK2BOX	7	98,196
OK2BXR	3.5	32,264

MULTI-OPERATOR SINGLE TRANSMITTER

YM5KA	13,098,790
P43GR	11,032,216
LR5A	8,716,291
LZ9A	8,032,400
8P9AQ	7,807,338
J49BDX	4,947,075
TQ5A	4,574,493
T77C	3,668,760
YBØZAA	3,561,495
GJØLYP	3,445,820
I2VXJ	3,309,510
US1A	3,050,910
OK3RKA	2,910,672
LT5F	2,860,578
RZ6AXO	2,745,160
HGØX	2,701,842
4U5ITU	2,690,496
FV1O	2,369,954
OK3KFF	2,142,132
LY2WW	2,113,120
SX5AA	1,769,337
JA8YBY	1,753,872

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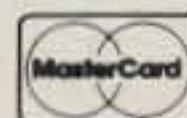
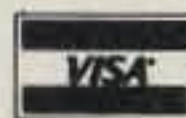
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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Printed Material—Part II of IV

Here is the second segment of this four-part article. Each segment includes data which is helpful to newer amateurs.

DX-World-Guide. Franz Langner, DJ9ZB, is a CQ DX Hall of Fame member. His guide contains 360 pages and more than 1000 pictures, plus all the information you need to effectively work DX. The price is \$25 prepaid. The address is DX-World-Guide, P.O. Box 1128, D-7570, Baden-Baden, West Germany. All text is in English and German.

EEB Catalog. The 42-page 1990 Electronic Equipment Bank catalog is primarily of interest to shortwave listeners. It lists a wide variety of SWL receivers, antennas, and accessories. It includes basic data about the fascinating hobby of shortwave listening. The theory coverage is also of interest to new amateurs. In this catalog 72 communications-related books are advertised. In addition to SWL equipment EEB markets communication equipment for amateur radio, aviation, commercial, government, and marine customers. The 1990 EEB Shortwave Catalog can be obtained by writing to EEB, 323 Mill Street NE, Vienna, VA 22180. Purchase orders may be telephoned to 800-368-3270. The number to use when calling for information is 703-938-3350.

A free reprint of my 18-page SWL introductory article will be sent to anyone who requests it and sends a self-addressed stamped envelope with triple first-class postage (65¢) attached.

Electronic Surplus. One of my favorite sources of electronic surplus items has long been Fair Radio Sales Company. Their current catalog (WS-90) is 36 pages long and is filled with items amateur radio operators can use. Their mailing address is P.O. Box 1105, 1016 East Eureka Street, Lima, OH 45802.

Electro Review. If you are an experimenter who needs to know about new components, I advise you to request a free subscription to *Electro Review*. This new bi-monthly publication is produced by TIDS (Technical Information Distribution Service), 866 Godwin Avenue, Midland Park, NJ 07432.

Foreign Airmail Postage. William Plum is a supplier of foreign postage stamps you can attach to self-addressed



This young lady is Keiko Shirota, JH1PVT, of Kanagawa, Japan. My wife (Marie, W6JEP) and I recently enjoyed contacts with her in the 15 meter Novice band.

envelopes being sent with QSL cards to DX amateurs worked on the air. This is an effective way to obtain desired DX cards. If you want information about what he has available, write to him at 12 Glenn Road, Flemington, NJ 08822. Send a business-size (#10) self-addressed, stamped envelope with your request.

Fox Tango Newsletters. If you own Yaesu equipment manufactured during 1972 through 1985, these newsletters may be of interest to you. They are filled with useful information about modifying, operating, and troubleshooting Yaesu gear. A 1976-1985 index is available at \$4; it can be used to select specific desired issues. A complete 14-year set of these newsletters costs \$49, postpaid. The address is Fox Tango Corporation, 747 South Macedo Boulevard, Port St. Lucie, FL 34983 (phone 1-407-879-6868).

Frequency Directories. CRB Research offers a free catalog of frequency directories covering aeronautical, broadcast (SW/MW/FM), government, maritime, military, police, press, spy, and utility frequencies. Their address is Box 56, Commack, NY 11725.

Fundserv Beam Headings. An unfolded NLQ printout of worldwide DX beam headings (customized to your location) costs \$7 from Fundserv, 1546B Peaceful Lane, Clearwater, FL 34616.

Gilfer Catalog. A superb source of shortwave receivers, books, antennas, cables, and RF connectors is Gilfer, 52 Park Avenue, Park Ridge, NJ 07656. Their 24-page catalog also includes eleven amateur radio publications and two transceivers which are available at re-

duced prices. The variety of available radios includes hand-held and vehicle receivers, all being sold below their list prices. Receivers range from low price to very expensive. Accessory items are included in the catalog's coverage. Gilfer sells a pair of books which are suitable reading for beginning amateurs and shortwave listeners. The original one is *Radio Receiver—Chance or Choice*. The updated version is *More Radio Receiver—Chance or Choice*. Either book sells at \$14.95 ppd, whereas the combination of books sells at \$21.50 ppd. This pair of books enables you to compare the latest receivers with their immediate predecessors. These books contain good explanations of all technical fundamentals you must know to achieve optimum receiver performance.

The May through October 1982 issues of CQ contain my article about shortwave listening. Reprints can be purchased at \$2.50 each from CQ Communications, 76 North Broadway, Hicksville, NY 11801. A copy of my related licensing-course handout is available at no charge to anyone who requests one and encloses a self-addressed envelope with triple first-class postage attached. The envelope has to be at least 10 by 12 inches, and it should be sent to my California address. Shortwave listening has provided the doorway to amateur radio for many people. It is an excellent adjunct to amateur radio.

Green Stamps. DX stations often advise other operators to send a green stamp to their home (DX) mailing address to get a QSL. A green stamp is a U.S.A. \$1.00 bill. Sending a dollar bill via international mail is a risky way to solicit a DX QSL card; however, it is also the fastest and most effective way to get a DX QSL. DX amateurs are unlikely to keep your greenbacks without sending their cards.

Students ask me to explain why they are asked to pay for the DX QSL, whereas their card is sent free to the DX operator. The answer is simple; we want (need) the DX QSL, whereas the DX amateur probably does not want (or need) our cards. This is particularly true in any case where a DX amateur is operating from a rarely heard location. Our \$1.00 covers costs of the DX QSL, the envelope, and postage; it leaves very little change to spare. In most countries a greenback is easier to use than a check, money order, or an International Reply Coupon (IRC). The green

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

stamp is usually less expensive than other payment methods.

Be careful to send green stamps only to amateurs in countries which allow their citizens to possess foreign currency, which is less than half of the countries in the world. Fines and/or jail sentences can be meted out to amateurs receiving greenbacks in countries which do not allow their citizens to have foreign currency. I remember an extremely rare DX operator being fined and put off the air because he received greenbacks with QSL requests, even though he never requested them.

Brian Treadwell, WV4V, offers an excellent printed guide detailing the proper use of greenbacks. His Green Stamp Guide includes an alphabetical list of the countries which allow their citizens to possess greenbacks. Every new amateur should obtain a copy of Brian's guide and should follow his excellent advice. The Green Stamp Guide price is \$2.45 ppd per copy. The ordering address is Brian W. Treadwell, WV4V, DX QSL Associates, 434 Blair Road N.W., Vienna, VA 22180.

Brian offers other services to DX enthusiasts. These include airmail postage stamps of 211 DX countries, European size (11 by 16 cm) airmail envelopes, blank (fill-in) QSL cards for DX station use, and ARRL incoming DX QSL bureau 5 by 7 1/2 inch envelopes. Send an SASE with your request for information.

As previously stated, sending a green stamp usually results in the receipt of a card from a DX station you have contacted. Sending a self-addressed envelope with the DX amateur's postage stamps attached is another effective way to get desired DX cards. Brian can supply both the envelopes and the foreign stamps which are required to use this system.

There are many DX locations which are not served by the ARRL QSL bureau. QST occasionally publishes a list of such countries. The best way to get cards from these countries is to send green stamps or self-addressed and stamped (DX postage) envelopes.

Do not show the DX amateur's callsign (or your own) on your outgoing envelope. Do not use commemorative stamps on your envelope.

Grove Enterprises. Grove publishes a 36-page catalog covering shortwave listening (SWL) equipment and accessories. This outfit also has a variety of helpful SWL publications which should be of interest to amateurs with equipment which enables them to listen outside the amateur bands. Bob Grove, WA4PYQ, sells a 258-page shortwave directory which covers stations operating between 10 kiloHertz and 30 megaHertz. The address for Grove Enterprises is P.O. Box 98, 140 Dog Branch Road, Brasstown, NC 28902.

Hallicrafters Service Manuals. Ardco Electronics has manuals for Hallicrafters amateur and SWL equipment. Write for price, specifying model number. Their address is P.O. Box 95, Berwyn, IL 60402.

Ham Radio Classifieds. This publication is issued every other Friday. A six-month domestic subscription costs \$8. The address is 880 Vista Drive, McKinleyville, Ca 95521. Their toll-free telephone number is 1-800-782-3131. They are open from 8 AM to 5 PM (Pacific time) Monday through Friday. They accept Visa and MasterCard.

Ham Radio Outlet Catalog. The 72-page Ham Radio Outlet Spring 1990 Communication Equipment Catalog is priced at \$2.00. Item prices are not shown because they change frequently, but they can be jobtained immediately by calling one of the four HRO toll-free 800-series telephone numbers. Equipment features are presented in tabular form, which enables you to easily compare items. This is an extremely useful catalog. The address is Ham Radio Outlet, 2620 West La Palma Avenue, Anaheim, CA 92801. Their toll-free telephone numbers are 1-800-444-0047 (New England),

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Ham Trader Yellow Sheets. "HTYS" is published twice each month and it is sent by first-class mail to subscribers. "HTYS" has existed for almost 30 years. A sample issue will be sent to anyone who requests it and provides a business-size (#10) self-addressed envelope with first-class postage (25 cents) attached. Subscriptions cost \$15 per year. Two addresses exist for "HTYS." One address is P.O. Box 15142, Seattle, WA 98115. The other address is P.O. Box 2057, Glen Ellyn, IL 60138.

HF Mobile Manual. Don Johnson, W6AAQ, sells a 112-page scrapbook filled with high-frequency mobile station installation and operation data. The prepaid price is \$10 per copy. The address is 809 Capay Street, Box 595, Esparto, CA 95627. Don has acquired a wealth of knowledge during his 40-plus years of mobiling, and his book reflects his clear understanding of this fun aspect of amateur radio. The title of his book is *A HF Mobile Antenna Compendium*.

Hi-Tech Trader. The "Hi-Tech Trader" is published twice monthly, and the domestic annual subscription rate is \$13.

A single sample issue is available free to anyone who requests one and sends an SASE. It covers amateur-radio-related equipment and services. The address is Hi-Tech Trader, P.O. Box 1152, Norwalk, CA 90651-1152.

ICOM Literature. If you want information about ICOM equipment, you can request it by calling their toll-free number, which is 800-999-9877. Your call will be answered by a machine. Be ready to state your name, address, callsign (if any), mailing address, and the ICOM equipment for which you want literature. Each request is filled within one working day.

INDEXA. The International DX Association publishes a helpful newsletter covering current DX activities. Data can be requested from INDEXA, Box 607, Rock Hill, SC 29731. Their annual membership fee is \$12.

Information Unlimited Catalog. The 25th issue of Information Unlimited's catalog is 24 pages long. Its title is "The Complete Catalog of Amazing and Fascinating Devices." That is an accurate title for this catalog of kits, plans, and products. Items advertised in this catalog include books, burning/cutting lasers, electronic defense weapons, electronic/sci-

entific devices (for use by experimenters, hobbyists, laboratories, researchers, and schools/colleges), FM wireless/security devices, high-power pulsed magnetic guns/launchers, night viewing devices, parts, pest/animal-control devices, plans (kits), plasma/ions/high-voltage devices (including plasma globes and rods), property/personal-protection devices, Tesla coils/accessories, ultrasonic/sonic devices, and visible light lasers. The mailing address is Information Unlimited, Box 716, Amherst, NH 03031. Their inquiries telephone number is 803-673-4730.

International Radio and Computers Catalog. This 16-page catalog is available at 65 cents from International Radio and Computers, 751 South Macedo Boulevard, Port St. Lucie, FL 34983. It covers filters for use in amateur radio equipment produced by most of our manufacturers. Their telephone number is 1-407-879-6868.

This completes the second part of this four-part article. The subsequent segments will provide additional useful information.

Scout Gathering In Australia

Peter Hughes, VK6HU, is the organizer of station VK3SWM activities to be held 29 December 1990 to 8 January 1991. This activity is part of the 8th World Moot 1990/91. A Moot is a gathering of 18- to 25-year-old Scouts. This Moot will be held at Gilwell, Gembrook in the Dandenong Range East of Melbourne, Australia. Gilwell is a wood badge training center for Scout leaders in Victoria. Two HF rigs will be operated around the clock every day. Worldwide Scout calling frequencies will be used; these are 14.29, 21.36, and 28.99 MHz. Schedules can be arranged by writing to Peter Hughes, VK6HU, 58 Preston Street, COMO 6152, Western Australia. If you want to contact a Scout (or group) attending the Moot, identify your desired contact in your schedule request. Your schedule request must include the date, frequency, time (UTC), and your station's callsign.

The American 15 meter Novice band will be included in this Scout activity. Listen for VK3SWM on 21,190 kHz starting at 0300 UTC from 30 December 1990 through 7 January 1991. Move up to the top end of the 15 meter Novice band and enjoy a few contacts with the DX stations operating on voice in that segment. It is legal for you to listen to voice transmissions and to transmit replies on code. Such cross-mode contacts provide another interesting facet of amateur radio. It is important to start making contacts with VK3SWM as soon as possible after 0300 UTC. If they make no contacts within the first ten minutes, they will operate elsewhere.

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TS-680S HF Plus 6m Xcvr	1149.95	Call \$
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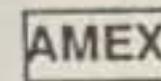
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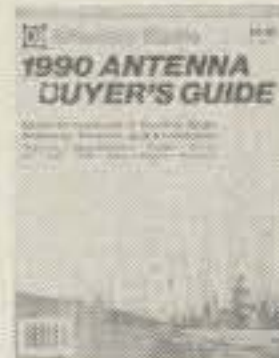
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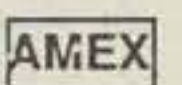
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REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Amateur Operator License Requirements

John B. Johnston, W3BE, Chief of the FCC's Personal Radio Branch, Washington, DC, recently made a presentation before the East Coast ARRL Educational Workshop in Gaithersburg, Maryland. His subject was the rules and regulations governing licensing in the amateur service. Johnston is the FCC official responsible for overseeing our amateur service. We used some of the data he presented in preparing this column.

There are two basic documents governing the amateur service in the United States. These are the International Radio Regulations and the Communications Act of 1934. Article 32 of the international Radio Regulations furnishes the general guidelines for amateur radio throughout the world. The Communications Act specifically applies to amateur radio in the United States. The amateur rules are primarily contained in Part 97 of the Communications Act.

International Regulations

Since radio waves do not respect national boundaries, governments enact and enforce radio laws and regulations within a framework of international agreements, both regional and worldwide in scope. The International Telecommunication Union (ITU), a specialized agency of the United Nations, consists of delegations representing more than 150 different countries. Once ratified, their collective agreements carry international treaty status.

The ITU got its start in Europe in 1865 as the International Telegraph Union to expedite message handling across national borders. Telephone was added in 1885; radio in 1906. The first ITU frequency allocations were made in 1927. It was renamed the International Telecommunication Union in 1932 to reflect its expanded responsibilities. Its most important function is the allocation of radio frequencies to eliminate harmful interference between nations or different countries.

The spectrum allocation process consists of dividing the spectrum into a number of segments or bands taking into consideration the behavior of radio waves at

different frequencies. The ITU allocation plan separates the world into three geographical regions. Our hemisphere is in Region 2. Transmitting stations are required to identify at regular intervals as an aid to enforcement of radio law. The first characters of the callsign indicate the country in which the station is authorized to operate. The United States is assigned AAA-ALZ, NAA-NZZ, and WAA-WZZ.

Radio operations are classified into services according to the nature and purpose of the transmission. Amateur radio comes under the Amateur Service and is defined in RR1-7. ITU Radio Regulation Article 1, Section 7 says amateur radio is a radiocommunication service of self-training, intercommunication, and technical investigation carried on by authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

The Amateur-Satellite Service is also provided for as a separate "... service using space stations on earth satellites for the same purposes as those of the amateur service." The amateur services have more frequency bands assigned to them than any other, which allows a wide range of experimentation at different radio-wave propagation characteristics.

Amateur Radio Requirements

RR32-I (ITU Radio Regulation Article 32, Section I) provides the general guidelines under which all amateur services throughout the world may operate. Although there is an escape clause, the international law requires amateur radio communications to be in plain language and not used as a replacement to existing public telecommunications services.

While no nation is required to even have an amateur service, most do. They unite under a federation called the International Amateur Radio Union made up of the amateur services existing in 123 different countries. The IARU enjoys Official Observer status at the ITU, where it is considered as the international representative of amateur radio.

The regulations prohibit message handling on behalf of others. The escape clause (paragraph 2734), however, permits changes in these policies by special arrangement of the countries concerned.

The United States, of course, does permit third-party traffic under certain circumstances. While digital and other fancy mode transmissions may not be considered plain language, they are also allowed under this paragraph.

International Licensing Requirements

Paragraphs 2735 and 2736 of the Radio Regulations cover the licensing guidelines, and there are certainly not many. Even then the criteria is subject to wide interpretation by the various administrations. Basically, the ITU nations have agreed that while amateur radio operators must be knowledgeable in the international Morse code, this requirement may be waived "... in the case of stations making use exclusively of frequencies above 30 MHz."

Most major countries of the world now permit no-code hamming at the VHF and higher frequency level. It appears that the United States will also soon be joining them! The FCC is currently considering adopting the codeless VHF/UHF Communicator class. In fact, we expect the FCC to announce their decision on the matter any day now!

Japan even allows low-power amateur radio operation below 30 MHz without code knowledge on the basis that it doesn't cause interference. Another loop hole in the international law permits administrations to bypass the radio regulations as long as their is no interference to properly operating stations. Reportedly, many other countries officially require telegraphy knowledge, but in practice look the other way at licensing time.

The international law requires a nation to "... take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station." Paragraph 2737 says the privileges attained should relate to any determined proficiency level.

The regulations leave it to the various ITU countries to determine what constitutes technical and code proficiency. There is no speed requirement whatsoever, only that "texts" transmitted in Morse code signals be understood "by ear" and sent manually "by hand."

Our country is no different from sever-

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al others. We bend the rules, too. Our FCC has taken the position that if you can copy code, you can transmit it; therefore, no one need demonstrate hand-sent telegraphy.

Our FCC also allows disabled people who are unable to copy faster speeds to obtain waivers of the 13 and 20 word-per-minute speed requirement necessary for the General and Extra Class licenses.

Even at the 5 WPM entry level, handicapped people are "accommodated" in many ways. These include a demonstration of hand sending rather than receiving "by ear"; the use of various non-aural means, such as blinking lights, vibrating surfaces, etc.; or by identifying sentences, phrases, words, or even individual characters instead of "text."

Section II of Article 32 covers the international rules for the Amateur-Satellite Service. These include all policies in Section I plus regulations for notifying the ITU of an approaching satellite launch and controlling emissions in the event harmful interference occurs.

Canada Restructures Its Amateur Service

A new realignment of Canada's Amateur Service took place on October 1st. Basically, the new restructuring recognizes the many strides that have taken place in amateur radio operation and equipment.

The new RIC-24 (Radiocommunication Information Circular) containing the syllabus for the Restructured Canadian Amateur Service is now available from all DOC (Dept. of Communications) offices. The new line-up has the approval of both of Canada's amateur organizations—the Canadian Radio Relay League (CRRL) and the Canadian Amateur Radio Federation (CARF).

Canada also has done away with all subbands—a major change indeed! No longer are there just CW segments in the Canadian amateur bands. Instead amateurs will now use a "maximum bandwidth" concept. Between 160 and 12 meters (except 30 meters) a maximum bandwidth of 6 kiloHertz is authorized. On 30 meters (10.10 to 10.15 MHz) 1 kHz is the maximum. A 20 kHz bandwidth is permitted in the 10 meter band, 30 kHz on 6 and 2 meters, 100 kHz on 220 MHz, and 12 MHz between 450 and 902. That's right, 12 megaHertz! (This allows both ATV vestigial sidebands and spread-spectrum emissions.) Bandwidths were not specified by the DOC above 902 MHz.

Any mode or emission may now be utilized on any amateur frequency as long as it conforms to the maximum bandwidth requirement. Canada will trust the amateur to heed the many unwritten operating conventions and "gentleman's agreements" when determining where

the various modes should best be employed on the bands.

Up until a couple of months ago there were three amateur license classes in Canada:

Amateur—Required 10 WPM Morse code proficiency plus a written test on regulations, technology, and operating procedures.

Advanced Amateur—Required 15 WPM code plus technical/practical written examination and the no-code.

Digital Amateur—Had to pass the first two written tests plus another on digital technology.

Effective in October there is now just one *Amateur Operator's Certificate*, but with four qualification levels. A certificate with a new qualification level will be issued by the DOC as amateurs upgrade by passing examinations.

Prior holders of the "Amateur" class are "grandfathered" to all four qualifications. That is, they receive all of the amateur privileges available in Canada—a very desirable and big feature indeed, since under the previous alignment they would have had to pass 15 WPM code and another written examination to obtain all the amateur rights Canada had to offer!

The four qualification levels are:

1. Basic theory (answer 60 of 100 multiple-choice questions)
2. 5 WPM Morse code
3. Advanced theory
4. 12 WPM Morse code

Every amateur must have at least the beginning Basic (no-code required) qualification to get a license which allows unlimited operation on all amateur bands above 30 MHz using all modes/emissions with up to a 250 watt power level.

The downside is that only certain amateurs may design/build their own transmitters. Basic amateurs may construct home-built transmitters only from approved kits. They may operate on all bands below 4 MHz once they pass 5 WPM. This authorizes them 160 and 75/80 meter band. Passing the 12 WPM telegraphy examination allows operation on the other HF bands between 4 and 30 MHz—i.e., 40, 30, 20, 17, 15, 12, and 10 meters. Those who additionally pass the Advanced theory are permitted a 1 KW power level and may sponsor repeater and club stations, operate remote-control fixed stations, and design and build transmitting equipment.

Communications Act of 1934

In the United States the basic document controlling telecommunications is the Communications Act of 1934, as subsequently amended. The Act established the independent governmental agency, the Federal Communications Commission (FCC), which is responsible for regu-

lation of interstate and foreign wire and radio telecommunication.

The FCC consists of five Commissioners who are appointed by the President and confirmed by the Senate. The President designates one commissioner as chairman. Among its duties, the FCC allocates frequency bands for various non-government radio services within the guidelines set by the ITU accords. The Personal Radio Branch (which falls under the Special Services Division, a section of the Private Radio Bureau) oversees the Amateur Service in the United States.

Section 303 gives the FCC "... authority to prescribe the qualifications of station operators, to classify them according to duties to be performed, to fix the forms of such licenses, and to issue them to persons who are found to be qualified by the Commission."

Section 4(A) and 4(B) allows the Commission to use volunteer examiners to test amateur radio operators: "The Commission, for purposes of preparing [or administering] any examination for an amateur station operator license, may accept and employ the voluntary and uncompensated services of any individual who holds an amateur station operator license of a higher class than the class license for which the examination is being prepared. In the case of examinations for the highest class of amateur station operator license, the Commission may accept and employ such services of any individual who holds such class of license."

FCC Rules Affecting Amateur Radio

Part 97 of the Commission's Rules and Regulations governing the Amateur Service is a section of Title 47 CFR (Code of Federal Regulations). Overall, there are 50 titles which represent broad areas subject to federal regulation. Title 47 covers telecommunications law in the United States. Thus, 47 CFR §97.1 is the rule covering the *Basis and Purpose* of the Amateur Service. Part 97 lists all of the government regulations that apply to the amateur service.

In early 1988 the FCC determined it was necessary to streamline and clarify Part 97 of its rules governing the Amateur Service. Part 97 now has been restructured into a new format consisting of six subparts and two appendices. The section affecting licensing is contained in Subparts "A" and "F."

Every radio amateur, and those aspiring to be, should have their own copy of the Part 97 Rule Book. Besides licensing regulations, Part 97 covers everything you need to know to legally operate your equipment on amateur airwaves. (See Table I.) The W5YI Group distributes the Part 97 Rule Book for only \$2.95 prepaid if you do not have an up-to-date copy. Or-

New Part 97 Rewritten Rules

Subpart A: General Provisions—contains those rules concerned with license and station application, restrictions, and requirements.

Subpart B: Station Operation Standards—comprises those standards that apply to all types of amateur station operation such as authorized/prohibited transmissions, third-party and international communications, station identification, and restricted operation.

Subpart C: Station Operations—contains the requirements that apply to non-standard operations such as beacons, repeaters, auxiliary operation, remote control of amateur stations and model craft, and AMSAT, the amateur-satellite service.

Subpart D: Technical Standards—containing the remaining technical principles, such as frequency bands authorized, power levels, and emission types.

Subpart E: Providing Emergency Communications—contains the rules applicable to operations in distress and disaster situations, along with RACES regulations.

Subpart F: Qualifying Examination Systems—contains the requirements for the preparation, administration, and coordination of amateur radio operator license examinations.

Appendix 1: Geographic Areas—where the amateur service is regulated by the FCC.

Appendix 2: VEC Regions—lists the regions where volunteer-examiner coordinators arrange license examinations.

Table 1—The new Part 97 rewritten rules, which took effect on September 1, 1989. The last major update previously to that took place in 1951—more than 40 years ago! Over that period amateur radio has changed from a telegraphy and AM voice pursuit to a dazzling world of repeater, computer, television, and satellite communication. Analog has given way to digital, HF to VHF/UHF, and manual tuning to push-button automatic!

der from P.O. Box 565101, Dallas, TX 75356, or call toll-free 1-800-669-W5YI (9594). VISA/MasterCard accepted.

From The Mail Bag— Commonly Asked Questions

How do I apply to become a ham? You should submit an FCC Form 610, license application to a volunteer examining team in your area. Almost any amateur

radio operator in your neighborhood can tell you where to locate someone to administer the tests. The form is available without charge from: FCC, P.O. Box 1020, Gettysburg, PA 17326, or you can write to us and we will send you one. Enclose a large self-addressed, stamped envelope.

What do the tests consist of? You must pass a multiple-choice written examination (called Element 2) and a five word-per-minute code test (Element 1A).

Thirty questions will be selected from a pool of 372. The Morse code test consists of five minutes of a typical amateur radio Morse code transmission. The examiners will usually accept one minute of solid copy (25 characters) or answering seven out of ten questions about the text transmitted. You will not have to hand-send Morse code. There is no charge to take the Novice level examinations.

What are the questions about? They cover rules and regulations, amateur operating procedures, station equipment, and elementary electronics. All questions, multiple choices, and answers are known and widely published. (Study material is available from toll-free 1-800-669-W5YI.) Passing mark is 22 questions answered correctly out of 30.

Suppose I pass only one of the two examinations? The VE team has two options. They may immediately readminister the examination, or they may return your Form 610 application to you certifying that you passed one of the required test elements. When you feel you are ready to retest, the certified form serves as evidence that you have already passed one of the required examinations. You have one year to pass the other element before you lose credit for the test you passed.

How long does it take for the license to arrive? The volunteer examiners will certify and mail your Form 610 application to the FCC in Gettysburg, Pennsylvania once you pass both test elements. You should receive your new Novice license and a 2-by-3 format callsign (two prefix letters, a numerical region designation, and three suffix letters) in about six weeks. You may not operate on the amateur airwaves until you receive your callsign.

How do I administer a Novice test? Any two General class amateurs age 18 or more with a clean radio enforcement record who are not in the amateur radio business may be volunteer examiners for the Novice level. Be aware that you must use the new Element 2 question pool that went into effect in July. You construct the written examination by simply selecting an appropriate number of questions from each subelement. We have complete instructions and ready-made properly prepared Novice tests available at no charge. Please send a large envelope with 65 cents postage to W5YI, P.O. Box 565101, Dallas, TX 75356. The cost is \$3.95 if you also need a code test cassette tape. We also have IBM-compatible Novice testing computer software on 5¼ inch floppy disks (\$4.95). This software generates written Novice examinations complete with an answer sheet, or allows you to administer the test right at your computer keyboard. A scored answer sheet is printed after the examination is over. Every written test is different.

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CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

Emergency Preparedness and Packet Radio

Perhaps the best way to begin the holiday edition of the "Packet User's Notebook" is to extend our thanks to a large contingent of great Americans who are looking out for our interests and welfare in another part of the world. Too often we take for granted the level of freedom that we are allowed here in this hemisphere.

To the ladies and gentlemen of the United States Armed Forces, we wish you good holidays, and all the best from a thankful America who is steadfastly behind you. I for one cannot say enough to you and for the spirit which you sustain.

And Now The News!

Bob Schafer, KA4PKB, a fellow packeteer who lives in East Alabama, recently uploaded to the Packet Bulletin Boards the text of a composition written by his daughter, Lisa Schafer. Lisa is studying for a Ph.D. in the "History of Technology" at Auburn University in Auburn, Alabama.

After reading the complete text of the story written by Lisa, and in view of the recent earthquakes and tremors that are occurring in many parts of this hemisphere, I'm compelled to pass on the highlights of her article. I would be remiss as a columnist if I did otherwise.

If this story by Lisa accomplishes no other purpose than increasing your interest and awareness in the need for Emergency Preparedness and Communications, then I will feel that this column has achieved a worthwhile direction. If, however, the projections made by Dr. Browning do indeed transpire, the supplementary benefits will make the efforts of scientists like Dr. Browning and writers like Lisa, become paramount in their level of importance.

Are Amateurs Ready For an Earthquake?

By Lisa Schafer

Are you ready to put your Emergency Ham Equipment and Field Day experience into practice?

Dr. Iben Browning, a New Mexico scientist, has projected that the Southeast will be shaken by a massive earthquake on December 3,

506 Pheasant Ridge Drive, Warner Robins, GA 31088

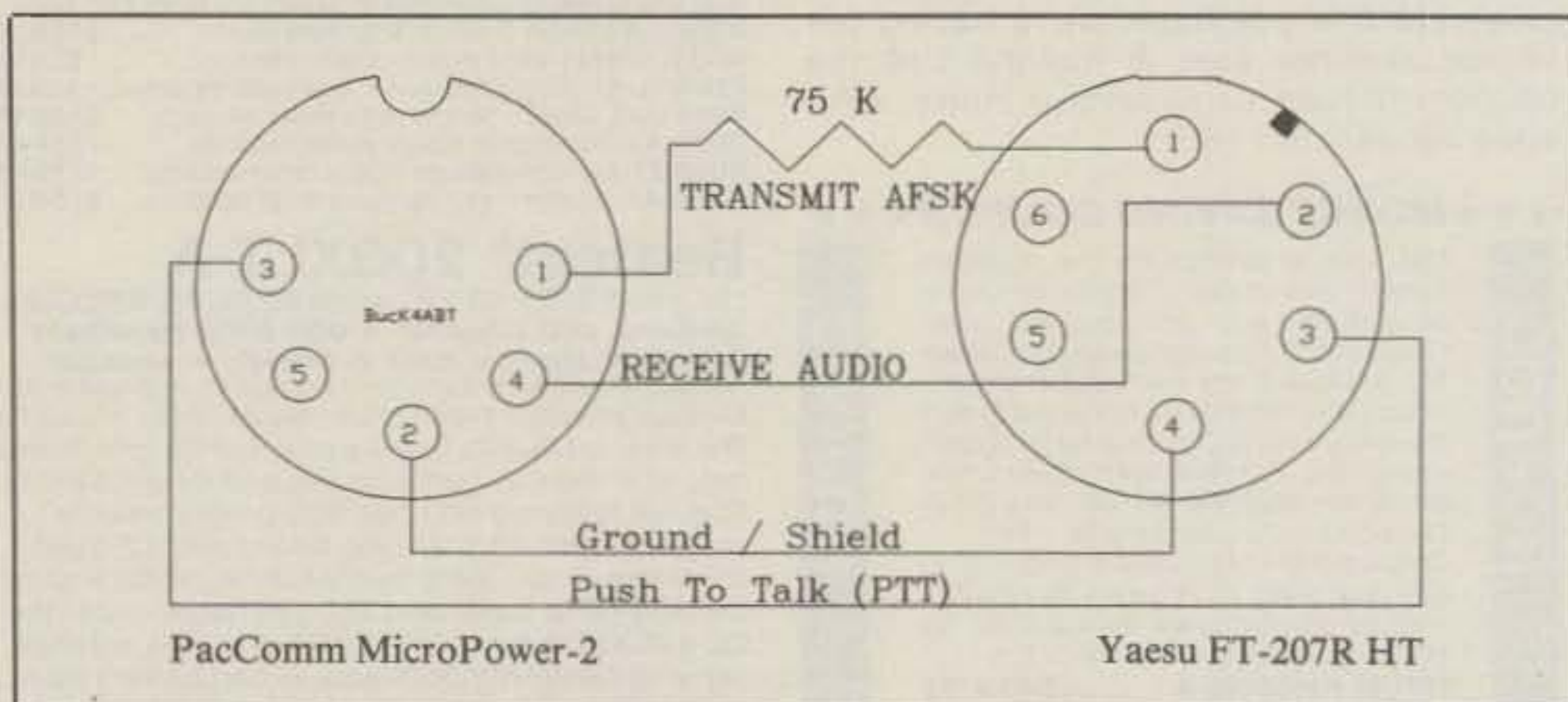


Fig. 1- The PacComm MicroPower-2 is a low power drain TNC that is easily adapted for portable use. Although the Yaesu HT is illustrated here, the MicroPower-2 TNC can be interfaced to other handie-talkies in a similar manner.

1990, originating from the New Madrid Fault. Faults (cracks in subterranean rock formation continuity) in the Midwest are parallel and perpendicular to the Mississippi River and located in Missouri, Arkansas, Tennessee, Indiana, Illinois, and Kentucky. The New Madrid Seismic Zone lies on the North American Plate, which is being compressed as it is pushed from both the east and west by neighboring plates.

Browning, who consults for Paine-Webber, is well-respected for his projections, which include natural disaster, political, and business forecasts. His credibility has been attained due to his accurateness. He has publicly announced his projections before the fact, including last year's California earthquake, the 1980 eruption of Mt. St. Helens, and the 1985 Mexico City earthquake.

In his book *Climate and the Affairs of Men* Browning explains his projection methodology. He notes most quakes in the Northern Hemisphere occur in winter months when perihelion (closest approach of earth to sun) and perigee (closest approach of moon to earth) occur. Every 4,425 years perigee and perihelion align, and "tidal forces trigger major earthquakes." To pinpoint future earthquake sites, Browning also uses calculations from the U.S. Naval Observatory to identify specific latitudes where maximum tidal forces develop and supplements this data with historical, geological, and seismological information.

He has specified that the New Madrid Fault will produce an earthquake on December 3, with a margin of several days. Browning says, "I can guarantee that the trigger will be pulled on December 3, 1990. . . . it will release an earthquake and the size will depend on the amount of strain energy stored up." He predicts that the New Madrid quake will be 7.0 or higher on the Richter scale. He believes fore-

shocks will hit on October 9 and November 6.

On December 16, 1811 the first New Madrid earthquake rocked the Midwest. In the same year a flurry of volcanic and earthquake activity occurred worldwide, and the Great Comet of 1811 soared through the universe. An eyewitness remembered that "The earth was observed to be rolling in waves of a few feet in height, with a visible depression between. By and by these swells burst, throwing up large volumes of water, sand and a species of charcoal, some of which was partly covered with a substance, which by its peculiar odor was thought to be sulphur. When these swells burst, large, wide and long fissures were left."

Two more earthquakes, estimated to be at least 8.4 to 8.7 on the Richter scale, struck on January 23 and February 7, 1812, and thousands of accompanying shocks were reported throughout that spring. New Madrid, Missouri was leveled, and the Mississippi River changed course (at one point it even ran backwards). The river claimed large parts of the town and bluff; tree tops poked out from the water's surface. According to the U.S. Geological Survey, this was the strongest series of quakes in American history. (See James Penick, Jr., *The New Madrid Earthquakes of 1811-1812* for more information.)

The panic was not isolated to the Missouri "bootheel." Tremors were felt in 27 states. The April 10, 1812 *Pittsburgh Gazette* reported, "The extent of territory which has been shaken, nearly at the same time, is astonishing—reaching on the Atlantic coast from Connecticut to Georgia and from the shores of the ocean inland to the State of Ohio." As far away as New Orleans, Richmond, Charleston, and Savannah, plaster cracked, bells rang, furniture moved, ground sunk, houses trembled, and citizens smelled sulphur.

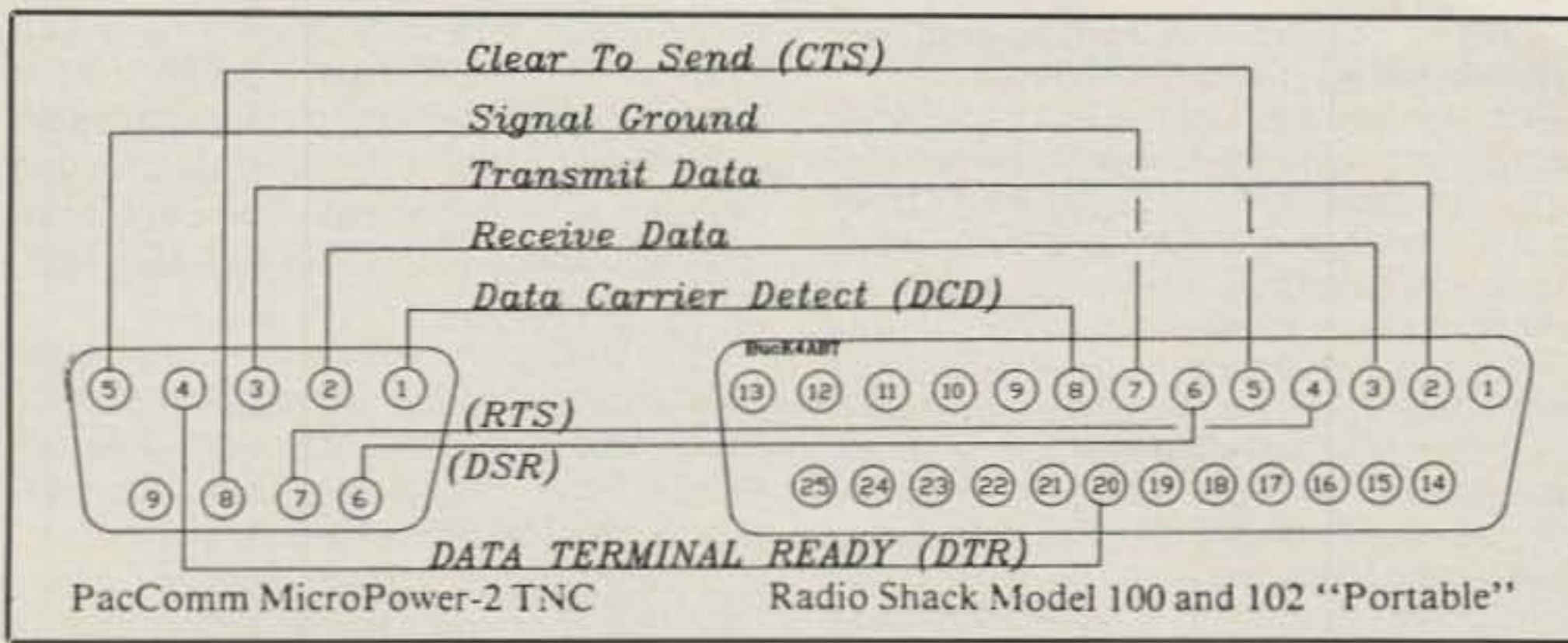


Fig. 2- This drawing illustrates how the PacComm Tiny-2 or MicroPower-2 is interfaced to the Radio Shack Models 100 and 102 lap-tops. This portable computer can operate up to 40 hours on four AA penlight batteries. This same configuration is applicable to the NEC Model 8300 lap-top. Note: RTS and CTS lines are active, so hardware handshaking can be implemented.

Browning, who carefully announces his projections, states, "I fear public panic more than I do an earthquake. However, I want the public to be forewarned of what can be done without panic. I hope that I am wrong and that on December 3 I will look like a fool. But I feel strongly about this and am willing to take the risk of being wrong in public so that the public can be warned."

He has rarely been wrong on his earthquake predictions, accurately forecasting the correct day, fault, time span, and scale of the 1989 San Francisco quake. Other geologists have done studies which corroborate that there is a high probability an earthquake could occur on Browning's date. Mississippi Valley scientists estimate a major quake shakes the area every 75-100 years, and the last one hit October 31, 1895, rocking 28 states. Energy has been building up and becoming more powerful ever since.

Memphis, Tennessee is expected to be hit hardest. The amount of casualties will be determined by whether the quake happens on a weekday or weekend, at night or day. Two groups of primary concern are children and the elderly. Some schools are planning to cancel classes on Browning's targeted date. Browning has warned that the military should equip pontoon boats to cross the Mississippi River because bridges will fall: the Missouri and Arkansas National Guard will hold earthquake exercises in early December. He has estimated that "one third of the buildings in Chicago will be damaged."

Roger Spencer, first vice-president of Paine-Webber, says, "I have learned not to bet against Browning." Paine-Webber has told its employees not to come to work on December 3. Spencer explains, "If it doesn't happen, we just got a day off. If it does, then we will definitely be better off at home."

William Atkinson, author of *The Next New Madrid Earthquake: A Survival Guide for the Midwest*, suggests that emergency supply kits should be assembled, including these crucial items: flashlights, batteries, portable radio, first-aid kit, fire extinguisher, canned/dried food, medication/bandages, manual can opener, blankets, sleeping bags, heavy clothing, soap, candles, matches, tent, ax, charcoal, lighter fluid, grill/camp stove, and plastic utensils/cups/plates. Atkinson advises that this kit be stored in an accessible, safe place

and that perishable items be replaced frequently. He also recommends that you should freeze several milk jugs of water in case the water supply becomes contaminated or unavailable.

Throughout the Midwest and Southeast the quake can be expected to damage buildings, highways, railroads, dams, power, gas, and water lines, and to cause landslides, fires, and power outages. Hams can provide communications through their battery-powered radios. Local amateurs should plan ahead how to secure their repeater, antennas, and other radio towers to ensure continuous access and operation.

If the quake hits, this area (East Alabama and West Georgia) could experience vertical and horizontal tremors rated from about 4.0 to 6.0 on the Richter scale, according to the intensity of the quake in the New Madrid Seismic Zone. The minimal impact can be expected to be felt inside and outdoors; awaken light sleepers; rattle dishes, doors, windows, building frames; and rock cars. The quake will feel like the vibration of a truck driving by or a heavy body hitting a building. A medium-intensity quake will rock buildings, break dishes, open/close doors, move furniture, and shake trees and shrubbery.

The most intense tremors will wake everybody and create a sense of excitement, fear, and panic. People will find it difficult to stand, bells will ring, plaster will crack and crumble, windows will break. The tremors will overturn and break furniture, churn waves on ponds and lakes, break concrete, and topple chimneys, stacks, and towers. Damage to houses and buildings will be determined by the quality of their construction and any architectural provisions made for earthquakes. Wood, adobe, and poorly constructed houses will be flattened; brick, steel-reinforced, and more solidly constructed houses will suffer moderate injuries.

During a quake the Earthquake Information Bulletin advises people who are indoors to stay there. If you are outside, don't go inside and run to a clear area free of hazards. You should find a desk, table, bench, or mattress to sit under for protection. If none are available, pull your legs to your chest and cover your head to provide some shelter. You should stay away from doorways, walls, windows, tall furniture, basements, elevators, and staircases. If you

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are in an automobile, pull to the side of road and stop, but don't stop on bridges.

After the quake has ended, be aware that after-shocks may strike. Check for personal injuries and those of others. Don't light matches until you have checked for gas leaks, water leaks, and electrical circuits for destruction and shut down damaged systems. If your home has suffered damage, leave it until it has been checked by an authorized safety inspector. Don't drink water, unless it is what you have stored: municipal and natural sources may be contaminated. Minimize your use of telephones. Many people will be stunned, suffering from trauma and shock, and medical situations will resemble war-time triage as most hospitals will be inoperable. Volunteers will desperately be needed to aid medical professionals and to facilitate community recovery through communications to outside areas.

The military is taking Browning's warnings seriously. National Guard units throughout the Midwest and Southeast are preparing to have earthquake exercises during the period that he warned is detrimental. Perhaps hams in the Midwest and Southeast should also rehearse for an earthquake. At the worst, nothing will happen in December 1990, and you'll be prepared for future emergencies. But consider this: On April 6, 1989, a 4.7 scale quake hit New Madrid, Missouri, affecting four states. A 4.0 Richter-scale earthquake shook Knoxville, Tennessee, on August 17, 1990.

Scientists agree that the New Madrid Seismic Region can expect a massive earthquake soon. And historically, we know that this type of earthquake will affect the entire Southeast. Amateurs in this projected area of seismic activity can and should responsibly arrange to provide emergency services for their communities—just in case.

Don't be "after"shocked!

Some Good News

After having read the article by Lisa Schaffer, it is only right that I follow with one means of Emergency Preparedness. This system takes the form of a portable and/or mobile packet station, or switch.

Often I try to arrange for an upcoming packet demonstration or packet forum by using the portable packet switch in the vehicle (Blazer). I do so because it is there, and available, and I have it ready just in case it is needed as an emergency switch, node, or digipeater. In any case, there is always the chance (even greater probability) that I will be conducting the packet forum inside a large room or small auditorium that is deep within a city convention center, a hotel, a school, or a county facility. This has been the case with the last few packet forums I've hosted.

With the portable packet switch set up in the Blazer, I'm able to use a low-power HT or mobile transceiver to punch my way out of many layers of steel, brick, concrete, and earth to the nearby "Blazer Switch." From the mobile switch I can either connect to, or digipeat through, to the local ROSE or network switches. This

way I'm assured of good continuity into the Local Area Network (LAN). For a heads-up on this kind of mobility for packet switches see the system described in the article "CQ Reviews: The PacComm HandiPacket TNC" in the October 1990 edition of CQ.

Now that many packeteers are beginning to upgrade their stations to the multi-mode and all-mode controllers, I've noticed a lot of TNC-2 type packet controllers appearing on the tables at the hamfest fleamarkets. These "Digital Dollar" bargains represent the final item that is needed to complete the "fixed" or portable packet switch.

The portable Packet Switch is not for everyone. This is a project that can be shared with others as a "club project." Most Packet Users Groups (PUGs) can build this switch or node and configure it at the time it is deployed. Therefore, the club or group can maintain an order of use versus application. In this instance I'm assuming that a switch or node would be packaged in such a manner as to be operated from a remote site with or without external utility power. It could even be used to experiment with various locations or sites to determine if the site would be appropriate as a permanent switch location.

Consider The Many Uses Of A Portable Switch

Several things come to mind as we begin studying the applications for this new-found means of boosting our communications capabilities. Emergency preparedness is one useful possibility. Contest "spotting" is another application. The list can get long if you stop to consider the many ways a portable packet switch could be of use. In my situation I conduct a lot of packet forums and packet radio demonstrations.

Case in Point

Recently I was ask to conduct a packet forum in our neighboring state of Alabama. It was not until I arrived at the Houston County Courthouse in Dothan, Alabama that I realized I would be presenting the forum in the Emergency Operations Center (EOC). This EOC is situated in the basement of the court house, with walls made of reinforced (rebar) steel and concrete. Above, below, and all around me was steel, concrete, and terra-firma. This is the test of all tests. I had only my briefcase packet station, and the new Alinco Data Radio. The Alinco Data Radio runs a full 25 watts output, but my 12 volt battery in the carrying case with the Alinco was only good for about 4 amperes. This meant that I would have to run the Alinco at low power (about 5 watts).

Divine Guidance

There must have been some kind of dynamism that prompted me to bring along a spare TNC. Not only did I have the spare TNC, I also had an EPROM with the ROSE code burned into it that I carry along "just in case." This way I could use the TNC as a switch or digi if the need arose. *It had!*

It took no more than three minutes to pop the top of the TNC and remove the Operating System EPROM and insert the ROSE coded EPROM. A TNC power connector from the vehicle 12 volt system was already in place.

I maintain a full set of TNC to transceiver interface cables in one of the briefcases that I carry along with me on these packet demonstrations. I've conducted enough packet forums away from my QTH to learn the age-old lesson that goes something like this: "The best laid plans of mice and men . . ." Packet forums and demonstrations soon teach you to maintain some form of backup in the event one of the units decides to bid farewell in the midst of a session.

I did a complete RESET of the switch (TNC), connected it to the mobile Alinco Data Radio, and returned to the EOC in the courthouse basement to begin the forum.

Converse, Conference, Contests, Clusters, and Caution

The adaptation of this mobile or portable switch for use as an emergency Converse, Conference, or "spotting" Cluster node or switch may be just the ticket for field day or the CQ contests. There is one caution that is related to this application.

I'll expand on the comment made recently in a BBS message that I received from Charles, N8MCY. "Converse nodes and packet clusters, whether used for emergencies or for DX spotting, should be placed on frequencies that are away from the regular throughput and calling frequencies." Having said that, let's next consider using the Converse Node. So what use does the Converse Node have as a portable switch?

Don't rule out the use of the Conference node as an emergency "round-table" system that can be implemented at a moment's notice. To the SYSOPs who are reading this column, go ahead and burn an EPROM for the Conference node (TNC-2 or clone), and put it a safe place "just in case."

Field Day and Contests

Consider the CQ contest. Several stations in an area are operating in concert with one another to attract points, and

they are operating on nearby frequencies, with multiple operators. There is always the problem that someone on a nearby (HF) frequency or band will interfere with nearby stations. Even with the finest equipment there are some cases where intermod or just plain fundamental overload will cause interference to a contest neighbor. To circumvent this problem we separate the sites by a few miles and use a mobile or portable packet Conference node to keep the neighbor station apprised of the whereabouts of the DX station we just worked. The added points could be the catalyst that makes this addition worthwhile.

The Converse node allows up to 256 connected stations to exchange traffic in a "round-table" fashion. I don't recommend having this number of stations connected, nor have I ever seen more than 30 stations connected to a Conference/Converse node. I'm quite sure that total

"grid-lock" would occur long before the connects reached the maximum.

The Applications Are Endless

With the costs of putting together the packet switch coming down, we could conceivably build the complete system into a steel, locked box and mount it to a utility pole or mast atop a hill and power it from solar cells. There is a topic for a future article if I ever saw one. I'm working on that application now, and it will appear in this column soon.

Think over these applications and determine if one of these remote or portable packet stations would influence your next site selection, field day, contest spotting, or emergency application.

We hope you have very Happy Holidays, and Have Fun Packeting.

73,de Buck4ABT





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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

From The Bookshelf

This time we want to share with you some of the hamshack books we've dug into recently. However, we'll also save room for our customary surveys of new antenna and software products you may find useful in and around your shack.

First let's flip through the pages of some interesting new books.

From the Bookshop

Wireless Antenna History. Walter J. Schulz, K3OQF, has come up with an intriguing and specialized book that is both a history of early "wireless antennas," especially verticals, and a technical text that gets into some of the more esoteric details of vertical antenna design, construction, and theory.

Walter's softcover book is 113 pages plus a 28-page technical appendix that includes many design formulas, tables, and charts. The book grew out of his interest in 160 meter operation using vertical antennas and the history behind them. Consequently, his book is divided into two parts. The first is "Wireless Antenna History"; the second is "Design Primer on Electrically Loaded Verticals."

In the first part the author goes back in time to discuss the earliest beginnings of radio around 1850, touching on the contributions of the "greats" including Maxwell, Hertz, Popov, Marconi, and Tesla. Walter discusses radio in World War I, spark gap transmitters, Alexander alternators, and vacuum tubes to set the stage for his discourse on verticals. Many interesting photographs of vintage equipment and radio experimenters are included, some of which are undoubtedly quite rare. My favorite is the group photograph of Einstein, Tesla, and Steinmetz—certainly not your average office photograph!

The second part gets into the design of vertical antennas with a strong focus on the early designs. Topics include basic electrical concepts, Hertzes and Marconis, solving the antenna feedpoint problem, base- and top-loading, increasing radiation efficiency, slant wires, grounds and radial systems, and more.

This book is obviously a labor of love prepared by an historical buff and "classic" antenna enthusiast. It could be improved by better organization, however, and it seems to try to be both an historical account and a technical text, difficult themes to combine in a single work. But if you're interested in the early days of radio with emphasis on the evolution of vertical antennas, this book should definitely hold your interest. It's available for \$16.95 plus \$2.00 postage and handling from Gilfer Shortwave, 52 Park Ave., Park Ridge, NJ 07656, or

317 Poplar Drive, Millbrook, AL 36054

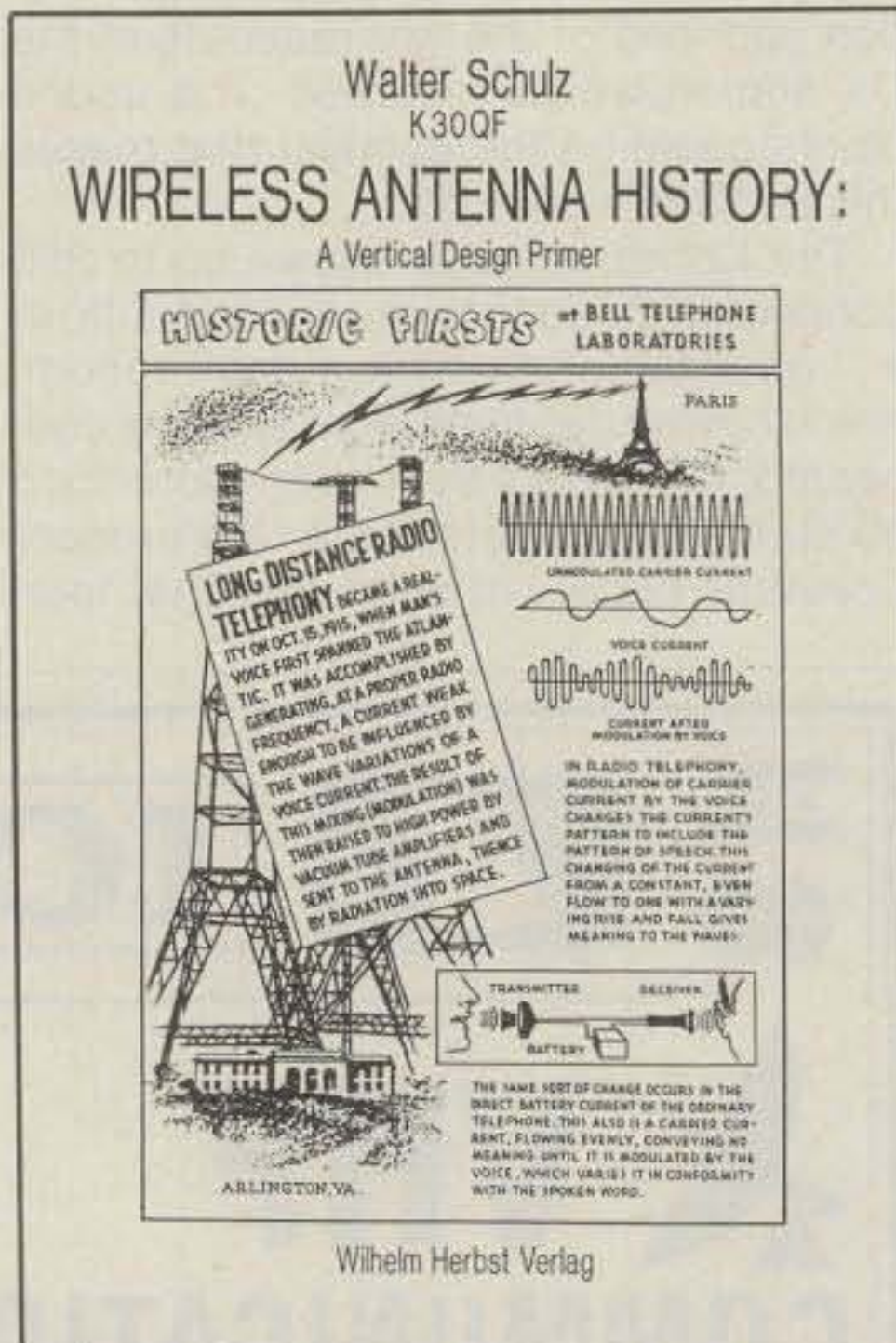


Fig. 1—Walter J. Schulz, K3OQF's interesting soft-cover book *Wireless Antenna History: A Vertical Design Primer* combines early wireless history and personalities with technical information on classic vertical antenna design.

from CQ's Bookstore. The book's cover is shown in fig. 1.

Genius at Riverhead. This is an extensively documented bibliography, a hardcover about radio experimenter and inventor Harold H. Beverage, ex-W2BML, whose name certainly "rings bells" in the heads of longtime antenna men. This 1988 book, which runs to 130 pages, is by Alberta I. Wallen; it's titled for Beverage's time with RCA at Riverhead, Long Island (New York) in the early days of transoceanic radio communications.

To recall, Riverhead was the location of the first full-scale "wave antenna," named for Beverage by Paul Godley, 2XE, who was sent to Britain by the ARRL during the trans-Atlantic tests of 1921, where he used a wave antenna for reception of the American signals, including those of Beverage's station, 2BML.

Some of the features of Wallen's book include historical notes about "Bev's" nature as a likable person and friend of contemporaries such as Albert Einstein, David Sarnoff, and Edwin H. Armstrong, as well as his many patents and inventions, which are thoroughly detailed in an appendix. Bev's description of the famed wave antenna, "The Wave Antenna for 200-Meter Reception," was published in the No-

vember 1922 issue of *QST* and is reproduced in one of the appendices.

In addition to the wave antenna, Bev also is credited with development of noise reduction systems, frequency- and space-diversity techniques, a television AGC system, and communications security systems involving switching signals among multiplexed channels, and many others. He is credited with some 40 patents.

Whether your interests are historical, nostalgic, or technical, you'll likely enjoy reading Wallen's book. It's published by the North Haven Historical Society, P.O. Box 858, North Haven, ME 04853. The price is \$15.95 plus \$1.00 postage and handling. (At press time, however, we learned that the book is out of print. Perhaps a copy could be borrowed from your local library, or obtained through a classified ad.)

Stay Tuned. This 705-page hardcover, the full title of which is *Stay Tuned: A Concise History of American Broadcasting*, is generally regarded as one of the finest books available on broadcasting history. I'd agree with that assessment, which certainly applies to the 1990 second edition I received (the first edition dates back to 1978). The authors, Dr. Christopher H. Sterling and Dr. John M. Kittross, both college professors, have certainly done their homework in documenting a very fluid field.

The authors note that in the decade since the first edition was published a great deal has changed in broadcasting. They comment that 1978 marked the start of a new ball game. At that time only one third of today's full-power stations were on the air. In the intervening years the industry has changed and metamorphosed to include VCRs, cable TV, low-powered TV stations, stereo AM, major changes in the radio and TV networks, new programming formats, changed FCC attitudes and regulations, and the like. All this has created a new landscape for audiences, broadcasters, advertisers, and students of broadcasting.

Especially interesting is the authors' observation that in the "old days" broadcasting was largely in the hands of innovative and colorful people who considered their positions in the industry as special callings. This is contrasted with the authors' view of today's broadcasting industry as being in the hands of a "new breed" of MBA managers who tend to consider broadcasting as just another business.

The Sterling and Kittross book is organized by coverage of various broadcasting eras that they define. While the heart of the book lies in radio, television and other recent developments are not neglected. The eras covered include prehistory (to 1919), the beginnings (1920-1926), the coming of commercialism (1926-1933), the "Golden Age" (1934-1941), radio in World War II (1941-1945), the era of great change (1945-1952), the age of televi-



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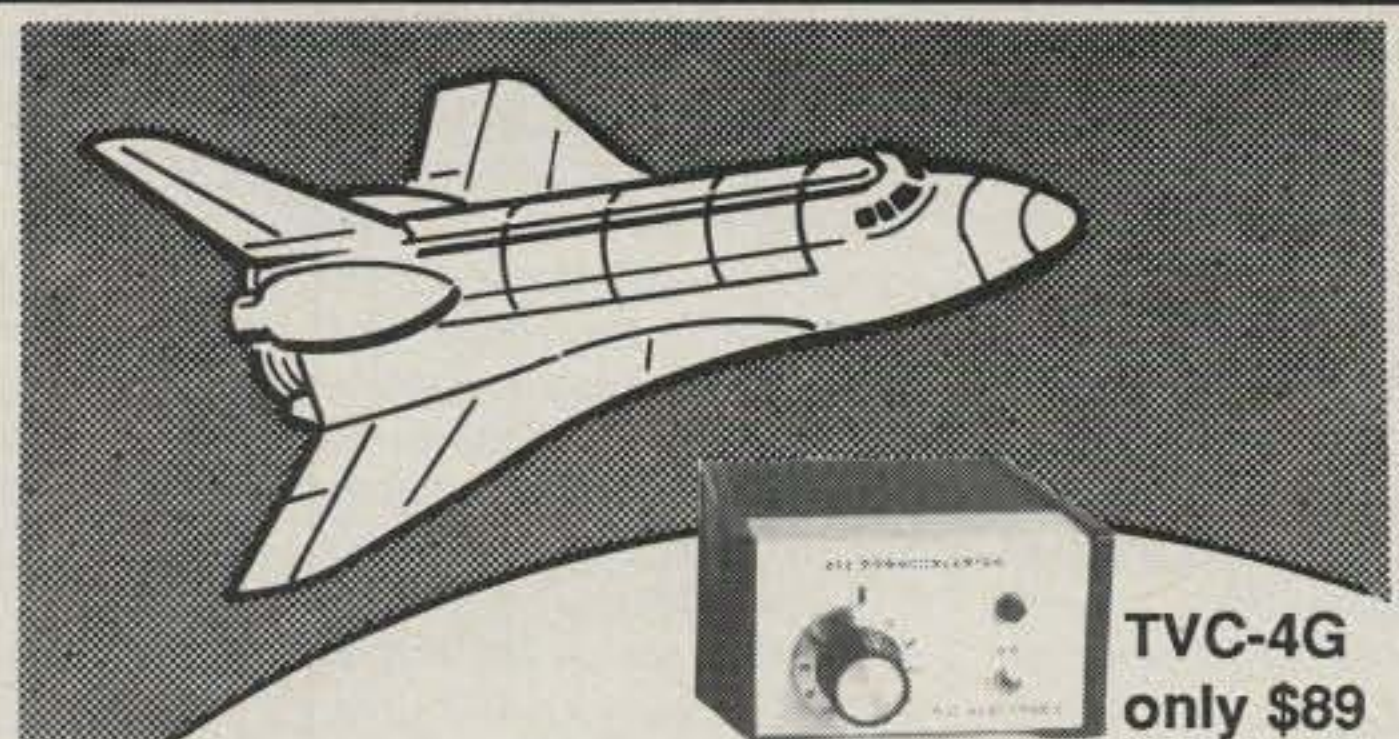
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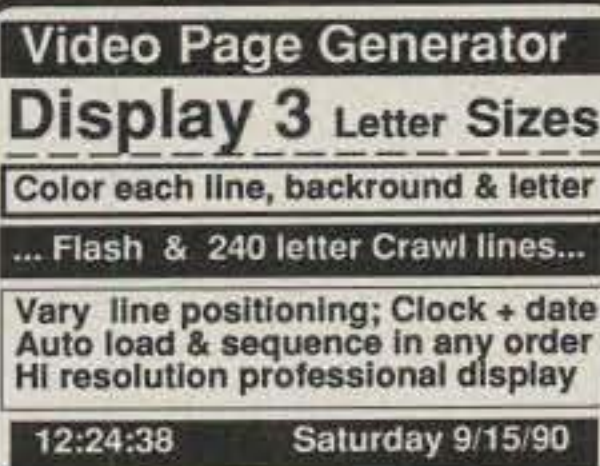
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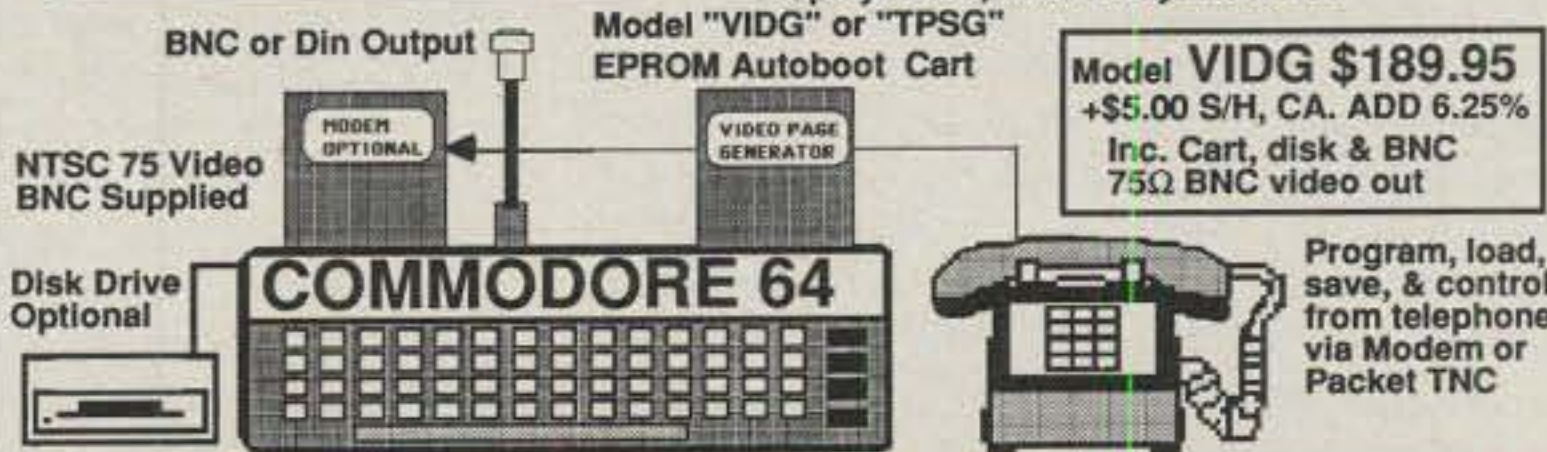
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sion (1952-1960), accommodation and adjustment (1961-1976), and challenge and competition (1977-1990). The book also includes four appendixes. These provide a short broadcasting chronology, a glossary, historical broadcasting statistics, and a bibliography.

If you're hooked on broadcasting and want to learn more about its past, present, and future, you'll likely enjoy reading this one. It's priced at \$38 from Wadsworth, Inc., 10 Davis Drive, Belmont, CA 94002.

Alternator Whine. It's unlikely that a book on such a specialized topic would make the best-seller lists, but David Navone, N6SWX's book on this particularly annoying and difficult-to-eliminate form of mobile noise is nevertheless good at what it purports to be: a primer on getting rid of alternator whine.

Included in the 50-page spiral-bound book are various diagrams and nontechnical terms that draw upon Dave's more than 20 years of experience in the field. The book tells you how to eliminate the whine without messing up the rather complex electrical systems in today's vehicles.

Alternator Whine is priced at \$14.95 and is available from Navone Engineering, 4119 Coronado #4, Stockton, CA 95204.

NGDC Bulletins. For most of us, a simple and easily obtained solar flux or sunspot number is all we need to plug into our favorite propagation prediction program to see when and if the band will be open to a given point. Others like to keep up with expected propagation conditions via the propagation column of their favorite amateur radio magazine. Still others like to have the raw data to "roll their own" propagation estimates.

For the latter do-it-yourselfers, the National Geophysical Data Center (NGDC) at Boulder, Colorado distributes monthly bulletins of solar and geomagnetic indices. The NGDC bulletins continuously summarize complex measurements and provide discrete values to simplify and clarify solar and geomagnetic variations. The bulletins contain data compilations that enable the reader to evaluate the dynamic effects of solar activity. They also provide an historic look-back, which may be used to diagnose and explain communications problems.

One of these bulletins is the "Geomagnetic Indices Bulletin." It's mainly concerned with the earth's geomagnetic field. The bulletin includes simple explanatory text, summarizes all daily "aa indexes," provides onset times of magnetic storms, gives global hemispheric K and A values, and even ranks the ten most quiet and five most disturbed days. The bulletin is issued monthly and costs \$21 per year.

Another NGDC bulletin is the "Solar Indices Bulletin." It's issued on the same schedule and carries the same \$21 subscription fee. The bulletin gives daily solar radio flux using 2800 MHz (10.7 centimeter) observations and summarizes the current cycle. It provides daily sunspot numbers for the last month and lists observed and predicted smoothed values.

For more information, contact the National Geophysical Data Center, NOAA/NESDIS E/GC4, 325 Broadway, Boulder, CO 80303.

Boardwatch Magazine. Published since March 1987, this telecommunications magazine is chock full of some of the most comprehensive and concise information available on electronic bulletin board systems as well as the developing "cottage industry" in online information services. Closely associated with the magazine is the Boardwatch Online Infor-

mation Service, which provides *Boardwatch* back issues, extensive listings of online services, dialing directories, terminal programs and utilities, and a variety of online periodicals.

The magazine subscription rate is \$28 per year, while the Boardwatch Online Information Service is \$35; the two also are offered as a package for \$50. For more information contact Boardwatch Magazine, 5970 South Vivian St., Littleton, CO 80127 (or call voice 303-973-6038 or online 303-973-4222).

RF Limited Catalog. A recent communications accessories catalog we received from this Washington State importer includes a number of mobile and base station antennas covering about 25 MHz up. The new catalog shows four versions of the HF wideband "Penetrator" series of 25-30 MHz mobile verticals. Several new wideband antennas are also featured, including a 25-1300 MHz discone and several imported Australian products, the Babyroo and Kangaroo fiberglass whips, the Wallaby three-element beam, and the 21 foot Outbacker fixed mobile antenna designed for camping and DX operations.

For a catalog, contact RF Limited, P.O. Box 1124, Issaquah, WA 98027.

Antenna Notes

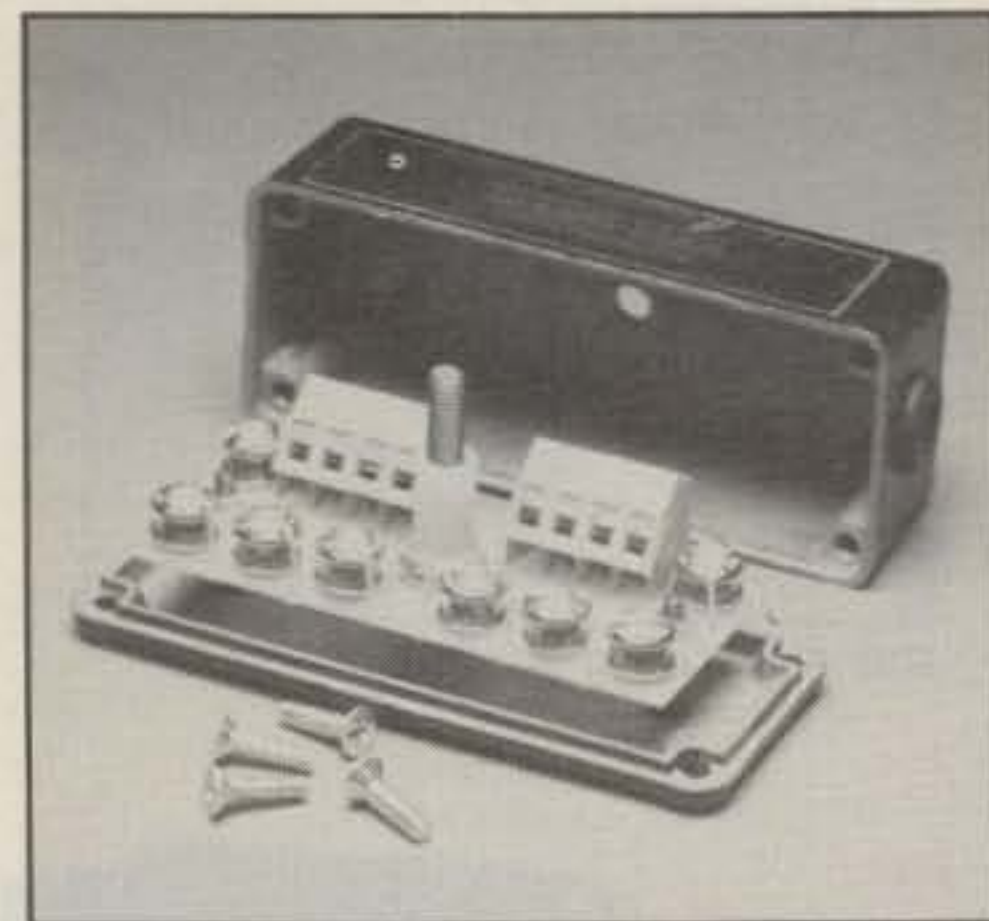
Universal Towers Followup. In the June column we mentioned the Universal Towers line of freestanding aluminum towers and mentioned their free catalog. President Gerald Kedzierski wrote to us to thank us for the many inquiries they received for the catalog. Unfortunately, I picked up the firm's *old* address for the column, delaying many inquiries. To set the record straight, the *correct* address of the Universal Manufacturing Corporation is 43900 Groesbeck Hwy., Mt. Clemens, MI 48083. Our apologies!

NVIS Antenna System. In last March's column we briefly discussed Near Vertical Incidence (NVIS) skywave techniques, using as an example the development of an NVIS antenna by the Marine Corps to fill in HF radio "dead zones" between groundwave's maximum range and skywave's minimum range.

With this technique the antenna transmits straight up, its signal to be reflected back to earth at much shorter distances than conventional skywave propagation would dictate. The Marine NVIS experiments used a loop antenna and were designed to increase HF communications reliability, especially behind ridgelines, in deep ravines and canyons, and in heavy vegetation, to overcome the problems of difficult terrain and dead zones.

I notice that the Sabre Communications Corporation has developed a commercial NVIS antenna, the Model 800-T-T-1 NVIS Antenna System for applications requiring communications over short distances of 500 miles or less. The new system, which is aimed at military and commercial operations where "rapid deployment" and ease of installation are paramount, covers the full 2-30 MHz range. The VSWR across the entire operating frequency band is said to be 2.5:1 or less.

The unusual antenna construction features a multi-section coaxial mast that acts both as the main antenna support structure and as a rigid 50 ohm coaxial feed for the antenna system itself; the coaxial mast sections telescope together and form a rigid 50 ohm coaxial support mast 20 feet in height. The antenna radia-



The Alpha Delta Model CLP Lightning Surge Protected Control Line Protector is designed to protect control lines to rotor control and remote switch boxes, modems, phones, and other equipment from lightning-induced surge voltages. The device can be installed on control cables having up to eight wires. (Photo courtesy Alpha Delta Communications, Inc.)

tors are terminated with resistors of the proper impedance which result in a wideband system that requires no external antenna coupler or matching device. The entire assembly is shipped in a reusable metal container. Sabre states that the system can be assembled and raised into position by two men in 10 minutes. Sounds great for Field Day, if your club can afford the cost.

For more information, contact Sabre Communications Corporation, 3400 Hwy. 75 North, P.O. Box 536, Sioux City, IA 51102.

Alpha Delta CLP Protector. Earlier this year Dave Tyrrell, W8AD, relocated his Alpha Delta Communications from Centerville, Ohio to Tempe, Arizona. Following the big move Dave sent us one of his newest products for inspection—the Model CLP Lightning Surge Protected Control Line Protector. The \$49.95 CLP is the latest in the series of Transi-Trap® lightning-protection devices offered by Alpha Delta mainly for coaxial-cable protection.

The Model CLP is a device designed to provide effective protection against lightning-induced surge voltages (though not for direct-strike protection) that occur on control lines to rotor control and remote switch boxes, modems, telephone lines, and other control-line-connected equipment. The CLP can be installed on control cables containing up to eight wires of up to 16 AWG wire size; smaller gauge wire can be accommodated in the adjustable connector openings.

The CLP is designed to be installed behind, or near, the equipment it protects and to be connected to the station ground. The CLP can be used outdoors if you moisture seal it with "Coax-Seal" or similar material.

Each of the control lines is individually protected by a high-surge, field-replaceable current gas tube Arc-Plug® cartridge. During the period of a surge voltage spike these cartridges toggle to ground, effectively shunting the spike to ground via the ground stud and associated ground wire. After the spike has passed, the cartridges automatically return to a ready state. The cartridges accommodate high baud rate data transmission and are said

to outperform competitive MOV-based protectors.

In addition to the Transi-Trap protectors, Alpha Delta also offers a surge-protected four-position RF coax switch, a tri-band twin-sloper antenna, four- and five-band dipoles, a two-band "delta dipole," two SWL wire antennas, and other products. For more information, contact Alpha Delta Communications, Inc., 1232 E. Broadway, Suite 210, Tempe, AZ 85282.

Discone Update. In the July issue we discussed the ProComm Digitrex Supercone. The basic antenna is the wideband DC-2515 discone which covers 25 MHz to 1.5 GHz. The antenna, as we pointed out, is a high-quality discone which should give excellent performance on VHF and up. The standard DC-2515 discone can be converted to the DC-2515 Plus with a five-band expander kit using Hustler HF resonators to allow operation on any five of the HF bands (80, 75, 40, 30, 20, 17, 12, or 10 meters).

We did not do a hands-on test of the antenna, and didn't analyze the HF configuration as well as we might have. One reader who had conducted extensive HF experiments with the antenna took exception to its capabilities as an HF transmitting antenna. He correctly pointed out that the supplied ground radials do not provide a sufficient counterpoise. Also, the same reader suggested that the Hustler coils should be elevated from the level of the ground plane if they are to work as center-loaded coils.

Bottom line: For reasonable efficiency and acceptable SWR on the HF bands, one might have to modify the system using a shaft for extending the elevation of the coils and using copper foil or longer wire radials to provide the necessary counterpoise.

Software Topix

IONSOUND Update. In the July column we

wrote up Jake Handwerker, W1FM's IONSOUND ionospheric propagation prediction program. Jake advises us that the program is now in Version 3, which significantly enhances performance. Some of the improvements he's made include two additional graphic plots, extended frequency coverage from 1.8 to 54 MHz, changes to the frequency selection menu, "souping up" of the propagation mode searching algorithm, changes to the tabular summary output, and modification of the error reporting algorithm.

Jake provided a free copy of the upgrade to purchasers of the earlier version. He's also had to raise the price of IONSOUND to \$29.95 plus \$3.00 shipping in North America (\$5.00 elsewhere), but offers a 20% discount to Volunteer Examiner Coordinators (VECs), instructors, military personnel, and schools and universities.

For more information, pull out the July column or contact Jacob Handwerker, W1FM, 17 Pine Knoll Rd., Lexington, MA 02173.

Amateur Radio Station Logbook. Gene Brewer, KI6LO, is already into at least Version 5 of his popular logger for the IBM PC and compatibles. Some of the main features of the Amateur Radio Station Logbook include light bar menus and single keystroke option prompts; comprehensive log information; standard database functions for adding, editing, and deleting QSO entries; an automatic log file backup and restore utility; and a built-in initialization routine. There's also DX prefix information in a separate datafile; beam headings for over 1,000 prefixes; a 50-page on-disk user's manual; sophisticated QSL label and report generators; and free user support by mail or phone, to mention just a few features.

Although I've not had the opportunity to put the ARS Logbook through its paces, it was thoroughly reviewed in the March/April 1990 *Digital Digest*, where Gene's program was rated as "outstanding." It is priced at \$29.95

with updates \$5.00. For more information contact L. E. (Gene) Baker, KI6LO, at LEB Enterprises, 1127 North Las Posas, Ridgecrest, CA 93555.

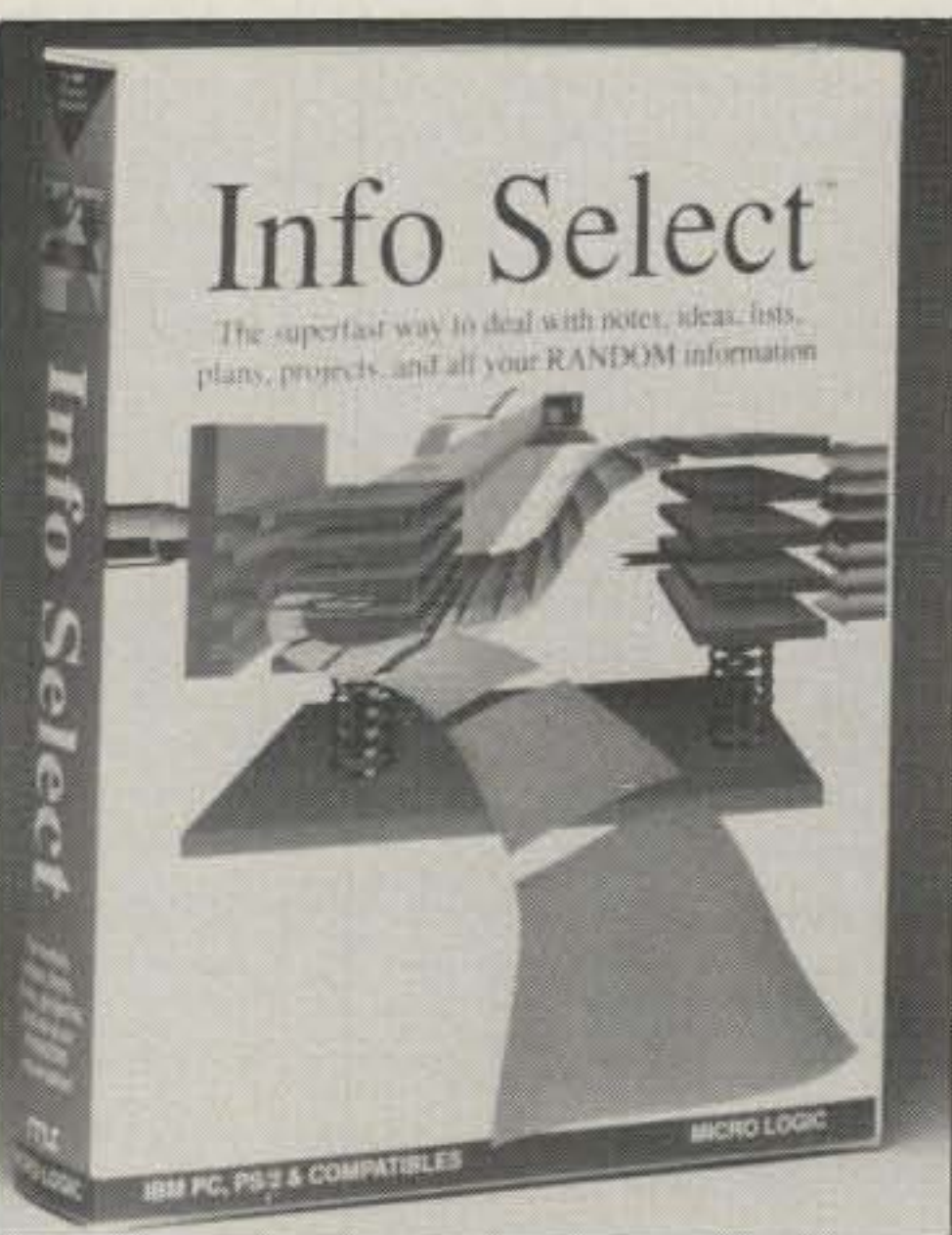
Total Ham. Dick Miller, WD4AZG, has introduced Total Ham, which is a logging and duping program for the IBM PC which provides other important information as well. This includes countries and states needed and worked checklists, beam headings, QSL manager list and QSL status information, and more. In addition to supporting regular logging, the program also adapts to net and contest logging modes.

Dick's program is shareware, and the cost of registration is \$25. For more information, contact Dick Miller, WD4AZG, P.O. Box 1566, Manassas, VA 22110.

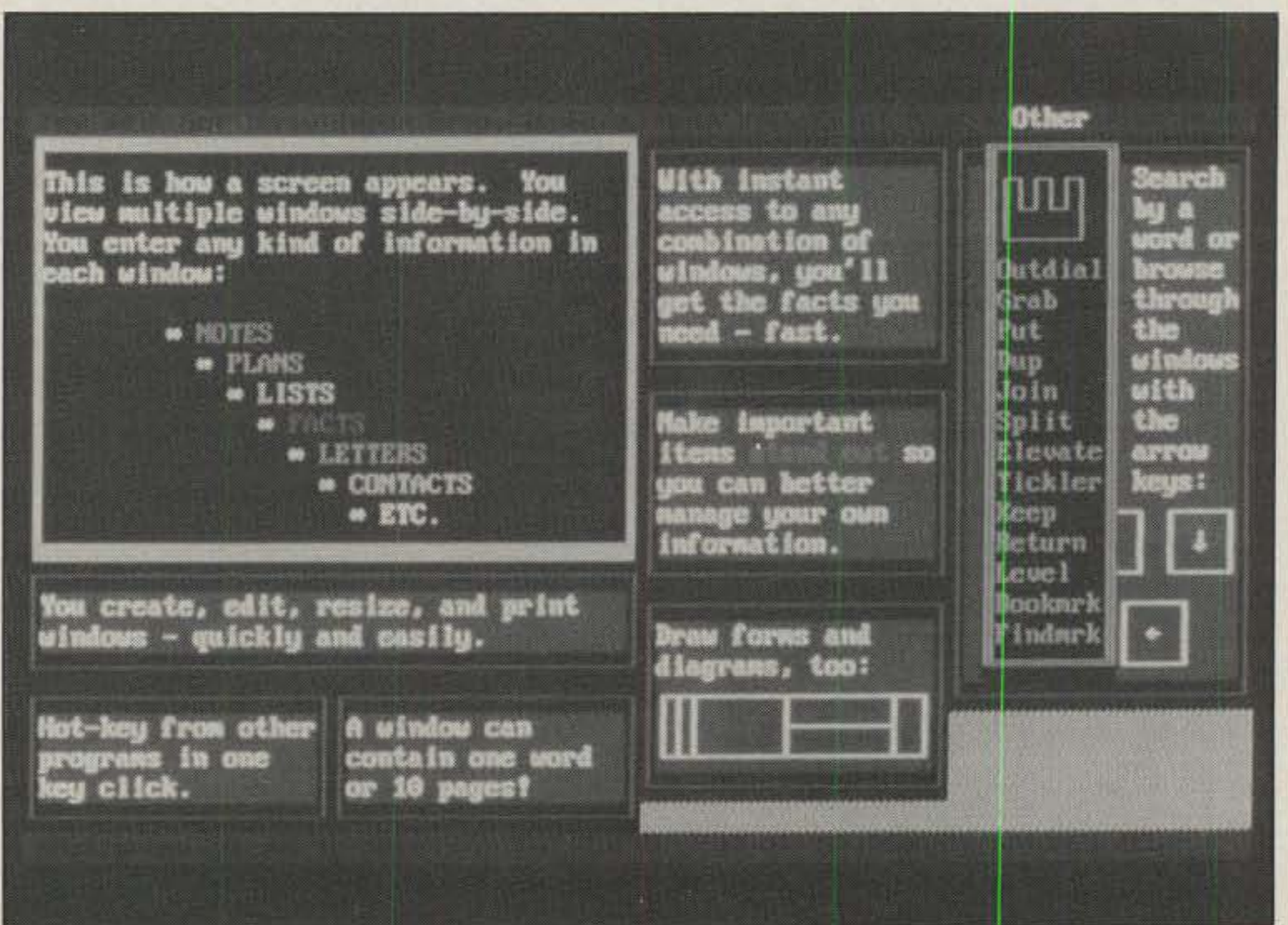
W2JO Master Log. This must be "logging software month," as I have still another logger on which to report. It's Dave Farnsworth's W2JO Master Log, also for the IBM PC. Dave's program has a number of worthwhile features including data transfer from other sources such as Lotus 1-2-3; WAS, DXCC, and WPX reporting; a net operations section; search and scan capability; menu-driven operation; global data adjust; QSL card printing and tracking; selectable printouts; and considerably more. The program is priced at \$29.95 from Dave Farnsworth, W2JO, P.O. Box 16, 2945 Main St., McConnellsville, NY 13401.

Super VR-85. The Commodore 64 doesn't seem to be dead in the hamshack yet, at least in the view of RLD Research. They've introduced Super VR-85, a satellite tracking program for the C-64.

Major features include map-oriented graphics having moving satellite and suborbital trace, with graphical and tabular representation of the mutual acquisition zone; user-port output for automatic antenna steering when using an AUTOTRAK™ board; room for 20 satellite element sets; user friendly data entry;



INFO SELECT is one solution to the problem of managing so-called random information, being on the leading edge of the new personal information manager class of software. The successor to the earlier Tornado note-based information manager, INFO SELECT is priced at \$99.95. (Photo courtesy Micro Logic Corp.)



Shown here is a typical INFO SELECT screen displaying a variety of information you might need during the course of a day, presented in a number of so-called "intelligent windows." (Photo courtesy Micro Logic Corp.)

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which can be scooped into a conventional database with its rigid structure.

A PIM such as INFO SELECT can help you deal effectively with this daily hodgepodge of information, giving you better access to it and allowing you to see new relationships among your information. The program allows you to manage these "random bits of information" (up to 64,000 items) for a variety of applications.

As a PIM, INFO SELECT has some excellent features that recommend it. Some of these include phone dialing, wordprocessing, and database functions; a computational capability; and presentation of overviews of your information. Other features include sorting and hypertext capability, a date tickler, line drawing, mail merge, auto date stamping, infobases up to 10 MB, "fuzzy" searching, expanded memory support, and over 200 other features. The program is fairly easy to learn, since it uses a data structure that is analogous to the familiar "stacks of paper" in which we tend to accumulate information. The so-called window-stack structure INFO SELECT uses also seems to work better than other structuring and organizational schemes for many users.

INFO SELECT can be run memory resident if you like so that you can access and process random facts while using other programs. A particularly nice toss-in is the swap utility, which allows the program to have an effective conventional memory size of only 7K, conserving precious computer RAM. This feature is particularly handy if you have other RAM-resident programs loaded in the background on your PC.

The program is priced at \$99.95; current Tornado owners should ask about a special trade-up offer. For more details, contact Micro Logic Corp., P.O. Box 70, Hackensack, NJ 07602. Fig. 2 shows one of the program's help screens.

and extensive documentation. The program is \$35; more information is available for an SASE to RLD Research, McCloud, CA 96057.

INFO SELECT. This commercial IBM PC program, which falls into the relatively new class of software known as "PIMs," or personal information managers, is a direct descendant of Tornado, a note-oriented PIM marketed by Micro Logic. We briefly reviewed two different versions of Tornado, one in the January 1988 column and another in the July 1988 column.

Okay, so what is a PIM? It's a special sort of

database (an "infobase") that allows you to readily enter, retrieve, analyze, and cross-reference data, not only numbers but also words. The kind of information the PIM is designed to handle is, as its name suggests, personal information, random bits of information you encounter every day, such as notes, names and addresses, telephone message slips, parts lists, project plans, magazine article notations, lecture notes, or even QSO logging information scribbled on the back of a scrap of paper. This type of information doesn't easily fit into well-defined formats as does some data

A Special Note

Your Antennas & Accessories column is largely a clearinghouse of information. While we publish prices, specs, and often even shipping information, several months elapse between the time we write up the information for the column and the time you read it. A great deal can, and often does, change in the meantime. Thus, we expect that you will first contact the offerer to confirm current availability, specs, and prices. We don't intend that you send money, sight unseen, for any product we mention in the column. Be sure to contact offerers first and carefully evaluate their product literature before committing yourself to purchase.

Also, please include an SASE or IRCs when writing to us if you expect a personal reply. Thanks!

Wrapping It Up

That's all the space we can reasonably take up this month, gang. Next time, more Antennas & Accessories topics of interest. See you then.

Overheard: Murphy's Fourth Law is such that if there is a possibility of several things going wrong, it's the one which will cause the most damage which will be the one to go wrong. That of course is followed by Murphy's Fifth Law, which holds that if anything cannot go wrong, it will anyway!

73, Karl, W8FX

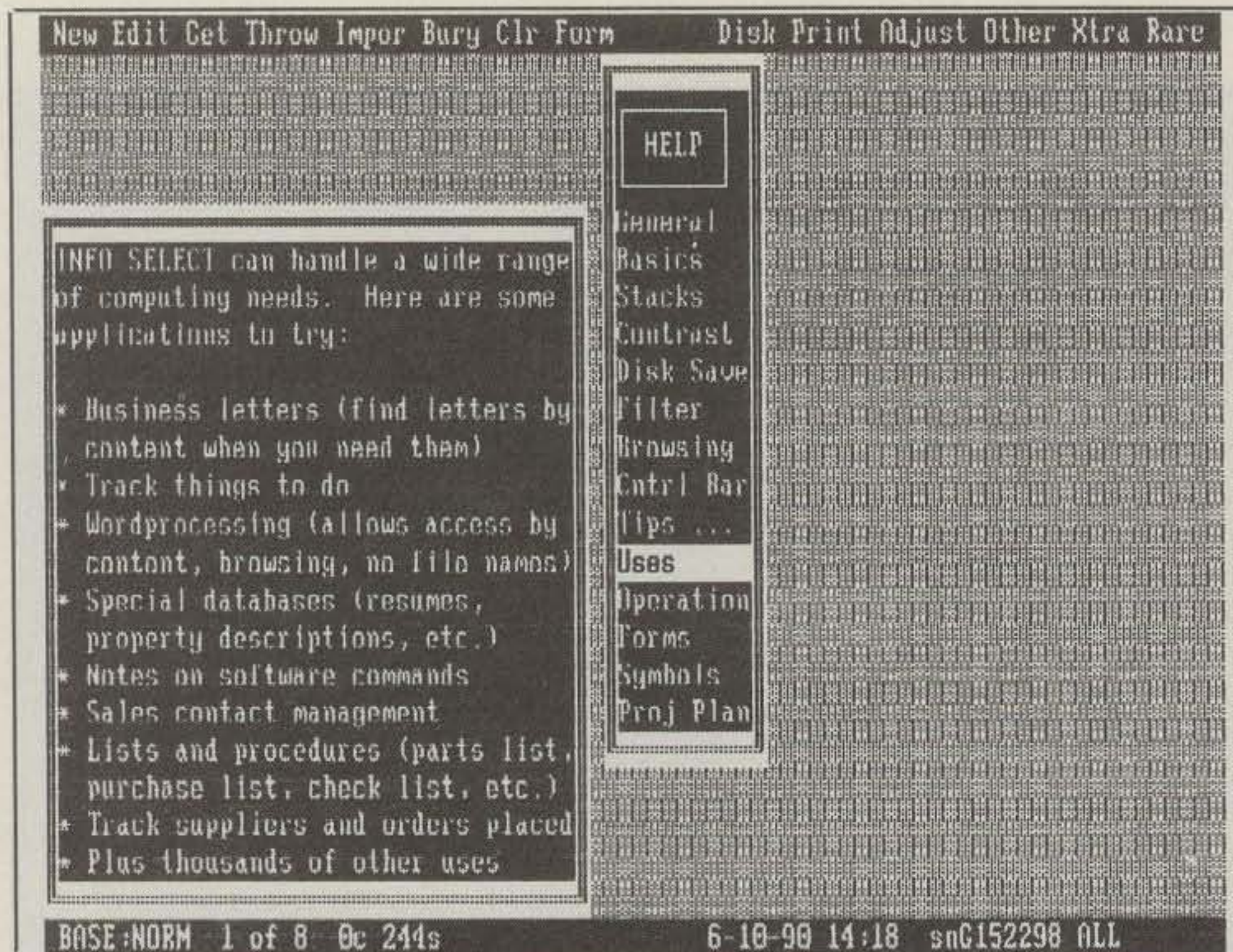


Fig. 2- INFO SELECT is a personal information manager (PIM) that can handle a wide variety of computing needs, including tracking things to do, planning projects, writing and organizing correspondence, taking notes, cataloging descriptions of objects, and organizing names and addresses, to name but a few. Shown here is one of the program's many help screens, accessed from a pull-down menu.

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T14	2.00"	10	35	21	T42	4.00"	32	70	40	T54	1.57"	113	225	275
T12	1.25"	40	35	28	T44	4.00"	40	70	40	T52	2.00"	120	400	340
T10	1.00"	50	35	28	T46	4.00"	40	70	40	T50	2.00"	120	400	340
T08	0.75"	75	40	35	T48	4.00"	40	70	40	T48	2.00"	120	400	340
T06	0.50"	150	35	28	T50	4.00"	40	70	40	T46	2.00"	120	400	340
T04	0.25"	300	35	28	T52	4.00"	40	70	40	T44	2.00"	120	400	340
T02	0.125"	600	35	28	T54	4.00"	40	70	40	T42	2.00"	120	400	340
T01	0.0625"	1200	35	28	T56	4.00"	40	70	40	T40	2.00"	120	400	340
T00.5	0.03125"	2400	35	28	T58	4.00"	40	70	40	T38	2.00"	120	400	340
T00.25	0.015625"	4800	35	28	T60	4.00"	40	70	40	T36	2.00"	120	400	340
T00.125	0.0078125"	9600	35	28	T62	4.00"	40	70	40	T34	2.00"	120	400	340
T00.0625	0.00390625"	19200	35	28	T64	4.00"	40	70	40	T32	2.00"	120	400	340
T00.03125	0.001953125"	38400	35	28	T66	4.00"	40	70	40	T30	2.00"	120	400	340
T00.015625	0.0009765625"	76800	35	28	T68	4.00"	40	70	40	T28	2.00"	120	400	340
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T00.0001220703125	0.00000762939453125"	9830400	35	28	T82	4.00"	40	70	40	T14	2.00"	120	400	340
T00.00006103515625	0.000003814697265625"	19660800	35	28	T84	4.00"	40	70	40	T12	2.00"	120	400	340
T00.000030517578125	0.0000019073486328125"	39321600	35	28	T86	4.00"	40	70	40	T10	2.00"	120	400	340
T00.0000152587890625	0.00000095367431640625"	78643200	35	28	T88	4.00"	40	70	40	T08	2.00"	120	400	340
T00.00000762939453125	0.000000476837158203125"	157286400	35	28	T90	4.00"	40	70	40	T06	2.00"	120	400	340
T00.000003814697265625	0.0000002384185791015625"	314572800	35	28	T92	4.00"	40	70	40	T04	2.00"	120	400	340
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T00.00000095367431640625	0.000000059604644775390625"	1258291200	35	28	T96	4.00"	40	70	40	T00	2.00"	120	400	340
T00.000000476837158203125	0.0000000298023223876953125"	2516582400	35	28	T98	4.00"	40	70	40	T00	2.00"	120	400	340
T00.0000002384185791015625	0.00000001490116119384765625"	5033164800	35	28	T100	4.00"	40	70	40	T00	2.00"	120	400	340

Toroid cores are used in most radio frequency projects because of their relative small size. EMI/RFI filters are made with a core in the interference's frequency range. The suffix of each core (eg. -2 or -4) indicates the mix.

- 2 mix - Maximum Q range: 25-10 MHz. Permeability (mu)=10. All transformers below 10 meters.
- 4 mix - Maximum Q range: 2-30 MHz. Permeability (mu)=8.5. All transformers to 10 meters.
- 17 mix - Maximum Q range: 20-200 MHz. Permeability (mu)=4.0. All transformers: HF-VHF.
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* Note: Toroids operate at 4 to 100 times the stated frequency range with reduced Q and efficiency.

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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for December:

**W.R. "Woody" Crane, N0CYB
USA-CA All Counties #637
All CW, 10-12-89**

"I was first licensed as a radio amateur in 1934 with the call W9CUF. I was relicensed in 1975 with my present call. In the interim I spent a career in the fields of radio and TV communication, including 30 years as Chief Engineer WGN, WGN-TV, Chicago. Other work included Engineer, RCA Manufacturing; Broadcast Engineer, WGN Chicago; and Engineer, U.S. Signal Corps during WW II. I was widowed in 1975. I have one son, Tom.

"I suspect that most county hunters slipped unknowingly into the network. Such was the case with me while I was on my way to Orlando, Florida from Chicago to attend a reunion of station WGN employees. Accidentally I got on the CW net frequency of 14066.5 MHz where KA4IFF was my first CH QSO. She followed me all the way to and from Florida, and by the end of the trip I was a county hunter. That was six years ago.

"Anyone who has done much mobiling is bound to have had some adventures, both pleasant and otherwise. My worst 'otherwise' occurred in upper Minnesota. At 8 AM one morning I started the day, and 15 minutes later I was more than startled to have a deer appear on the windshield as he tried to jump over the car. As he went over the car, the driver's side window disappeared, as did the rear window. The front window looked like a spider web, but it was intact. The antenna was scattered along the highway. Needless to say, the deer never knew what happened. The game warden was then called. I taped the antenna together, and even though it was horizontal instead of vertical, I headed home, being constantly reminded that it was cold and raining. There was an \$1800 bill for the insurance company to pay. Free advice: If you ever are approaching a deer 'frozen' in its tracks, honking your horn is the way to move him. I didn't have a chance to do this, as I didn't see the deer until he hit the windshield.

"Another time, in a small town in southern Missouri, I stopped for a bite to eat. When I tried to leave, the car wouldn't move, and I discovered I had a broken ax-



W. R. "Woody" Crane, N0CYB, USA-CA All Counties #637, All CW.

le. Usually such things happen on Sunday, but I was fortunate. It was a Tuesday at 3 o'clock. By 4 PM the next day it had been repaired. I learned what 'bed time' stories are told on daytime television. It's a good thing the kids are in school.

"Another adventure: After a long day of mobiling I pulled in to a motel. I had my shoes off at the time. Another car pulled in and by the time I got my shoes on and up to the desk, the last room was taken. To this day, Norm, W6NNV, always reminds me to 'keep my shoes on' at the end of the day.

"One time I ran out of gas in the real boonies of Arkansas. I was fortunate to have a car come by and stop to see why I was stopped. The fellow had a gallon of gas, which he gave me at no charge, with the stipulation that I do the same if I ran across someone out of gas. I had an opportunity to do just that a few weeks later in Kansas City. I witnessed the same incredulous look that I must have expressed when it was my turn.

"When you have been a county hunter for a while and have attended a couple of conventions, you truly appreciate what a fine bunch of people county hunters are. —73, Woody, N0CYB."

USA-CA Honor Roll

3000		1500	
K7OQZ	700	K7OQZ	928
K2POF	701	K2POF	929
KG8I	702	WY4B	930
KA1LSD	703	N7LWX	931
		KA1LSD	932
2500		1000	
K7OQZ	777	K7OQZ	1126
K2POF	778	K2POF	1127
KA1LSD	779	KA1LSD	1128
2000		500	
K7OQZ	843	K7OQZ	2438
K2POF	844	J6DX	2439
WY4B	845	TI2JP	2440
OK1DKS	846	CT1AHU	2441
KA1LSD	847	KA1LSD	2442
KU0A	848	KB0FQC	2443
		LU7HJM	2444

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.

USA-CA Special Honor Roll

Alvin J. Thinnis, K7OQZ
USA-CA All Counties #672
All SSB, 8-2-90

Wilbur R. C. Lewis, K0OJG
USA-CA All Counties #673
Mixed, 8-2-90

Jerry Burkhead, N6QA
USA-CA All Counties #674
All CW, 8-3-90

William R. Corp, K2POF
USA-CA All Counties #675
Mixed, 8-20-90

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

Dave Lombard, KA1LSD
USA-CA All Counties #677
All 20M SSB, 8-27-90

E. W. "Gene" Nadolny, W2FXA
USA-CA All Counties #578, 8-16-88
Endorsed All CW, 8-11-90

Louis Hubert, K8IXU
USA-CA All Counties #628, 7-29-89
Endorsed All 20M, 8-29-90

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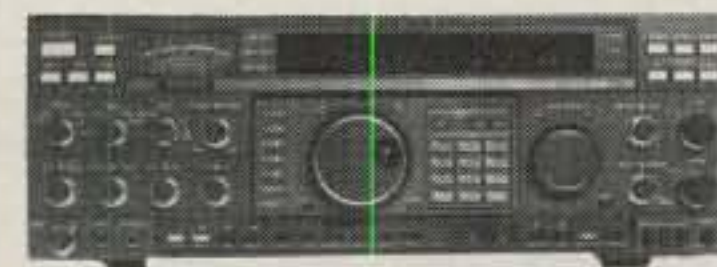
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Awards Issued

Alvin J. Thinnis, K7OQZ, submitted his application, along with a completely filled record book, and received USA-CA All Counties #672, USA-CA 3000 #700, USA-CA 2500 #777, USA-CA 2000 #843, USA-CA 1500 #928, USA-CA 1000 #1126, and USA-CA 500 #2438, All SSB, dated 8-2-90.

William R. C. Lewis, K0OJG, collected his final confirmations and claimed USA-CA All Counties #673, Mixed, dated 8-2-90.

Jerry Burkhead, N6QA, completed his quest and received USA-CA All Counties #674, All CW, dated 8-3-90.

William R. Corp, K2POF, rounded out his complete set of confirmations and received USA-CA All Counties #675, USA-CA 3000 #701, USA-CA 2500 #778, USA-CA 2000 #844, USA-CA 1500 #929, and USA-CA 1000 #1127, Mixed, dated 8-20-90.

Harry H. Incho, N2CWG, continued his brass pounding to qualify for USA-CA All Counties #676, All CW, dated 8-25-90.

Dave Lombard, KA1LSD, was another to do it all in one big jump by claiming USA-CA All Counties #677, USA-CA 3000 #703, USA-CA 2500 #779, USA-CA 2000 #847, USA-CA 1500 #932, USA-CA 1000 #1128, and USA-CA 500 #2442, All 20M SSB, dated 8-27-90.

E. W. "Gene" Nadolny, W2FXA, USA-CA All Counties #578, 8-16-88, received an All CW endorsement dated 8-11-90.

Louis Hubert, K8IXU, USA-CA All Counties #628, 7-29-89, added an All 20 Meter endorsement dated 8-29-90.

Bob Matthews, KG8I, received USA-CA 3000 #702, Mixed, dated 8-20-90.

William B. Aab, WY4B, added to his good record by claiming USA-CA 2000 #845 and USA-CA 1500 #930, All SSB, dated 8-20-90.

Karel Sokol, OK1DKS, received USA-CA 2000 #846, All SSB, dated 8-23-90.

Nelson Moyer, KU0A, received USA-CA 2000 #848, All SSB, dated 8-27-90.

Charles "Bart" Bartlett, N7LWX, submitted his good application for USA-CA 1500 #931, All 20M SSB Mobiles, dated 8-21-90.

USA-CA 500 certificates went to:

Alvin J. Thinnis, K7OQZ, USA-CA 500 #2438, All SSB, 8-2-90.

Southwest Ohio DX Association, J6DX, USA-CA 500 #2439, All CW, No Mobiles, 8-6-90.

Jose Pastora, TI2JJP, USA-CA 500 #2440, Mixed, 8-13-90.

Carlos Alberto Pinto Moreira, CT1AHU, USA-CA 500 #2441, All SSB, 8-13-90.

Dave Lombard, KA1LSD, USA-CA 500 #2442, All 20M SSB, 8-27-90.

Dave W. Crutchfield, KB0FQC, USA-CA 500 #2443, Mixed, 8-30-90.

Aurelio Jose Maria De La Vega, LU7HJM, USA-CA 500 #2444, All 10M SSB, 8-31-90.

Awards Available

Japan Award Hunters' Group (JAG). Membership of the JAG is open to all interested in amateur radio award hunting. The purpose of the group is as follows:

1. To promote the general welfare of amateur radio in the world.

2. To encourage fellowship among members.

3. To contribute to the improvement of wireless science and culture in the world.

The group publishes a magazine (club news); issues awards; helps improve wireless science; holds festivals; honors members for outstanding achievements; holds meetings of members; exchanges information about awards; announces the ranks of award hunting; and conducts other activities that are necessary to achieve its purposes.

To become a member of JAG you must be a member of your own country's amateur radio league, be interested in amateur radio, have the desire to earn awards, and have more than 20 awards that this group recognizes, including more than one award issued by this group and more than one award issued by the JARL (other than awards issued by a local office or branch of the JARL).

The annual membership fee is 10 IRCs, or 1000 Yen. Send membership application, with award list and fee, to JR1DOQ, Kazuya Mitsuhashi, 882 Nakazawa Kamagaya, Chiba 273-01, Japan.

JAG Awards include the following.

The Samurai Award. Work five members of the JAG. Send application with certified list and 10 IRCs to Award Manager JA1JKG, T. Hosogai, 3095 Yanokuchi, Inagi-city, Tokyo 206, Japan.

Worked Japan 1st Call Area Award. This award may be applied for by all licensed radio amateurs and SWLs who can prove contacts with 500 stations of



The Samurai Award sponsored by JAG, the Japan Award Hunters Group.



Worked Japan 1st Call Area Award offered by the Kanto Award Hunters Group.



Worked Japan 1st Call Area Award available from the Kanto Award Hunters Group.

the JA1 area. You may include special calls such as 8J1HAM, 8J1XPO, etc., but not 8J1RL, 8J1RM. One station may be counted on each band. Endorsements are available for each additional 500 stations and you will receive a special shield.

Worked Japan 1st Call Area Award II. This award may be applied for by all licensed radio amateurs and SWLs who can prove contacts with 100 stations of the JA1 area, including 8 prefectures as follows: Tokyo, Kanagawa, Chiba, Saitama, Ibaraki, Tochigi, Gunma, and Yamaguchi.

World Wide Award. This award may be applied for by all licensed radio amateurs and SWLs who can prove contacts with a total of 601 stations; 100 in AF, 100 in AS, 100 in EU, 100 in NA, 100 in SA, 100 in OC, and 1 in Antarctica. For this award, as well as the 1st Call Area Awards, send only QSL list to Award Manager JA1CKE, Yukio Hoshino, Kanto Award Hunters

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クラスI 千葉県全市区町村
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British Post Codes Award. The Civil Service Amateur Radio Society in Westminster, London, England, is marking 1990, the 150th anniversary of the issue by the British Post Office of the Penny Black, the world's first adhesive postage stamp, with the introduction of a new award based on working (or hearing) the various Postcode areas of the UK. The Postcode Area is that represented by the initial letter or letters which precede the first numeral in the postcode of the ad-

dress from which the station worked (or heard) is operating. In most cases the Postcode or the name of the Postcode Area is shown in the station's entry in the 1990 RSGB Callbook, and a list and map of Postcode Areas will be found on pages 2 and 3 of that edition. Following is a summary of the rules.

1. The award is for working the various UK Postcode Areas on or after 6 May 1990 (150th anniversary of the Penny Black) and is issued in three classes: Gold (all 120 Postcode Areas), Silver (100 Areas), and Bronze (75 Areas). A QSO with a CSARS HQ callsign (G1CSR, G3CSR, GB0CSR, GX1CSR, or GX3CSR) may be substituted for one unworked Postcode Area.

2. General awards in any class can be claimed for any combination of licensed modes and bands (whether HF or VHF and including WARC bands), but the award can be endorsed for single mode, VHF only, single band, etc.

3. Contacts via repeaters or with stations not operating from a postal address do not count.

4. QSOs may be made from any one or more postal addresses from which the applicant is permitted to operate using the same callsign.

5. QSLs are not required and should not be enclosed with applications.

6. Applications should show callsign, name, and full postal address (including postcode where applicable) of the applicant and a list of claimed QSOs showing Postcode Area, callsign, date, band, and mode. Also included should be a declaration, signed by the applicant and countersigned by two other licensed amateurs, that the claimed QSOs conform with the relevant entries in the applicant's log.

7. The award is also available to SWLs on a "heard" basis.

8. Applications, together with a fee of 3.00 pounds or \$4.00 U.S. or 12 IRCs, should be sent to Civil Service Amateur Radio Society, Civil Service Recreation Centre, Monck Street, London, SW1P 2BL, England.

A full copy of the rules, together with an application form and a list and map of Postcode Areas, may be obtained by sending an SASE, or an SAE plus adequate return postage, to the above address.

Potential applicants are invited to join a Postcode net on the first Monday in each month at 1200 UTC on 7.080 MHz (minus 5-10 kHz QRM) and at 1630 UTC on 144.375 MHz (plus QRM). For an initial period, beginning on the first Monday in November 1990, these nets will be controlled by the CSARS club station using callsign G1CSR on 2 meters and GX3CSR on 40 meters.

Barcelona Olympic Games Award. On the occasion of the Olympic Games "Barcelona 92" and as a celebration of

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this event, "Olympiada Cultural Barcelona-92" and Radio Club BAIX Penedes have organized an award for radio amateurs under the following rules.

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

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

3. Mode—All modes are permitted.

4. Band—All HF bands are permitted.

5. Duration—Time limits are from September 1990 until the last day of the Olympic Games, 9 August 1992.

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

7. Areas—To be entitled to a diploma, these scores are needed: Spain, Balearic, Portugal, and Andorra 70 points; Europe, Africa, Canary, and Azores Islands 50 points; Asia and Americas (North and South) 30 points; Australia 10 points.

8. Call—The call will be "CQ CQ CQ BARCELONA 92."

9. Lists—Participants will only send

the numbered label of the QSL cards, including their call with the serial number. Logs will only be accepted if they are fully certified by the association or corresponding radio club. The postal address to which labels and lists are to be sent is Radio Club Baix Penedes, Box 250 - 43700 El Vendrell, (Tarragona) Spain.

10. Remittance—Diplomas will be sent free of charge.

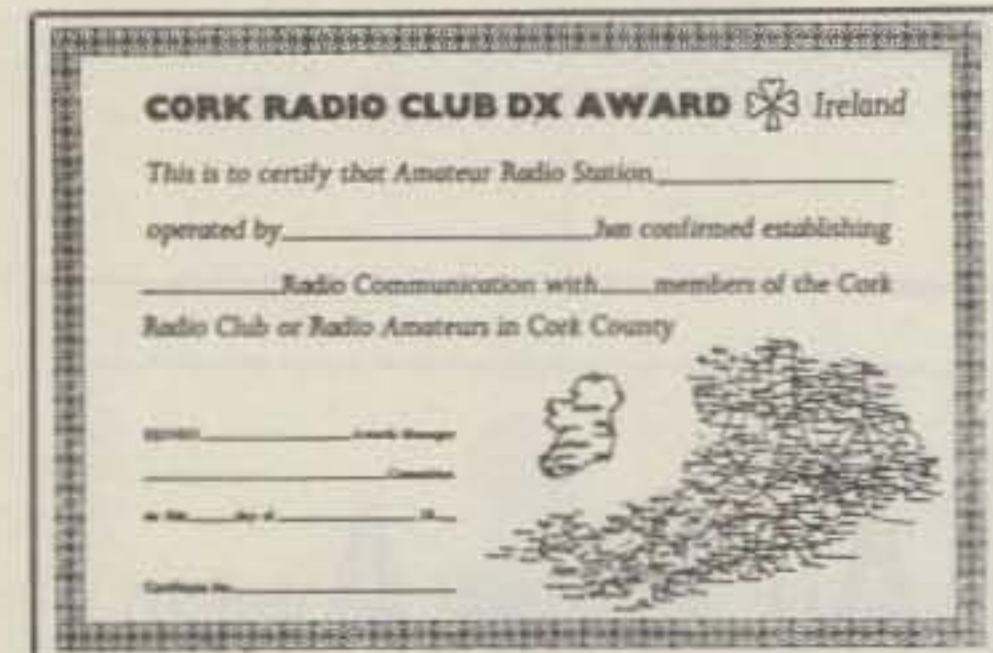
11. Any violation of these rules in any way, any unsportsmanlike conduct, or any failure to follow amateur radio rules and legislation can cause disqualification. Judgments by Olimpiada Cultural Barcelona 92, COOB 92, or Radio Club Baix Penedes will be final and unappealable.

CXCW Award. The CXCW Award is issued by the Grupo Uruguayo De Telegrafia for all radio amateurs. To qualify, make five confirmed QSOs after August 1989, in CW mode, any band, with amateur radio stations in Uruguay. Three of the QSOs must be with member stations of the Grupo Uruguayo De Telegrafia (Uruguay's Telegraph Groupe).

Members of the group are: CX3AN, CX3AW, CX4AW, CX5AAI/YL, CX3BH, CX5BW, CX6BM, CX7BBB, CX7BY,

CX7BBU, CX5BBI, CX8BBH, CX4CO, CX4CQ, CX9CJ, CX9AU, CX6CV, CX3DD, CX2DF, CX2DK, CX8DR, CX1DX, CX2ET, CX3EU/QRP, CX3GR, CX4GL, CX1JM, CX4LO, CX3MA, CX4SB, CX4SS, CX4VA/YL, CX5CO.

Send log verified by your local radio club or national award manager (do not send QSL cards), with 6 IRCs, to the manager, Alberico Lopez, CX4GL, 75001 Palmitas. Dp. Soriano, Uruguay.



Cork Radio Club DX Award sponsored by the Cork Radio Club DX Group, Ireland.

Cork Radio Club DX Award. The Cork Radio Club DX Award is sponsored by the Cork Radio Club DX Group. It was introduced in May 1982. To date 150 awards have been issued to stations representing all 6 continents and 41 countries. The award is available to licensed amateurs and shortwave listeners.

Contacts must be made with members of the Cork Radio Club or EI stations in County Cork. DX stations need two contacts; European stations need three contacts; EI/G stations need four contacts. Any band, any mode may be used. QSL cards are not required.

Send certified copy of the log, showing callsign, name, date, time, band, and mode used to the Award Manager, W. O'Reilly, EI8AU, Mount Oval, Rochestown, Co. Cork, Ireland. The fee for the award is 6 IRCs, or \$4.00 US first-class airmail. Every effort will be made to meet claims where insufficient funds are enclosed, and a fund has been set up for this purpose. Also, the award manager advises that for countries where funds or IRCs are not available he will accept *unused (mint) postage stamps*, to a value of 2 pounds sterling or \$4.00 US, catalog price.

The award may be endorsed 2 x SSB, All CW, etc. The certificate shows a map of County Cork at the lower right-hand corner. All printing is in black on a cream-colored, good-quality card. The border and shamrock are in green. The size is 210 mm x 296 mm.

Happy Holidays! See you again next month.

73, Dorothy, WB9RCY

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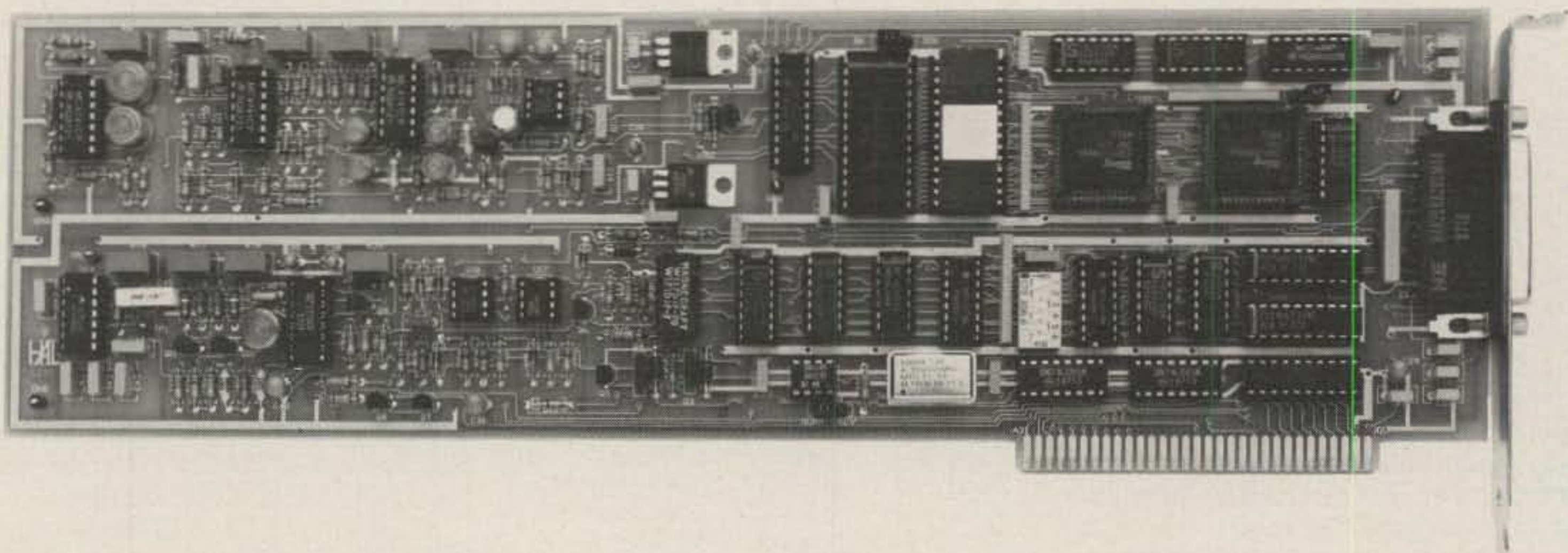
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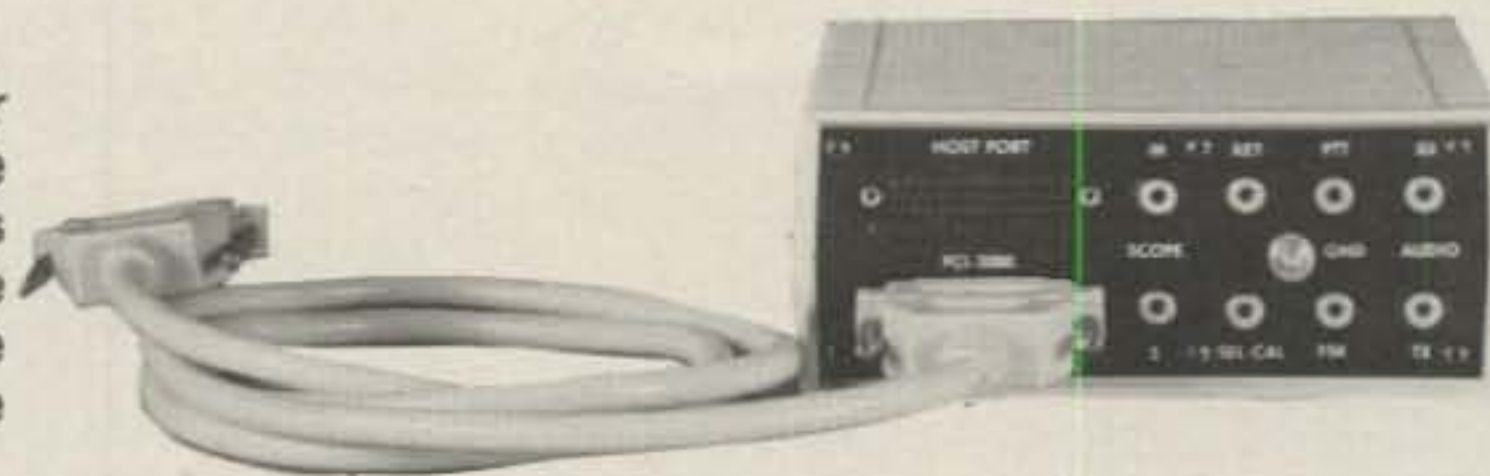
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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Great Moments in Sport

There have been some great moments in the world of sports. The dynasty of the Boston Celtics, Mark Spitz's gold medal dominance in olympic swimming, and Pele's soccer career are just a few that come to mind.

Although contesting has a long way to go before it ranks as a "spectator sport," its competitive nature can be compared to the excitement of an Oakland Athletics World Series game. The recent events at the World Radio Team Championship in Seattle have given new credence to the term "contest sporting." For contesters, competitive operating is a sport in the true sense of the word. We train by practicing in smaller contests and sharing operating techniques. Our focus on superior equipment/antennas is not unlike an olympic runner using the best pair of Nike shoes money can buy.

Over the years there have been remarkable achievements in contesting, which enticed me to write about "Our Greatest Moments in Sport." To add credibility to the exercise, I polled the opinions of over 40 experienced contesters. Albeit their profiles varied in terms of specific operating accomplishments, focus, and expertise, they collectively have a passion for the sport and have enough stories to keep us entertained for hours.

The Results

What follows is a summary of the comments I received from our elite and respected group of contesting's finest! Please don't construe some of the stories as personal boasting. I specifically asked each contributor to include his own experiences as well as others. In any event, I think you'll enjoy their recollections as much as I did.

Len Chertok, W3GRF. Len, along with many others, reflected on the achievements of Vic Clark, W4KFC.

Vic's accomplishments put him into a class by himself as he operated from a station using a 3-element 20 meter Yagi at 80 feet, and 15/10 meter Yagis on a 60 foot tower. His low-band antenna was nothing more than a single long wire.

Calendar of Events

Nov. 24-25	CQ WW CW DX Contest
Nv.30 -De. 2	ARRL 160M Contest
Dec. 1-2	Telephone Pioneers QSO Pty.
Dec. 1-2	TOPS CW Activity 3.5 MHz
Dec. 8-9	ARRL 10M Contest
Dec. 9	ARCI QRP CW Sprint
Dec. 30	CARF Canada Winter Contest
De.31 - Jn. 1	ARRL Straight Key Night
Jan. 5-6	ARRL RTTY Roundup
Jan. 12-13	N.A. QSO CW Party
Jan. 19-20	N.A. QSO SSB Party
Jan. 19-20	Mich. QRP Club CW Contest
Jan. 19-21	ARRL VHF Sweepstakes
Jan. 25-27	CQ WW 160M CW Contest
Jan. 26-27	YL-ISSB YL/OM CW Contest
Jn.26 - Fb. 3	ARRL Novice Roundup
Feb. 9-10	QCWA CW Party
Feb. 16-17	ARRL DX CW Contest
Feb. 22-24	CQ WW 160M SSB Contest
Mar. 2-3	ARRL DX SSB Contest
Mar. 8-10	Japan Int'l CW DX Contest
Mar. 9-10	QCWA SSB Party
Mar. 30-31	CQ WW WPX SSB Contest

Vic and I were the only W's to ever make a world high score in the CQ WW from the United States.

There was the time that I built an antenna for Vic in the middle of the DX contest to later learn that he was beaten on that band by his own generosity.

Breaking into the high-sixty QSOs/hour for the first time from W3GRF.

Lew Gordon, K4VX/0

Vic Clark reflecting on DXCC as "a contest for slow operators."

Hearing Fred Laun at HS1ABD from PJ9JR at 4 AM local running JAs with no beam-heading discrimination. His signal came down from the heavens.

My 360 hour at PJ9JR on 10 meters in 1978 only to have it claimed by the 15 meter operator!

Following a successful new M/M record at PJ9JR, Don Search was seen dancing on the table at the Coral Cliff Hotel after having one too many "Peter Styvesants."

Gene Zimmerman, W3ZZ, doing his Count Dracula routine while passing out "59 Transylvania" from W4BVV.

Randy Thompson, K5ZD

N2LT making USA Top Ten in CQ WW and ARRL DX Contests 66 of 68 possible times over the past 17 years.

VP2E makes 10,000-plus QSOs as Multi-Single in ARRL DX Contest in one weekend.

K7JA wins SS CW 4 times (1971-76) and SS Phone 5 times (1970-75). That was both modes in 1971-73!

Scott Redd, XE1IJ (also known as K0DQ), making over 10,000 QSOs from Mexico as a Single Op in the two-week-end 1974 ARRL DX SSB Contest.

K5ZD winning SSCW 4 times in 5 years (1981-86).

K5ZD does a 385 hour from NP4A in 1982 CQ WW Phone.

K7JA (at KV4FZ) battles W0UA (at W0TR) to the wire in the 1976 SS Phone. Probably the most exciting "one-on-one" finish in contesting history. W0UA wins by only a few QSOs.

Mike Wetzel, W9RE

The impact K1EA's CT Contest Logging program has had on the face of contesting.

The incredible improvement in operating skills and stations over the years considering how K5MDX's 330 QSOs in 1962 rates as just a few hours of casual contest operating today.

W9RE asking his wife on the telephone to delay the labor/birth of their son Jay at the hospital so that he could finish his European run in the 1981 CQ WW CW Contest. She did!

Stu Santelman's (KC1F) remarkable 6.4M-plus record score in the 1988 CQ WW SSB Contest and 220 hour on 10 meters into Europe.

Pete Chamalian, W1RM

There was the time when I drove through a driving snowstorm before the 1972 ARRL DX CW Contest to find an infinite SWR on 20 meters at the station. Soaked to the bone, I climbed the tower and repaired the antenna, beginning the contest at 0015Z. That was the first time I won Single Op/USA in that contest.

My memories of Vic Clark include an ARRL DX Contest back in the days of quotas. Everyone was running around calling stations. Vic on the other hand was the only station that had hordes of Europeans calling him even as he attempted to call others.

My first single band effort was in the 1979 CQ WW CW Contest. Just as I was about to take a nap I made a quick check of the long path. After a VK6 answered my call through a EU pile-up, I later worked a

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You also get peak performance at different power levels from one end of the band to the other.

Ball bearing vernier reductions drives on both the plate and load control makes tuning precise and easy.

3-500Z Tube in shielded RF compartment gives you nearly 70% efficiency

You get the rugged time proven 3-500Z tube with an estimated life of 20,000 hours ICAS. That's nearly 20 years operating 20 hours a week -- you may never have to replace your tube.

The AL-80A is built on a rugged steel chassis. It has a separate RF compartment that's fully shielded to keep unwanted RF from leaking out. This keeps RFI and TVI to an absolute minimum.

A superb RF design and layout, a Hi-Q tank circuit and commercially rated RF power components give you nearly 70% plate efficiency over the entire operating range. This puts maximum power into your antenna instead of heating up your amplifier.

A whisper quiet internal computer style fan draws in cool air over the power supply components and blows it around the 3-500Z tube. This removes excessive heat and gives you reliable performance.

Built-in adjustable ALC circuit keeps your exciter from overdriving your AL-80A. The result? A clean signal without flat-topping.

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The guts of the AL-80A is its heavy

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Some competing high priced amplifiers using *two* 3-500Zs *can't* give you much more power output than the AL-80A. Why? Because their lightweight power supplies can't deliver enough high voltage for the tubes.

Step-Start Inrush Protection™

When you first turn on your amplifier, a massive inrush current flows.

Your house lights flicker as you hear a loud "thump" from your amplifier. This terrible inrush current stresses *all* your power supply components to their limits. Your cold tube filament suffers abusive thermal shock.

Eventually, this massive inrush current will damage your amplifier.

The AL-80A special *Step-Start Inrush*

picture of the operating condition of your AL-80A. They let you know right away if there is a problem.

Grid current of the 3-500Z is monitored continuously by one meter. Grid Current indicates proper amplifier operation better than any other parameter.

You also get a multi-meter that measures plate voltage, plate current, *peak* RF watts output and drive power/ALC detector voltage.

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You get a full kilowatt right out of the box -- ready to plug in and bust through QRM in minutes.

A kit could actually end up costing you more than your best price on the AL-80A -- and leave you frustrated if you can't get it to work.

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No other kilowatt amplifier on the market comes with a 2 year warranty. In the unlikely event that there are defects in materials or workmanship, we'll fix it free for 2 years from the date of purchase.

The 3-500Z is covered by the tube manufacturer's warranty.

Commitment to Service

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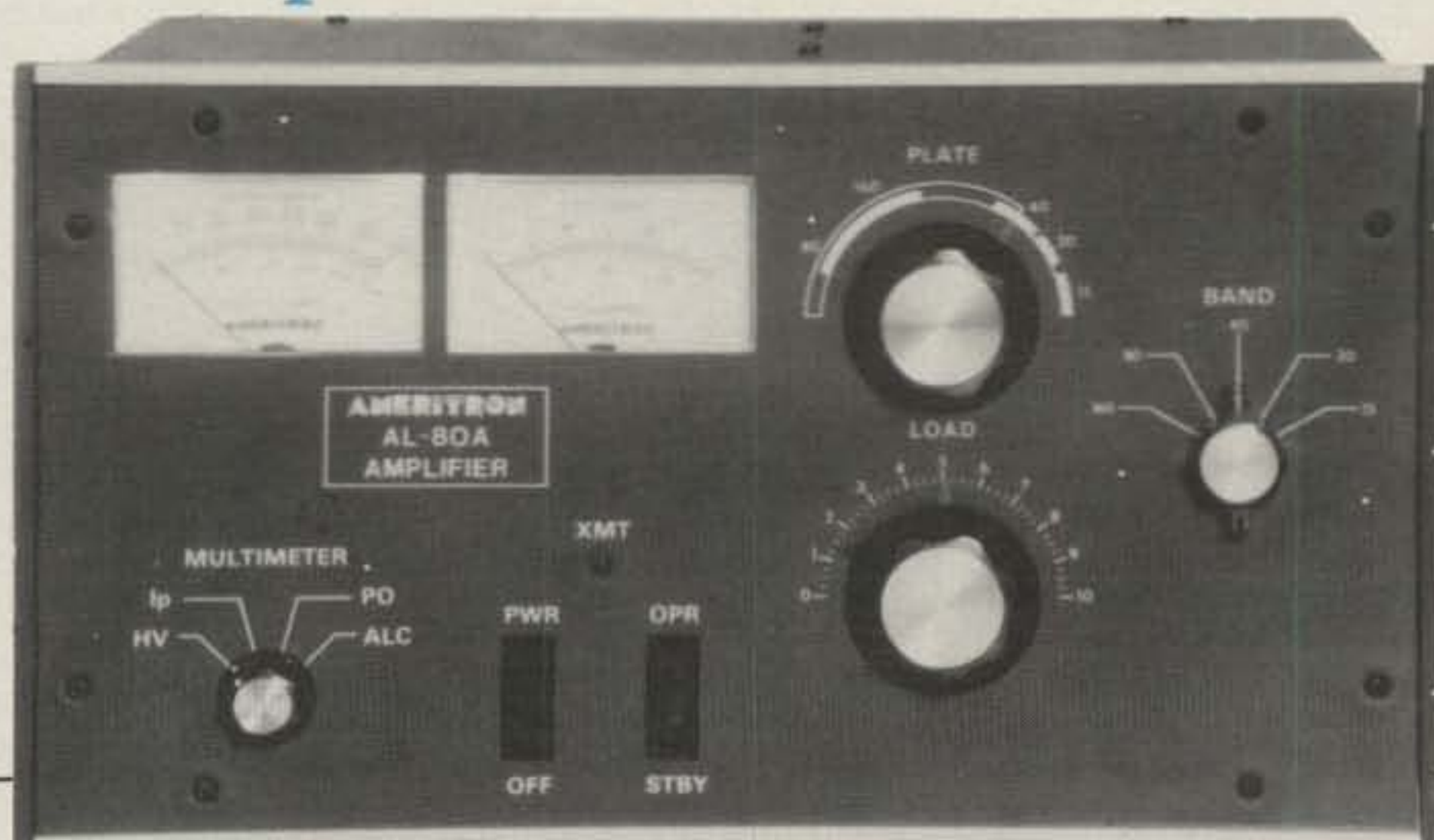
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Don't consider a linear amplifier without this critical protection.

Multi-Voltage Primary protects your amplifier and gives you peak performance

Too high a line voltage stresses components and causes them to wear out and fail. Too low line voltage causes a "soft-tube" effect -- low output and signal distortion.

The Multi-Voltage Primary in the AL-80A transformer lets you compensate for too high or too low line voltage.

With the AL-80A you get the longest component life and peak operating efficiency -- regardless of your line voltage.

Before you buy an amplifier make sure it has a multi-voltage primary.

Dual Illuminated Meters

Two large meters give you a complete

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More Errata 1989 CQ WW

Dave Goodwin, VE2ZP, was incorrectly listed as the Zone 2 winner on SSB. The correct callsign should be VE2LJ with 425,972 points.

The CW QRP score of Phil Krichbaum, W0KEA, was incorrectly placed with the high-power entries. Correctly entered, Phil's score places him number 5 World, and number 3 USA.

The operator listing for VE6OU/3 should be corrected to include VE3OZB (not VE2OZR as printed) in the Multi-Single SSB category.

9V1, UL7, UM8, VU, UA9/0, etc. That was the year that the 15 Meter Single Band record was broken.

Vic Clark on his first trip to Dayton in the middle of a large crowd introduced everyone (many whom he had just met) by full name and callsign to a newcomer who had just wandered over. Now that's a dupe sheet!

Jan Perkins, N6AW

The change in contesting rules over the years. The first DX contest was sponsored by ARRL in 1927. Running for an entire week, scoring was computed by assigning one point/QSO (no multipliers). Certificates were issued to the highest scoring stations. In the 1927 contests, 12 certificates were issued to 11 stations (W6AM received two!).

Rich Strand, KL7RA

I recall running a 2000 foot beverage on 160 meters at night in 40 below weather to work KH6XX. We don't think we ever did work him.

Waded, crawled, and dug my way through 5 feet of snow at midnight to discover why the vertical failed during the 1989 CQ 160 Meter Contest. . . . an exploding snow bank caused by a trailing moose ended that contest for me!

Conditions during the 1980 ARRL 10M Contest were so good that I held the same frequency for 8 hours from KL7 (nearly unheard of in these parts).

John Thompson, W1BIH

Organizing the first of the BIG Multi-Multi DX operations from Curacao for the 1967 CQ WW CW Contest. The world-high score was set that year with a 35 foot bent wire on 20 meters, 12 foot high wire on 80 meters, and a 40 meter ground plane. The group continued to win in 1968-71 until they decided to QRX for a few years to benefit the locals.

Frank Donovan, W3LPL, operating M/M for the first time in the 1974 CQ WW in Curacao, sparking his current interest and dominance in the Multi-Multi class.

Tom Taormina, K5RC

The Great Texas Armadillo Run of 1986 in which a coordinated effort was put

forth to activate every U.S. county during the contest period. The results were nearly 80% successful.

Eighteen continuous years of publishing the *National Contest Journal*.

Rich Smith, N6KT

Gary Caldwell, WA6VEF, winning and setting the USA Single Op All Band record in the 1983 CQ WW Contest from the West Coast.

Tom Frenaye, K1KI, finishing a close second Single Op/All Band from P44A in the 1984 CQ WW SSB with a vertical and dipole antenna.

Danny Eskanazi, K7SS, breaking 3M points at PJ2FR in the 1987 CQ WW SSB running 5 watts QRP!

N6KT winning and setting a record in 1983 CQ WPX SSB from PJ2FR running barefoot after the amplifier failed in the first 8 hours.

N6KT working 367 stations in first hour of 1988 ARRL DX SSB. Total duped QSOs were 9505 (no other single-op had ever broken 8000 contacts).

Joel Chalmers, KG6DX

Conditions during the peak of Cycle 21. HS and 3W both active from Zone 26 in same CQ WW Contest (1988).

World record effort from Oceania by AH0AB on 21 MHz in 1982 CQ WW. This has been historically very difficult from this part of the world.

Greg Cronin, W1KM

The master, W4KFC, consistently breaking 100K in CD Parties with superb operating technique, ears, and signal.

One of my best runs ever on 80 meters when I worked 217 QSOs in 2 hours of operating beginning at 0430Z in the 1986 CQ WW CW Contest. I later went on to win the contest, despite 600 feet of cumulative tower climbing just hours before the beginning of the contest.

Jeff Briggs, K1ZM

One day while working on a 70 foot tower at W1ZM, my climbing belt caught and broke a top guy support (poor quality yellow cable). Gerry reached out and caught the dangling end and said, "We're safe for the moment, but now what?" When we reached the ground later, we were all ready for a new hobby.

Peter Watson, ZL3GQ

Jeff Brigg, K1ZM's operation from ZL3GQ in the 1987 CQ 160 Meter Contest. Pulling weak signals through the noise for the entire first night, Jeff was rewarded with S9 Europeans on Day 2. Jeff's 100K-plus score will probably never be equalled from this part of the world.

Lynn Schriener, W5FO

The consistent performance of Katsushi Nose, KH6IJ, over a long period of time from an average city-sized lot.

The track record of some of contesting's fine Multi-Multis over the years including W3AU, W4BVV, W2PV, K2GL, N5AU, etc.

The incredible accomplishments of Al

Slater, G3FXB, who is still in there making world-class scores.

John Crovelli, W2GD

Dick Norton, N6AA's domination in the CQ WW Contest (both modes) for over a decade.

The record-setting Field Day operations from W2RQ with over 10,000 QSOs each time. Both years the stations were completely installed within 24 hours running the 15A class (15 simultaneous transmitters) with KWs.

6001 QSOs in the 1988 ARRL DX CW from P40GD.

Sweepstakes domination by the Northern California Contest Club.

Winning the 1978 ARRL CW SS from my home station (TH6 at 60 feet, 402BA at 70 feet, 80 meter dipole at 60 feet).

The great "Paper Club" controversy in the 1970s.

My win in the 1976 CD Party from KP4 (a CD Party DXpedition!).

Andy Blank, N2NT

During the Multi-Multi operation at NP4A in the 1980 CQ WW CW, we had a small crew that left us short on 160 meters. Fortunately we had Wayne, one of the local ops, to help. The only problem was that he had long since forgotten how to copy CW. Our instructions were simple: "If you hear any beeps in the headphones, come and get one of us!" We chased a lot of "radio birdies" in the middle of the day that year.

Ron "Sig" Sigimonti, N3RS

Starting small with the goal to be one of the best at what you do. N3RS grew over the years, starting as WN3WJD in 1953, to be a winner in Multi-Single and Multi-Multi, beating the likes of W2PV, K2GL, W3AU, W4BVV in the 70s.

Fred Hoppengarten, K1VR

The 1974 CQ WW SSB Contest included K1EA and K1VR sharing 80 meters at W2PV. Jim, being meticulous, commented to anyone who would listen that he hoped they knew what they were doing, as a "homebrewed" audio/earphone system was installed. We ended up winning the band!

Monday morning after a great effort from KP4EAJ in the 1977 CQ WW CW Contest, Chet was awakened by a State-side ham calling to say a "K9" begged him to contact Puerto Rico to get the final score. The "K9" turned out to be "Willy" at UK9AAN, who was just beginning to hone his skills of dealing with the West.

Dave Siddall, K3ZJ

Overcoming adversity in the form of government bureaucracy and manmade limitations (e.g., preserving historical structure guidelines), along with the generous assistance from Barry Goldwater, the U.S. Senate station, W3USS has remained on the air in contests for over 20 years!

Jim Rafferty, N6RJ

My wins in the ARRL DX SSB Contest

four years in a row from ZF2FL (now ZF2JR).

Being one of the first to publicize the problem of using the last two letters of a callsign in DXing and especially contests. **Clarke Greene, K1JX**

In 1970 a large number of East Coast stations (no big surprise!) filled the Top 10 in the ARRL CW DX Contest. Approximately 5 of them were from the Eastern Massachusetts section. They included W1AX, who had a Classic 33 at 60 feet, a vertical, and some wires. The top 10 also included K2KIR, who used a TA33 at 27 feet and low dipoles for 40/80 meters.

Being ahead of K1AR in the 1982 CQ WW CW Contest by 150 QSOs only to lose power while I was sleeping, thus resetting the alarm clock. Still don't know how John arranged that one!

Operating and winning the 1981 CQ WW Multi-Multi class for the World from W2PV in his last operation. Several of his operators and I had the honor of personally awarding Jim's trophy just days before he passed away. This was one of the most moving experiences I've ever had in contesting.

Bill Tippett, W0ZV

The perennial dominance of K5UR on 160 meters in contests. This is especially significant considering his midwest location.

The horse race between K0RF and N2IC in the 1988 CQ WW SSB Contest. Not intimidated by Chuck's impressive hardware, Steve hung in there to edge out Chuck by only 20K points (out of 3.65 million).

Phil Koch, K3UA

The 231 QSOs/hour achieved by KC1F while operating on 20 meters CW at NP4A in the 1982 CQ WW CW Contest. Pedro's still cleaning up the floor from the scads of small notes containing callsigns that we copied in the pile-up together.

Operating 48 hours straight without sleep in the 1983 CQ WW CW Contest from NP4A without a memory keyer, signing the callsign after every QSO.

N2NT operated 48 straight hours in the 1980 ARRL CW DX Contest. Andy operated most of the last 8-10 hours while standing so that he wouldn't fall asleep in the chair.

It's hard to follow up such a long and exhaustive list of accomplishments such as those described above. A few did come to mind as I did my own reminiscing.

Jeff Brigg's 80 meter Single Band effort from NP4A in the 1988 CQ WW CW Contest. Jeff's 808K score is a record that will likely stand for a long time.

The 1-plus million point 20 meter SSB effort by KC1F in the 1985 CQ WW from K1OX. Stu's score was nearly a world high that year and still stands as a record to be broken.

The big Multi-Multi battles between W2PV and K2GL in the 1970/80s. The competition in those days was some of the most intense that I ever experienced.

The 1985 CQ WW SSB operation from the old QTH of K1AR. Knowing I was about to move to a new QTH in a matter of weeks, I had special motivation to make a good score. That year was the first time a USA Single-Op had broken 4M-plus points, setting a record that has since become commonplace.

The 15 meter "dynamic-duo" of N2NT and K1DG at W2PV and KP2A.

The impact of packet radio spotting and resulting new categories on DX contesting.

NCCC's victory in the 1983 CQ WW club competition. Their club tally resulted largely from an extraordinary effort to organize scores of expeditions around the world for the win!

K5ZD's remarkable 5.5 million score in the 1989 CQ WW CW Contest from K3TUP. Given John's (TUP) distance from the East Coast, this score could be considered more significant than the 6.4 meg SSB effort from KC1F in 1988.

The dominance of the Frankford Radio Club in the DX Contest club competitions over the past 10-15 years. Most noteworthy is their amazing 300-plus million effort in the CQ WW 1989.

The considerable contributions by the operators from Finland in mounting dozens of contest expeditions around the world.

Final Comments

Contesters love nothing more than telling old war stories. The hospitality booths at Dayton speak to that point. Not surprisingly, there was virtually no overlap in the descriptions of great contesting moments offered by the contributors to this month's column. Contest operating is fun. Story telling can sometimes be even better!

Although hard to believe, the holidays are already upon us. It's my desire that you and yours have a safe and joyous time with friends and family. As always, the deadline for the March 1991 Contest Calendar is January 1st.

Happy Holidays! 73, John, K1AR

TOPS Activity Contest 3.5 MHz CW

1800Z Sat. to 1800Z Sun., Dec. 1-2

TOPS is an international club founded in Great Britain in 1946 for the benefit of CW enthusiasts. This year's 3.5 MHz competition is a 24-hour event in which

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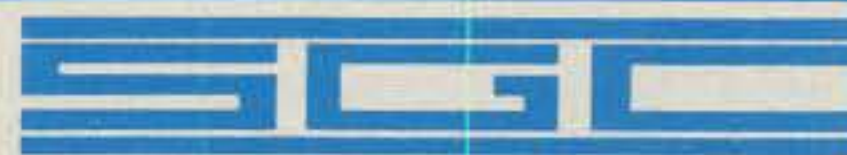
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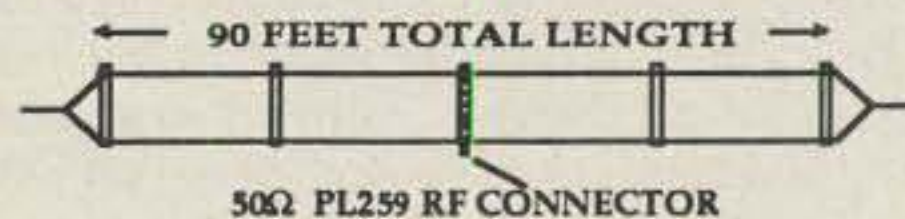
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the participants contact any amateur worldwide. Call "CQTAC" to solicit QSOs.

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 this 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. 8-9

This is the 18th 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 9

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, prov-

ince, and country with two or more entries.

Include a summary sheet showing the scoring, a dupe sheet for entries with 100 or more 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.

ARRL Straight Key Night

1200Z to 1200Z, Dec. 31 to Jan. 1
(7 PM Mon. to 7 PM Tues., 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.

Canada Winter Contest

0000Z to 2400Z Sun., Dec. 30

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: RS(T), name, and QTH. Province, state, or DX country.

Points: 10 points for each VE, VO, or VY contact. Two points for non-VEs, and 20 points for working any CARF official station with the TCA or VCA suffix.

Multiplier: Each Canadian area and territory 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-multi.

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.

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THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle Rises Again!

Bulletin

This issue of *CQ* should reach most readers in time for the CW weekend of the *CQ* Word-Wide DX Contest, November 24 and 25. 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 130 mark, with a 10.7 cm solar flux count expected in the 175 range. The Alpha (A) index for the geomagnetic field is expected to be generally quiet, ranging between 10 and 15. Expect generally High Normal conditions on both Saturday and Sunday, November 24 and 25, with a very good possibility that they may climb to Above Normal at times on Saturday.

Conditions are expected to be good enough so that new contest records may be established on the 10 and 15 meter bands.

Cycle 22 appeared to have reached its peak during July 1989 with a smoothed sunspot count of 159. For one year after this apparent peak the cycle steadily declined. But then it suddenly happened!

The most intense month of Cycle 22 occurred during August 1990. The Royal Observatory of Belgium reports a monthly mean sunspot number of 200 for August 1990. This is the highest monthly mean observed during the entire cycle to date. On August 20th solar activity soared to 295, the highest daily value to be recorded during the present cycle.

The August mean value results in a 12-month running smoothed sunspot number of 153 centered on February 1990. This is an *increase* of three points from the previous month's level.

This sudden increase in solar activity has refueled the controversy among solar experts. This would seem to support those who believe that the present cycle has not yet reached its peak, and that the July 1989 peak of 159 will be exceeded. Other experts feel that this sudden rise is

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for December 1990

Propagation Index.....	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 10, 20-21, 25	A	A	B	C
High Normal: 7-9, 11, 15-16, 19, 22-24, 26	A	B	C	C-D
Low Normal: 3-4, 6, 12-14, 17-18, 27, 30-31	B	C	D	D-E
Below Normal: 1-2, 5, 29	C	C-D	D-E	E
Disturbed: 28	C-D	D	E	E

Where expected signal quality is: A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S0 and S3, and with considerable fading and noise.

E—No opening expected.
3 dB per S-Unit.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be fair-to-poor (C-D) on December 1st and 2nd; good-to-fair (B-C) on the 3rd and 4th; fair-to-poor again on the 5th (C-D); good-to-fair (B-C) on the 6th, etc. Excellent (A) conditions are forecast for Christmas Day.

an isolated case, and that the cycle will now resume its slow decline.

With such a wide difference of opinion among the experts, it is difficult to forecast the level of solar activity to be expected during December. If the sudden increase is an isolated case, a smoothed sunspot number of approximately 130 is expected for this month. If the cycle is indeed on the rise again, a considerably higher level can occur.

The Algonquin Radio Observatory at Ottawa, Ontario reports a monthly mean 10.7 cm solar flux level of 228 for August 1990.

Check the Last-Minute Forecast appearing in this month's column for day-to-day conditions expected during December.

December Band Openings

A high level of solar activity is expected to

take place during this month. This, coupled with seasonally peak levels of ionization in the northern hemisphere during the winter months, should result in generally excellent propagation conditions on all HF bands, and on the 6 meter VHF band as well, during December.

Excellent *daytime* DX openings to all areas of the world should be possible on the 10, 12, 15, 17, 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 15, 17, 20, and 30 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 30, 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 PM in all time zones, and continuing until 3 AM in the EST zone; 1 AM in CST; midnight in MST; and 11 PM 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 PM to 3 AM 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 AM 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

11307 Clara Street, Silver Spring, MD 20902

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

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)*	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)*					
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 (3) 09-10 (2) 10-11 (1) 17-19 (1) 22-23 (1) 23-00 (2) 00-01 (1)	06-08 (1) 18-20 (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) 03-06 (2)	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)*					
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)	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)*					
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)*	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)*					
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 (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)*	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)					
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)*	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)					
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)*	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) 19-21 (3) 21-22 (2) 22-23 (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)*
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)	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)*					

**Dec. 15, 1990 to Feb. 15, 1991
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) 08-09 (2) 09-13 (4) 13-14 (2) 14-15 (1) 09-11 (1)**	06-07 (1) 07-08 (2) 08-14 (4) 14-15 (2) 15-16 (1)	03-06 (2) 06-07 (3) 07-09 (4) 09-10 (3) 10-12 (2) 12-13 (3) 13-16 (4) 16-18 (3) 18-21 (2) 21-23 (1) 23-01 (2) 01-03 (3)	14-16 (1) 16-17 (2) 17-19 (3) 19-02 (4) 02-03 (3) 03-04 (2) 04-05 (1) 17-19 (1)* 19-20 (2)* 20-02 (3)* 02-03 (2)* 03-04 (1)*
Northern Europe & European USSR	07-08 (1) 08-09 (3) 09-10 (4) 10-11 (2) 11-12 (1) 08-10 (1)**	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (4) 11-12 (3) 12-13 (2) 13-14 (1)	04-06 (1) 06-07 (2) 07-09 (3) 09-14 (2) 14-16 (3) 16-18 (4) 18-20 (3) 20-23 (2) 23-02 (1)	17-19 (1) 19-01 (2) 01-03 (1) 19-02 (1)*
Eastern Mediterranean & Middle East	07-08 (1) 08-09 (3) 09-11 (4) 11-12 (3) 12-13 (2) 13-14 (1) 09-11 (1)**	07-08 (1) 08-09 (2) 09-11 (4) 11-14 (3) 14-15 (2) 15-16 (1)	07-10 (1) 10-13 (2) 13-16 (3) 16-18 (4) 18-22 (3) 22-01 (2) 01-03 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 01-02 (1) 20-00 (1)*
Western Africa	07-08 (1) 08-09 (2) 09-12 (3) 12-16 (4) 16-17 (3) 17-18 (2) 18-19 (1) 08-10 (1)**	05-06 (1) 06-08 (2) 08-14 (3) 14-19 (4) 19-20 (3) 20-22 (2) 22-23 (1)	03-04 (3) 04-06 (2) 06-13 (1) 15-15 (2) 15-17 (3) 17-00 (4) 00-01 (3) 01-03 (2)	18-20 (1) 20-23 (2) 23-01 (3) 01-03 (2) 03-04 (1) 22-03 (1)*
Eastern & Central Africa	08-09 (1) 09-11 (2) 11-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1) 08-10 (1)**	06-08 (1) 08-12 (2) 12-14 (3) 14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	01-04 (2) 04-06 (1) 06-08 (2) 08-14 (1) 14-16 (2) 16-17 (3) 17-23 (4) 23-01 (3)	18-21 (1) 21-23 (2) 23-01 (1) 21-00 (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)*

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) 14-17 (4) 17-18 (3) 18-19 (2) 19-20 (1) 09-11 (1)**	06-07 (1) 07-08 (3) 08-10 (4) 10-11 (3) 11-13 (2) 13-15 (3) 15-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	02-06 (2) 06-07 (3) 07-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3)	19-21 (1) 21-04 (2) 04-06 (1) 21-05 (1)*
McMurdo Sound, Antarctica	08-10 (1)	06-08 (1) 08-10 (2) 10-12 (1) 15-17 (1) 17-18 (2) 18-22 (3) 22-00 (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)

**Time Zone: PST (24-Hour Time)
WESTERN USA TO:**

	10/16 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 & European 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) 11-12 (1)	06-07 (1) 07-10 (2) 10-14 (1) 14-16 (3) 16-17 (2) 17-20 (1) 20-23 (2)	07-09 (1) 18-22 (1)
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)	06-07 (1) 07-08 (3) 08-10 (4) 10-13 (3) 13-18 (4) 18-19 (3) 19-20 (2)	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)*

	17-18 (1) 08-10 (1)**	20-21 (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)
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)

*Indicates best time to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher. F-2 layer DX openings on 6 meters may occur at the same times and over the same paths shown with a propagation index of (3) or (4) under the 10 meter column. For 12 meter openings interpolate between 10 and 15 meter openings. For 17 meter openings interpolate between 15 and 20 meter openings. For 30 meter openings interpolate between 40 and 20 meter openings.

rise at the easternmost terminal of the path.

For short-skip openings during December try the 80 and 40 meter 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

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M, T, W (9-6) Th, F (9-8) Sat (9-3)

Call Mike for These Last Minute Gift Ideas

- CQ's BUYER'S GUIDES
- CALLBOOKS
- LOGBOOKS
- ARRL TAPES
- ARRL MANUALS
- ARRL HANDBOOK
- REPEATER DIRECTORIES



During his annual "salt the ionosphere" trip, George Jacobs, CQ's Propagation Editor, this year made sure that the ionosphere over the Prime Meridian was well salted. As proof, here is W3ASK straddling zero degrees longitude at the Greenwich Observatory.

and 160 meters at night. Between 750 and 1300 miles try 20 and 30 during the day, 40 and 80 meters from sunset to midnight, and 80 meters later in the evening and until sunrise. Try 30 and 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, 17, and 15 meters during the day, with 10 and 12 meters running close behind. Try 20, 30, 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 were 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 PM.

The *Geminids*, a major meteor shower, should begin on December 13 and last for about three days. Maximum intensity is expected at about 10 AM 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 AM 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.

Season's Greetings

The Editor of this column wants to take this opportunity to extend to everyone his warmest wishes for a Merry Christmas and a very happy and peaceful New Year and holiday season.

The year 1990 was a very good year for high-frequency propagation. It now looks as if Santa's sack contains a special present for radio amateurs everywhere—that is, continued good propagation conditions during the New Year. CU on the amateur bands during 1991!

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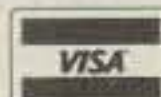
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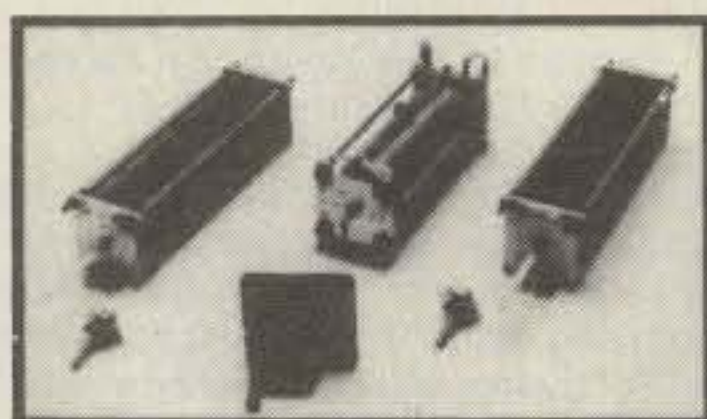
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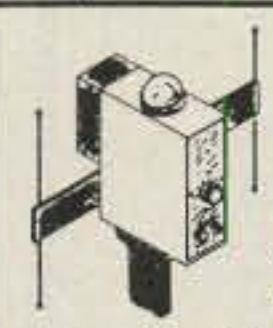
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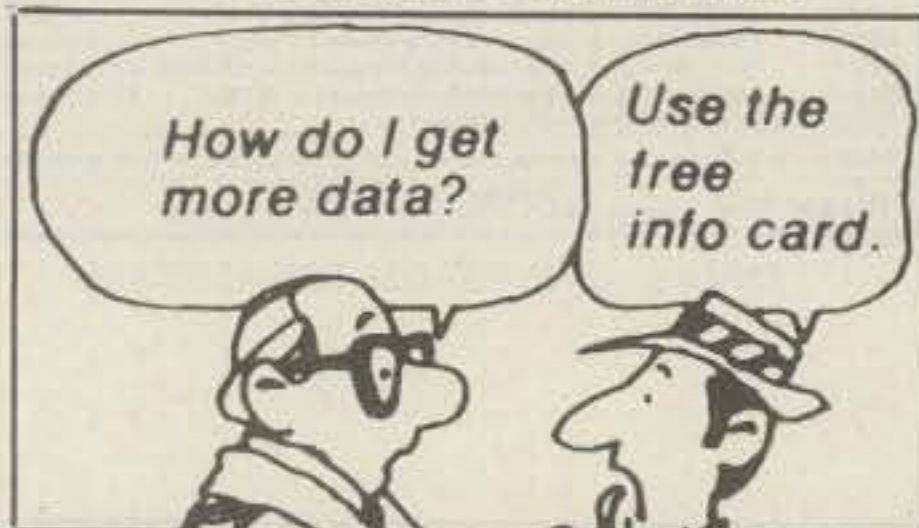
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- Increments: 5 to 955KHz selectable/ 5 or 12.5 steps.
- Audio: .4 Watts
- Power: Input 9 - 13.8 V. DC
- Antenna: BNC
- Display: LCD
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- Sensitivity: .4uV Lo,Hi. .8uV Air. .5uV UHF. 1.0uV 800
- Scan Speed: 15 ch/sec.
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- Increments: 10,12.5,25,30
- Audio: 1W
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 Speed: 38 ch/sec. scan. 38 ch/sec. search
 IF: 750.00, 45.0275, 5.5MHz 455KHz
 Increments: 5,12,5,25 KHz
 Audio: 1.2 Watts at 4 ohms
 Power: Input 13.8 V. DC 300mA
 Antenna: BNC
 Display: LCD, backlighted.
 Dimensions: 2 1/4H x 5 5/8W x 6 1/2D Wt. 1lb.

Options:

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External Speaker. Mobile Mount.	MS190	\$19.50
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 IF: 736.23, (352.23) (198.63) 45.0275, 455KHz
 Increments: 50Hz and greater
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 Audio: 1.2 Watts at 4 ohms
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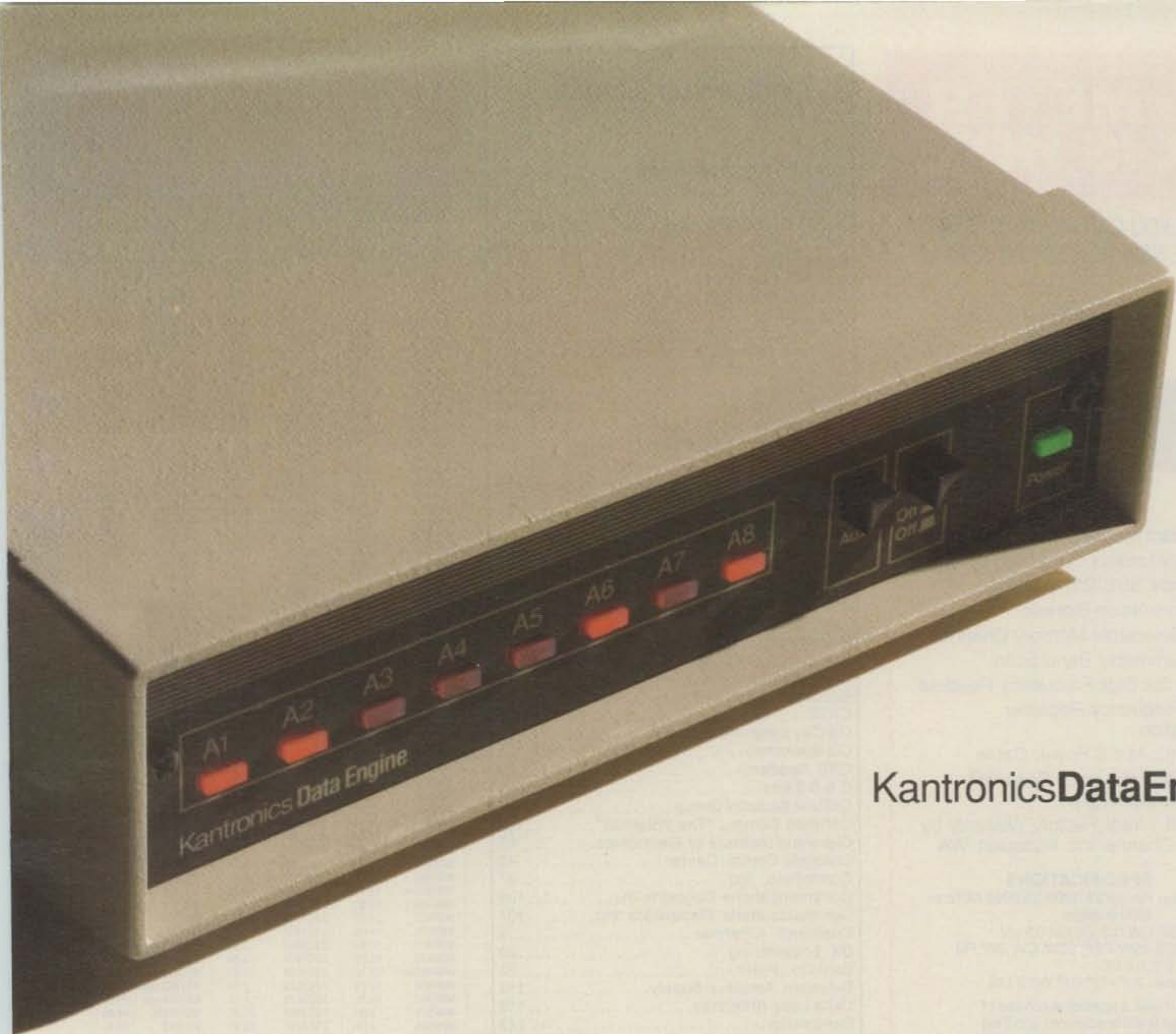
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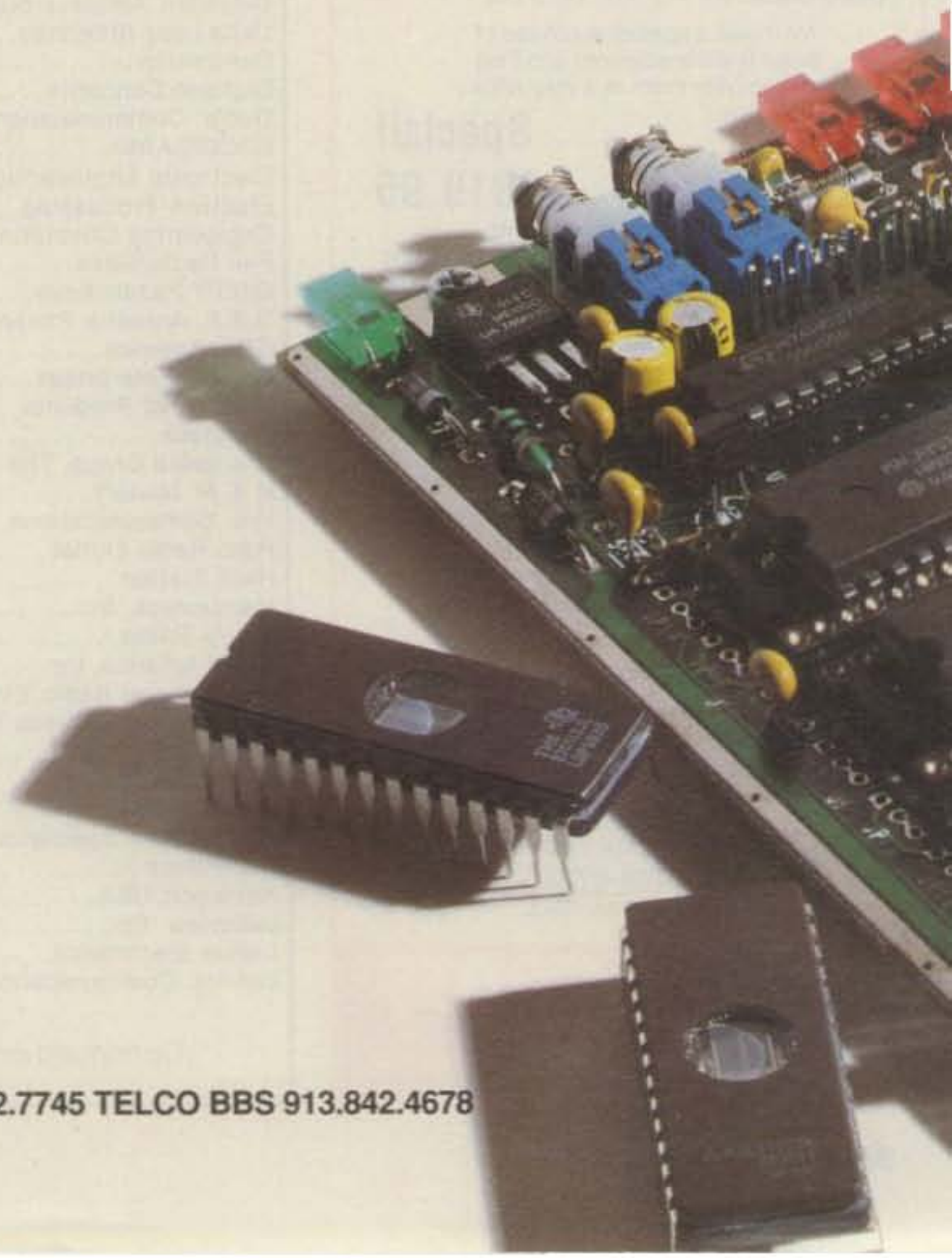
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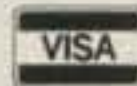
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We'd like to see your company listed here too. Contact Arnie Sposato, N2IQO, at 516-681-2922 or FAX 516-681-2926 to work out an advertising program tailored to suit your needs.

R-X NOISE BRIDGE



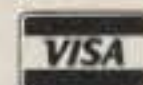
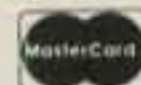
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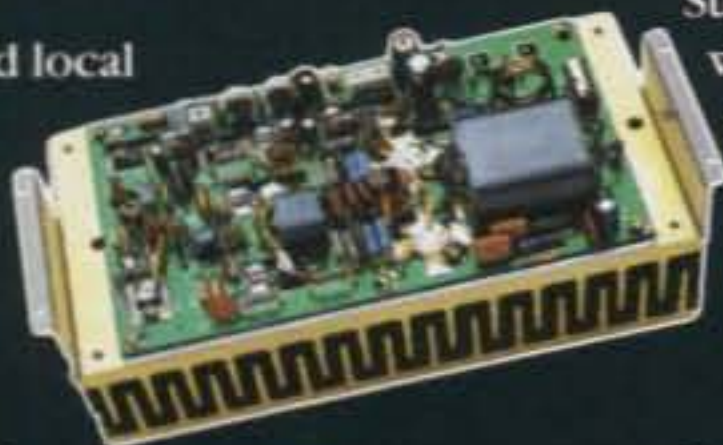
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What is "tech knowledge"? Read the facts.

200 Watt Transmitter

The FT-1000 delivers continuously adjustable output from 20 to 200 watts. Using a massive power transformer and powerful 10" squirrel cage blower, the FT-1000 far outdistances linears requiring 100-150W output. The full 200 watts output and exceptional audio provide outstanding "barefoot" pile-up performance.

Clean DDS derived local signals and conservative design mean the FT-1000's MRF-422 final transistors, operating at a 30 volt Vcc level, offer third order IMD of -36 dB at 150W PEP. The FT-1000 may be used at 100 watts output continuous duty.



200 Watt
RF Power Amplifier



DDS
Unit

Direct Digital Synthesis

Yaesu assembled a special independent R&D team to create the FT-1000's Direct Digital Synthesizers. Two 10-bit and three 8-bit DDS permit very low carrier/noise on transmitted signals and wide receiver blocking dynamic range by providing exceptionally clean VFO sources to the PLL local oscillators.

Dynamic Range

Enjoy unparalleled strong signal handling with the FT-1000. You get 14 five-pole main receiver front end bandpass filters (11 on the optional BPF-1), a switchable cascode dual JFET RF preamp, and a double-balanced mixer ring using high-Idss JFETs.

In addition, the front end gain distribution may be adjusted by switching to IPO, or by adding attenuation in 6 dB (1 S-Unit) steps. Typical



RF Receiver
Unit

measured two-tone dynamic range is 108 dB (at 50 kHz, 500 Hz BW, preamp off), yielding a +32 dBm 3rd order IP1.

Simultaneous Dual (Unlimited) Frequency Reception

On the FT-1000, each receiver (Main and Sub) has its own weighted fly-wheel tuning knob and the two receive channels may be different modes and/or different filter bandwidths. Add the optional BPF-1 module for crossband dual receive.

Use headphones or speakers for monitoring, mixing or splitting audio in either mono or stereo. A single RX MIX control adjusts the relative volume of each channel. Install the optional BPF-1 and enjoy true diversity reception by using a separate antenna for each receive channel.

Competition-Grade Receiver

Frequency, mode and bandwidth information are stored independently for each of the two vfos on each band (or the 100 memories). Filter bandwidths of 2.4 kHz, 2.0 kHz, 500 Hz and 250 Hz along with an IF notch filter, IF Shift, variable bandwidth and a CW Audio Peaking Filter provide unmatched ORM rejection. Plus, the FT-1000 offers a dual-mode noise blanker and all-mode squelch. The front-panel RX ANT switch allows convenient enabling of your Beverage or loop receiving antenna.

The optional DVS-2 Digital Voice Storage unit gives you a 16-second receive memory to correct potential "busted calls" or dump an important OSO to tape for archival pur-



Dual Tuning



Low Pass
Filter Unit

poses. The DVS-2 also functions a two- or four-memory voice "CQ Machine" for contests.

CW Operation

The FT-1000 provides the most complete package ever offered to demanding CW operators. For instance, CW

Spot, samples your (offset) CW carrier, assures precise "zeroing" during pileups. Other exceptional features include BFO offsets of 400, 500, 600 or 700 Hz, a PLL-controlled CW tuning visual indicator, built-in electronic keyer and full QSK. Key jacks for paddle input are located on both front and rear panels.

Optimal Digital Communication

The FT-1000 offers special provisions for RTTY/AMTOR and packet modes including an independent, built-in microprocessor to control AFSK generation. Use the RTTY mode button to select Mark frequencies and Hz shifts. The display can show the Mark or any offset you load in.

Non-standard tone pair/shifts can also be accommodated with the manual IF shift and independent display offset adjustment on the front panel.

Flexible Mode and Filter Selection

Each receiver (main and sub) has its own vfo on each of 10 bands and each of these vfos has two sub-band channels. As a result, the FT-1000 give you 40 tunable vfo channels and 99 tunable memories—each with its own independently selected and memorized filter and mode combination.

Tap into the FT-1000 Tech Knowledge

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IF Unit



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IC-765 HF TRANSCEIVER

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