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Amateur Radio

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Season's Greetings

THE RADIO AMATEUR'S JOURNAL

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KENWOOD



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 mAh), 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.

KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
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Complete service manuals are available for all Kenwood transceivers and most accessories. Specifications and features are subject to change without notice or obligation.

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Freedom of Choice

TM-741A Modular FM Transceiver

The choice is yours. Kenwood's new FM Multibander allows you to start as a deluxe dual band radio – or add a third band. As a dual band, you'll have access to 144 and 450 MHz operation.

If you decide to add a third band – choose again. Select from the 28, 50, 220, or 1200 MHz bands. Then simply plug this option into the available slot.

Your ultra-compact TM-741A offers a full 50 watts on 10, 6, and 2 meters; 35 watts on 450 MHz; 25 watts on 220 MHz, and 10 watts on 1200 MHz!

On 2 meters, you'll find wide band receiver coverage with RX on 118 - 174 MHz, and TX on

the Amateur bands. The 2 meter section is modifiable for MARS and CAP (permits required).

303 memory channels are available, with 101 in any one band. Cross band repeat between bands, or, choose dual band input with cross repeat to the third band. The offset function is active on the output, allowing you to repeat to repeaters.

Other features

Individual volume and squelch controls for each band. Remote mounting of front panel with optional cable kit. Optional selective calling or group calling. Optional DTMF memory stores 15 characters for repeater controlling. Versatile scanning. Auto offset on 2m. Fixed detect output for packet radio.

Multi-function DTMF microphone. Separate antenna and speaker outputs. Auto power off and time-out. 4 step dimmer. 3 step power. Clock, timer and calendar. DC cable, and mobile bracket.

UT-28S: 28MHz, 50 W, RX: 24-36 MHz, TX: 28-29.7 MHz. **UT-50S:** 50MHz, 50 W, RX: 46-57 MHz, TX: 50-54 MHz. **UT-220S:** 220 MHz, 25 W, RX: 215-230 MHz, TX: 220-225 MHz. **UT-1200:** 1200 MHz, 10 W, 1240-1300 MHz. **DTU-2:** digital paging unit. **PG-4K, PG-4L:** remote cable kit. **MB-11:** extra mounting bracket. **PG-2N:** extra DC cable. **PG-3B:** DC line noise filter. **TSU-7:** CTCSS encode/decode unit.

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KENWOOD

Our new TS-850S just made the competition obsolete

No competition class transceiver is even in the same ballpark as the TS-850S.

You'll find a superior intermodulation dynamic range of 108 dB throughout the entire 100 kHz to 30 MHz range.

Kenwood's optional DSP-100 Digital Signal Processor (DSP) converts audio signals to digital information, where it is shaped and processed by a microprocessor. For SSB work, this means a cleaner signal, and for CW, it allows adjustment of the rise and fall times for optimum waveshape. The DSP-100 also works at the

receiver detector level for audio shaping, in all modes.

Other advanced technology in the TS-850S includes 10 Hz step dual VFOs, multi-mode scanning, full and semi break-in CW, superior interference reduction, keyer, dual noise blanker, and RIT/XIT. 100 memory channels store, transmit, and receive frequencies independently. High boost for SSB signal "punch." Microphone supplied.

The Kenwood TS-850S. All band. All mode. One year warranty. In a class by itself!

Key options.

DSP-100 Digital Signal Processor.

AT-300 160 - 10 m external antenna tuner.
AT-850 160 - 10 m internal antenna tuner.
DRU-2 Internal digital recording unit.
IF-232C Computer interface. PG-2X DC cable. PS-52 Power supply. SO-2 TCXO. SP-31 Matching external speaker.
VS-2 Voice synthesizer. YG-455C-1 500 Hz CW filter for 455 kHz IF. YG-455CN-1 250 Hz CW filter for 455 kHz IF. YK-88C-1 500 Hz CW filter for 8.83 MHz IF. YK-88CN-1 270 Hz CW filter for 8.83 MHz IF. YK-88SN-1 1.8 kHz SSB filter for 8.83 MHz IF.

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The Radio Amateur's Journal



ON THE COVER: Bet you didn't know that Santa was into Ham Radio. Neither did we, although we should have guessed. Who else but a Ham would spend so much time up on the roof in the dead of night in the middle of a snow storm! (Photo by Larry Mulvehill, WB2ZPI)

DECEMBER 1991

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Under The "Missile-Tow"

As is typical, the end of the year brings out retrospectives on the preceding twelve months. The holiday season brings out feelings of joy, anticipation of gifts to receive and give, and a general sense of well being. So to reflect a bit is in keeping with the times.

It dawned on me recently that today's amateurs have missed out on one of the great experiences shared by amateurs of the 1950s and 60s. No, not necessarily the use of AM gear, but the wonderment and abundance of military surplus. An ARC-5 could be almost anything your mind could think up. Magazines, especially *CQ*, featured countless articles on surplus conversion, and it was the rare station that didn't have at least one piece of surplus gear in use (if only for the splendid hardware). Today there is no way to have available anywhere near that quantity or variety of military gear. Most of today's gear is very sophisticated and only has some limited possibilities.

True, there are amateurs out there today who collect, refurbish, and sometimes use that vintage military equipment, but for the most part we looked at it in utilitarian terms rather than as objects connected to war. We literally beat the swords into plowshares and then worked the world with them.

This past year we've seen a monumental war practically begin and end within the same week, political changes erupt where none were dreamed possible, and global defense strategies (including hardware) made obsolete by the stroke of a pen. With all this peace breaking out, nations are rushing to destroy certain very useful pieces of surplus—useful especially to amateurs. We're missing out on a golden opportunity.

Today's new amateurs can capture some of the experience that we older amateurs fondly remember and have a legacy of their own. It doesn't mean simply wearing desert camouflage clothing or learning to like Meals-Ready-to-Eat, but the full-fledged opportunity to put their creative know-how behind some pretty sophisticated electronic military marvels while coming up with articles encouraging the rest of us to give it a try.

As I watched various news programs showing the world settling down to arms agreements which required a certain

amount of destruction, it occurred to me that the answer to what happened during the Bouvet DXpedition and the beginning stages of Albanian re-entry into amateur radio was staring me in the face.

While the US and Russia cavalierly destroy missile inventory to reduce mutual threat, there is an unappreciated alternate solution suited to amateur radio. First, we don't need most of the warhead material, especially the nuclear stuff. A little bit can go a long way. What we need is the missile itself and the guidance system. The age of the RF-seeking missile is upon us.

Picture, if you will, a horrendous pile-up. Bits and pieces of call letters are being shouted out. Suddenly, a godzilla-like signal pops on and begins a torturous tune-up ritual. At the same time, plaintive (and some not so plaintive) voices cry out "What's the DX?" Other voices scream "Listen" or "Up 5 (10, 20, or whatever)." Some amateur takes this opportunity to engage in witty repartee, while newcomers, attracted to the melee, tune up accompanied by indecipherable sounds, grunts, and what seem like the sounds of small animals being severely abused.

Now focus in on a finger pushing a button and shortly thereafter the welcome sigh of relief as the rare and exotic DX station comes back to your call, that clear and distinct bell so recently emerged from that vaporized cacophony. Now don't tell me you never thought of the possibility.

This might take the realm of serious DXing up a notch or two from simply Big Guns and Little Pistols to Terminators and Vaporizers. It also might encourage some people to listen more and talk less, and without a doubt it would boost sales of dummyloads. Of course, there are always special occasions whereby someone gets through the pile-up and expresses his curiosity by questioning the geo-political influences of native folk dances to the obvious delight of everyone else who is waiting (not always patiently). In this case, inquiring minds should be expanded. I'm not sure whether a line should be drawn with regard to neighbors who suddenly take up amateur radio and like to operate on the same band as you do. Perhaps some sort of proximity device could be held in reserve.

Imagine all the new things you could see at the Dayton fleamarket. Just hook up a

trailer-hitch and drive it away. The potential for all of this "new" surplus makes a lot of things possible. Think of all the conversion articles it could generate. Think of portable launching sites for Field Day or Primers on Selective Targeting, etc. Think of all the wonderful and catchy new names we could apply to those ominous and serious jobs we grew to respect via CNN. Or simply think of it as recycling and doing your bit for the environment. Well, it's a thought anyway.

Back To Reality

We've all experienced a year of phenomenal changes, both political and in amateur radio. What was perceived as a mighty army literally crumbled in a matter of hours, and a seemingly monolithic political system became inviable in roughly the same amount of time. Our own monolith, CW, also took a step back in favor of the future, and we welcomed the return of ZA to the airwaves. It certainly gives credence to the statement that everything is possible. A lot transpired in 1991—far more than most of us expected.

If anything, amateur radio should be a source of enjoyment which enriches us and provides a sense of fun. Ideally, our participation in amateur radio enriches someone else's life and helps to increase his enjoyment. We're in a people hobby that transcends borders, boundaries, languages, and customs, yet we hopefully make each other's lives better, even with a momentary contact. There are times and situations where we can help to make a lot of people's lives better or help to allay fears, anxieties, and uncertainties of loved ones seeking to find information during emergencies. Yes, it is technology, sophisticated equipment, skills, and the machinations of upgrading, too, but that is the smallest part. It comes down to people who shine in the best and worst of times and enjoy the glow.

All of us at *CQ* hope that you shine each and every day of the new year, and that you really enjoy yourself in 1992. This holiday season put the gift of fun high on your list, not only to give to others, but to give to yourself.

73, Alan, K2EEK

AEA is...



Packet...plus!

If you want the best Packet or multi-mode equipment available, look no further. These data controllers have no equal when it comes to features, performance and value.

The versatile DSP-2232 (above) is simply the most powerful multi-mode controller available to amateurs. It features Digital Signal Processing modems, dual simultaneous ports, all known amateur digital modes, Packet and AMTOR mailboxes, and much more.

The legendary PK-232MBX (top right) has long been the most popular data controller ever, and is still going strong. Includes: Chebyshev filter design, Host Mode, Signal Identification mode and more. With features like these, no wonder it's number 1.

For Packet only, the PK-88 (center) and its PC-compatible plug-in counterpart, the PCB-88 (bottom right) offer AEA's famous Host Mode, Packet maildrop, KISS mode, lithium battery-backed RAM...the list goes on and on.

When hams think of Packet, they think of AEA.
AEA is Packet...plus!

For complete information on these or any other AEA products, call the toll-free Lit Line at (800) 432-8873.



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ON THE ROAD ...

Model DR-570T

Cross Band Full Duplex, Twin Band Transceiver

The DR-570T allows full duplex operation and 20 memory channels with 4 scan modes. It also functions as a twin band receiver, with independently adjustable squelch and volume controls for each band.

A powerful output gives you 45 watts on VHF and 35 watts on UHF, plus you can activate the Automatic Band Exchange to switch back and forth between the "sub" and "main" bands at the touch of a button.

The LCD makes the display easy to read even in bright sunlight.



Ask to see ALINCO products at your dealer and become familiar with our quality line and accessories. We've always been here, and now we're ready to go wherever you do.

New

Model DJ-162TD

A Complete Receiving And Sending Station In Your Hand

This 2M handy combines the best features from the most advanced handholds available today. Built-in DTMF squelch is standard, as is a wildcard function to help you access any group code that you have programmed without recalling the exact numbers.

There are power saving features such as auto shut-off and timed LCD lighting, timed to turn itself off after 5 seconds of non-use. The display is conveniently located on top of the unit for reading when the transceiver is being carried in your pocket or in a bag. There is even a key lock mode to prevent accidental changing of frequencies, should the buttons be hit while the unit is being handled.

...IN THE HAND.



ALINCO
ELECTRONICS INC.

ALINCO ELECTRONICS INC.
438 Amapola Avenue, Unit 130
Torrance, CA 90501
Tel. (213) 618-8616 Fax (213) 618-8758

Two Year Limited Warranty.

Specifications and features are subject to change without notice or obligation.

ANNOUNCEMENTS

• **Operation: Holidays** - Operation: Holidays is a public relations campaign launched to promote the idea of having the public send radiograms via the National Traffic System (NTS) for civilian to civilian greetings and MARS-grams for military-civilian greetings. People everywhere could supplement the usual sending of greeting cards with radio traffic. Achieving this goal requires that amateurs everywhere make an effort to inform the public about the services available (not just at the holiday season) and how to contact the appropriate operators who handle message traffic. For more information, contact Dept. of the Army, Eastern Area Public Relations Officer, Lorraine S. Matthew, N4ZCF/AAM3PR, P.O. Box 1439, Santa Rosa Beach, FL 32459.

• **Midwest VHF Net** - The Midwest VHF/UHF Society's VHF Net meets Monday nights on 3.836-3.846 plus or minus QRM at 9 PM EDST (daylight time eastern). For more information, contact N8ZM (Callbook).

• **Khabarovsk Fund Raiser** - Members of the Oregon Region Relay Council have started a fund-raising drive to donate to the Khabarovsk amateur radio operators of the Soviet Union a fully operational 2 meter repeater. This area of the Soviet Union does not currently have any repeater. Donations may be sent to the Oregon Region Relay Council, Inc., P.O. Box 25451, Portland, OR 97225-0451.

• **Chernobyl Special Event Station** - CQ magazine has accepted an invitation from the International Foundation for Assistance to Chernobyl Victims, Geneva, Switzerland (in conjunction with the United Nations) and the American Chernobyl Relief Assn., Washington, DC, to operate a special event station to help the world reflect on the consequences of Chernobyl. The Soviet government is being requested to provide a commemorative call sign for a station in Chernobyl for operations on the 6th anniversary of the disaster, April 26,

1992. More information will be provided as it becomes available.

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

2-land, from the 200th anniversary of the Bill of Rights, Mount Vernon, NY; Westchester ARA; 1700-2200 December 13, 14, 15; on 21.290, 14.290 kHz (plus or minus). For special Bill of Rights QSL, send QSL and SASE to W2IEI, Saint Paul's Historic Site, Bill of Rights Museum, National Park Service, 897 South Columbus Ave., Mount Vernon, NY 10550.

W3ECV, from former Coast Guard Cutter *Taney*, Maryland; US Coast Guard Yard ARC; December 6-8 (no times given); phone and CW 25 kHz up from bottom of General 80-10 meter subbands and Novice 10 meter subbands. For certificate send QSL and 9 x 12 SASE to US Coast Guard Yard, Electronics Shop—Bldg. 40A, Curtis Bay, MD 21226.

K4HML, from Christmas Special Event, Ft. Christmas, FL; Coronado Wireless Assn.; 1400-2200Z December 14-15; phone only, 25 kHz up from General bands plus Novice/Tech 10 meters. For QSL send business-size SASE to K4HML, P.O. Box 1, Edgewater, FL 32132.

K4BV, from "Birthplace of Speed" and "Gaslight Parade" commemorative celebration, Daytona Beach, FL; 1700Z November 29 through 2100Z November 30; 25 kHz up from General portion of 15, 20, 40, 80 meters plus Novice 10 meters. For certificate send QSL and SASE to DBARA, P.O. Box 9852, Daytona Beach, FL 32120.

W5QX, from Christmas at Old Fort Concho, San Angelo, TX; 1700Z December 5 to 2300Z December 7; on 40, 20, 15 meters and about 28367 on 10 meters. For 8 x 11 1/2 certificate send SASE or \$1.00 to W5QX,

c/o Don Goff, 1210 Ardmore, San Angelo, TX 76905.

KA6RJF, from Toys for Tots Ham Radio Rally, Rose Bowl, Pasadena, CA; 1900-2400Z December 1; SSB in General 40 and 20 meters and Novice 10 meter subbands. For certificate send QSL and 9 x 12 SASE to KA6RJF, 1302 Mar Vista, Pasadena, CA 91104.

AA6YL, from 103rd anniversary of Tournament of Roses, Pasadena, CA; Relay Repeater ARC; 1600-0400Z December 28 to January 1; 14.260, 21.335, 28.450 (or on 2 meters via club repeater 144.970/147.410 or on 147.21-plus or 220 meters via the Condor Connection). For certificate send QSL and 9 x 12 SASE (58 cents) to Relay Repeater Club, P.O. Box 81, Arcadia, CA 91066.

KH6SP, NNN0NBW, NNN0ARZ, from 50th anniversary of Pearl Harbor attack, Ford Island, Pearl Harbor, HI; Region Eight, Navy-Marine Corps MARS; 0400Z December 7 to 0400Z December 8; lower portion of General phone bands, AMTOR and RTTY in subbands. MARS operations will be announced separately. For QSL, send QSL and SASE to KB4JI/KH6, 106 Ford Island, Honolulu, HI 96818.

KH6-land, from 50th anniversary of Pearl Harbor attack, Hawaii; group of Hawaii hams; 1700Z December 7 to 1700Z December 8; lower portion of each subband, all bands, all modes, including Novice subbands. For QSL certificate send QSL and 9 x 12 SASE and 6 IRCs (or equivalent) to Pearl Harbor Special Event, P.O. Box 788, Wahiawa, HI 96786.

VA1S, from 89th anniversary of Marconi's first successful west to east trans-Atlantic radio transmission, Sydney, Nova Scotia; Marconi Amateur Wireless So-

(continued on page 10)



Vectronics Corporation Inc.
31 Estate Drive, Scarborough, Ontario,
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MEET YOUR MATCH 300 W Antenna Tuners

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Switch between two coax antennas. **Only tuner in production today** that allows you to tune your transmitter through the tuner into the dummy load to avoid off-air interference.

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Both the VC300 and DLP models feature a precision dual-needle meter to monitor RF power and SWR.

Design: Unique engineering design have made VCI one of the leading innovators in the amateur radio industry.

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- Pem-nuts to avoid using self-tapping screws.
- Lexan reversed printed front panel labels for a scratch-proof finish that will last for years.

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Longest Element, ft (m)	27.7 (8.4)	32 (9.7)	25.1 (7.7)
Turning Radius, ft (m)	15.5 (4.7)	18.4 (5.5)	14.4 (4.4)
Mast Size Range, in	1.25-2.0	1.25-2.0	1.25-2.0
Wind Load, ft ² (m ²)	4.4 (0.47)	5.5 (0.51)	4.1 (0.38)
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ADD-ON KITS			
Model	A743	A744	A103
Frequency, MHz	7 or 10	7 or 10	10

Announcements (from page 8)

ciety of Sydney; during December (no times or frequencies given). For certificate send QSL with confirmed contact and \$3.00 or 5 IRCs to Alan Leith, VE1AL, 846 George St., Sydney, Nova Scotia, Canada B1P 1L9.

• The following hamfests, etc., are slated for December:

Dec. 1, **Hazel Park, Michigan ARC Swap and Shop**, Hazel Park High School, Hazel Park, MI. Contact HPARC, P.O. Box 368, Hazel Park, MI 48030.

Dec. 1, **Toys for Tots Ham Radio Rally**, Rose Bowl, Parking Lot 1, Pasadena, CA. Contact Bruce, N6TFS, 213-257-5502, packet N6TFS at N6YN. (Bring new toy valued at \$5.00 or more—all toys collected by US Marine Corps Reserved. Special Event Station, judging of ham radio rig installations, more.)

Dec. 7, **Wiregrass ARC, Dothan, Alabama Hamfest**, Wiregrass Memorial Park, Dothan, Alabama.

Contact N4RNU, 1811 West Main St., Dothan, AL 36301. (VE exams, contact WA4MZL.)

Dec. 7, **Courage Center Handi-Ham Winter Hamfest**, Eagles Club, Faribault, MN. Contact Don Franz, W0FIT, 1114 Frank Ave., Albert Lea, MN 56007. (Exams.)

Dec. 8, **Hancock ARC Hamfest**, Hancock County 4H Fairgrounds, Greenfield, IN. Contact Keith Dairymple, N9GWK, P.O. Box 7033, Greenfield, IN 46140 (317-462-0023 or 317-328-4028).

Dec. 8-9, **1991 New Orleans Hamfest**, Alfred Bon-nabel High School, Metairie, LA. Contact New Orleans Hamfest 1991, P.O. Box 73665, Metairie, LA 70033.

Dec. 29, **South Bend, Indiana Hamfest Swap & Shop**, Century Center between Society Bank building and river, South Bend, IN. Call 219-233-5307, or write to Wayne Werts, K9IXU, 1889 Riverside Drive, South Bend, IN 46616.

Our Readers Say



Fits The Bill!

Editor, CQ:

I read a very interesting article in your February 1991 issue of CQ, "How To Build A New Operating Position" by Larry Hill, AA4DJ. The article caught my eye right away, because I have been looking for just the right piece of furniture to use in my shack, and I've found nothing that fits the bill until now. I took the plans Larry drew up to my friendly carpenter and told him to build it as shown in the article, with a few modifications. I asked him to construct the bench out of solid cherry wood, and make the legs and the shelves removable. This makes it easier to transport up and down stairs or through door openings if it becomes necessary to move.

When the carpenter called to inform me that the bench was finished, I could hardly wait to see it. As it turns out it fit into the space I had reserved for my ham shack as if it belonged there all along. My compliments to Larry Hill for a fine idea.

I'm sending you some pictures of the completed bench. You will notice that there is a severe lack of radio equipment. I have been selling off my inventory of professional camera equipment to pay for my amateur radio needs. I have a "Swan 700-CX" in the mail to me as of this date.

Thanks for taking the time to read this. I enjoy your magazine very much. Keep up the good work.

Verne E. Schwartz, KD4DEL
Woodbridge, VA

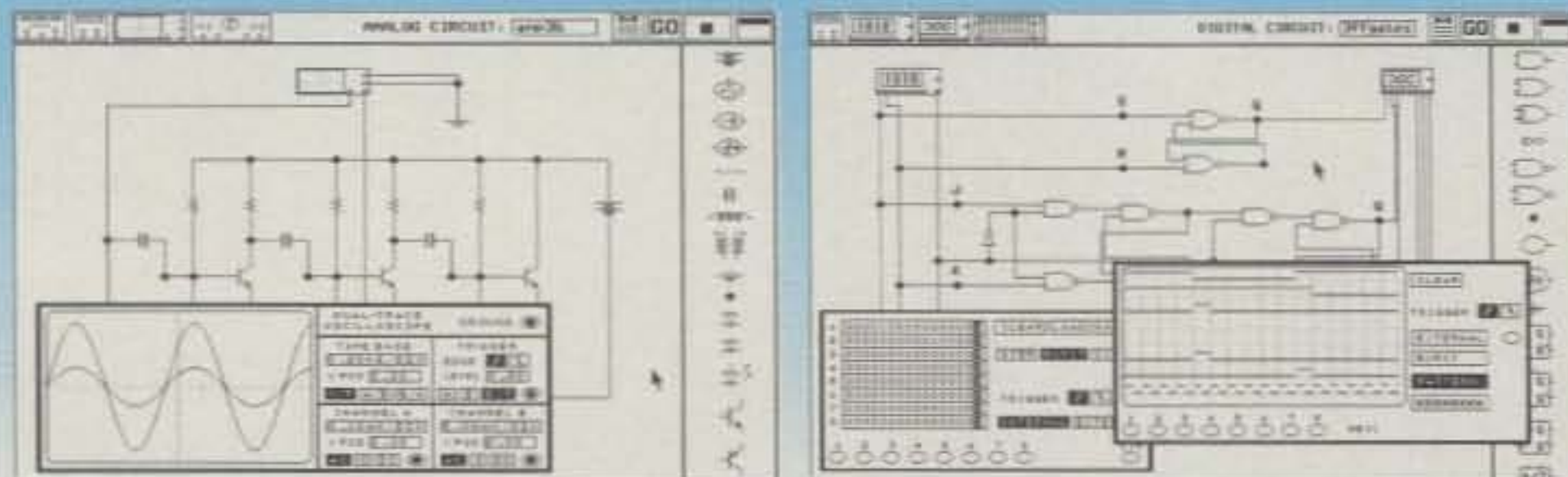
Cover Clarification

Editor, CQ:

I never thought that one picture could cause so much confusion (see the September 1991 cover of CQ). I have had several phone calls (they say it's not easy to get my number from information) and a couple of letters so far. They all think that I am running a logging program on a Radio Shack Model-4 computer. Unfortunately, the right side of the machine is cut off, or you could tell it doesn't have any disk drives. It is in fact a DT-1 (Radio Shack Dumb Terminal-1) being used as a terminal on my MM logging software. I have enclosed a copy of my announcement for MM in case anyone there is interested. I have just started shipping today.

Dave Robbins, KY1H
Peru, MA

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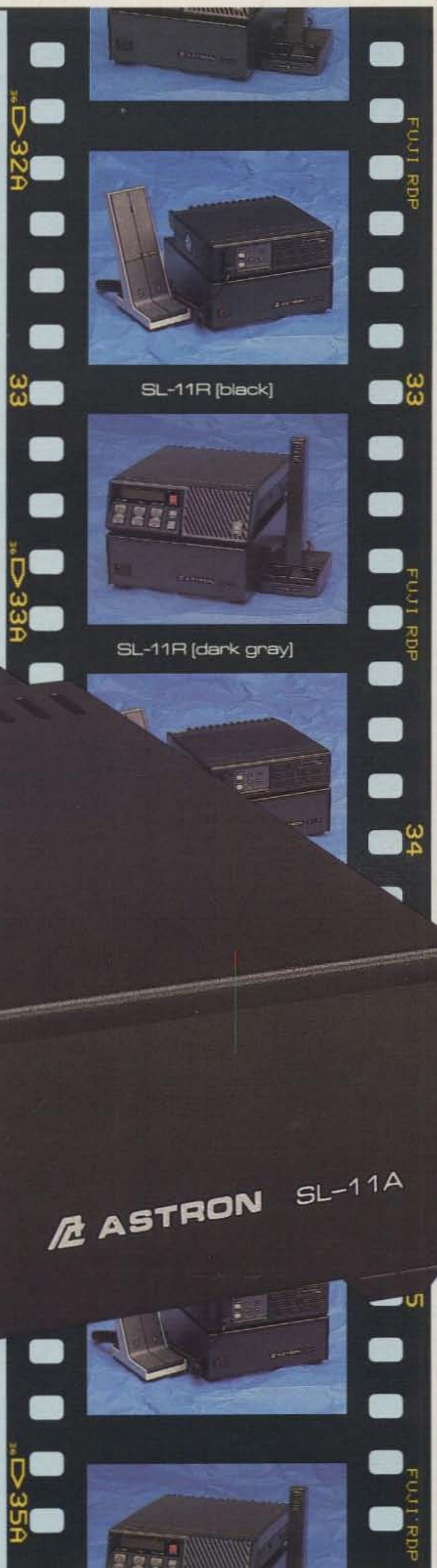
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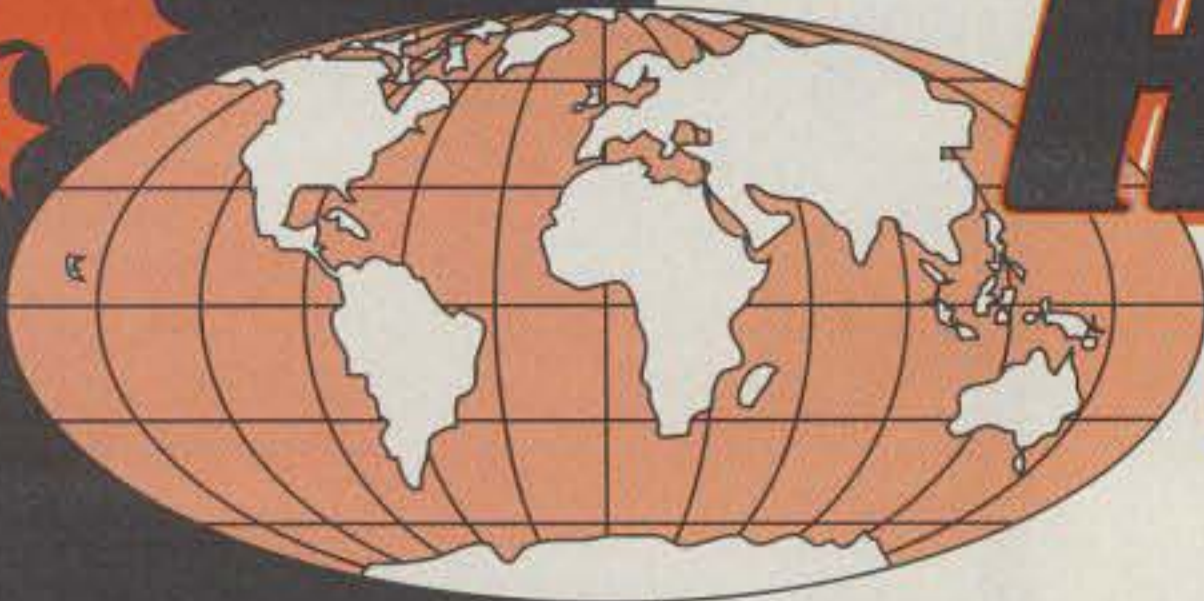
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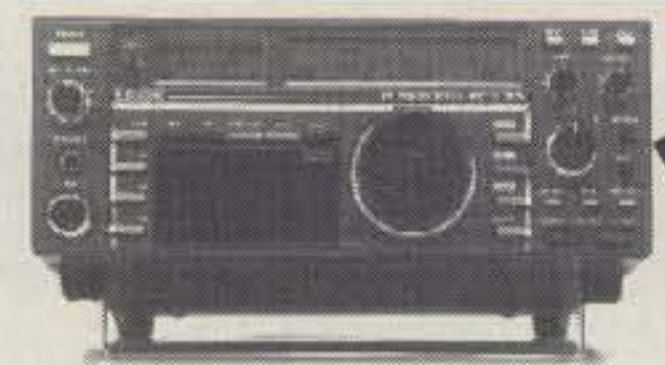


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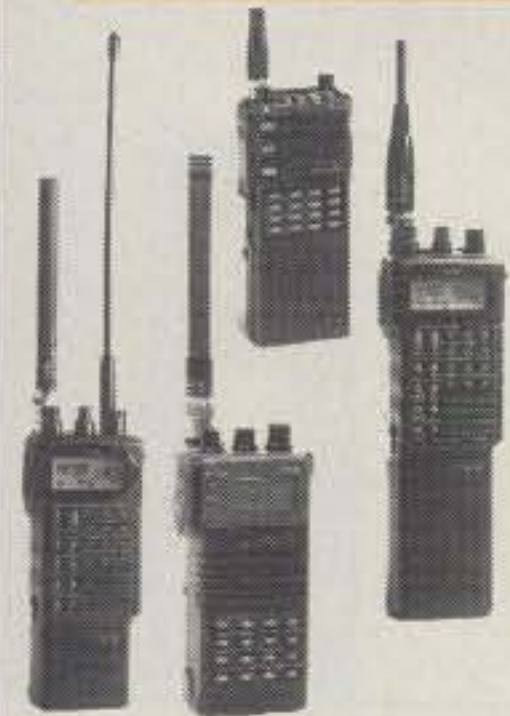


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Results of the 1991 CQ 160 Meter DX Contests

BY DONALD McCLENON*, N4IN

Many 160 meter enthusiasts must have felt certain the band wouldn't be very good during this part of the sunspot cycle. Activity was a little below last year's, but conditions were fantastic. If you didn't participate, you missed two real fun weekends. Many west coast USA participants worked their first Europeans, for example. There were 3477 stations on CW and 4166 on phone. K4VX/0, N6DX, K9RSW/5, WB9Z, and W0ZV worked all 50 states on CW, as did NK7U and WB9Z on phone.

The following number of active stations were reported on each mode from each country having over ten.

CW	Country	Phone
211	DL/Y	27
10	EA	14
21	F	10
90	G	43
21	HA	—
18	HB	—
38	I	37
180	JA	—
—	LY	10
—	LZ	18
—	OE	11
125	OH	10
195	OK	31
33	PA	12
30	SM	—
174	UA	673
—	UA2	18
48	UA9	99
155	UB	705
22	UC	—
—	UL	11
—	UO	10
30	UQ	—
108	VE	130
1817	W	1963
33	YU	28
117	Other	306
3477	Total	4166

There were at least three stations active in every state. The hardest to get for most people were Idaho, Montana, and Mississippi. There was no activity reported from VO2, PEI, or YUK on either mode. One NWT was claimed on phone. There were 83 countries on CW and 85 on phone. That's less on CW and more on phone than last year. Rarest CW DX was 4U1, 9M, C6, CT1, CX, D4, EA9, FM, GU, IS, KL7, LX, TF, UI, UN1, V7, and ZD8. Phone goodies included A92, EA6, D4, J6, GJ, GU, HK0, OY, T7, UD, UF, UG, UH, UI, UJ, UM, YB, and 4U1.



Top USA phone single operator WW2Y (left) helped by N2NU, K2WI, and ANOX is shown laying radials.

CW Contest January

Good equipment, good antennas, lots of operating skill, packet for some, plus wonderful conditions produced scores far above last year's. ON4UN was plagued by deliberate jamming for several hours of prime time. He shut down for 3 hours of rest. Then the jammer was gone, and he went on to make the world-high score of 465,394. The only other above 400K score was that of VE3EJ, sporting his new call vs VE6OU, his old call, and making a 400,016 score. Third world-high score of 337,330 was made by multi-op PA3DQW* (asterisk denotes multi-op throughout story). Next in line were KP2A (K4TEA Op.) 330,700; top USA WW2Y* 305,694; K1ZM 293,000; UZ2FWA* 268,363; AA1K 267,430; IT9ZGY 253,650; and W2GD* 250,542. There were 21 scores over 200K. This far exceeds similar results last year.

Top 10 single-op USA, VE, and DX scores are shown in the score boxes, as well as top 10 worldwide multi-op scores. Trophy sponsors and winners are shown in the trophy winners box.

QSO leaders were W2GD* 875, K1ZM 874, AA1K 848, WW2Y* 844, WB9Z* 834, VE3EJ 805, K3LR* 792, AB4RU* 780, OH0AM* 776, and K5NA 773. High QSO totals outside WVE were OH0AM* 776, ON4UN 758, PA3DQW* 689, KP2A 584, OK5TOP* 577, UZ2FWA* 576, HA6PX* 560, IT9ZGY 559, I4EAT 538, and DK8ZB 535. High contact totals outside NAEU were UL8AWL 376, EA8RCT 315, 9L1US 277, PJ9JT 263, YV1OB 245, 4X4NJ 235, UF6FXC*



The JA7YCQ CW multi-op crew, from left to right, JF7WIH, JG7RWV, JI7GBI, and JI7LZL.



IT9ZGY was a multiplier for 599 participants in 50 countries. He was the third world-high DX CW single operator.

*3075 Florida Ave., Melbourne, FL 32904

TROPHY WINNERS

SINGLE OPERATOR CW

World by K5AAD (N5JJ Memorial): Winner John Devoldere, ON4UN.
U.S.A. by K4TEA: Winner Jeffrey Briggs, K1ZM.
Zone 3 by KM4MG: Winner Paul Gordon, N6LL (WA6CDR Op).
Zone 4 by K5NA: Winner Ivan T. Payne, VE3DO.
Zone 5 by WA4CUG: Winner Jon Zaimes, AA1K.
Africa by K4SB: Winner Olli Rissanen, EA8RCT.
Asia by NE4S: Winner Vasilij Gokoev, UL8AWL.
Europe by K4UEE: Winner Pietro Marino, IT9ZGY.
Oceania by K4TKM/6: Winner Jack Wheeler, KH6CC.
South America by K4JAG: Winner John H. Thompson, PJ9JT.

PHONE

World by K5AAD (N5JJ Memorial): Winner John Sluymer, CG3EJ.
U.S.A. by K4JRB: Winner Peter D. Hutter, WW2Y.
Zone 3 by N4ONI: Winner L. Darrell Bevan, N6DX.
Zone 4 by KC4MJ & KM4IH: Winner Gary Nichols, KD9SV.
Zone 5 by K4ODL: Winner Carl D. Henson, WB4ZNH.
Africa by WB4ZNH: Winner Hernani Correia, CT3M (CT3EE Op.).
Asia by W4LVM: Winner Ermolaev Yuri Semenovich, UL7ACI.
Europe by N4NX: Winner Alex A. Kovach, RB5DX.
Oceania by K4DLI & KB4SSS: No entrant.
South America by KL7JAR/W4: Winner Cedric Jan Puchalski, YV1CP.

MULTI-OPERATOR CW

World by N4RJ: Winner Gerard Geurtz, PA3DQW.
U.S.A. by WS9V: Winner Peter D. Hutter, WW2Y.

PHONE

World by Southeastern DX Club: Winner Jerry Rosalius, WB9Z.
U.S.A. by WB9Z: Winner William L. Hiers, AA4GA.

a CQ. Then after working it, he calls CQ and denies anyone else a chance. Worse yet, he allows a few buddies to work the DX, and then slams the door with another CQ. Is this unsportsmanlike conduct, or does he really own the frequency? Your comments are solicited.

Propagation was almost as good as for the CW contest, with a surprisingly low noise level. Because phone requires more bandwidth, and there were more stations on, the wall-to-wall CQ's kept trans-Atlantic contacts to a trickle when the band was open.

Someone was trying to fool the OK's. Sorry, but JA, JT8, and YB8 all turned out to be "phonies."

The world-high score of 367,367 was made by CG3EJ, just a little below last year's top. He was followed by UL7ACI 330,156; world-high multi-op WB9Z* 223,568 (*again, asterisk denotes multi-op*); AA4GA* 204,850; KM4HH* 168,428; WW2Y 152,640; YT2R* 147,833; KD9SV 129,312; WB4ZNH 119,370; KD0FW* 118,858; KC8EK 118,170; WY2X* 117,504; WD9INF 116,111; KE5FI 109,695; and KN8Z* 102,168. These are all the 6-figure scores; one more than 1990.

WB9Z* had the world-high QSO total of 1013 valid contacts, a few less than his last year's top. He was followed by CG3EJ 977, AA4GA* 915, KM4HH* 797, KC8EK 793, KD0FW* 781, WW2Y 757, WD9INF 754, WB4ZNH 736, KN8Z* 678, AA4S 677, WY2X* 670. Outside W/VE high contact totals were RB5DX 659, UL7ACI 639, YT2R* 566, OK5TOP* 419, OK3TKW 374, LZ1KWZ 312, G0KPW* 291, OK3PA 285, and OY9JD 267. Outside NA/EU contact leaders were UL7ACI 639, A92BE 201, CU2CE 140, YV1CP 139, CT3M 120, HK4BHA* 105, YV1DRK 84, and 9L1US & UZ9XWH* 48. These were much below 1990 figures.

WB9Z* again led the multiplier parade with 89, ahead of the last two years' best. Next in order were AA4GA* 85; KM4HH* 82; WW2Y 80; CG3EJ 77; AA4MM 73; WY2X* & KD9SV 72; and K2BU & KE5FI 71. DX leaders were CU2CE 59; G0KPW* & UL7ACI 54; XE1VIC 51; CT3CM, YT2R* & YV1CP 49; OK3CQR & OY9JD 48; OK3PA 47; and IU8A & OK5TOP* 46.

Top country leader UL7ACI with 50 beat last year's top of 49. He was followed by YT2R* 47; OY9JD 46; OK3PA 45; IU8A & OK5TOP* 44; G0KPW* 43; A92BE, HE7CXZ*, I3QJZ* & OK3CQR all 42. The high W/VE country leader WB9Z* had 36, far ahead of top 29 in 1990. Next were AA4GA* 32; KM4HH* 29; WW2Y 27; K2BU 23; CG3EJ 22; AA4MM & WY2X* 21; and W3BGN, K4PI & KD9SV all 19.

A quick check of some of the big logs showed the following best QSO per hour rates: W9RE 138, K4YT 115, WB9Z 104, NA3F 90, KF4HK 87, CG3EJ 84, K3WW 83, and K4PI 82. None of the DX logs had rates above the low 60's.

The statement regarding certificates for state, province, and country winners at the end of the CW text also applies to the phone leaders.

Club Competition

The Frankford Radio Club continues to dominate this category, going over the 3 million point mark to be well out in front. The Southeastern DX Club upped their score to nearly 1.7 million and retains the runner-up spot. The Yankee Clipper Contest Club's 1.56 million holds the third spot. The Mad River Radio Club posted a huge increase up to nearly 1.1 million, to move into fourth place. These are the only clubs to go over

231, KH6CC 186, and UZ9CZO* 164. With 12 less countries active than last year, wouldn't you expect the top multiplier to be far down from that of 1990? The amazing fact is that 9 stations equalled or exceeded that mark! Leader WW2Y* was 9 above it with 102. KP2A and KZ1M each had 100 multipliers. Then followed AB4RU* 96, K5NA 95, AA1K & ON4UN 94, W2GD* & WB9Z* 93, K3LR* & VE3EJ 92, and W3BGN 91. DX multiplier leaders not shown

above were PA3DQW* & UZ2FWA* 79, G0NAA & IT9ZGY 75, DK8ZB 74, 9L1US 73, EA8RCT & OK5TOP* 71, and I4EAT 70. As with the scores and QSOs, these results run well above last year's.

ON4UN worked an incredible 59 countries, 10 more than last year's top, and with 12 less on the air. He was followed by OH0AM* 55, UZ2FWA* 54, OK1KSO* 53, DJ6TK & EA8RCT 52, YT2E* 51, IT9ZGY 50, PA3DQW* & OK5TOP* 49, and OK3KEE 48. W/VE country leaders were WW2Y* 47, K1ZM 45, K5NA 43, AB4RU* 42, AA1K 41, VE3EJ & W2GD* 40, W3BGN & WB9Z* 39, and K3LR* 38.

While going thru the logs, notes were made of especially good QSO per hour runs. It's quite likely that a careful search would improve some of these, and add a few more, but here is the list: OH0AM 144, K1TO 114, KE2PF 104, N6AR 104, YT2E 98, PA3DQW 94, K1RU 92, WM4Z 89, W3UM 86, W1WEF 85, HA3KNA 85, OK5TOP 85, UZ2FWA 85, ON4UN 84, WD8LLD 80, and K5ZD/3 79. Like most of the other statistics, these run well ahead of last time. As noted then, one super hour may be good for the ego, but doesn't have much effect on the final score.

Single and multi-op winners in each state, province, and country will receive certificates. In close races a runner-up will also get one, as will all in the top ten boxes.

Phone Contest February

Many people have complained about the lack of a DX window. Not one of them has answered our request of last year as to where it should be located or how it would be policed. There also seems to be no simple answer to the situation where a big gun raises a choice DX station on



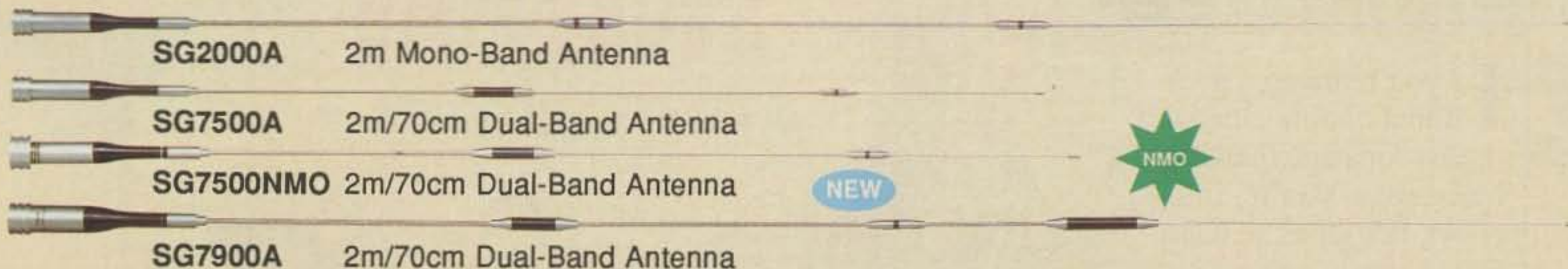
Broadcast tower tuned up on 160 by K8RYU/8 after sunset shutdown. They made him QRT before sunrise.

1991 IS A DIAMOND YEAR SOPHISTICATED ANTENNAS FOR THE NEW DECADE.

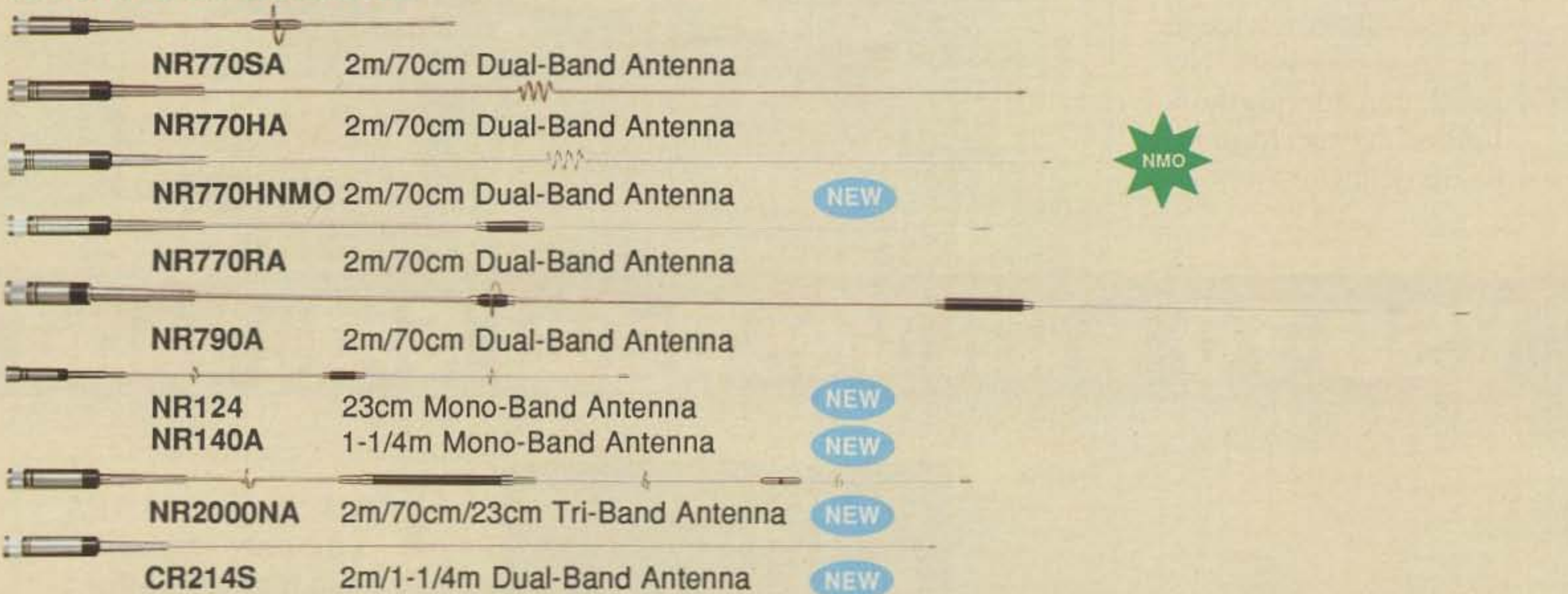
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SG & NR series ANTENNA SPECS.

PART #	BAND	GAIN(dB)	POWER(W)	MOUNT	LENGTH(IN)	ELEMENT PHASING
SG2000A	2m	5.2	150	UHF	62	1/2λ+3/8λ
SG7500A	2m/70cm	3.5/6.0	150	UHF	41	2m:1/2λ,70cm:5/8λ
SG7500NMO	2m/70cm	3.5/6.0	150	NMO	42	2m:1/2λ,70cm:5/8λ
SG7900A	2m/70cm	5.0/7.6	150	UHF	62	2m:1-1/2λ+1-3/8λ, 70cm:3-5/8λ
NR770SA	2m/70cm	-/2.15	100	UHF	17	2m:1/4λ,70cm:1/2λ
NR770HA	2m/70cm	3.0/5.5	200	UHF	40	2m:1/2λ,70cm:2-5/8λ
NR770HNMO	2m/70cm	3.0/5.5	200	NMO	41	2m:1/2λ,70cm:2-5/8λ
NR770RA	2m/70cm	3.0/5.5	200	UHF	39	2m:1/2λ,70cm:2-5/8λ
NR790A	2m/70cm	4.5/7.2	120	UHF	58	2m:3/4λ, 70cm:3-5/8λ
NR124	23cm	8.4	100	N	25	4-5/8λ
NR140A	1-1/4m	4.0	150	UHF	37	5/8λ
NR2000NA	2m/70cm/23cm	3.15/6.3/9.7	100	N	39	2m:1/2λ,70cm:2-5/8λ, 23cm:5-5/8λ
CR214S	2m/1-1/4m	2.1/3.4	120	UHF	37	2m:1/2λ,1-1/4m:5/8λ

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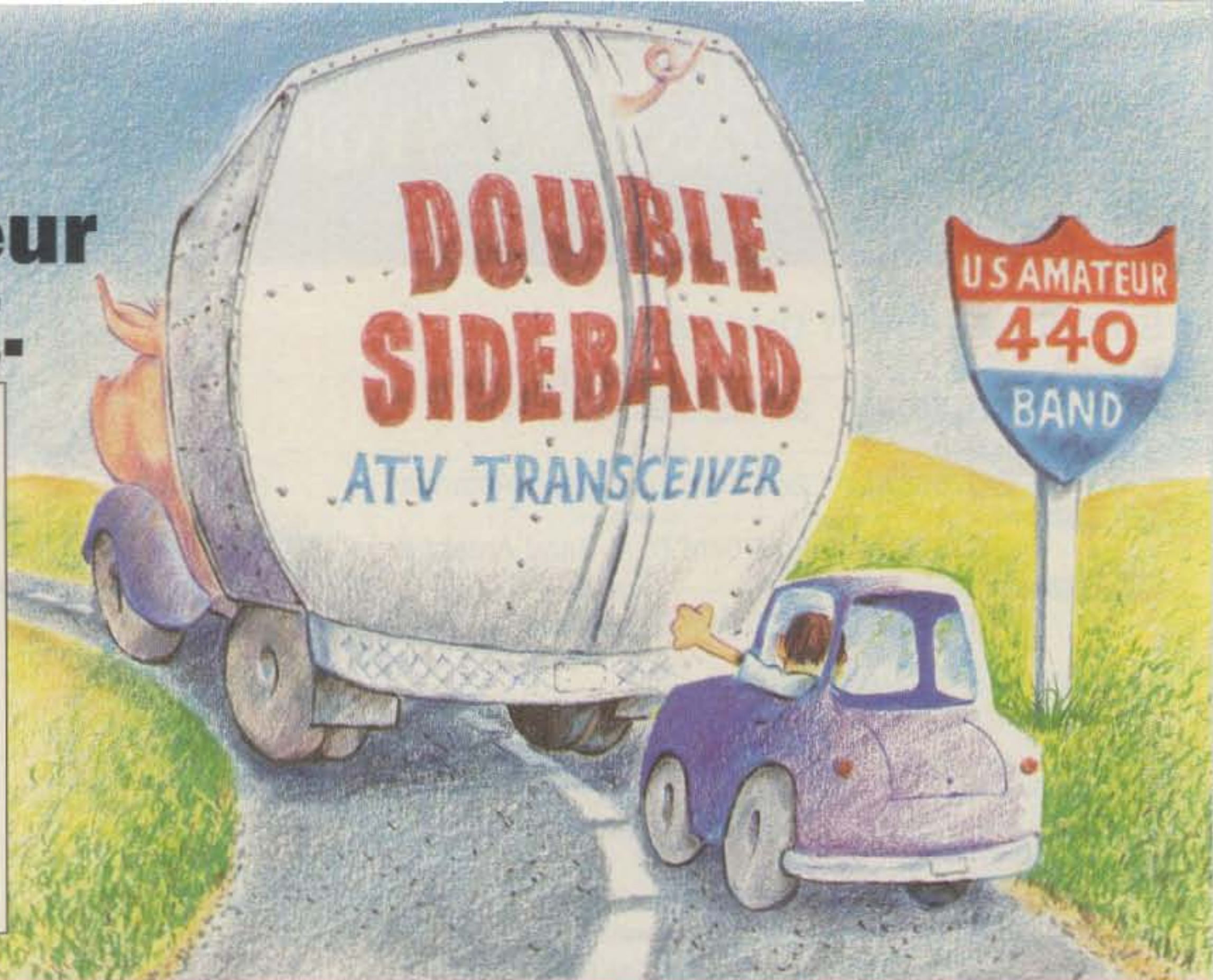


RF PARTS

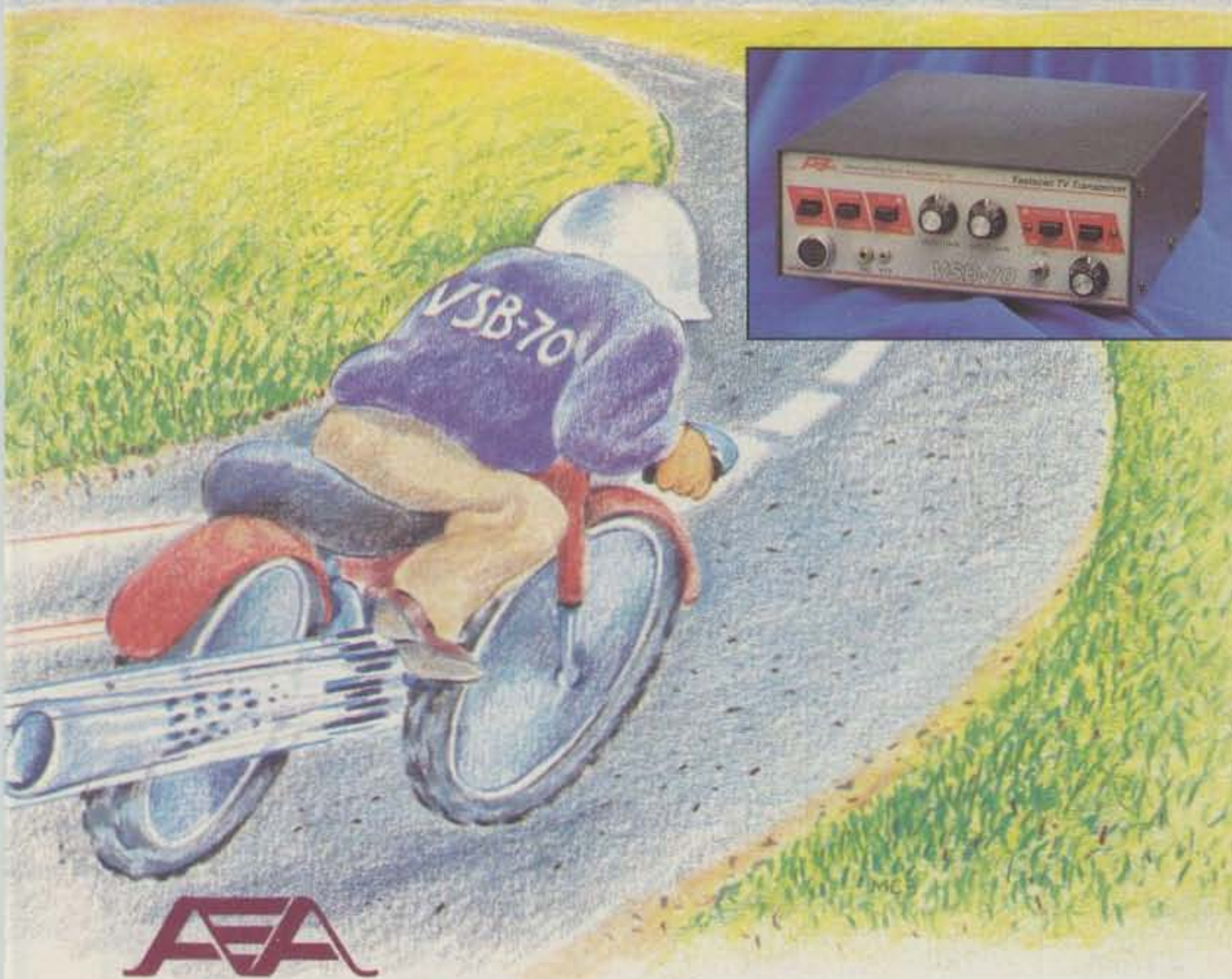
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It's summer static time at PY1BVY, but he was in there trying and worked some of the stronger signals on CW.

the million mark, but the Society of Midwest Contesters was pushing it, with over 900K for fifth place. Now that at least two scores must be submitted to make the club list, there were only 33 shown this time.

Thanks, Guys

The total number of contacts to be processed in this contest keeps growing. Computers are necessary to do the work, but a lot of human judgment is required to assure that the computer doesn't get contaminated with "garbage" data. It got to the point where either a less careful job would get done, or a lot of help was needed to meet the publishing deadline.

We are extremely fortunate that Dave Thompson, K4JRB, offered to help. He knows this contest well, having entered it for many years. He is also a knowledgeable manager with plenty of computer savvy. He enlisted the help of other Southeastern DX Club members. Together they processed all the phone logs, after establishing the WVE and DX master. Please thank Dave and his co-workers for all those man-hours any chance you get.

Miscellaneous

If you make over 200 contacts, you must send in a check sheet to avoid being listed as a check log. Be sure the sheet agrees with the log. A printed alphabetic list is preferred, but the chart-type is acceptable. Leave all dupes in the log, and mark them as such, so all cross-checks come out okay. There is no penalty for marked dupes.

It's great if you persuade a pal to get on and work you. Lots of extra participation is generated this way, because he stays on and works others. Indicate this in the log if you think he might show up as a "unique."

Include a stamped, self-addressed card if you want assurance your log arrived. It's the cheapest way.

A clearly written log or printout of your log must be sent in even if you do your work on disk.

Next Time

The 160 Meter CW Contest will be held the last full weekend of January 1992 (January 24, 25,

26) and the Phone Contest will be held the last full weekend of February (February 21, 22, 23). Please note there are still 5 days left in January after the contest is over, and 6 days in February after it's over. Times for both are 2200Z Friday to 1600Z Sunday.

Send your business-size SASE to CQ 160 Meter Contest, 76 North Broadway, Hicksville, NY 11801 for the summary and log sheets you plan to use. You may photocopy log sheets or make your own, with Z-time, station, info sent and received, sequentially numbered multipliers as each is worked, and claimed points. Typed or computer lists are best, but number the QSOs, separate the pages of fan-fold paper, and clarify any calls written on the folds. Include a summary sheet showing your printed name, address, call, and location. Multi-ops show who was operating at all times.

CW mailing deadline is February 29 and Phone deadline is March 31. Send logs to 160 Meter Contest Director Don McClenon, N4IN, 3075 Florida Ave., Melbourne, FL 32904. Logs may also be sent to CQ, but will then be forwarded to N4IN. Please indicate CW or Phone on the envelope. Be sure you have enough postage on your entry. We welcome photos of your setup (no deadline for them).

Let's do it again in 1992!

73, Don, N4IN

Soapbox CW W/VE

Big thrill to have Europeans answer my 60 watt CQs ... N4YDU. Maine is rare enough that it adds more dB than more power ... KN1M. Found neighbor's electric fence noise maker just in time! ... N8LM. Good practice for a very rusty CW operator! ... KK4RV. Probably spent too much time hunting multipliers. Quietest noise level in several years ... N4IN. DX conditions were great to Europe. Unfortunately college cut into operating time! (19 yrs old) ... KE2PF. Made the mistake of running off the floppy disk and ran out of log space! ... W1WEF. Conditions were good. I heard quite a few DX stations, but they did not hear me ... WA7GUV. Fewer stns on this year. Heard EU (G,HB9) first time in many years but too weak to copy at 0700 UTC ... K6MO. At age 72, I could not stay alert into the morning hours and missed the Pacific and Japanese DX ... W9PNE.

XYL took Girl Scouts out camping. I operate this thing barefoot. Which one is crazier? ... KV8Q. Nice to hear so many courteous operators. Lots of Extra class calls ... K16CK. Finally made WAS from here.

TOP 10 SCORES

SINGLE OPERATOR

USA CW		USA PHONE	
K1ZM	293,000	WW2Y	152,640
AA1K	267,430	KD9SV	129,312
K5NA	243,960	WB4ZNH	119,370
W3BGN	226,863	KC8EK	118,170
K9UWA	171,275	WD9INF	116,111
K5ZD	156,315	KE5FI	109,695
AA4S	156,025	AA4S	99,456
WA2SRQ	148,311	K4YT	96,135
W3TS	147,378	W3TS	87,425
WD8LLD	142,598	K4LLQ	87,168

VE CW

VE CW		VE PHONE	
VE3EJ	400,016	CG3EJ	367,367
VE3DO	189,462	VE3PN	78,100
VE3KP	163,100	VE3MSN	67,620
VE1ZZ	144,648	VE2ZP	62,514
VE3PN	108,272	VE6JY	58,353
VE3MSN	81,785	VE3NXA	56,716
VE3CUI	55,566	VE7ERY	45,872
VE4JB	48,177	VE7KD	45,590
VE6UX	41,700	VE3DC	39,640
VE5XU	17,160	VE2QO	22,155

DX CW

DX CW		DX PHONE	
ON4UN	465,394	UL7ACI	330,156
KP2A	330,700	RB5DX	74,690
	(K4TEA Op)	OK3TKW	74,005
IT9ZGY	253,650	A92BE	72,756
DK8ZB	235,764	OY9JD	68,736
I4EAT	221,900	OK3PA	68,573
EA8RCT	221,094	YV1CP	64,925
G0NAA	219,600		
	(G4BYG Op)	CU2CE	60,239
9L1US	200,166		
	(K8MN Op)	OK3CQR	59,136
HA6PX	186,120	LZ1KWZ	58,500
GM3YOR	176,814		

MULTI-OPERATOR

CW		PHONE	
PA3DQW	337,330	WB9Z	223,568
WW2Y	305,694	AA4GA	204,850
UZ2FWA	268,363	KM4HH	168,428
W2GD	250,542	YT2R	147,833
OH0AM	237,916	KD0FW	118,858
AB4RU	235,104	WY2X	117,504
OK5TOP	231,602	KN8Z	102,168
WB9Z	224,688	OK5TOP	97,198
K3LR	218,776	KY1H	83,490
KY1H	195,306	G0KPW	82,566

Thought West Virginia would never hear me ... N4ARO/6. Without a doubt, Saturday night was my all-time best-ever DX operating session on 160 meters, in an amateur radio career spanning nearly 20 years. Thanks for a GREAT time! ... VE3CUI. My computer insisted on giving me 5 points for Wyoming. It is probably worth 5 points, but I fixed it ... N0BNG. Exciting to hear the brief opening to Europe the second night ... W0ZV. Biggest thrill was hearing 9L1US. Now if only he had heard me! Had snow static opening night, but next night good condx ... K0RW. Why is 30 wpm with a repeat better than 20 wpm with no repeat! ... KA9LOE. First time in this contest from the East Coast. I finally figured out why we need an attenuator on a rig. EU contacts were fairly easy to get if you could hear them through the front end overload ... WD5T/1.

Best European opening ever for me! ... K3WW. Missed Saturday night for banquet, food, drinks, dancing, band, and girls. Tough decision ... K3ANS. I asked Danny, WB4ETY, to get on and work me. He did so plus two others. Is there an award for the smallest log submitted? ... K4PB. I think I worked everyone I could hear

AGGREGATE CW AND PHONE CLUB SCORES

Club Name	Total Score	CW	Phone				
Frankford Radio Club	3,109,926	WW2Y	WW2Y	Punto Fijo DX Club	174,523	YV1OB	—
Southeastern DX Club	1,699,261	KP2A	AA4GA	North Texas Contest Club	163,396	K5WXZ	K5WXZ
		(K4TEA Op.)		Northern Ohio ARS	149,530	WB8PHI	K8SVT
Yankee Clipper Contest Club	1,564,162	K1ZM	KY1H	Kansas City DX Club	118,858	—	KD0FW
Mad River Radio Club	1,092,565	KN8Z	KC8EK	Texas DX Soc.	117,835	KI3L	KE5FI
Society of Midwest Contesters	953,552	WB9Z	WB9Z	New Mexico Big River Contesters	114,751	K9RS/5	AA5B
North Coast Contesters	672,849	K3LR	K5ZD/3	Bulgaria Radio Club	110,109	LZ2JE	LZ2JE
Potomac Valley Radio Club	579,176	K3ZO	K4YT	Western Washington DX Club	106,685	N7PMC	—
Rhein Ruhr DX Assoc.	575,162	ON4UN	—	Canadian Int'l DX Club	105,549	VE6JY	VE6JY
HWRC DX Club	473,596	UL8AWL	UL7ACI	Minnesota Wireless Assoc.	92,359	KS0T	KD0OZ
Bavarian Contest Club	424,109	DK8ZB	—	Northern Calif. Contest Club	85,998	N6TV	WN4KKN/6
Southern Calif. DX Club	356,148	N6DX	N6DX	RAC of Greater Milwaukee	66,318	WA9TZE	WA9TZE
Radio Contest Group OK5TOP	328,800	OK5TOP	OK5TOP	Arrowhead RAC	61,038	N0BNG	—
Carolina DX Assoc.	327,714	AA4S	AA4S	Kettle Moraine RC	58,077	N9KS	N9KS
Dixie DXERS	308,344	NQ4I	KM4HH	Rochester DX Association	51,111	N2WK	KE2WK
Mile HI DX Assoc.	243,065	W0ZV	—	Green Bay Mike and Key Club	36,208	KA9LOE	KA9LOE
Hoosier Contesters	182,892	KD9SV	—	Petaluma DX and Experimenters Soc.	19,060	WB6EGE	WB6EGE

by tuning the band . . . N5NMX. The good band conditions the East had to Europe did not extend to my house . . . K5WXZ. Friday a big tree branch broke my antenna. I had to dig it out from under the snow to fix it. Then my daughter and family came for dinner Saturday night. One final amp tube blew up and then the band went sour . . . W1PL. Spent about 7 hours in test—took same amount of time to do the paperwork! Best rate 107 QSOs in 1 hour . . . K4PI. European signals quite good at times; no JAs heard either morning . . . K1ZM. I've been off the air for twelve years and it is hard for me to stay awake after 1:30 AM, hi . . . K2DW.

Blew antenna tuner. Rig and antenna had a divorce! 160 can really strain that marriage . . . K2PS. Conditions to Europe super, for this period in sunspot cycle. Nice to hear so many old friends. Someday I would like to put in full time again . . . W3BGN. I had an old piece of test equipment on the desk. Unfortunately there was a 100 volt difference between my key, which it touched, and the equipment. This zapped my keyer, and caused the Corsair to operate, drawing excess current. I quit while ahead Friday night (Saturday morning) when the odor of burned plastic was obvious . . . K4BAM. I thought conditions were not as good this year as they were last. Maybe I just didn't try as hard or perhaps I just missed some good ones . . . K4TO. Two weak JAs first morning, none second AM. One weak European first evening, several second evening. Don't believe there was quite as much activity as last year . . . W5FIX.

This is one of my favorite contests even though it cost me a lunch . . . K3CP. Best condx ever to Europe. Surprised when OH0AM called me! Only 12 hours of operation (but all the best ones) . . . K5ZD. Again thoroughly enjoyed the contest. Great to have so much European participation! . . . WF2W. Thirty OKs, 27 DLs,

23 Gs—WOW! After 3 contests during the solar maximum, it's good to experience conditions like this time . . . WW2Y. Lots of fun operating portable from Maine, but my friend's trees were not as high as he told me! . . . W2XL/1. Not a good effort here! Had to sleep 4 hours first night; CQ'd too much the second night—cost me some multipliers for sure . . . AA4S. I am new to 160 but really like it. There are a lot of real gentlemen working the band . . . N4PKL. Jury-rig antenna setup slapped together in a hurry. Managed to have a great time and to work some great operators. Thrill was to have a G4 call me! . . . K2UFT.

Fantastic conditions to EU on second night. I just hope you can always provide the same conditions in years to come, Don! . . . K4VX. The biggest thrill was having our heater working the first night when the wind chill hit -15. Biggest disappointment was number of multipliers, but we all had a great time. Thanks! . . . WS7W. Conditions Friday very good. 9L1, EA8 for my first African, both called me! Had to work 9L1US a second time to confirm the exchange because I did not believe my ears the first time! 9M8AX was so loud Saturday morning that I could have worked him on AM! Saturday very odd conditions. The East Coast signals were 10 to 20 dB weaker than Friday . . . N6LL. First European opening in a long time. The JAs Sunday morning were as loud as I've ever heard them . . . N6ND. Fun contest. Just wish I had listening antennas to hear DX . . . WF2G. The beverage antennas made the difference. We were working stations we could not hear in years past. Best test ever! . . . W8WEJ.

This fall I managed to track down and eliminate an S9 interference on 1835 from a neighbor's touch lamp. That and the improved conditions contributed to a 50% better score than last year . . . WA2SRQ. Fantastic European opening second night. Some noise

problems, good test. First time on contest software. Loved it . . . KD9SV. First serious multi-op. We'll be back! Best condx ever to EU . . . K3LR. Fantastic conditions! Really enjoyed getting European answers to my CQ! . . . WD8LLD. Without beverages, we couldn't hear much EU DX, and one of our ops needs glasses so bad he couldn't see the dupe sheet! So the station couldn't hear and the operators couldn't see! Fun contest as always, though . . . W1OP. Had a personal best hour of 114 QSOs . . . K1TO. Very proud to WAS in 9 hrs. 4 min. . . . WB9Z.

Great European opening second nite, and thanks to K8CC for computer program . . . K9UWA. My first contest with computer. WOW! Threw out all my pencils. Condx poor here. Little activity heard . . . KT7G. Good opening to Europe and Soviet Union. Wish more of them could have heard me. Doubled last year's score as KN4DS, so my contest skills are improving . . . AC4BA. About 2 hours into contest, amp went FFFEEET Bang! Fixed it for next night (metal sliver in ant loading capacitor). Even with all my RX ants, there was NOISE NOISE NOISE! . . . WA5POK. By next year I hope to have the computer going so I can type in your call and have the computer do the rest. I feel like a kid not ready to walk. I have a super good antenna system, good radios, but am very poor on computers! Makes me feel 99 years old. Hi! . . . W0AIH. I managed to get permission to use the tower of broadcast station WVVW, located in Newport, Ohio after they signed off at sunset. The tower is 240 feet tall and is an incredible performer on 160. My score would be a lot better were it not for the limits set by the broadcast schedule; lots of fun and plenty of activity . . . K8RYU/8.

It was a treat to hear the band open up the second night . . . VE5XU. Had lots of fun. New vertical with raised ground system works great . . . AB4RU. Enjoyed



K4TEA operating KP2A appears in more WVE CW logs than any other DX station. We all owe him thanks for providing that multiplier. He was tied for second worldwide in the multiplier department with 100.



Laci, W1PL, may be one of a select few who have been in every one of these contests since they started. He is the single operator CW Massachusetts winner this time, as he has been many other times.



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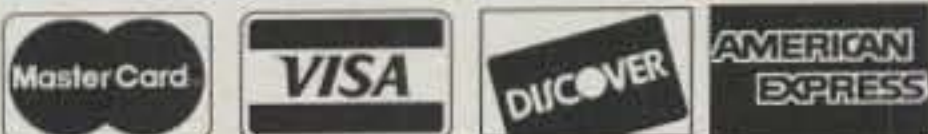
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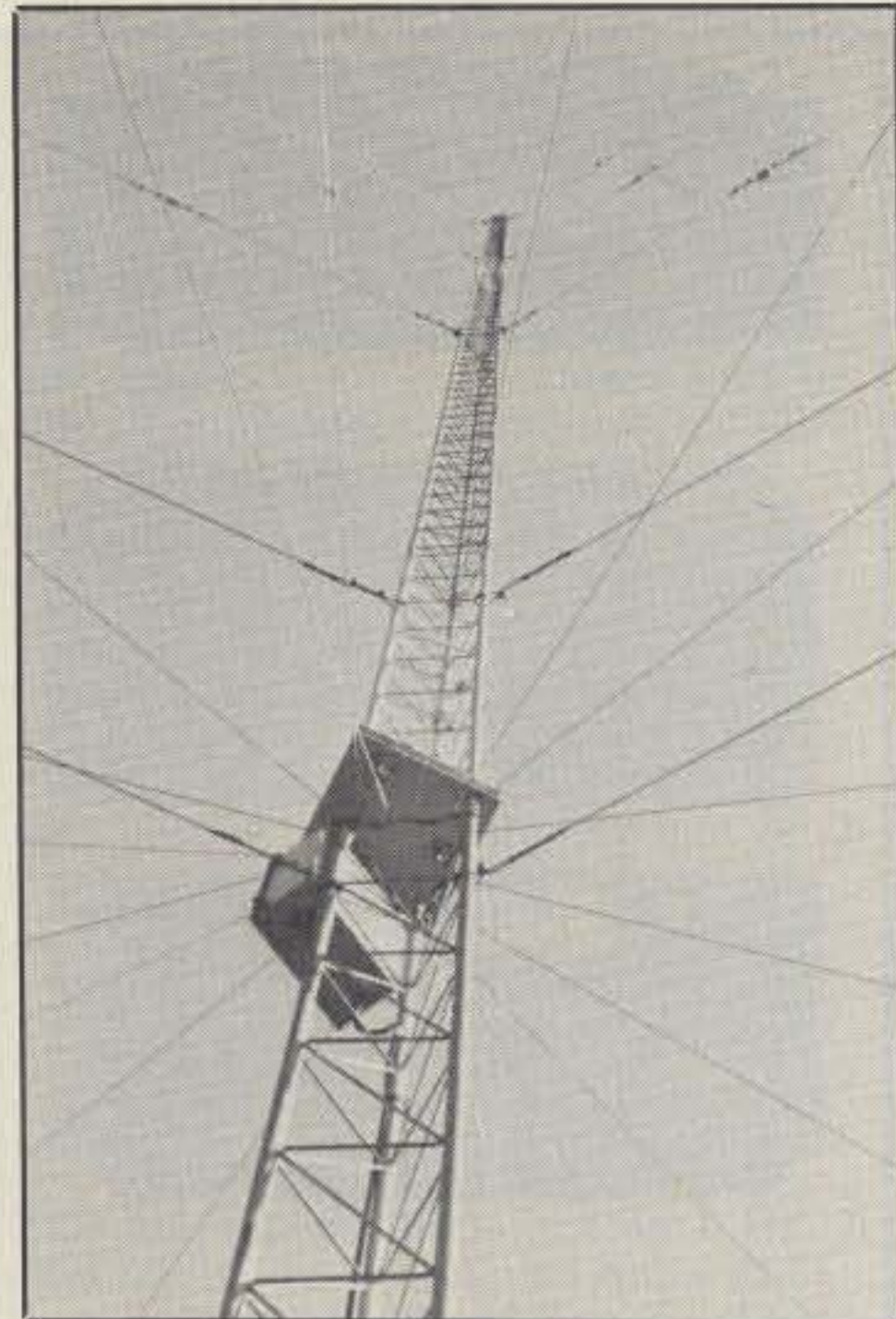
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Sunset at WS7W, Wyoming. Shown is the 140 foot insulated tower with 4500 feet of radials 10 feet above ground.



How appropriate for the second highest scoring CW Netherlands PA3BAS to have a loop antenna supported by a windmill. Operators were PA3AUC, PA3CLH, and PA3DSB.



AB4RU, sixth world-high CW multi-op, has a 150 foot vertical with 20 raised-ground 133 foot radials. Operators were AB4RU, AA4GA, and WS4F.

JA pile-ups both mornings . . . K9RS. First time in years to operate in a 160 contest. What a blast! . . . W2CRS. Pleased to hear so many VE6s and VE4s on the air this year . . . VE4JB. Any contest I can find Wyoming is a good one. Wish I had more time to operate . . . W9KHH. Amp was down but fun remained up. One of the better contests and always interesting . . . K9OSH.

Soapbox CW/DX

Conditions first night bad into the USA, but second night much better. We operated from our windmill QTH. See you next year . . . PA3BAS. Hope to participate seriously later with an appropriate outfit. Perhaps next year . . . TF3DX. I have a love/hate relationship with this contest. It is so fun, but sooo hard

. . . KP2A. Operating standards as always the tops in this contest . . . G0NAA. To me condx seemed very good to NA, although only TI worked apart from USA and VE . . . G4BWP. Worked seven W stations—usually work one at the most . . . GW3GWX. Gave many the TI multiplier. Surprised by the amount of Europe worked. Thanks to "Doc," T17LGY, for the chance to be DX . . . T17LGY. Very slow the second night. Ten hours after the contest I had the best opening to Europe I've seen in two years. Many loud Europeans during the contest, but unable to work any. This was my last year in the CQ WW 160 Contest from DU. See you next year from Virginia again . . . KE9A/DU3.

I enjoyed the test very much, this year from ashore. Worked VK3 shortly before and PY1 shortly after the test, hi! Anyway this was my best result ever . . . DJ4SO. Heard a lot of USA stations but worked only

a few. Maybe next year better! . . . YT3T. Condx were rather strange. To the east they were bad, and we only worked a few UA0 stations. To the west they were great, especially during the last hour. It was a big thrill to work 29 states in 9 different call districts, including 3 stations from CA (new zone for me) . . . PA3DQW. First 160 WW DX. Much harder to work DX than on other bands! . . . Y22KK. It was nice to work so many stations on top band . . . OH6YF. Nice propagation to the east coast, but I had only a little chance with my little antenna . . . Y37XJ. Lots more US stations than last year. 9L1US was really loud here. I have to learn fast typing . . . F6BEE.

Terrible "tropical QRN" on 160 meters here, but enjoyed contest very much . . . HI160M. First top-band contest. Many countries worked for first time. Great participation and fun . . . IK1NDB. It is my first contest



Eighth world-high CW multi-op hired guns (left to right) WB9Z, WS9V, K9ZO, AG9A, and WO0G. Their WB9Z was the world-high multi-op on phone.



W9PNE laying out a vertical.



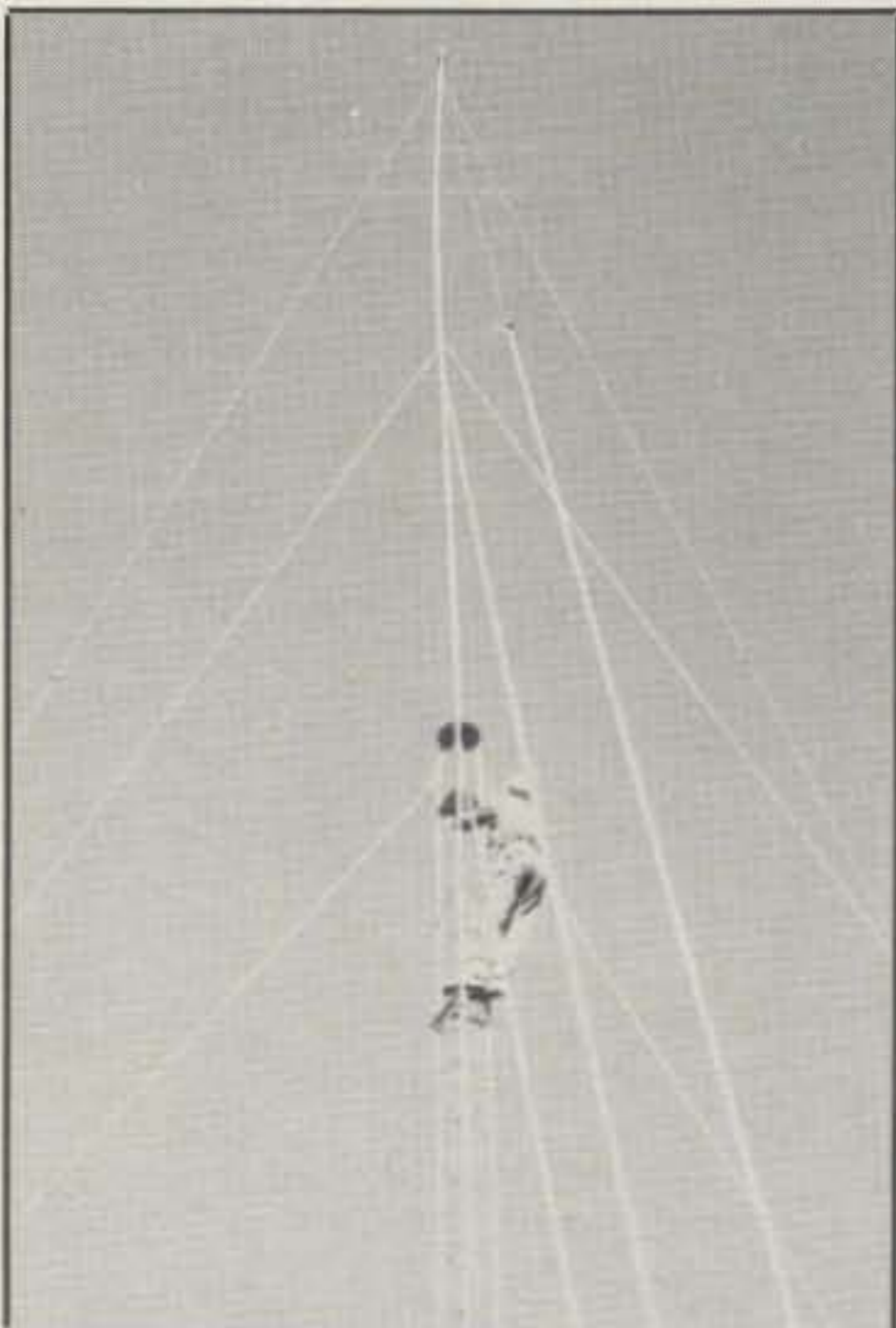
African CW single operator trophy winner EA8RCT.



CW single operator UA2EC was in the far right building in Kaliningrad.

on 160 meters. Just a few minutes before the end, I worked my friend IS0VSG! . . . IT9ZGY. It was really tricky working with the balloon-supported vertical. Thank you for the nice and enjoyable contest! . . . I2UIY. Just to test our 160 meter antenna we took part for a few hours. Activity and results were amazing! . . . PA3EBT. Poor cdx. Strong tropical QRN; can't copy EU stations . . . YV1OB. New quarter-wave vertical with 250 radials works great. Twelve beverages hear about all there is. First night all Ws came in from South America. Second night was plagued by a persistent jammer, and got three hours sleep. Then the Ws were coming from the normal direction, and worked many in the far west and west coast . . . ON4UN.

Bad WX in contest; fog, frost, and many problems with antennas! . . . OK1KSO. This is my first CQ WW 160 Meter DX Contest. I'm very happy for my good score, and the many Asian and USA stations. I will go in 1992 also . . . HA6PX. I enjoyed top band very much in HI. Wish I could work phone from Japan . . . HI8DMX (JP1DMX Op.). Absolutely magnificent conditions, and all of those lovely 10 point QSOs combined to boost the score considerably. I only hope it's enough to snag the plaque for Africa on CW . . . 9L1US. Our old 6KD6x5 linear amplifier had just broken before the contest. If it had worked well, we would have done better . . .



Virginia single operator phone winner K4LLQ on his tower. It's insulated 10 feet up, with radials attached there. Sixteen foot top hat.

JA7YCO. I am 15 years old. This is my first big contest, and a thrill for me. Special thanks to OM Yuri, UL7ACI, for getting me organized . . . UL8AWL Op. Very pleased to work a new country, 9L1US . . . YU3EA.

Soapbox Phone W/VE

More power made a big difference. Also used a computer to log. Boy did I have a blast! See you next year . . . KN2T. Another adventure in subliminal listening! . . . K0RW. Had to have some quiet time because we were baby sitting an expectant mother, hi! . . . W0CEM. When one gets to be an octogenarian (which I did nearly 2 years ago), it is hard to stay at that mike all night like the relative youngsters do. I just have to get my sleep or take a nap. Hi . . . W4HVU. I urge the return of the DX window. The "group clique" passes DX to their friends, then refuses any calls from stations copying the DX. These stations are right on the coast for the most part, and probably initiated request to drop "window" . . . KF4HK. This was our first multi-op effort. Sure enjoyed the tremendous European opening on Saturday nite . . . KM4HH.

Usual gentleman ops went crazy when Europeans began coming through . . . N4IN. I always look forward to the CQ 160 Contest because I don't have to change bands or rotate antennas and can usually make myself heard calling CQ or calling someone. This year I had an unexpected (and unwelcome) visitor, the intestinal flu. However I was able to spend lots of time in the throne room reading March CQ, watching the war news, and feeling sorry for myself. Well, as us Redskins fans say, "There's always next year" . . . W3TMN. Great run, lots of fun, QSOs flew, then amplifier blew! . . . W8WEJ. I had not planned to compete, but fell into a groove and couldn't stop. Most exciting moment: 9L1US called on a CQ—good signal. Biggest disappointment: No Europe—barely heard CU2CE. Worked all states the first night . . . N6DX. More antenna work needed. It didn't work as well as last year . . . N2VW.

Kept burning out capacitors in my antenna tuner. Sorry my receiving was so poor and I missed the DX calling me . . . K4JRB. QRM, QRM, QRM—hard to find a clear frequency; even harder to keep! . . . VE3EJ. Next year I will use the CQ contest sheets to make life easier, especially if my computer decides to swallow so many calls again! Fortunately I had scribbled the calls down on a note pad and only missed seven according to the difference in numbers . . . VE3NXA. Most interesting moment: neighbor comes by to complain that his answering machine only plays back "CQ CQ CONTEST VE3DC" . . . VE3DC. I have worked this contest before, so anything that I could work, especially DX on a dipole without a linear, was a thrill . . . NX3A. With Wisconsin QSO Party experience, I tried this contest. It was fun . . . N9FZL. Could only work one night, but got all the lower 48 states. Voice gave out, but was saved by a voice recorder . . . WA9TZE.

Too much power-line noise. Could not CQ most of contest because of noise . . . K5WXZ. Between weekends of ARRL contest, could only get on a few

hours. It was wife's birthday weekend . . . W3BGN. Linear amp crapped out after 129 QSOs; worked rest of contest barefoot with 940 only . . . K2DOX. Tough without proper antenna and power. Better expectations next year; this low-pressure contest was fun anyhow . . . K2OWE. Working KX4S and K4XS back to back in the middle of the night is confusing . . . WB4ZNH. Lots of VE activity this year; those 5 pointers really add up! . . . WD9INF. Sure did have fun. Band was worse this year compared to last; can't wait for low sunspot numbers. The ops during this test are tops, no 20 M stuff . . . KA9LOE. I'm especially pleased that Milt, N5IA, who got on "for just a few minutes" to work me, continued on to make 275 QSOs barefoot . . . N6LL.

My thanks to CQ magazine and you and your crew, Don, for a great weekend of fun. I enjoy the competition but most of all enjoy meeting some of the old friends on the air. Surprising how many people can call you by name on this band . . . VE7ERY. Conditions better than expected. Nice to pull 34 countries through the furious QRM . . . WB9Z. Enjoyed the contest as usual. Wish we could hear a little more DX up here in the NW. Thanks to everybody for their patience with all the repeats . . . NK7U. Did not once hear remarks usual in contests. "This frequency is in use, move (sometimes please)." "This is my frequency. I've been here for—hours." And so on . . . W0ACT. K2UFT said at 2 AM "What we need is a G catcher" and 10 minutes later one calls us at 0629Z! . . . KC4MJ. Somebody has to have the lowest score! . . . K3YD.

Soapbox Phone DX

Being new on 160 I was impressed by the sportmanship of the operators! With only 100 watts, I had to yell. I'm sure the neighbors are glad it's over . . . VP5JM. Poor Stateside opening on Saturday morning, but much better on Sunday. Heard W9 and W0, but couldn't work them . . . G0KPW. After a Murphy visit: 20% of last year's power (200 W) and 57% of the QSOs. CU AGN next year . . . YV1CP. Too much party, too little contest time; maybe next year . . . PA0IJM. Very hard to break CQ machines barefoot from down here. W3TS, WX4G, W3BGN, sorry guys. I did my darnedest to work you but no dice! . . . VP2EXX. I began making the antenna at 0100Z, finished at 0245, and got first QSO at 0256Z, February 23 . . . XE2HWH.

Dismal propagation on the second night with pronounced rapid QSB and high atmospheric. Some East Coast U.S. stations were alligators. They were quite loud in West Africa, but couldn't hear me after two evenings of calling, yet I had little trouble working the Midwest and California . . . 9L1US. Poor cond. We had aurora. Fell asleep second night. Woke up at about 0735. Worked 4 USA stations and heard VP2VA with very good signal; then we had sunrise. Will be back next year . . . OY9JD. Phone contest conditions much poorer than for CW . . . IT9ZGY. Unbelievably bad conditions. The many USSR stations saved the contest . . . YT2R. My first 160 meter contest. Hope better next time . . . YB2OK. Worked pirate YI2SH. Of course SH is for Saddam Hussein! . . . LY2BIM. Condx not as good



World-high CW QSO leader W2GD had 875 contacts. He had the ninth world-high score, and was the fourth worldwide multi-op. Operators shown (left to right) are K2TW, W2GD, KU2C. Not shown are KZ2S and WA2MKM.



Single operator DJ6TK, with 52 CW countries worked, was tied for fifth world high in this category. He was first of the 26 German entries.

as for CW test. See you in these and WPX next time ... Y58IO.

I very much love this contest. Propagation was excellent. I heard many USA stations calling me, but European QRM kept me from making good copy ... UL7ACI. The best band to make friends ... CU2CE. My participation for a good last place ... IT9ZWV.

CW Multi-Op Station Crews

KB1H & K1GX, KR1U, N1GKI. KY1H: KB1W, NS1M, packet. NX1G & K1XX, packet. W10P: K1DT, N1AKO, W1GS. WW2Y & K2WI, N2NU, WG3I. W2GD & K2TW, KU2C, KZ2S, WA2MKM, packet. KE2PF & packet. K3LR & WB3KKX. K3WW & packet. K3TUP & N3BJ. K3IPK & packet. W3AP & packet. K3ND & packet. NC1R & KN4GI. AB4RU & AA4GA, WS4F. K3KG & K4BAI. WA4CTC & packet. N4XM & AB4RX, KD4U, N04R. W4XD & AB4RI. K9RS & AA5B. WM4Z & K5CM, N5CG, N5KW. N6DX & AD6C, N6VR. WN4KKN/6 & N6RZ. AA6DT & W6JU, W6/YT3NC. WB6EGE: KA60PN, KI6LP, N6MQ, N6QC, WB6WPO. KT7G & K7LXC, KR7G.

WS7W & KQ5R, N7OSW, NA7R, WB7OBS. N8EA & K8LX, Eric (K8?), logger. W8CD & K8GG, W8SEY, W8UVZ. N8CXX: AA8EV, K8FC, K8JM, W8TU. KN8Z: N8JEC, NZ8O, WA8YVR. W8WEJ & AA4VV, W8VVE. WB9Z & AG9A, K9ZO, W00G, WS9V. KD9SV & KA9A. W9UP: KA9FOX, N0BSH. KY0A & KV0Q. NC0P & W00V. N0HYB & KA0KAN, NJ8M, WQ0P. N0BNG & AA0AW, AA0BY, K0ET. K4VX/0 & K9FD, N9JF. K0LIR: AA0A, KB0GDS, KB0KK, KE0YO, N0IS, N0KFE, NT0W, W0HBH, W0YIJ, W0CHW. VE20J: VE2FLD, VE3NJ, VE3RCI. VE6JY & VE6XH. HI8DMX: JP1DMX & VK2FFI. JA0ZRY: JH0NCJ, JP1NOM, JP1QGO, JR0BQD, JR0JBI. JA7YCO: JF7WIH, JG7RWV, JH7IMX, JI7GBI, JI7LZL.

JA1YXP: JI1UTP, JQ1UXN, JS1INN. JA3YKC: not shown. UZ9JWV: Kluterov, Vlad. UZ9CZO: UV9CAZ, UA9-154-2007, UA9-154-2044. UF7FXC: RF6FM, UF6FIM. OH0AM: OH1JT, OH2BH, OH2MM. OK5TOP: OK1AUT, OK1DFP, OK1DIX, OK1DQW, OK1DWX, OK1FCW, OK1FOW, OK1PZW, OL1BRA. OK1KSO: OK1AEZ, OK1CF, OK1JJB, OK1JKT. OK3KEE: OK3CTA, OK3CTL, OK3MB, OK3WM. OK3KAP: OK3PA, OK3TMW, OK3TNU, OK3TPV, OL8CUT. OK1KQJ: OK1AYP, et al. OK2KBA: not shown. OK10PT: not shown. G3VGG: G3MRC, G3RLF. Y21CW & DH1LAO, DJ7SW. DF3CB & DL7MAE. DL20BI & DL20AP, DL20AT, DL30BQ. HA3KNA: HA3NS, HA3OV.

PA3DQW & PA0ERA, PA3EYZ. PA3BAS & PA3AUC, PA3CLH, PA3DSB. PA3EBT & PA0AAC, PA0PNK, PA3EPN. ES4XB: ES4AA, ES4MM. UZ10WZ: UA10Z, UA10MS, UA1-113-244. UZ6LWB: RA6LW, UA6-150-1495, UA6-150-1499. UZ1AWJ: UA1-169-900, UA1-169-2391. UZ2FWA: UA2FF, UA2FJ, UA2FX, UA2FZ. YT2E: YU2AJ, YU2AW, YU2CT, YU2EU, YT2TW.

Phone Multi-Op Station Crews

KY1H & packet. WY2X & K2TCK, NF2L. W9FFC/2 & WB2YOF. KQ20 & packet. W2GD & packet. W2CWW & KA2DMQ, N2K00. AA1K & Net. K3WW & packet. N3HHE & logger. K3ND & packet. KN4GI & NC1R. AA4GA & AB4RU, WS4F. KM4HH & KB4KZY. KC4MJ & K2UFT, WA4CUG. N5NMX & N5NMY. W5MPX & KB5AWK, N5LXG, WD0CEN. WB6EGE & KI6LP, N6QC, WB6WPO. NK7U & NI7T. KA7AUH & N7HJJ. N7OSW & KD7CCK, N7JUO, NA7R, WB7DBS. KN8Z & KC8WR, KD8OK, N8HTT, N8JEC, NZ8O, WX8T, WA8YVR.

WB9Z & WS9V. KA9LOE & ND9Z. K00FW & NX0I. VE3DC & VE3ACA, VE3ANB, VE3OCY, VE3TJB, VE3VFR, Vic. VP2VM



Popular single operator CW multiplier VE4JB runs this very neat layout. He had the eighth highest Canadian score.

& K5NA, KU2Q. UZ9XWH: Ali, Andy, Sergev. UJ9KWC: Sergev, Valery, Sergev. OK5TOP: OK1AUT, OK1DFP, OK1DIX, OK1DQW, OK1DWX, OK1FCW, OK1FOW, OK2PZW, OL1BRA. OK2KET: OK2VZE, et al. G0KPW: G4BAM, G4PIQ, Cook. DK0IW: DJ9MF, DJ9WA, DL5MFL. I3QJZ & I3KVV, I3MAU. LY1BZB & LY2BDQ, LY2BKF, UP2BSD. IT9ZGY & IT9BLB, IT9EWG. HE7CXZ & HB9AOF, HB9FAL, HB9ZE. YT2R: YT2GW, YU2KM, YU2MP, YU2NJ. HK4BHA & HK4DUM.



Pam, N5KW, operating WM4Z, handing out one of their 592 Oklahoma CW contacts. Other operators were WM4Z, K5CM, and N5CG.



Aki, HI8A/JA5DQH, provided many a Dominican Republic multiplier on both modes from HI160M.

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This handy little gadget will get you tuned up quickly, and most important quietly, without the rest of us firing our RF-seeking missiles.

A Noisy Tune-Up Procedure That Produces Absolutely No QRM

BY PAUL CARR*, N4PC

Picture this. You're involved in an interesting QSO with a DX station or perhaps a weekly sked with your best friend, and all of a sudden there it is: An S9 heterodyne takes the phones off your head. Does this sound familiar? Unfortunately, this scenario has become all too common. Apparently, some of us haven't heard of a dummy load or other means of tuning up without QRMing our fellow amateur. Many of us use antennas that have a Transmatch in the feedline, and these things require adjustment in order to make the rig happy. There should be a way to accomplish this feat—quietly. There is, and better yet it's simple.

The Theory of QRM-less Tune-Up: Use Your Receiver

A few years ago a new guy appeared on the block—the RX noise bridge. This was one of the greatest pieces of test equipment to come along for those of us who enjoy building and tuning antennas. The amateur fraternity now had a relatively inexpensive piece of test equipment that would provide both resistive and reactive component values for our antennas. What happened to that RX noise bridge when these measurements were completed? It went back on the shelf. Well, get the bridge back out. There is a permanent place for it in our ham shacks. It can help to eliminate QRM.

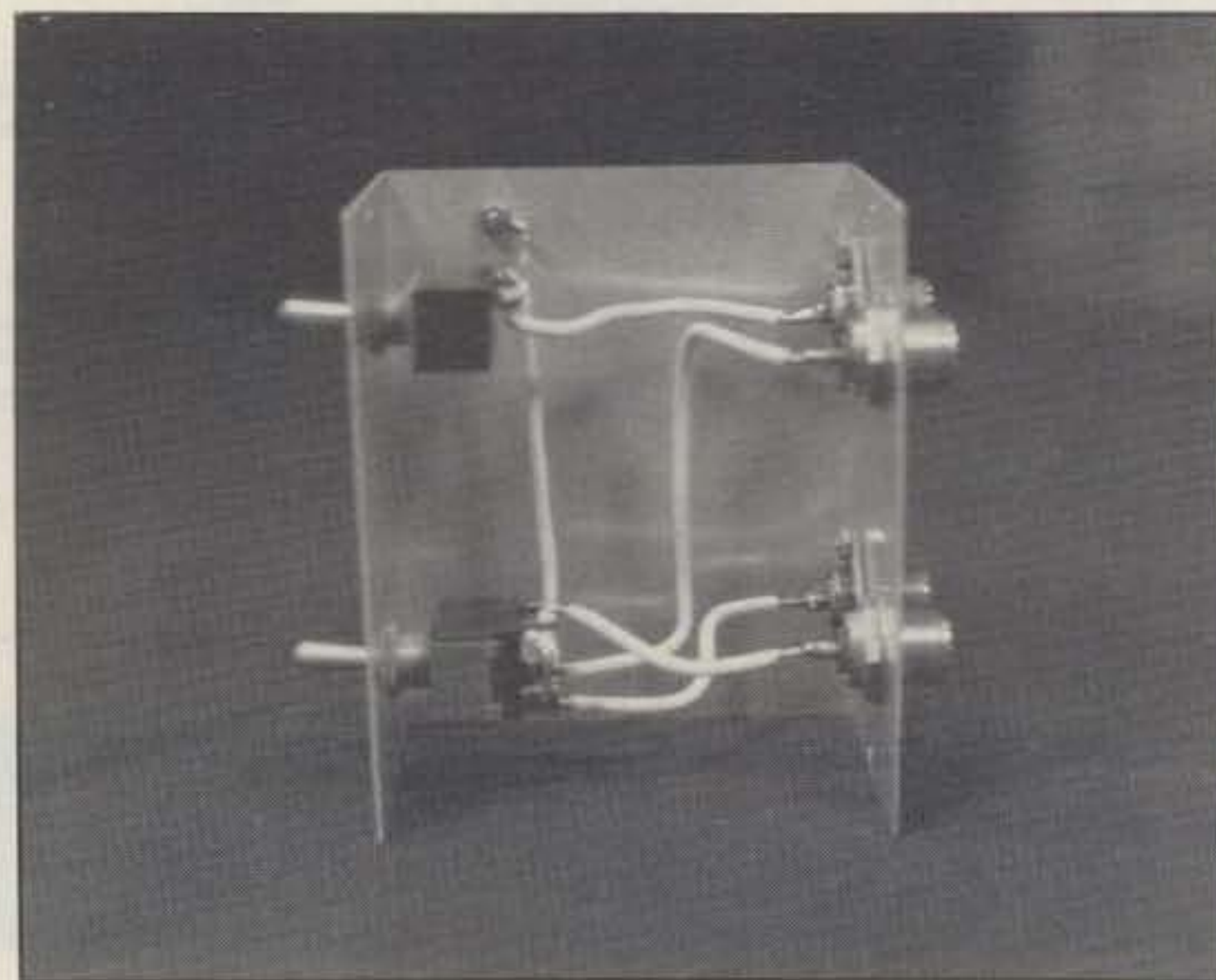
Modern transceivers want to see a 50 ohm resistive load. In fact, some of the new rigs with solid-state finals have circuits that will reduce the power output when the SWR becomes too high. In other words, the rig wants to see a 50 ohm resistive load. Any serious departure from this value will not be tolerated!

The Transmatch is a piece of equipment that many of us have in our shacks to ensure that our rigs see 50 ohms and are happy. However, these devices require adjustment. This normally means that we put a carrier on the air and adjust the Transmatch for a 1:1 SWR, thereby creating QRM for somebody.

There is another way to accomplish the adjustment of the Transmatch silently without creating QRM. Put the RX noise bridge between the Transmatch and the receiver. Set the noise bridge for a 50 ohm resistive and a 0 ohm reactive load and tune the Transmatch for minimum noise. Sounds simple, doesn't it? It is, but a small box to house a couple of switches is required to prevent having to connect and disconnect the bridge each time we change bands. Construction is a breeze. Read on.



My Palomar RX Noise Bridge is held to the control box with a strip of Velcro®



Inside view of the control box.

*97 West Point Rd., Jacksonville, AL 36265

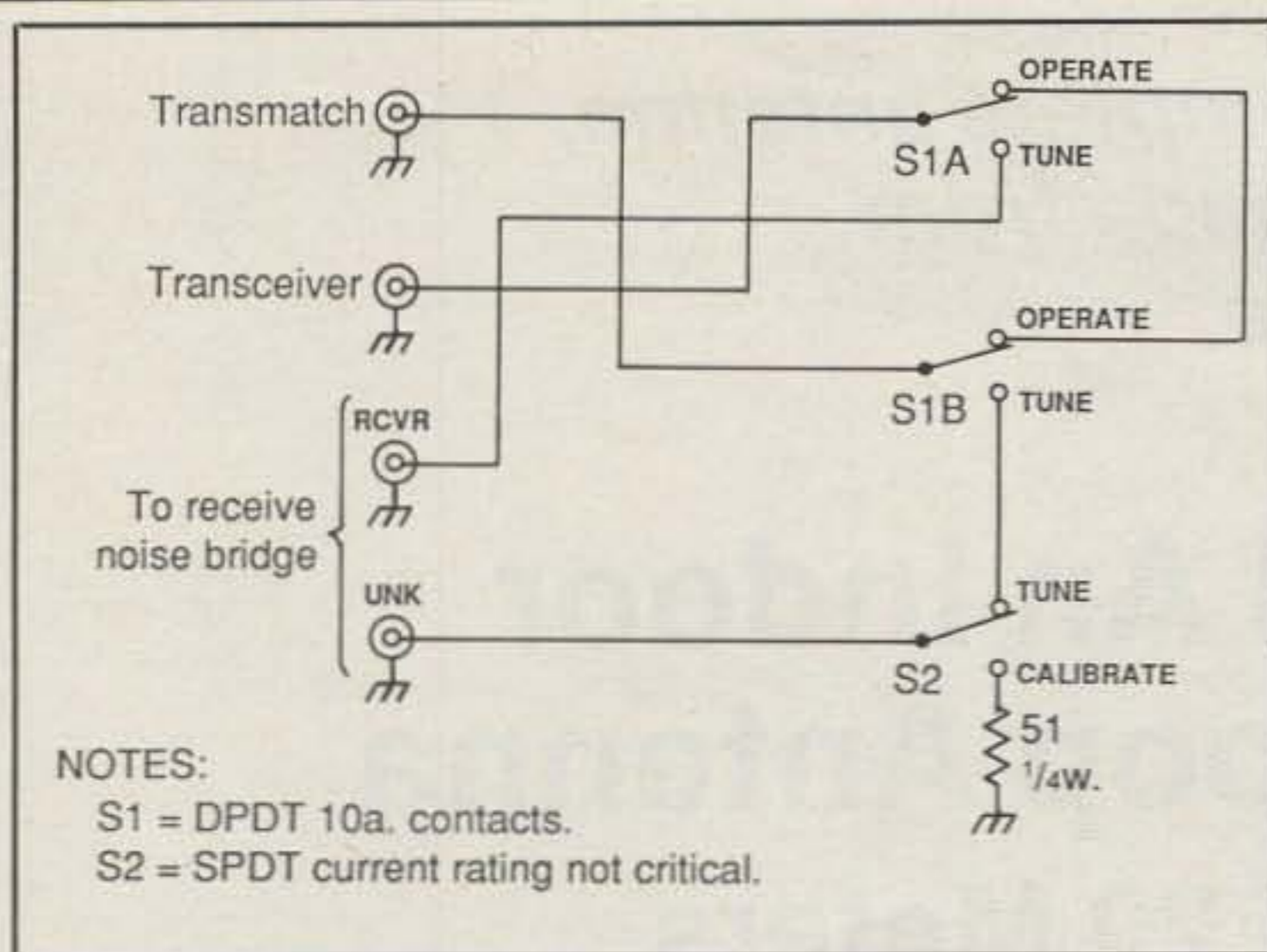


Fig. 1— This simple control box can be made with ordinary components.

Construction

The switching unit is housed in a 3" x 4" x 5" mini-box. Two switches and four coaxial connectors are required. A double-pole double-throw (DPDT) switch connects the RX noise bridge for tune-up purposes or bypasses the bridge for regular operation. A second switch, a single-pole double-throw (SPDT), switches in a 50 ohm nonreactive resistor for calibration purposes. This ensures that the transceiver is properly matched to the transmission line. The DPDT switch is wired to the SO239 sockets using #14 wire salvaged from a scrap piece of house wiring. If you want, you can use either RG58 or RG8 coax, depending on the power

level for which you are building your unit. The entire unit is almost as easy to build as it is to describe.

Operation

Operation is very simple. Connect the unit as indicated in fig. 1. With S1 in the tune position and S2 in the operate position, adjust your Transmatch for maximum receive signal. This will get us in the "ball park," so to speak.


Next place S1 in the calibrate position and S2 in the tune position. Turn on the RX noise bridge and adjust the reactance and resistance controls for minimum detected noise. This assures us of a 50 ohm nonreactive load for our tune-up procedure.

Now place S1 in the tune position, and with S2 still in the tune position, adjust your Transmatch for minimum detected noise. When you are sure no further improvements can be made, place S2 in the operate position and there you have it—minimum SWR and you never placed a carrier on the air.

Parts Procurement

The parts I used were from my junk box. Both switches were heavy-duty toggle switches, but almost any switch can be used for S1 since it never passes any RF energy. A quick glance at fig. 1 shows only receive signals from the RX noise bridge. The other switch does pass the RF output of your station, and the toggle switch pictured will probably handle at least 250-300 watts. If your station is of the KW variety, choose a proper switch for that level with good RF insulating properties.

Conclusion

The RX noise bridge has been a great innovation for those of us who enjoy experimenting with antennas. With this handy switching arrangement the RX noise bridge can have a permanent place in our stations and help stamp out "tune-up" QRM. 



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Here's a plumber's delight. A complete antenna, down to the tuning capacitor, made from commonly available copper pipe.

How To Build An Indoor Transmitting Loop Antenna

Part I—10 and 20 Meters

BY ROBERT H. JOHNS*, W3JIP

If your only option is an indoor antenna, a single-turn loop offers small size and high efficiency. However, a loop antenna has one major drawback: narrow bandwidth. It is a nuisance to retune the antenna when changing bands or making a large frequency change within a band. Considering the difficulties of indoor operation, however, narrow bandwidth is a reasonable price to pay for efficiency.

This article shows a small single-turn loop for 10–20 meters, and Part II describes a two-turn loop about 4 feet in diameter which covers 40 and 80 meters. They really work and put out respectable signals. Many contacts have expressed surprise that my signal was coming from an indoor antenna. They can be home-brewed and don't require expensive tuning capacitors or motor-driven tuning systems for indoor or portable operation, where the operator has access to the antenna for changing frequency. And the bandwidths aren't terribly restrictive on the higher frequency bands with this antenna (see Table I). The pinch comes on 40 and 80 meters with the larger loop.

Efficiency in a loop antenna requires very low resistance in the loop and the tuning capacitor, as discussed in the *ARRL Antenna Handbook*. Read the section on small transmitting loops in Chapter 5 for a discussion of loop theory and some other practical antennas. This antenna is made from $\frac{3}{4}$ inch thin-walled (Type M) copper pipe, which is actually $\frac{7}{8}$ inch in diameter. The joints are standard 45 or 90 degree ells, soldered to the pipe. If you aren't concerned about packing up the antenna for storage or for portable

operation, all the joints can be soldered together. The antenna in the pictures disassembles, as in fig. 5. One pipe is soldered into each ell, and the remaining connection is made with a hose clamp around the slotted ell and pipe when the loop is assembled. Tests described later indicate that there is no noticeable loss in efficiency with these temporary copper-to-copper joints.

A high-voltage, high-current tuning capacitor for the loop is formed by bringing the two ends of the loop parallel to one another and changing the spacing between them to change frequency. The length of straight pipe needed for the capacitor means that the top of the loop is square while the bottom is roughly octagonal.

Band (meters)	2:1 Bandwidth (kHz)	Cap. Spacing (inches)
10	91	1.7–3
12	60	1
15	55	0.5
17	39	0.25
20	21	0.13

Table I—The 2:1 SWR bandwidths of the loop as measured with the station SWR meter.

Changing bands is accomplished by loosening the plastic nuts in fig. 3, and moving the capacitor plates (pipes) closer together or farther apart by sliding the bolts in the slots of the insulators. Marks on the



Fig. 1—The 20–10 meter transmitting/receiving loop antenna. The tuning capacitor is the top of the loop, between the two parallel lengths of copper pipe.

*865 Feters Mill Rd., Bryn Athyn, PA 19009-0662



Fig. 2- For portable operation the base plate mounts on a 1 inch wood dowel. You still need to be able to reach the capacitor at the top to change frequency.

insulators indicate the approximate band spacings. A fine adjustment is afforded by turning both insulator handles, which moves the pipes lengthwise and also changes their separation a little. And a fine-tuning control is afforded by the aluminum capacitor plate above the pipes. It is mounted on a 1/4 inch nylon bolt and is only capacitively coupled to the loop ends; there is no direct contact to either one. It provides about 100 kHz band-

spread on 20 meters and about 1 MHz on 10 meters.

The antenna is tuned to a frequency by listening for the noise peak in a receiver while the variable capacitor is changed. The tuning capacitor "controls" are insulated to permit this. Final frequency adjustment is made with the top plate for minimum SWR, while a very small amount of RF is supplied to the antenna.

A gamma match is used to feed the loop with 50 ohm coax, with the SWR at resonance either flat or less than 1.3 on all bands. The presence of large metal objects, like heating ducts under the floor, can cause the SWR to rise, so some experimenting may be needed to find the best location. The base lets you stand the antenna on the floor or on a table or bookcase. If possible, get it out on a balcony. For portable operation, the large hole in the base provides a tight fit for a piece of 1 inch wood dowel. The dowel can then be mounted in a tripod, or sharpened and driven into the ground as in fig. 2.

Bandwidth

The 2:1 SWR bandwidths of the loop are listed in Table I, as measured with the station SWR meter. They are approximate.

The bandwidths for the loops in the *Antenna Handbook* are at the half power points, 3 dB down. They occur at an SWR of about 2.5:1, so they are a bit broader than the 2:1 usually used in amateur work. The bandwidths of this antenna are a little wider on some bands than those listed for a similar size octagon in the *Handbook*.

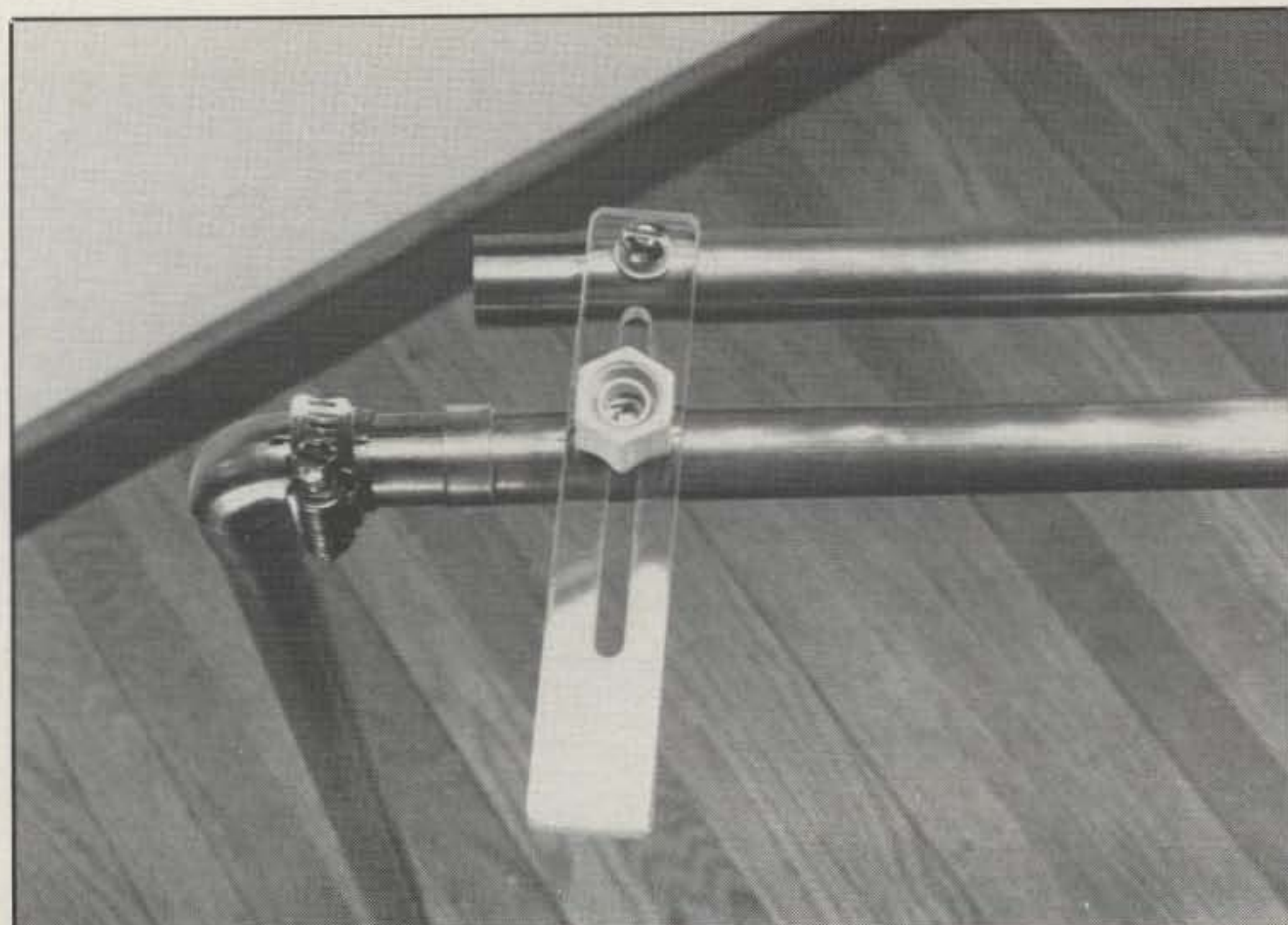


Fig. 3- The tuning capacitor pipes are held in place by the slotted insulators. The white knob has a nut inside it which loosens one pipe to slide closer or farther away from the other pipe to lower or raise the frequency of the loop.

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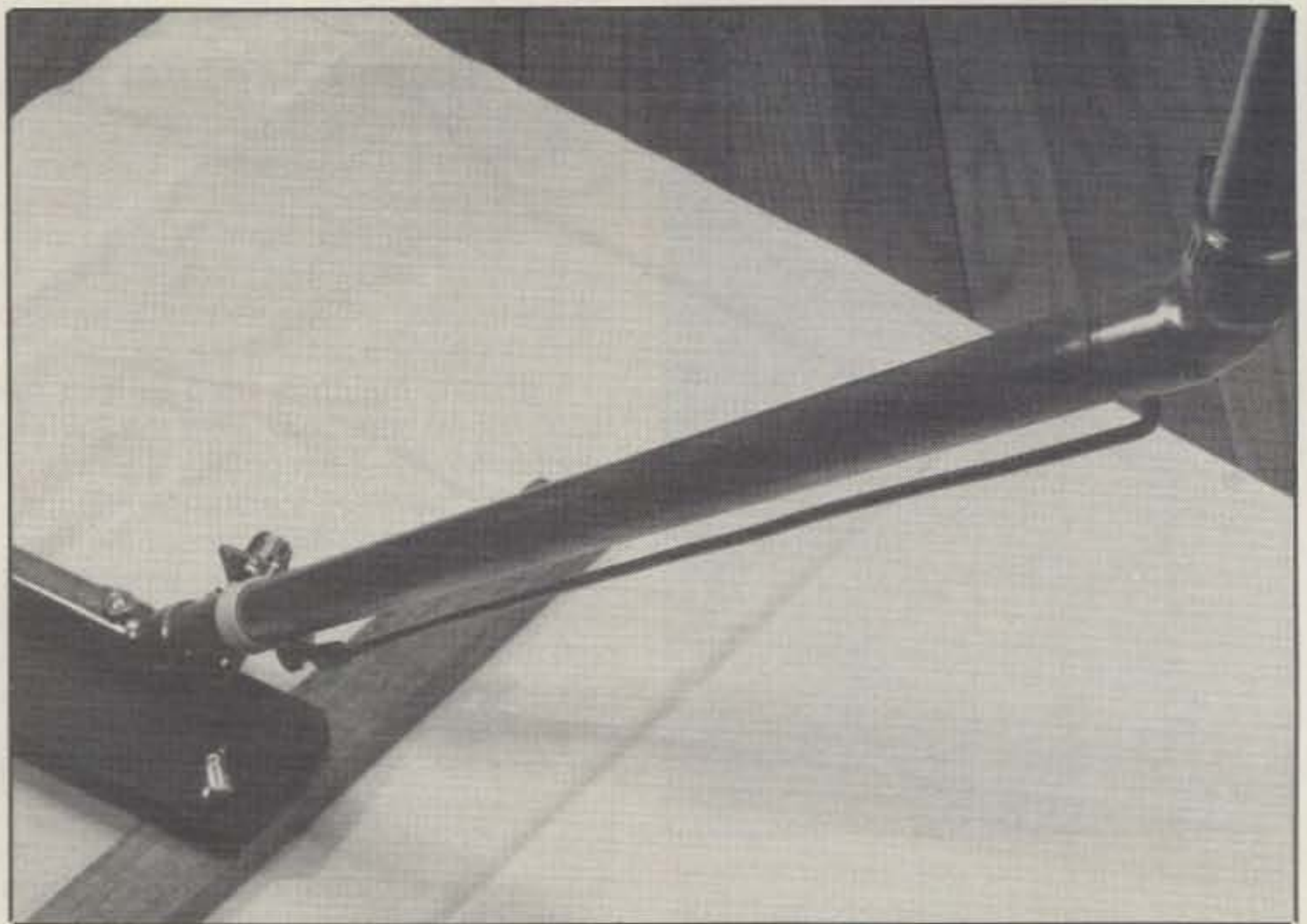


Fig. 4- The "foot" of the antenna, the gamma match, and the SO-239 coax connector.

Suspecting that the hose clamp connections were at fault, I soldered all the joints. To my surprise there was no change in the bandwidths! If there had been extra resistance caused by those connections, the antenna Q would have increased when all joints were soldered, and the bandwidth narrowed. Additional tests showed that the hose clamps had to be quite loose, almost slack, before the increased resistance at the temporary joints affected the antenna performance.

The resistance of the tight copper-to-

copper pipe connection is in the same range as that of a soldered connection. In addition, measurements (made with 10 amps through the antenna and a digital voltmeter that resolves tenths of millivolts) showed that the DC resistance per inch of joints with clamped connections is actually less than the resistance per inch of the straight copper pipe. DC resistance is not the same as the RF skin effect resistance, which is about 20 times greater, but it is an interesting comparison. Overall, for indoor use where

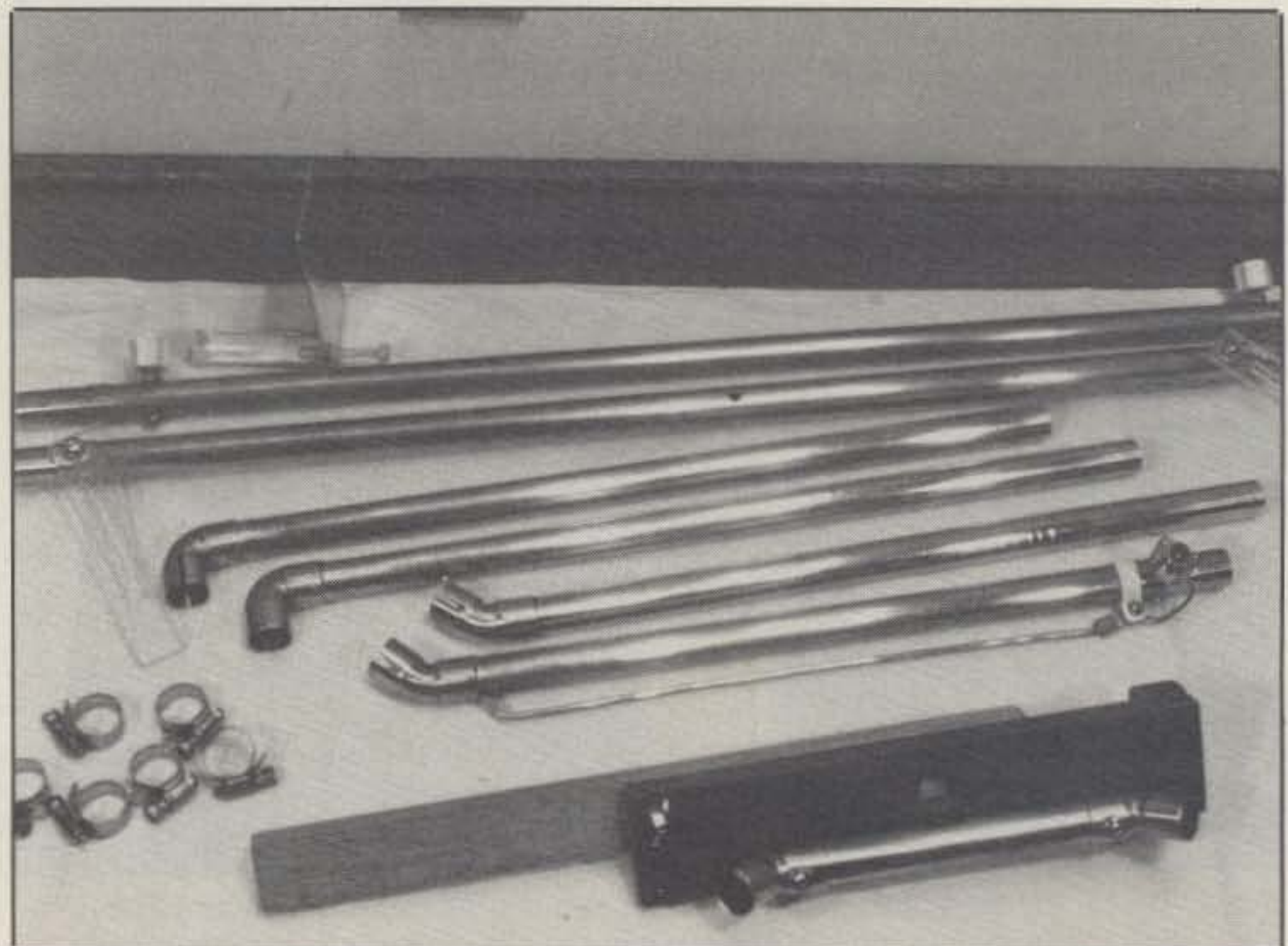


Fig. 5- The parts of the antenna ready for storage or travel.

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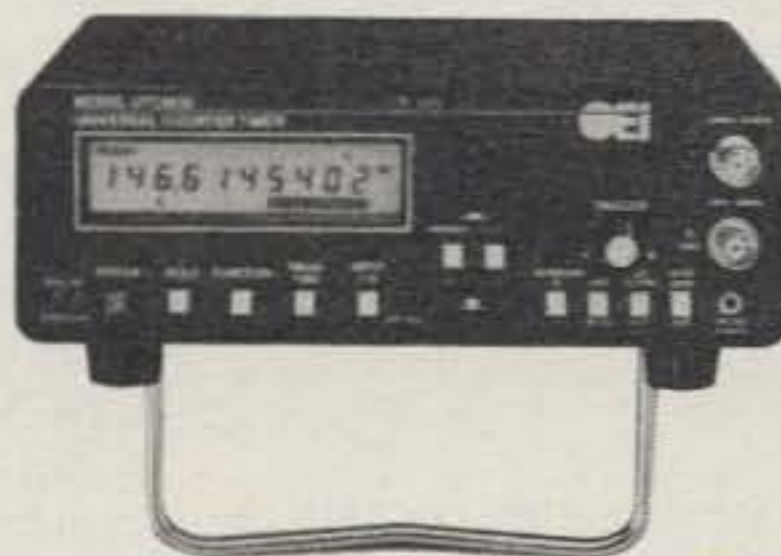


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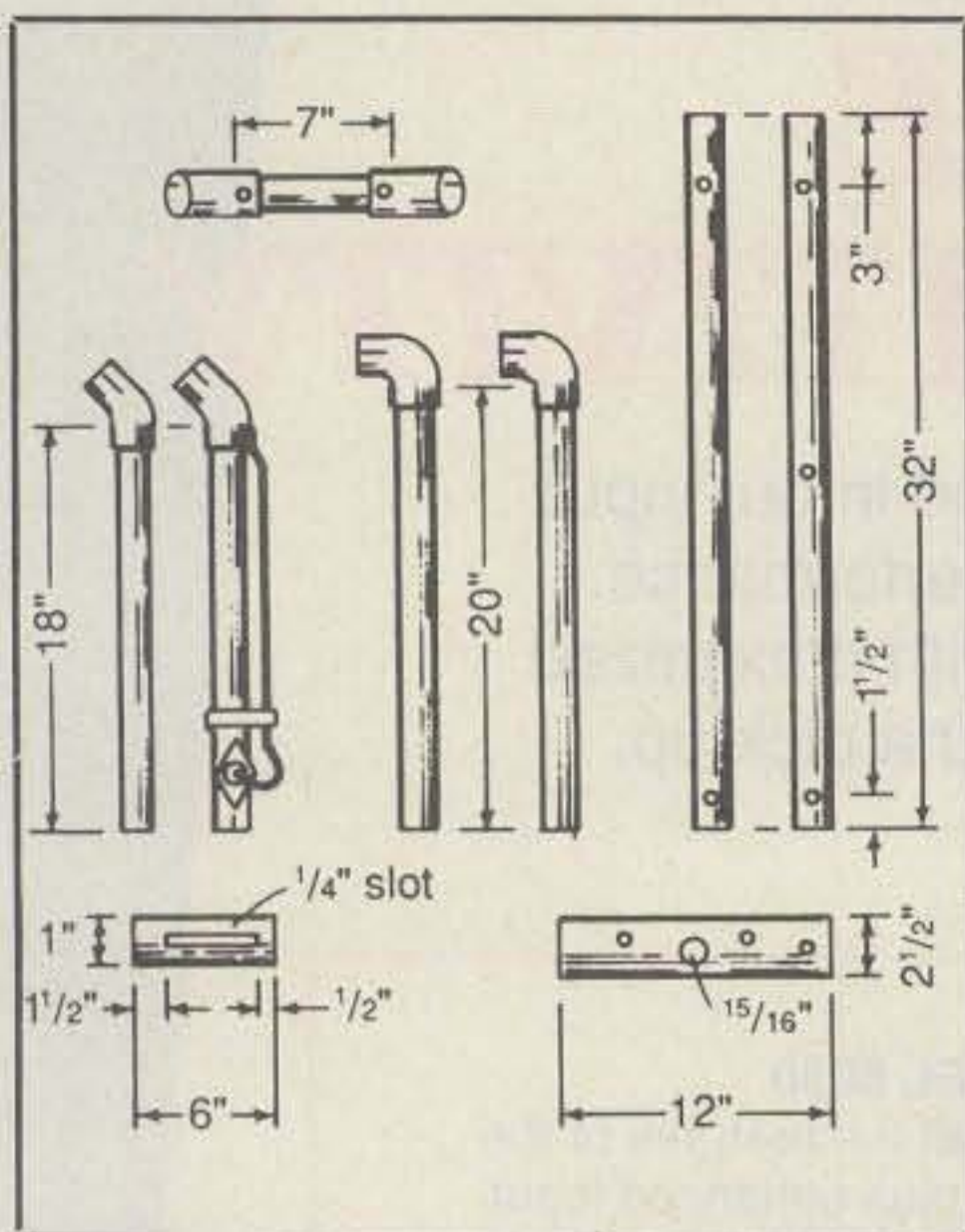


Fig. 6- Dimensions of the parts, not to scale. Lengths of pipe indicated are the lengths to be cut, before attaching the ell. Unlabelled holes are $\frac{1}{4}$ inch. Seven $\frac{1}{4}$ inch bolts $1\frac{1}{2}$ inches long, with nuts, are needed. Also, $12\frac{1}{2}$ feet of $\frac{3}{4}$ inch copper pipe, four 45 degree ells and two 90 degree ells.

corrosion will not increase the contact resistance, I believe that this method of assembling a portable loop is a good one. And the performance of the loop is excellent, considering its location, size, and simplicity.

Construction

The $\frac{3}{4}$ inch copper pipe is available at hardware and discount stores, but be sure to get the Type M thin-walled tubing which is much lighter and costs less. The type will be inked on the tubing. You will need a propane (or MATT gas) torch to solder the pipe to the copper ells. You can use electronic solder, but the excess rosin in the solder core will make quite a mess. Better to buy solid solder and a small can of rosin flux with the pipe.

No previous experience with sweating or soldering copper pipe is necessary. Clean the surfaces to be soldered with steel wool and brush on a thin coating of flux. Heat the work hot enough to readily melt the solder and it will wet and flow into the joint by itself. Don't heat the solder directly with the torch, however. After soldering, clean up the copper with steel wool, and you will have a nice looking work of art suitable for display in the living room!

After soldering ells to the pipes, slot the copper ells with a hacksaw and carefully smooth out the inside of the cuts with a round file. Clean the inside surface with steel wool. Drill the quarter inch holes in the base section of the loop after the two

45 degree ells have been soldered to the 7 inch pipe. The quarter inch holes in the 32 inch lengths of pipe are located $1\frac{1}{2}$ inches from one end and 3 inches from the other end. These holes in each pipe need to line up so that the bolts through them will be in the same plane.

The base plate can be made from any hard plastic, about $\frac{3}{4}$ inch thick, or even wood if it will be out of the weather. A cross-brace to make the antenna stand by itself is made from a 16 inch length of 1×2 inch wood. It is held to the base by a $\frac{1}{4}$ inch bolt $1\frac{1}{2}$ inches long and a wing nut. Counter sink the head of the bolt into the wood so that it doesn't scratch the surface on which the antenna sits. Glue or screw a small piece of the 1×2 under the other end of the base plate to keep it level. Drill the large hole in the base plate with a $\frac{15}{16}$ inch flat wood bit.

The slotted insulators in fig. 3 are $\frac{1}{4}$ inch thick Plexiglas in this antenna, but they too can be made from any stiff plastic that the junkbox yields, since the insulator is out of the most intense electric field between the pipes. Even at the hundred watt level there are thousands of volts across this gap! The $\frac{1}{4}$ inch wide slot is most easily cut with a router, but you can also drill many holes and connect them with a drill and a file. The insulated nut for the slotted insulator is made by squeezing a $\frac{1}{4}$ inch nut into the plastic hex nut with a vise. The plastic nut is a $\frac{3}{8}$ inch ferrule nut with integral sleeve (JACO 0-6), made for plastic piping, and is available at plumbing or swimming pool distributors. If you can't locate it, drill a $\frac{1}{2}$ inch hole into a $\frac{1}{2}$ inch PVC threaded cap and force the $\frac{1}{4}$ inch nut into it.

The gamma match (fig. 4) is made from a length of #6 or #8 solid copper ground wire, available at discount stores or electrical distributors. It is soldered to one of the 18 inch lengths of pipe near the ell at the end, leaving $\frac{3}{4}$ inch at the end to go into the ell. Use a hose clamp to hold the heavy wire in place while soldering; solder won't stick to the stainless steel clamp. The SO-239 coax connector is mounted near the other end of the pipe, leaving room to go into the base ell. Six 32 bolts $1\frac{1}{2}$ inches long are used to mount the connector. One-half inch long standoff sleeves that fit around the mounting bolts can be made from $\frac{1}{4}$ inch brass tubing, available from hobby shops. The center pin of the SO-239 is trimmed shorter and a length of flexible hookup wire is soldered to it. A $\frac{3}{4}$ inch plastic strap for hanging electrical conduit is used to support the other end of the gamma wire and the short wire from the coax connector. A 6-32 screw $\frac{1}{2}$ inch long will pass through the ends of the strap and secure two terminal lugs there.

As an aid in tuning up on 20 meters, I put a short collar of $\frac{7}{8}$ inch ID, 1 inch OD plastic tubing around each top pipe (Plex-

iglass, Lexan, etc.). These $\frac{1}{16}$ inch shims are slid between the pipes to space them the proper distance apart, and then they are slid out of the gap after the nuts have been tightened. This puts the antenna close to 20 meters. These collars aren't essential, though.

Operation

Assemble the loop from the base upwards, tightening the hose clamps only enough to keep the sections in place. Set the long top pipes to be about 1 inch apart, and then tighten all the hose clamps securely. Mount the slotted insulators on the pipes so that they both extend out like handles on the same side of the loop, as in fig. 1. The approximate spacings for each band are given in Table I.

Adjust the gamma rod for best match on all bands by bending it closer or farther away from the pipe. Start with it about $\frac{1}{2}$ inch from the pipe. There is a little compromise, but the match is good on all bands. To help reduce RF feedback, wind chokes on ferrite cores at both ends of the coax feeding the antenna. The rectangular cores in plastic frames are widely available (Radio Shack, MFJ, etc.) and work well for this purpose. Make sure that the frames are tight and there is no air gap in the ferrite.

Although this loop could sit on the operating table or be close at hand for easy access for frequency changes, I prefer to place it in another room to minimize the amount of RF my body receives. I also turn it so that the operating position is on a perpendicular through the loop, since there is a null in the radiation pattern along that line. Also, make sure that no people or pets touch the antenna when you are transmitting. They could get a nasty RF burn.

Power

The antenna has been used at 100 watts. Although there is occasional arcing across the $\frac{1}{16}$ inch gap on 20 meters, on 15, 12, and 10 meters it would handle the legal limit with ease. However, even 100 watts is too much for an indoor installation where there are other family members, especially young children, around! I just don't operate when anyone could possibly touch the loop.

In talking with amateurs at club meetings and hamfests, I find that a generation has come along that has experienced only solid-state rigs with low-impedance outputs, and coax transmission lines. Many have never felt an RF burn and are scornful of its hazards. (Only 100 watts?) Be advised that the thousands of volts from this antenna is a serious shock hazard and also a fire hazard if drapes or curtains should touch it! Care is essential.

(To Be Continued)



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combined with an indoor control unit lets you stack multiband antennas for maximum and makes it easy. The Universal Phase-Box is built standards, utilizing high-current constant impedance transformer rated at 5 KW, a clean CAD-designed PC strip-line technology and a rugged weatherproof out-enclosure. Simply connect a feedline from each remote unit, run an inexpensive 3-wire control cable, to operate! Rugged, reliable and easy to use, the Box is priced at \$295, shipping prepaid.

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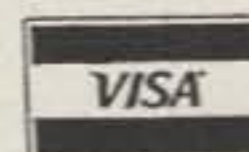
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For the packeteer who only thinks he has everything, this holiday season offers something new to upset that thought and again prove the old adage that good things often come in small packages.

A Plethoric Packet Present

BY BUCK ROGERS*, K4ABT

The only excess here might be the ultimate price, but then again, if you have to ask, as they say... The object of this combination, however, was to see how small and compact a packet station could be and still be completely versatile. This station is small enough to fit in your briefcase with enough room left over for your sandwich, a piece of fruit, and those papers you drag back and forth every day. —K2EEK

First I will relate how the likes of this article came about. In 1984 I wrote an article (in another publication) about a fresh new idea that has since become popular with a lot of packeteers. The article also brought many letters that told about how the readers had concocted variations of the system that I had described in that article. Many had read the article and within a few days of having read it were having fun with their "Portable Packet Stations."

Those who remember the description of my "Port-A-Packet" station will remember that I had placed everything into a slightly oversized briefcase. The Port-A-Packet station consisted of a Radio Shack model 100 computer, an ICOM hand-held transceiver, and a Kantronics KPC-2. The Tandy model 100 and the ICOM hand-held transceiver were both battery powered. It was the Kantronics KPC-2 that made it necessary to include a 5 amp GelCel in the package. In those days the TNC with a built-in nickel-cadmium battery did not exist.

To some that was only seven years ago, and to others that was an eternity ago, depending on whether you look at the advances that have occurred in packet technology, or if you remember the fun of building your first Heath HD-4040 Terminal Node Controller (TNC).

*P.O. Box 158673, Nashville, TN 37215



What do you get when you combine an Alinco F1 with a HandiPacket and the Hewlett-Packard 95LX? Another HP ("Hip Pocket") packet station! The Rolex is optional.

Introducing HP, HP, and HP

What do you get when you combine an Alinco F1 with a PacComm HandiPacket and the Hewlett-Packard 95LX? A "Hip Pocket" packet station! And it's beginning to appear as if there is a trend toward HPs.

A Picture is Worth A Thousand Bucks

The photo tells the complete story about the packet station that I call "MicroPacket." This MicroPacket station can fit into a trouser pocket, or into one corner of a briefcase.

With the release of the Hewlett-Packard 95LX PC-compatible we have reached new heights in technology and in packet communications. Here is the ultimate packet

station for the packeteer on the go. In teaming together the three items shown in the picture, I've brought together as much power as we can muster and still not have to carry a power supply with us everywhere we go.

The HP 95LX is self-contained with more than just the RS232 port and Lotus 123 in ROM. It has a port for plug-in cards just like you have for plugging disks into a full-blown PC. There is the serial port for driving the modem or TNC (more on that later in this article). Rather than try to tell about all the special features in the HP 95LX, I'll make it simple and list them here so we can get on with the rest of our MicroPacket station description.

Some of the HP 95LX features are:

1. Filer
2. Communications Support
3. Appointment Calendar
4. Phone/Address Storage

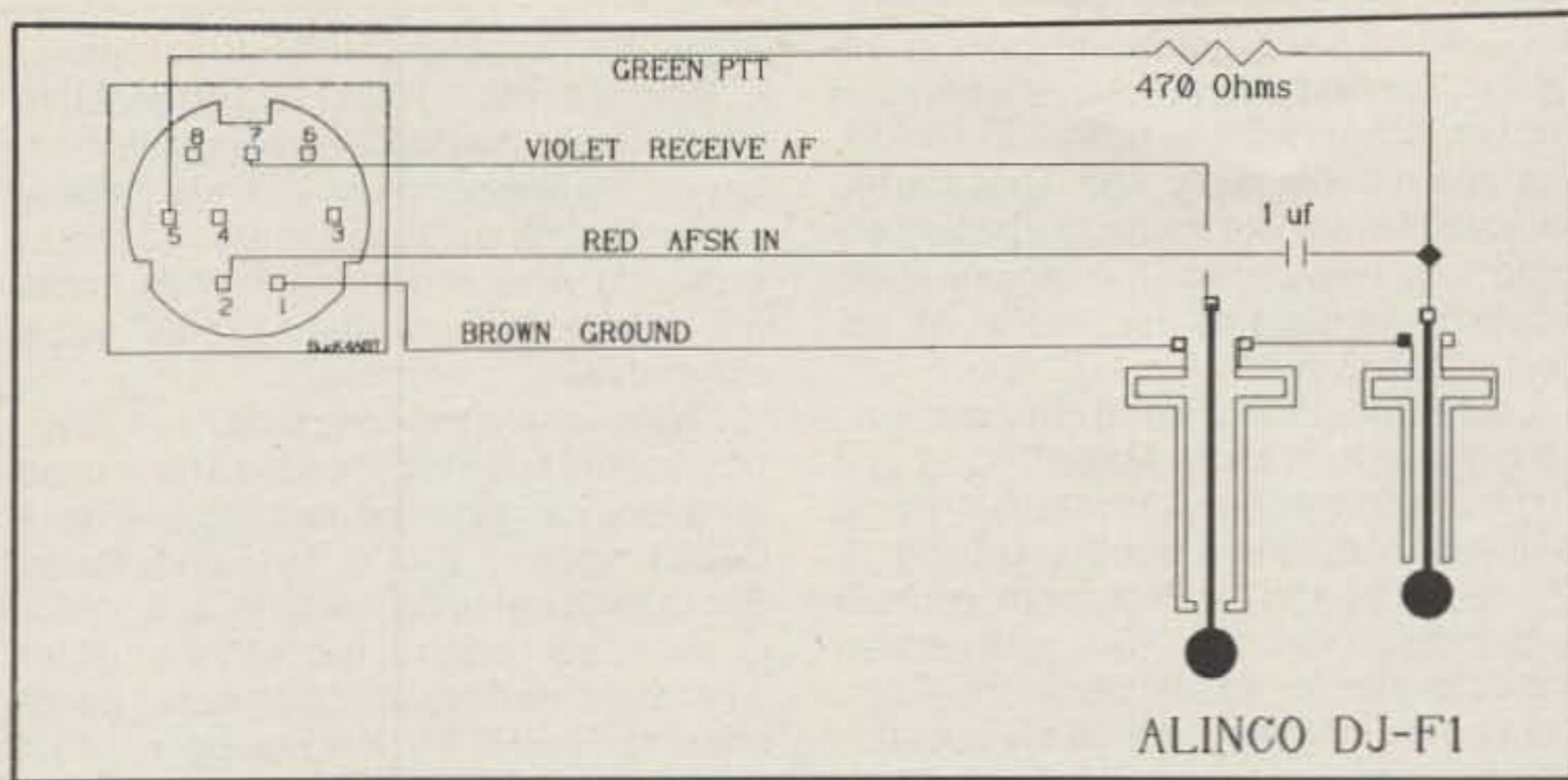


Fig. 1- Interface drawing of the HandiPacket TNC to the Alinco F1. The 470 ohm resistor is chosen to provide 3.5 kHz deviation when the HandiPacket level control is set to mid-range.

5. Memo/Notepad
6. Hewlett-Packard Calculator
7. Lotus 123

All the above features are included in ROM within the HP 95LX computer. How much memory and what accessories you want with the HP 95LX will determine the ultimate price you pay for this computer. For the current price see your nearest HP dealer or contact Hewlett-Packard at Hewlett-Packard Company, Corvallis Division, 1000 N.E. Circle Blvd., Corvallis, OR 97330 USA. And oh, yes, the HP 95LX uses MS-DOS and standard MS-DOS commands. (MS-DOS is a registered trademark of Microsoft Inc.)

TINY-2 is Small, But HandiPacket is Smaller

The reasons why we used the PacComm HandiPacket TNC are obvious:

1. The PacComm HandiPacket is small and compact.
2. The PacComm HandiPacket power is self-contained.

3. The PacComm HandiPacket uses rechargeable nickel-cadmium batteries, which will power the HandiPacket for over 12 hours of use between charges.

Some other features of the HandiPacket that are useful but not related to its size are described below.

- The HandiPacket supports 32 kilobytes of RAM.
- The HandiPacket includes a Personal Mailbox System (PMS) that has 15 KB of RAM reserved for message storage.
- The HandiPacket TNC can be configured as a ROSE switch, and as a TheNet or NET/ROM node.

For more information about the PacComm HandiPacket contact PacComm Packet Radio Systems, Inc., 3652 W. Cypress Street, Tampa, FL 33607-4916 (813-875-2980).

A Fist Full of Dynamite

Finally we come to the source of RF for our MicroPacket station. The Alinco F1 is the beginning of a family of new products from Alinco that may prove to change the man-

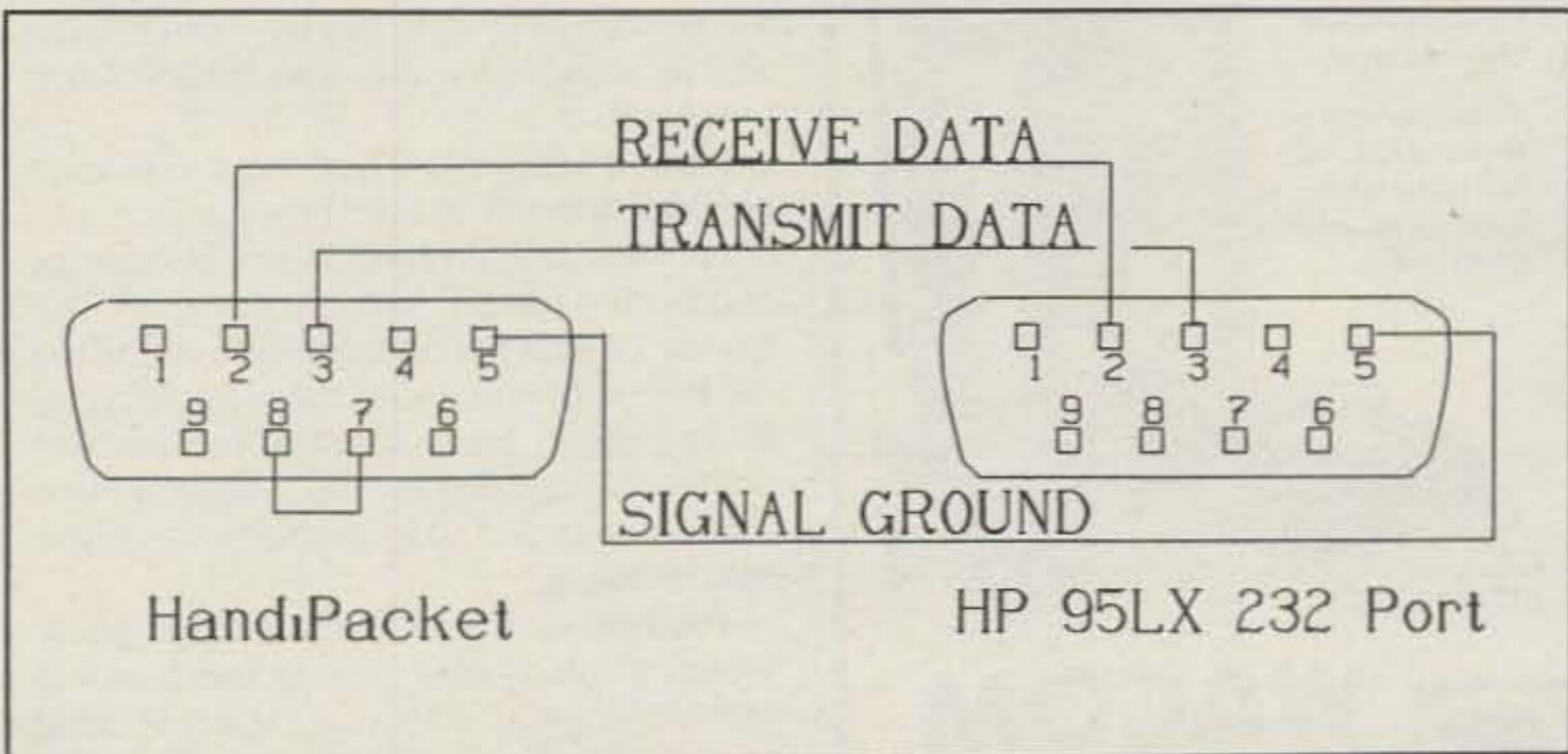


Fig. 2- A minor change is required when using the HP 95LX with the PacComm HandiPacket. Note the jumper at pins 7 to 8. This jumper must be added when using software handshaking with the HandiPacket.

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Dimensions: 17" wide x 19" deep x 8"½ high
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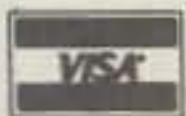
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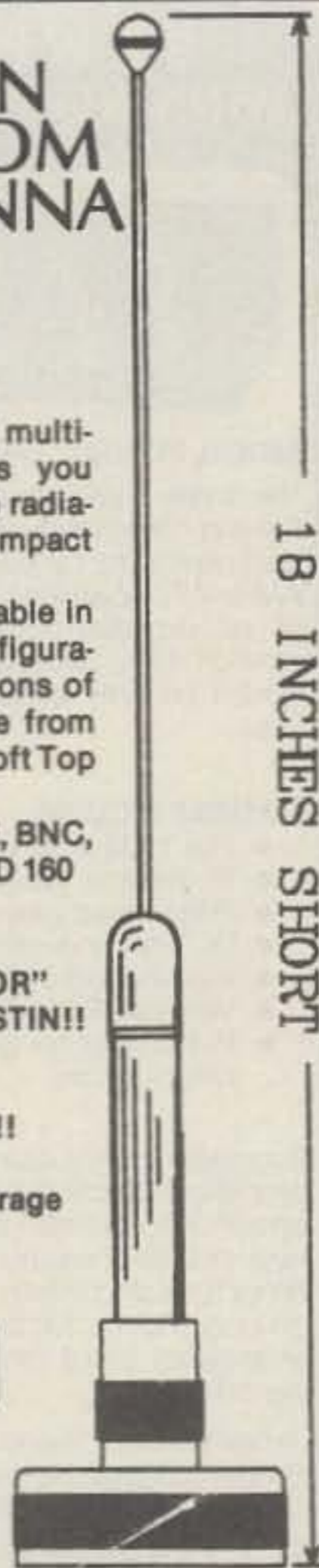
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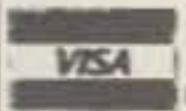
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ner in which the digital world looks at the future. The first thing I noticed when getting my F1 last year was how clear and distinct the receive audio was. That started me to thinking about its use in a packet environment. I wondered if the transmit audio would be as good as the receive AF appeared to be.

Last April at the Dayton Hamvention I bought the PacComm HandiPacket and made the connection. What I really mean is I interfaced the two together (see fig. 1). The Alinco F1 and the PacComm were the beginning of this article. (See your nearest Alinco dealer for details about the F1.)

I also found the answer to my question which concerned the transmit audio from the Alinco F1. The packet coming from the F1 is rivaled by none. It is clean and easy to demodulate.

I have all three battery types for the F1, so I can use the small, thin battery for short trips, or the 600 mA battery for the longer trips, and if I wish to run the full 5 watts output, I use the 800 mA 12 volt battery pack. That's a "fist fulla dynamite."

There was still only one minor problem: I had to use the Toshiba T-1000 compatible as a terminal in order to have a truly portable packet station. It was not until the Hewlett-Packard Company introduced the HP 95LX that it all came together. The HP 95LX has more features and it is much smaller than the T-1000. Add to all this, the batteries in the HP 95LX last several times

longer than a charge of the T-1000 battery.

Now with the T-1000 I had no problem interfacing to the PacComm HandiPacket. Everything seemed okay, and I made many contacts with packeteers around metro Nashville. After moving to the new home near Gallatin, I obtained the HP 95LX computer.

This is where the completion of this article began, and almost ended. I have used hardware handshaking ever since I left the Color Computer (CoCo™ of Tandy/Radio Shack) and opted for these PCs. Suddenly I was again confronted with a situation where I will need to use "software" handshaking. The HP 95LX is equipped with a five-pin three-function RS232 port. These pins represent transmit data, receive data, and signal ground.

I had made the correct connections to the HandiPacket, yet all I could get was a small portion of the HandiPacket sign on screen. It would then seem to hang until I reset the terminal (HP 95LX). This wouldn't work. I had the HP 95LX, and there was no turning back now.

Pulling hair and scratching my head were futile. I made sure the TNC and F1 were functioning by returning to the T-1000 and making a contact. That meant the TNC and Alinco were okay. So why the problem with the MicroPacket system? I used the T-1000 to be sure the XFLO and FLOW were "ON." All the calls and TNC commands were set correctly.

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It Came Upon A Midnight Clear

At midnight, September 14th I remembered that Burney Kohler at Hewlett-Packard had said something about holding pin 8 high. He had told me that I might possibly have to put a jumper between pins 7 and 8 of the PacComm HandiPacket to make it handshake properly.

I "jury-rigged" the two pins together and gave it a try. Bingo! There it was, the PacComm HandiPacket sign on, and as soon as I pressed the enter key the "cmd:" was on the screen. I was in the MicroPacket business.

I found a 9 pin to 9 pin, male to female connector in the "hack" box. It took about 5 minutes to disassemble the connector and put the jumper inside (see fig. 2). The reason I made the connection outside the HandiPacket is because there might come a time when I will choose to connect another system to the TNC, and pins 7 and 8 will be needed to implement hardware handshaking.

The rest was pure pleasure and packeteering fun. If your time in the shack is limited, take it with you. MicroPacket operation is only limited by your imagination, unless you have a hankering to stuff all of this into the glove-compartment of a Rolls-Royce. Then you have a real problem.



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CQ REVIEWS:

The Mirage/KLM WARC-Band Dipole and Vertical

BY DAVE INGRAM*, K4TWJ

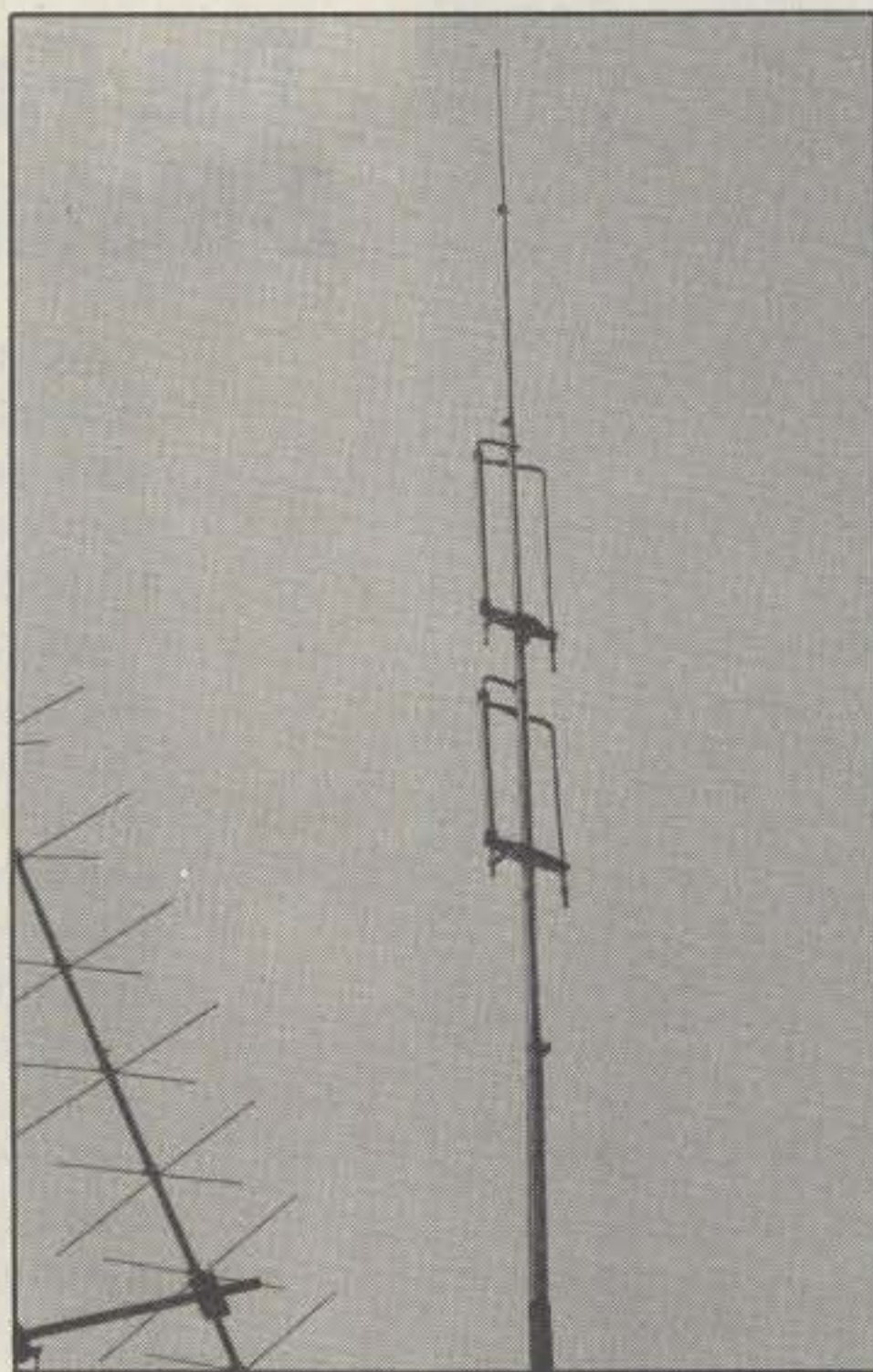
Ready to add a fresh new air of enjoyment to your HF operations? Start working the WARC bands. These relatively new 30, 17, and 12 meter bands are ideal retreats from large weekend contests, bare-foot rigs get out great, and DXing is terrific. One or more WARC bands are also open almost any time you switch on a rig. This 10.1, 18.1, and 24.9 MHz coverage is included in all modern transceivers, so what are you waiting for? Come on in and join the fun!

One word of caution, however. Avoid starting out with makeshift antennas like 40 or 80 meter doublets connected to an in-shack tuner. The results are always weak radiated signals and unnecessary disappointment. Put up a decent antenna and go first class from the start. You will be glad you did.

Two quite impressive antennas that cover all three WARC bands are the subject of this review: the Mirage/KLM 12-17-30 Dipole and 12-17-30 Vertical. The cost of either antenna is quite reasonable, and they will keep you WARCing for many years. What else can I say except the WARC bands are waiting, and they are terrific fun!

Mirage/KLM's WARC band antennas are top quality all the way, just like their famous KT34-series of tri-band beams. Similarly, the WARC 'Tennas utilize linear loading sections rather than conventional traps to maximize efficiency and ensure wide bandwidth. The vertical is self-supporting, stands 21 feet tall, weighs 6.5 pounds, and has a wind load of 1 square foot. It is supplied with a heavy base mounting bracket that bolts to a support pipe with two large muffler clamps (also supplied).

The dipole is basically two verticals "butted together" with a center balun and mount/mast support. Its tip-to-tip wingspan is 42 feet, weight is 13 pounds, and wind



My complete and installed KLM 12-17-30 vertical. Antenna is lightweight and works like a champ.

load is 2 square feet. You can bolt it to a medium-weight mast and use a small rotor to turn the dipole 180 degrees for directivity. Both the dipole and the vertical handle full legal power.

Since construction and tuning of both Mirage/KLM antennas is similar (and the dipole require twice the vertical's assembly time), I checked out the vertical. This report, however, applies to both antennas. Being an avid "WARC'er" ever since 30 meters was first opened, I have a good "feel" for the bands and was delighted to review the Mirage/KLM antennas. Like most other WARCers, my previous antennas for these bands include dipoles, verticals, a G5RV, and a Delta Loop. As an opening point, I can also say the Mirage/

KLM vertical is right in there with the best of them. It has good advantage, however, as you can move between bands in a flash rather than fumble with two or three cables and/or an antenna tuner. It is also nice to put up a premeasured/pretuned skywire you can connect to your rig and start using immediately.

Assembly

Like all modern antennas, the Mirage/KLM vertical (and dipole) are shipped in a small box and must be assembled. The instructions are very good and fully detailed, but working fast and trying to combine assembly steps is not recommended. I did that, and installed the linear loading sections for 12 and 17 meters in opposite positions. Be patient, strive for accuracy, and no problems will be encountered.

In my case I assembled the vertical's three main sections in the ham shack over a 4 hour period, and then moved outdoors for brief final assembly and erection (see the photo of the almost-completed vertical). The upper section slips into the top of the middle section, which in turn slips into the top of the bottom section. The base plate then fits on the end of the bottom section, and the antenna is ready to install on a support pipe. Mirage/KLM's attention to fine details is admirable.

The hardware is stainless steel to prevent rust, full-compression radiator clamps are used at each concentric-tubing junction and a liberal-supply can of Penetrox is included with each antenna. This Penetrox, incidentally, is a significant advantage in long-term performance of any and all antennas utilizing aluminum tubing. Only three tools were necessary to assemble the full antenna: a screwdriver, a pair of pliers, and a tape measure.

Installation and Performance

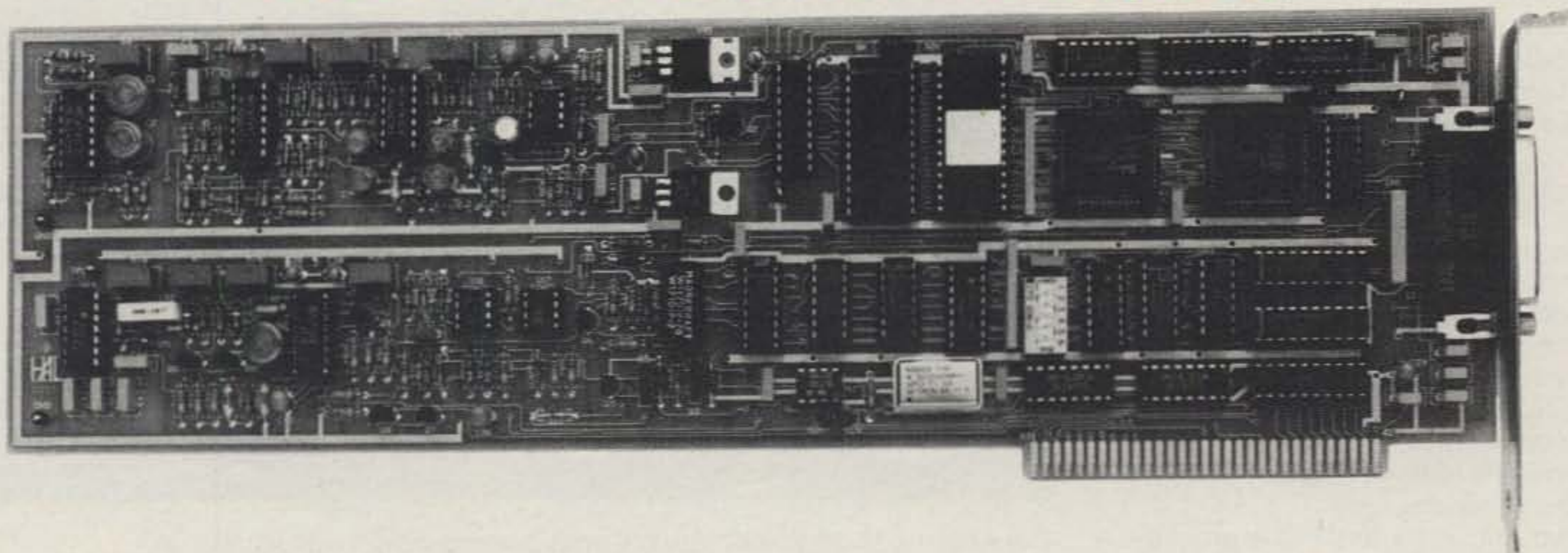
Final assembly and installation of the Mirage/KLM WARC Vertical took approxi-

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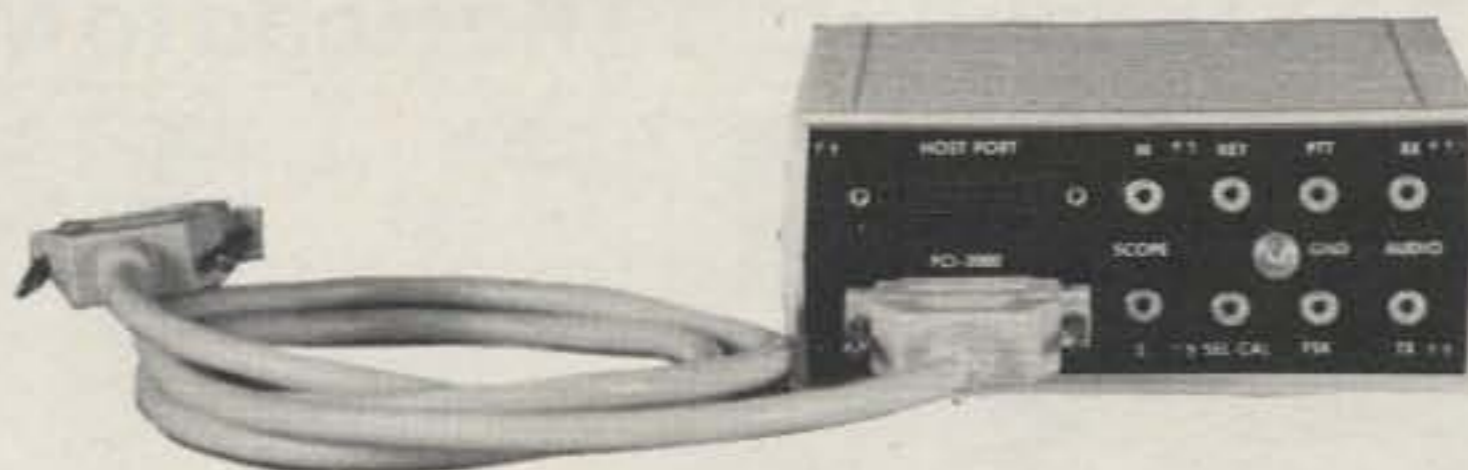


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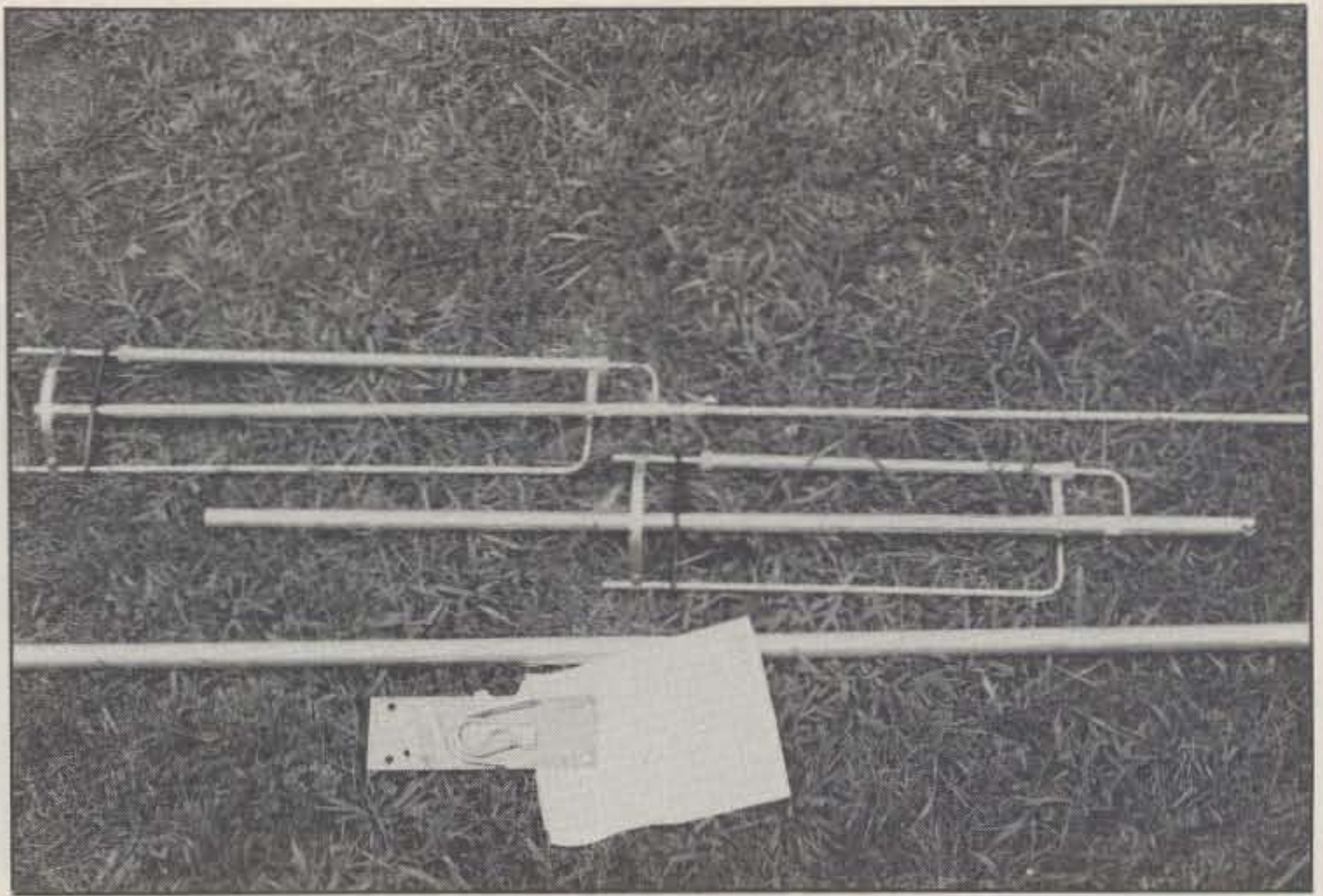
mately an hour's time, most of which was spent installing the radials. This installation of radials is very important to any and all quarterwave verticals' performance and should not be shortcut. Remember that radials are necessary for producing a "mirror image" of a vertical's "missing half."

The instruction sheet suggested using at least two quarterwave wire radials for each of the three WARC bands, but I went two steps further by using 1 1/2 inch wide copper foil rather than small round wire. This foil is ten times better than wire in any RF application, because it has a very wide surface area. I heartily suggest copper foil for everyone desiring optimum performance from vertical antennas. The difference between wire and foil is like the difference between day and night. You can buy 25 or 50 foot rolls of 3 inch wide copper foil from Ham Radio Outlets at a very economical price, then tear it by hand down the middle to produce double the length at half the width.

If you mount the antenna at ground level, the radials can be buried (a flat-edge shovel is convenient for slitting the ground). If you mount the antenna at roof level, the copper foil can simply be laid on the roof and secured with a few weights. I joined all the copper straps into one lead at the antenna's base and mounted it to the bracket with a couple of screws and nuts. The completed antenna system was then checked for rigidity, and pronounced for WARCing in high style (see the photo).

Although the Mirage/KLM is a unity gain antenna, it is right on par with most other WARC antennas and does a good job. A couple of ground-rule statements are necessary to support that statement, however.

Any and all vertical antennas require "breathing room" for proper operation. Just because they are small, avoid mount-



The KLM 12-17-30 WARC Vertical after preassembly in my shack.

ing them close to a house or beside a chain-link fence. Any vertical should have a clear horizon view in most directions and an open radiating area for at least one quarter wavelength from its element. Combine that with a good ground or roof radial system, and you have a simple but effective DX antenna.

The Mirage/KLM Vertical turned good results right off the bat. Using a barefoot/100 watt transceiver, I worked 3B8, FR7, ZS5, and a number of JAs on 17 meters during a couple of mornings after the antenna was installed. Late-night DXing on 30 meters was even better with prefixes such as 4Z4, UA0, and a large number of Europeans filling the log. Twelve meters

was suffering the mid-summer doldrums, but I made several stateside contacts on this 24.9 MHz band and worked some good DX, such as ZD8, FR5, and several JAs during surprise openings.

One fact we can state for sure: The Mirage/KLM 12-17-30 Vertical works! I particularly liked the ability to switch between WARC bands in a flash. This is a real asset, especially around spring and fall equinox when all three bands are booming with DX (usually around sunset). Since the vertical "breaks down" into three short sections which easily fit in a car, I am looking forward to carrying it on some IOTA mini-DXpeditions during the near future. Judging from home experiences, setting it up on a beach or cottage should take less than 20 minutes.

Conclusion

All aspects considered, I think the Mirage/KLM Vertical (or the Dipole) is a very good antenna, and I feel no hesitancy in recommending either one.

I also encourage you to check out the WARC bands. DX pile-ups (and I use the term loosely) are much lighter, and you can usually work a station within three or four calls. Classic amateur radio friendship flourishes on these bands, and operator congeniality is tremendous.

My special thanks to Mirage/KLM for the privilege of reviewing their new WARC Band Vertical Antenna. It is the perfect way to go tri-band WARCing almost anywhere and anytime. For more information on the antenna, contact Mirage/KLM, P.O. Box 1000, Morgan Hill, CA 95038 (telephone 408-779-7363).



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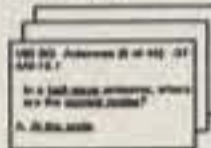
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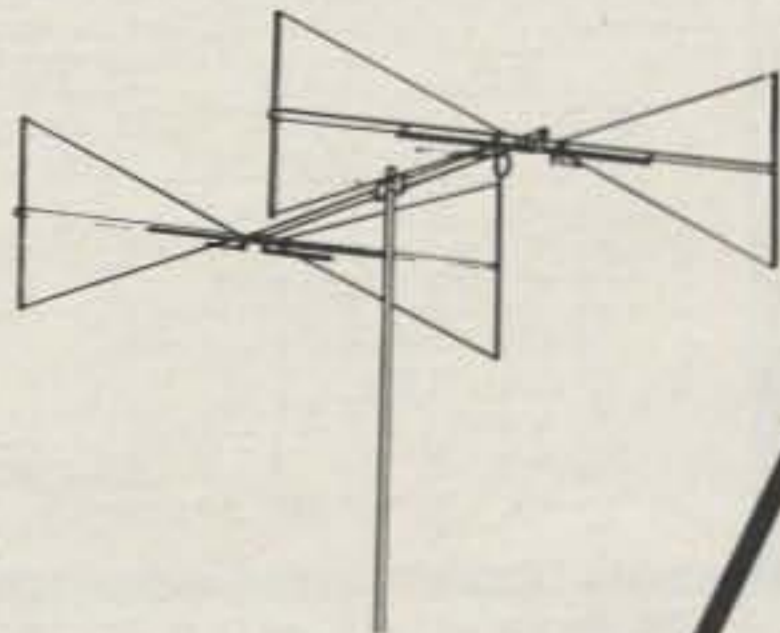
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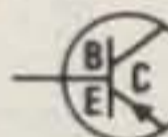
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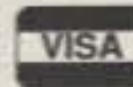
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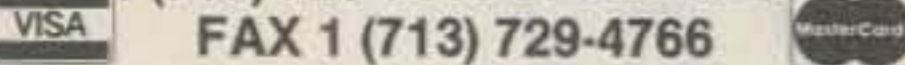
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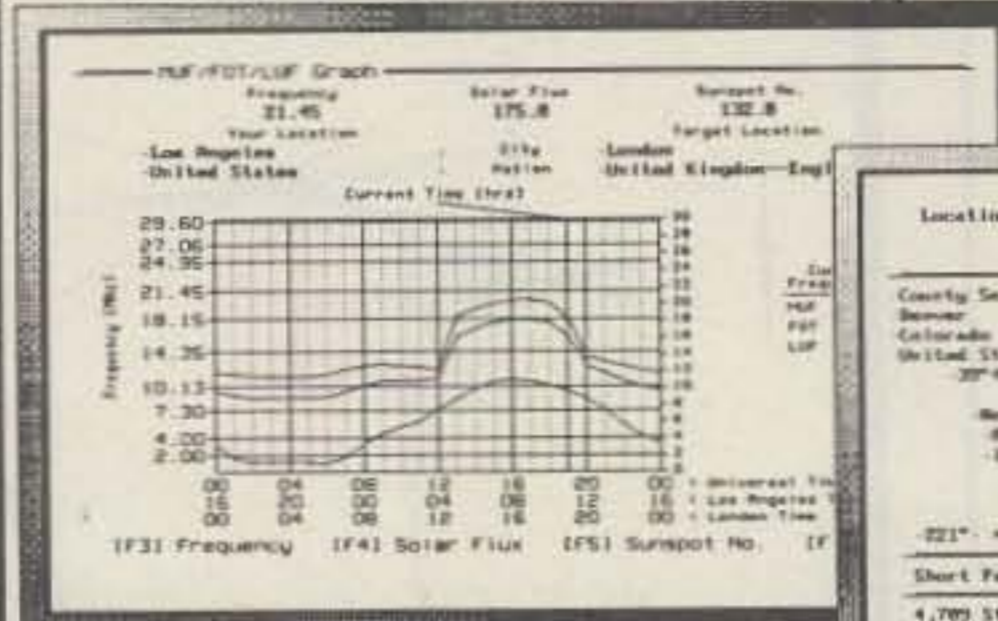
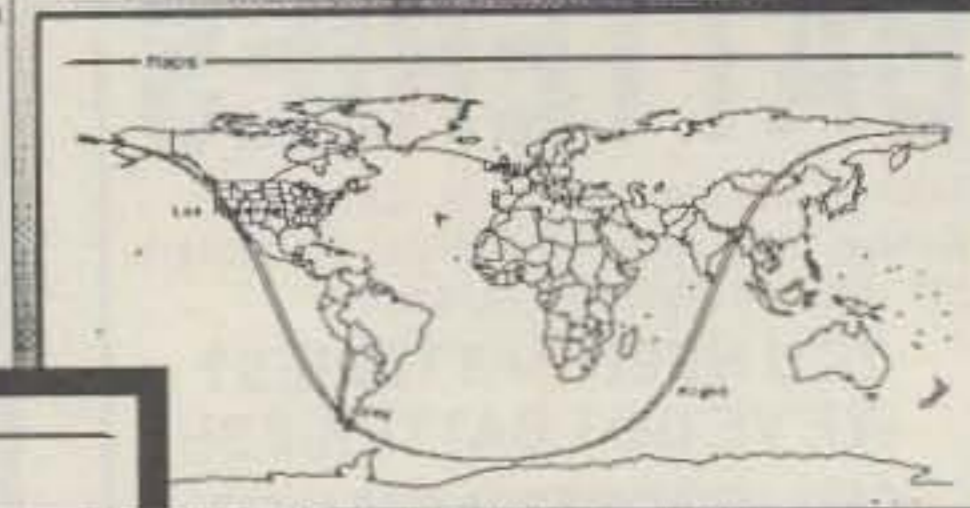
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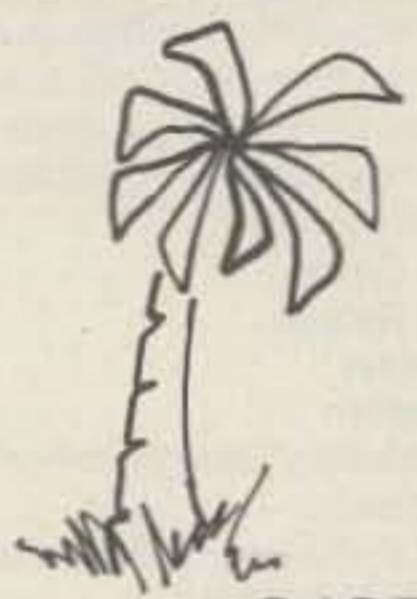
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- AST memory expansion board with 384 K memory, clock, serial and parallel ports. **+ \$75.00**

NEW*NEW*NEW*NEW*NEW*NEW

- Clock card for PC **\$15.00**
- Color graphic card with printer port **\$25.00**

NEW*NEW*NEW*NEW*NEW*NEW

NEW*NEW*NEW*NEW*NEW*NEW



NEW UNISYS PC CLONE!

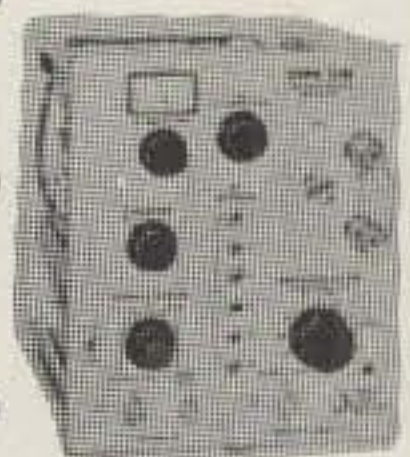
- New in Box Unisys PC Clone with: Keytronics 101 keyboard, 256 K memory, clock, serial port, one 360 K floppy drive, manuals, DOS, etc. **\$175.00**
- Memory expansion card for above, bringing total memory to 640 K **+ \$65.00**
- Unisys computer at top with used monochrome monitor, printer port and monochrome card **\$250.00**
- Same as above but with two 360 K floppy drives **\$200.00**
- 30 meg flash card **\$149.00**
- 640 K, 2 floppy disk drives, 30 meg Hard drive, and monochrome system **\$489.00**

TEKTRONIX 500-SERIES PLUG-INS!

TEK 1L10 SPECTRUM ANALYZER **\$ 395.00**
 For use with 530-, 540-, 550-, and 580-series scopes. Dial accuracy is ±(100kHz + 1 % of dial reading) RF attenuation of 51 dB

TEK 3A6 DUAL TRACE PLUG-IN **\$ 39.00**
 Designed for Tek 560, 561, 564, and 565 scopes DC to 10 MHz 10 mV DIV to 10 V DIV in 10 steps Dual Trace

TEK 3B4 TIME BASE PLUG-IN UNIT **\$ 50.00**
 Designed for use with the Type 561A, 564 and 567 Oscilloscopes Provides calibrated sweep rates from 0.05 μsec/div to 5 sec/div in 25 calibrated steps Provides 5 steps of deflection sensitivity from 0.2 volts/div to 5 volts/div



**TEKTRONIX MODEL 851
 DIGITAL TESTER
 \$79.95**



**\$2995.00
 NEW PRICE!**

- The 851 is an easy-to-operate portable unit containing a DMM, a counter and input signal conditioning circuits and is used for servicing digital equipment
- The DMM is an auto ranging 4 1/2 digit multimeter with floating inputs and a 500 VDC maximum input and 350 VAC maximum input
- The counter is an auto ranging 5 digit, 35 MHz universal counter with three inputs and an accuracy of ±0.005%
- The unit also has a calibrated gated square wave output at 5 KHz which is suitable for probe compensation
- All three channels feature -30 to +30 V threshold adjustments

**DOW KEY 60-2604
 ANTENNA RELAY \$ 49.00**



- Basic SPDT type relay with "UHF" connectors
 - Remote operation with 115 VAC coils*
- Ideal for use as antenna relay, amplifier switching, and other RF applications. Will handle maximum legal amateur power. *UHF* connectors not recommended above 440 MHz.
- With 12VDC Coil **\$85.00**
 - With Auxiliary Contacts, 115 VAC **\$85.00**
 - With Type N Connectors, 26 VDC **\$55.00**

**FLASH CARD-30
 \$149.00**



New-in-box 30 meg hard drive on a card with 65 msec access time. Easy installation in your PC.

1991 CQ WPX CW Contest High-Claimed Scores

The following scores are early-bird high-claimed scores as of 15 September 1991. These are raw scores subject to verification.

UNITED STATES SINGLE OPERATOR ALL BAND

KM1H	4,159,046
K3ZO	3,712,500
KT3Y	3,557,466
KE2PF	3,537,675
NR1E	2,756,839
N2AZS	2,728,818
KW8N	2,570,694
K4PQL	2,454,363
NW3B	2,267,220
NI6W	2,025,261
N6TV	1,804,914
K2PS	1,578,192
WX4G	1,346,028
K3TEJ	1,260,153
W9LT	1,254,396
NN7L	1,245,330
KB4C	1,013,652
NS2K	1,003,365
AA3B	957,726
K9ZO	954,720
KM0L	941,382
KC7V	877,608
WD5JZL	816,147
KV8Q	768,462
WX9U	746,790

28 MHz

WE3C	95,890
K5NA	90,147

21 MHz

NE8T	933,012
AB4LX	758,520
WD8LLD	680,944
NT5G	245,311
WA4QMQ	137,940
N6ZB	124,818
W8BLA	101,460
W6TKF	26,718
WQ7R	13,650

14 MHz

NI8L	1,685,509
K2VV	1,628,832
K4JPD	1,606,826
KD2SX	1,357,196
W1WEF	1,291,320
WD8AUB	861,120
N8AA	590,648
KC2X	538,020
W8IQ	480,400
WZ6Z	432,234

7 MHz

NO2D	1,026,324
W3BGN	618,192
K2SX/1	534,298

NR2H	401,380
WE5I	104,400
N9AG	57,330

3.5 MHz

K1ZM	247,744
N1CC/2	44,604

QRP/p SINGLE OPERATOR ALL BAND

N3RS	828,808
W2GD	731,430
KN1M	498,960
K5RX	490,854

21 MHz

W0KEA	73,305
-------	--------

14 MHz

N0AX/7	141,000
K9OSH	51,660

7 MHz

AA6XX	75,048
-------	--------

MULTI-OPERATOR SINGLE TRANSMITTER

N4WW	5,450,655
WC4E	4,877,325
KS9O	4,258,254
WF1B	3,792,360
AA5B	2,458,494
NG8D	2,170,968
WD3I	2,123,856
N0XA	1,865,286
WG3T	1,802,183
AG6D	1,675,040
NQ7M	1,301,679
KI6X	1,284,732
AC8W	1,165,080
WF5E	1,134,272
WA6IET	1,123,848

DX SINGLE OPERATOR ALL BAND

4M2BYT	8,882,720
ZD8Z	7,783,200
CT3M	7,703,164
YU400/5B4	7,001,834
H18A	6,652,828
LZ3DX	4,728,377
KM1H	4,159,046
HC2G	4,092,192
VP2VDX	4,048,792
K3ZO	3,712,500
CS8T	3,706,252
UA9SA	3,683,883
KT3Y	3,557,466
KE2PF	3,537,675
ED4KA	3,419,091
VE3EJ	3,305,308
CK7C	3,099,357
OK1ALW	3,006,633

DF0SSB	2,851,692
PA0GAM/ST2	2,781,696
NR1E	2,756,839
N2AZS	2,728,818
KW8N	2,570,694
JH7WKQ	2,532,284
HA3NU	2,506,740

28 MHz

ZS6BCR	3,649,005
LU6EBY	2,170,016
Z21BL	1,482,435
IQ9ITU	579,477
WE3C	95,890
K5NA	90,147
JA0QNJ	42,380
VE3HX	34,272
LZ1AG	25,155
OH5BQ	17,200

21 MHz

ZD8LII	5,125,416
LT0A	4,293,136
PY4OD	3,759,264
N7DF/NH2	2,840,154
7L1GVE	2,826,261
YV4ABR	1,854,168
YT2E	1,762,375
LZ2VP	1,427,635
OH1AU	1,018,350
NE8T	933,012

14 MHz

YW1A	4,617,456
4Z6DX	4,614,030
VK6LW	2,454,732
GB8FX	2,293,530
UT5UGR	1,704,780
NI8L	1,685,509
K2VV	1,628,832
K4JPD	1,606,826
SV1RP/SV2	1,517,082
KD2SX	1,357,196

7 MHz

YT2R	1,676,160
6G0V	1,149,234
NO2D	1,026,324
RV6AGG	752,488
W3BGN	618,192
K2SX/1	534,298
NR2H	401,380
UB4JFJ	392,620
OK1ARN	336,770
Z21HQ	308,450

3.5 MHz

4N1A	436,200
G4FAM	352,618
LZ2WF	347,472
OK3CBU	304,470
ES5RY	298,764
K1ZM	247,744
LZ1ZX	229,368
Y21CW	164,736

YU7XM	157,376
OH2BSQ	118,680

1.8 MHz

LZ2WA	3,312
-------	-------

QRP/p SINGLE OPERATOR ALL BAND

VP2MU	1,554,735
N3RS	828,808
W2GD	731,430
5Y4FO	573,729
KN1M	498,960

28 MHz

JR3RWB	14,525
RB5FO	11,880

21 MHz

4Z7U	1,032,120
W0KEA	73,305
FB1NHF	35,464

14 MHz

OZ3PE	172,085
N0AX/7	141,000
SM1CNS	65,136

7 MHz

AA6XX	75,048
-------	--------

3.5 MHz

OK2BQZ	53,040
--------	--------

MULTI-OPERATOR SINGLE TRANSMITTER

4J0Q	11,324,773
ZD80V	10,938,352
AG9A/AH2	9,005,641
ZB2X	8,618,823
4J1FS	7,123,800
PA6WPX	6,755,460
FQ2M	6,395,128
TW1C	6,302,670
VP5W	6,254,820
5K1R	6,060,075
GW8GT	5,930,790
N4WW	5,450,655
JU1SU	5,419,375
RQ7W	5,017,600
WC4E	4,877,325
OL1A	4,843,245
OL9A	4,670,088
GB5AA	4,399,200
IS0/DL6RAI	4,362,228
KS9O	4,258,254

MULTI-OPERATOR MULTI-TRANSMITTER

HG73DX	16,468,480
JE2YRD	8,388,942
LY2ZO	6,971,510
JA3YBF	3,427,614
KL7RA	1,354,000
4G1A	785,970

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Full featured, reliable, easy to use Cross Needle SWR/PWR meters for all brands. The CN101 and CN103 are the newest SWR meters offering three switch-selected PWR ranges, PEP monitoring and more!



Proven reliability in Cross Needle meters offering in/outdoor remote sensor capability. Convenient peak reading in SSB operation. NS660A 1.8-150MHz, NS663BM 140-525MHz, SO239 or N.



Daiwa offers high quality compact Cross Needle meters for mobile and base use. Easy to read forward and reflected power shown simultaneously with VSWR, at your fingertips.



The DP800 series, the latest advances in SWR/PWR meters! LCD, forward pwr. and VSWR by digital readout, bar graph and beep tones. (Avg. or PEP) DP830 features 4 zone clock, 1.8-525MHz.



Full line of Linear Amplifiers for base or mobile use. 144-148MHz coverage, 1.5-10W in, 30-150W out, depending on model. Daiwa Quality Continues, Proven Reliability for Today's Amateur!



PS120MII provides reliable regulated power, 3-15VDC variable, 12A max. with 9.2A continuous.



Designed for Efficiency! The PS304 is compact and lightweight, yet supplies the latest in Hi-Tech circuitry and protection.



1-15VDC variable, 30A max., 24A continuous. The new standard for Power Supplies.



PS140II is 13.8V fixed, 14A max., 12A cont., and cig. plug. The same high quality component used in all Daiwa supplies.



A LOOK AT THE WORLD AROUND US

Holiday Gifts for Amateurs

Happy Holiday Greetings to all our super friends and column supporters everywhere. I sincerely hope 1991 was your best year yet and all your dreams for 1992 will come true. In light of those cheerful thoughts and good wishes, this month's column once again makes its annual diversion to feature special holiday gifts for radio amateurs. This time we have some real gems lined up for amateurs of all license classes. They are great for giving, even better for receiving (!), and/or ideal self-rewards for some of your 1991 accomplishments. Enjoy our visual tour of brand new items (several debuting here for the very first time), and jump quickly to order the ones you find most appealing. In fact, I will even highlight lower-cost/medium-priced goodies to help keep your spontaneous buying under control. Fair enough?

Our featured items are available directly from their manufacturers or from dealers nationwide (not from me). I am simply your guide for this window-shopping tour. When an item captures your interest, check its included address and telephone number or the ads in *CQ* for ordering. Remember, too, home shopping is expanding every year and ordering early is very important to sidestep shipping bottlenecks or "sold out" reports. That's enough soapboxing, however. Now let's peek into Old St. Nick's bag and... by jove, it is filled with talkies, antennas, books, calendars, and all kinds of accessories!

Portable Delights

Whether you are traveling long distances, visiting nearby relatives, or simply sticking with home festivities during the holidays, nothing beats a brand new handheld to enjoy along the way. Filling that bill like a champ is Alinco's new DJ-F1T pocket-size 2 meter FM transceiver (see photo 1). I quickly previewed this new mini-talkie at the Saginaw National Convention during August, and it was so exciting I ordered one right on the spot. After a brief programming, the talkie was copying local weather reports, hamfest repeaters, "direct" activities, airport communications, and play-

4941 Scenic View Drive, Birmingham, AL 35210

ing "Strangers in the Night" on one of its four autodialing DTMF memories (48848, 48684). What a blast!

The DJ-F1T works 2 meters, with extended receive range for NOAA weather coverage, and the clipping of an inside wire also adds 118-138 MHz AM airband reception. It is nearly impossible to describe all the features packed into this little rig: 40 memories, 6 scan modes, 4 autodialing DTMF memories, illuminated keypad, and more. The rig's front looks like the cockpit of an airplane when switched on in a dark room or out-of-doors at night. I am especially impressed by the talkie's high-quality audio, built-in tone pager with message code storage, and auto-shutoff circuit that switches the rig off if I forget. A battery pack slides on/off the talkie's back, and the supplied 7.2 volt /700 mAh battery powers the DJ-F1T to 2.5 watts output. An optional 12 volt battery powers it to 5 watts output. Two other neat accessories are the lapel speaker/mike with memory or VFO selection and up/down tuning buttons, and the headset with VOX for bicycle mobiling or jogging. Just talk and the rig switches to transmit. Neat!

A similar talkie, the DJ-F4T is also available for 70 cm, and it uses the same accessories as the DJ-F1T. Alinco's terrific new handhelds are available from dealers nationwide and due to their economical price, they will probably sell out during the holiday season. Be forewarned and order early!

Our next items are brand-new talkie accessories from the Pro Am division of Valor Enterprises, and they work with all types and models of FM handhelds for quick and easy mobiling. The upper-left item in photo 2 is a suction-cup mount for remoting a rubber ducky on the inside of a car's window or motel window. The other item is a slip-over mount for quick-installing a gain-type pull-up whip on the outside of a car's side window. Both of these portable mounts are perfect for mobiling in rental cars and/or for use by younger amateurs riding on the rear seat while vacationing with the family. Just clip or "stopper" one of these mounts on the window (even when moving), connect their cable to your handheld, and you have an "instant mobile setup" with only one cable. Both mounts are supplied with 7 feet of coax and pre-installed BNC



Photo 1- A super holiday gift every amateur will love is Alinco's new DJF1T 2 meter FM handheld. This palm-size rig is absolutely packed with delightful features.

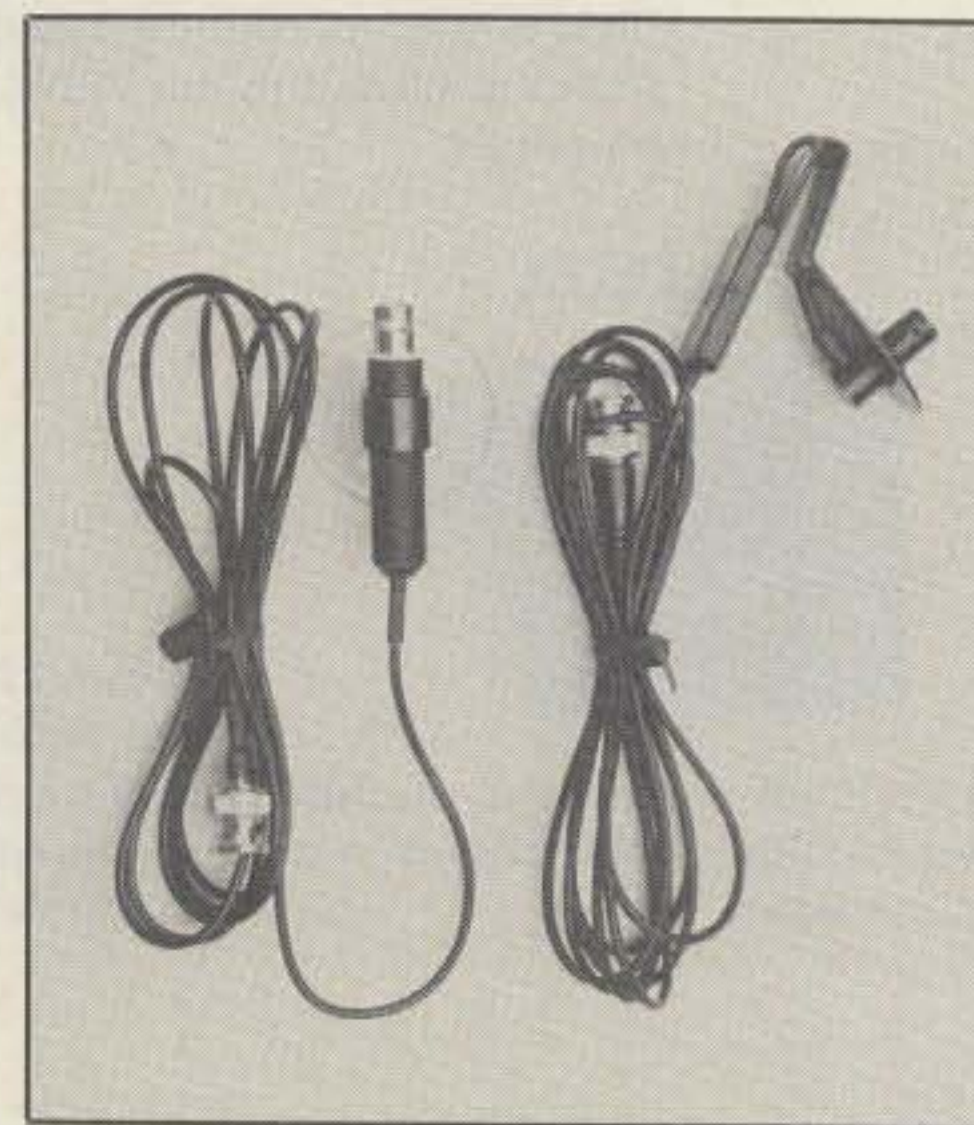


Photo 2- Valor's new suction-cup and window-top mounts for VHF or UHF ducky or "pull-up" gain antennas. Items are great for instant mobiling or use in motels.

MFJ-949D Deluxe 300 Watt Tuner

Lets you tune out SWR on virtually any antenna 1.8-30 MHz . . . plus, you get dummy load, Cross-Needle meter, antenna switch, balun, 1-year *unconditional* guarantee . . . for only \$149.95

MFJ-949D

\$149⁹⁵

- Peak reading Cross-Needle Meter
- Full size dummy load
- Custom inductor switch
- Antenna Switch
- 4:1 Balun for balanced lines
- Covers 1.8 to 30 MHz
- 1 year Unconditional Guarantee
- Made in USA



FREE
\$19.95 MFJ 12/24 Hour Clock
with MFJ-949D purchase!
Read UTC and local time at a glance with MFJ-108B dual LCD clock that displays 12 and 24 hour time simultaneously.

More hams use the MFJ-949D than any other tuner... why settle for an imitation?

More hams use the MFJ-949D than any other antenna tuner in the world!

Why? Because the MFJ-949D gives you your very best value, first-rate performance, proven reliability, unbeatable quality and the best guarantee in ham radio -- all from the most trusted name in antenna tuners.

All the Features You'll Ever Need

The MFJ-949D matches your rig to virtually any antenna from 1.8 to 30 MHz.

You can tune out SWR on dipoles, inverted vees, verticals, random wires, beams, mobile whips, balanced lines and coax.

A lighted peak and average reading Cross-Needle meter shows you SWR, forward and reflected power -- all in a single glance.

A 6-position antenna switch lets you select 2 coax lines (direct or through tuner), random wire or balanced line and dummy load.

Has 4:1 balun for balanced lines.

Special Inductor Switch

The inductor switch is the most likely component to burn up in your antenna tuner.

The inductor switch in the MFJ-949D is *specially designed* to withstand the extreme voltages and currents that are developed in your tuner -- it's not an underrated off-the-shelf switch that can put you off-the-air.

Full Size Dummy Load

The MFJ-949D has a *full size* dummy load measuring 3/4 inch diameter by 5 inches. It easily handles 300 watts of abusive tune-up power.

Watchout for midget size dummy loads -- marginal ones could burn up your rig and put you off-the-air.

Unbeatable Quality

Each MFJ-949D aluminum cabinet is chemically etched to strongly bond MFJ's tough *baked-on* paint. You won't find a

MFJ Low Pass Filter

MFJ-704
\$39⁹⁵

1 year guarantee



Plugs between your transceiver and antenna. Suppresses TVI, RFI, telephone and other interference by reducing unwanted harmonics going into your antenna. 9 Chebyshev poles, teflon dielectric capacitors, high-Q inductors, ground plane shielding give you excellent TVI/RFI suppression. Handles 1.5 KW 1.8-30 MHz with low loss, low SWR. Made in USA.

tougher, longer lasting finish anywhere.

Detailed logging scales and legends are clearly silk screened on the front and back panels with *permanent* black ink -- it's not merely a plastic decal or glued-on paper strip that can peel off.

MFJ uses a *custom* cabinet for each model.

Imitators may use the *same* cabinet for different models using different decals and leaving unused open holes that can be a haven for bugs and other small creatures.

MFJ-948 Deluxe 300 Watt Tuner

MFJ-948

\$129⁹⁵



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

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

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

Continuing Service

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

No Matter What™ Guarantee

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

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

Cross-Needle SWR/Wattmeter covers 1.8-60 MHz

Cross-needle SWR/Wattmeter lets you read peak/average, forward/reflected power and SWR. 200/2000 watts forward and 50/500 watts reflected power ranges. Covers 1.8-60 MHz. Has meter zero adjustment. 7¼x4½x3½ inch aluminum cabinet. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, \$12.95. One year *unconditional* guarantee. Made in USA.

MFJ-815B
\$69⁹⁵



But what do you do if it burns up and they say, "Sorry, your limited warranty does not cover that?"

Why take chances?

There's just no shortcut. MFJ is the most trusted name in antenna tuners -- we've made more tuners for more years than anyone else.

Why take chances with an imitation when you can get the MFJ-949D -- the world's leading antenna tuner with years of proven performance -- **and a no matter what unconditional guarantee** at an affordable price?

Why Buy Made in USA

The MFJ-949D is made in USA. You're keeping your money here in the USA and helping fellow Americans.

If you buy a foreign made product, how do you get service if there's no service center in the USA?

Are you willing to pay expensive freight and duties to a foreign country for service?

Does a foreign company have to honor their warranty in the USA?

Call your Dealer for your Best Price

Call your favorite dealer for your *best* price and order your MFJ-949D today!

FREE MFJ 12/24 Hour Clock

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

650 MHz Dummy Load

MFJ-264
\$59⁹⁵

1 year guarantee
Made in USA



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

Nearest Dealer/Orders: 800-647-1800

Technical Help: 800-647-TECH(8324)

FAX: (601) 323-6551

MFJ MFJ ENTERPRISES, INC.
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(601) 323-5869; TELEX: 53 4590

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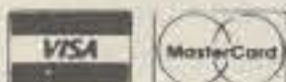
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Name _____ Call _____

Street _____

City _____ Prov./State _____ PC/ZIP _____

\$30 in U.S. \$42 elsewhere (U.S. funds) Licensed amateurs or age 65 or over, upon submitting proof of age, may request special dues rate of \$24 in the U.S. \$36 elsewhere in U.S. funds. Persons age 17 and younger may qualify for special rates, write for application.

For postal purposes, fifty percent of dues is allocated to QST, the balance for membership.

VISA, MC, AMEX, Discover # _____

Signature _____ Expires _____

The American Radio Relay League
 225 Main St. Newington, CT. 06111 USA

CO

CIRCLE 78 ON READER SERVICE CARD

World of Ideas (from page 48)

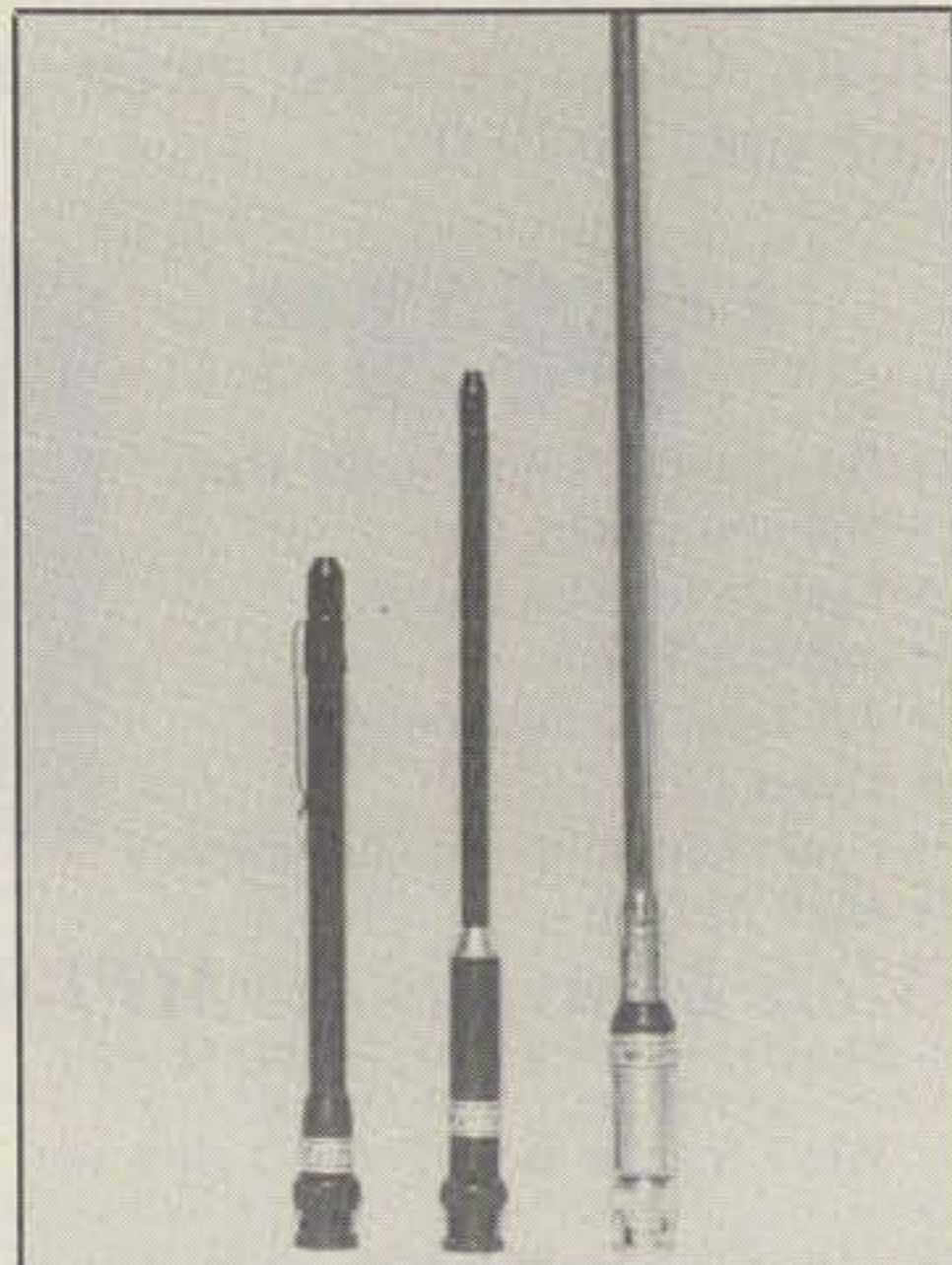


Photo 3— Three quick and easy ways to extend your HT or "instant mobile" range are the MFJ gain antennas shown here. They are inexpensive but quite effective!

connectors for your handheld. The two mounts (Valor) should be available from dealers nationwide by early December. If you have difficulty finding them, telephone Pro Am/Valor Enterprises at 1-800-543-2197.

Need a spiffy gain-type pull-up whip antenna for your 2 meter talkie or Valor mount? Latch onto an MFJ-1710 "pocket linear" $\frac{3}{8}$ -wave pull-up antenna. This little tyke is black, only 5½ inches tall when retracted, and has a clip so it looks like a ball-point pen when carried in a shirt pock-

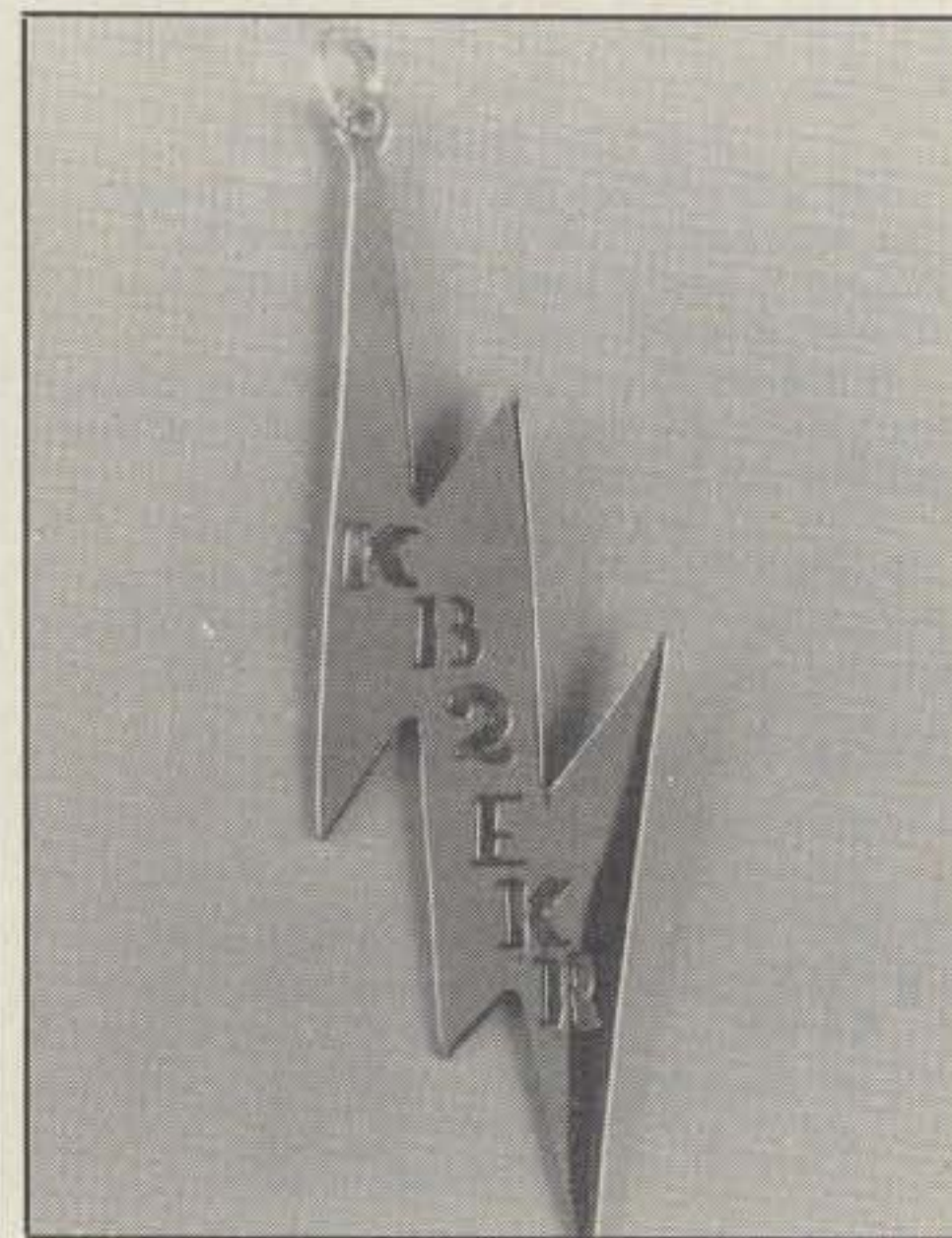


Photo 5— H & M Jewelry's brand-new Lightning Bolt with Call Sign pin or necklace is a real heart throb. It is available in gold or silver.

BEST OF MFJ

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



MFJ-422B

\$134⁹⁵

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

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

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

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

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

Deluxe 300 W Tuner



MFJ-949D

\$149⁹⁵

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

Antenna Bridge

MFJ-204B

\$79⁹⁵

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

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



Super Active Antenna

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

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

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

MFJ-1024 **\$129⁹⁵**

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. 6 pos. 2 KW PEP, 1 KW CW. 1.8-30 MHz. 10x3x1 1/2 in. **MFJ-1702B**, \$21.95. 2 positions plus new Center Ground. 2.5 KW PEP, 1 KW CW. Insertion loss below .2 dB. 50 dB isolation at 450 MHz. 50 ohm. 3x2x2 in. **MFJ-1704**, \$59.95. 4 position cavity switch with lightning/surge protection device. Center ground. 2.5 KW PEP, 1 KW CW. Low SWR. Isolation better than 50 dB at 500 MHz. Negligible loss. 50 ohm. 6 1/4 x 4 1/4 x 1 1/4 in.

"Dry" Dummy Loads for HF/VHF/UHF



MFJ-260B **\$28⁹⁵**



MFJ-264 **\$59⁹⁵**



MFJ-264N **\$69⁹⁵**

MFJ has a full line of dummy loads to suit your needs. Use a dummy load for tuning to reduce needless (and illegal) QRM and save your finals. **MFJ-260B**, \$28.95. VHF/HF. Air cooled, non-inductive 50 ohm resistor. SO-239 connector. Handles 300 Watts. Run full load for 30 seconds, derating curve to 5 minutes. SWR less than 1.3:1 to 30 MHz, 1.5:1 to 150 MHz. 2 1/2 x 2 1/2 x 7 in. **MFJ-264**, \$59.95. Versatile UHF/VHF/HF 1.5 KW load. Low SWR to 650 MHz. Run 100 watts for 10 minutes, 1500 watts for 10 seconds. SWR is 1.1:1 to 30 MHz, below 1.3:1 to 650 MHz. 3x3x7 inches. **MFJ-264N**: "N" connector.

HF or VHF SWR Analyzer™

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

MFJ-207 **\$99⁹⁵**

MFJ-208 **\$89⁹⁵**



MFJ Speaker Mics

MFJ's compact Speaker/Mics let you carry your HT on your belt and never have to remove it to monitor calls or talk. You get a wide range speaker and first-rate electret mic element for superb audio on transmit and receive. Earphone jack, lapel clip, PTT. **MFJ-284** fits ICOM, Yaesu, Alinco. **MFJ-286** fits Kenwood. **MINIATURE SPEAKER MICS**: 2" x 1 1/4" x 1/4". **MFJ-285** and **MFJ-285L** (with "L" connector) fit Icom, Yaesu or Alinco; **MFJ-287** or **MFJ-287L** fit Kenwood; **MFJ-283**: Split jack Alinco. All features of compact models. One year guarantee.

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

MFJ-1278 Multi-Mode Data Controller

Use computer to transmit/ receive in all 9 digital modes: Packet, AMTOR, ASCII, CW, RTTY, FAX, SSTV, Contest Memory Keyer and Navtex receive. Automatic Signal Analysis™ (ASA™), Easy-Mail™, printer port, 20 LED tuning indicator, AC supply, Host, Multi-gray level modem, CW key paddle jack and tons more. Options include 2400 baud modem (MFJ-2400, \$69.95) and software with cables for IBM compatible, Commodore 64/128, Macintosh and VIC-20. **MFJ-1278T**, \$359.95. **MFJ-1278** with 2400 modem built in.

MFJ-1278 **\$279⁹⁵**



12/24 Hour LCD Clocks



\$19⁹⁵ MFJ-108B **\$9⁹⁵** MFJ-107B

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

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

Cross-Needle SWR Meter

MFJ-815B **\$69⁹⁵**

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

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

Deluxe Code Practice Oscillator

MFJ-557 **\$24⁹⁵**

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

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

MFJ Multiple DC Outlet

MFJ-1112 **\$29⁹⁵**

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FL-7000 15M-16M		Call \$
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FRG-8800 G		Call \$
FT-290R/II All		Call \$
FT-690		Call \$
FT-790		Call \$
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FT-5200 2M		Call \$
FT-2400	95	Call \$
FT-212RH 2M F		Call \$
FT-712 70CM Fl. 35V		Call \$
FT-470 2M/70CM FM		Call \$
FT-411E 2M FM w/T	300.00	Call \$
FT-811 70CM FM w/TTHH	410.00	Call \$
FT-26R 2M FM 2W HH	329.00	Call \$
FT-76R 70CM FM 2W HH	359.00	Call \$

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IC-735 Gen. Cvg Xcvr	1149.00	Call \$
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IC-726 Gen. Cvg Xcvr		Call \$
IC-R7000 25MHz		Call \$
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IC-275A 2M		Call \$
IC-475A 70C		Call \$
IC-241		Call \$
IC-3220		Call \$
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IC-229A 2M		Call \$
IC-228H		Call \$
IC-W2A 2M/70C	90.00	Call \$
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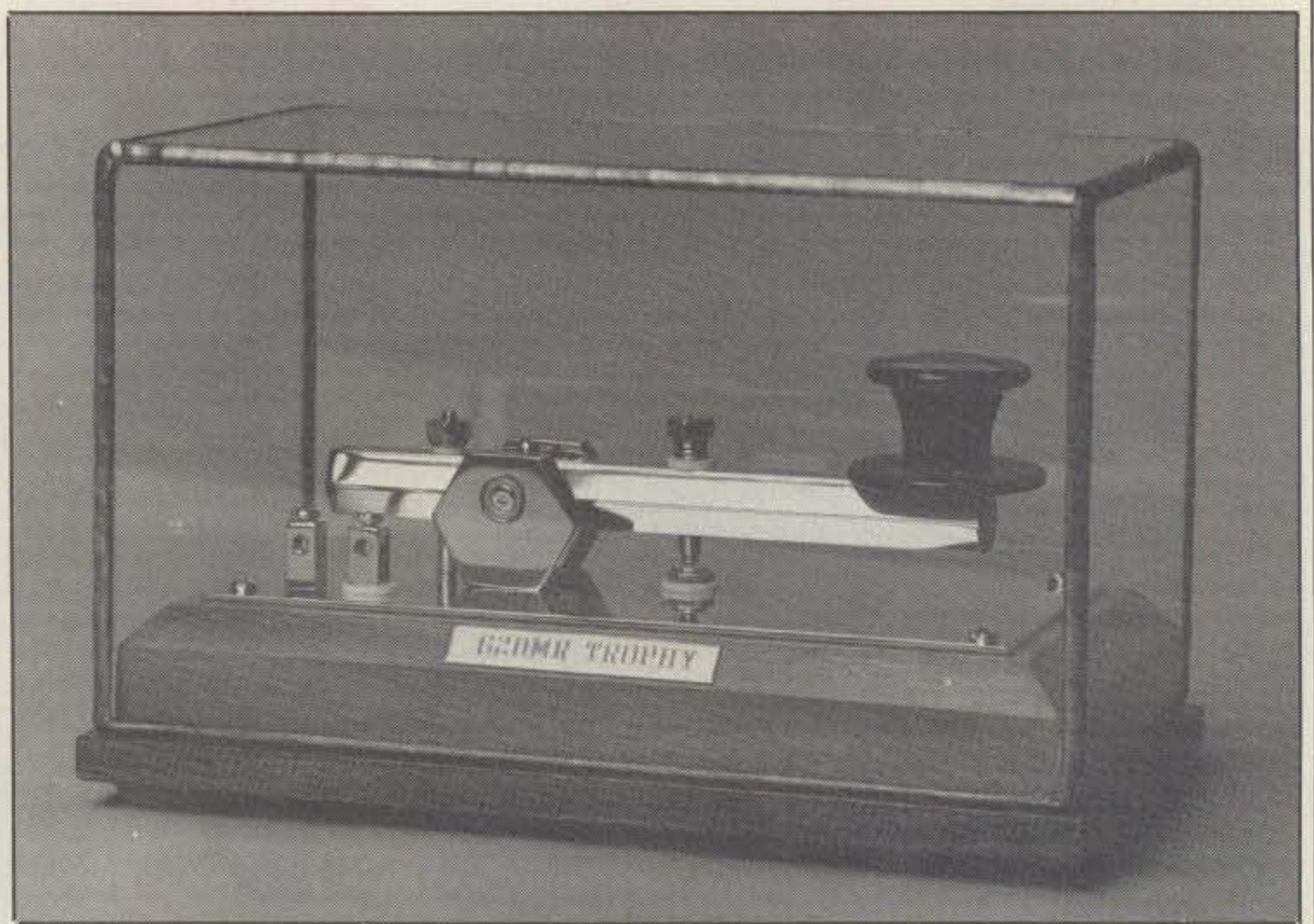


Photo 4—Sheer elegance with CW class for sure! This G4ZPY Grand Luxe Trophy key is goldplated, mounted on a mahogany base, and works great. Talk about going in style!

et. I have used one of these pull-up antennas for several years and would not go anywhere without it. The little critter gives a respectable extension to a talkie's range—not necessarily by bringing in unreadable fringe-area repeaters, but by boosting your "noisy" signal closer to "full quieting." Need a similar 2 meter/70 cm dual-band HT booster? Pick up an MFJ-1710. Prefer more gain? Check out the 2 meter 1/2-wave MFJ-1714 Long Ranger. These MFJ antennas are shown in photo 3 and are available from dealers everywhere, or you can direct-order them from MFJ Enterprises at 1-800-647-1800.

A Touch of Gold

Bearing shades of James Bond and Goldfinger is G4ZPY's new gold-plated, hand/pump key shown in photo 4. This magnificent gem is called the Grand Luxe Trophy model because clubs often use it as a special prize or award, but you can now have your very own model. It comes complete with your call engraved on the base and is ready to use on the air daily. Now that is definitely working CW in high style! Who knows? You may become the legendary "Goldfinger" (fister?) of amateur radio.

This key is a precision instrument with fine adjustments, and it works great. The feel is terrific! Also available is a glass case for dust-proofing the key. The cost varies with the market value of gold, but it is quite reasonable for what you get (and still falls under the \$300 category). For exact pricing and delivery time contact Gordon Crowhurst, G4ZPY, 41 Mill Dam Lane, Bur-

scough, Ormskirk, Lancs. L40 7TG, England (from the U.S., direct "ring up" 011-44-704-894299. Call between 4 AM and 6 PM your local time for lowest cost per minute).

If you prefer wearing your gold rather than using it with the rig, check out H & M's new additions in ham jewelry shown in photos 5 and 6. Harold produced a real beauty in the Lightning Bolt with Call Sign. It is 2 inches long, available as a pin or necklace in gold or silver, and both styles look absolutely magnificent. I am sure any amateur would be delighted to receive one of these personalized pins as a gift, and it would definitely add flair to any OM's or YL's suit or hamfest attire!

New this year also is the YL's amateur radio ring shown in photo 6. It is available in several stone styles with microphone or key engraved, plus your call is added on one side and name on the other side. Pictures really cannot do these rings justice. Their quality and workmanship are exquisite, and they are items you would be proud to wear anywhere. H & M has also added a couple of neat desk accessories to their line. One resembles a trophy, and the other has a traditional pen plus medallion. Both desk items have a classic key engraved in their medallion and look terrific. A backlog will probably develop quickly on H & M's jewelry, so order early! You can contact H & M Jewelry at telephone 607-797-5458, or write to them at 26 Edgecomb Road, Binghamton, NY 13905-4017.

Special Treats

Listen up, gang. Our next highlighted item

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

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

MFJ-1278

\$279⁹⁵



No old stale technology at MFJ!

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

Only MFJ gives you all 9 modes

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

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

NEW! New Full Color SSTV!

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

The best modem you can get

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

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

Exclusive Built in Printer Port

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

20 LED Tuning Indicator

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

New Easy Mail™ Personal Mailbox

You get MFJ's new Easy Mail™ Personal

Radio specific TNC cables

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

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

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

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

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

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

MFJ-5026, Kenwood HTs

MFJ-5080, Yaesu 8 pin rigs

MFJ-5084, Icom 8 pin rigs

MFJ-5086, Kenwood and Alinco 8 pin rigs



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

Multi-Gray Level FAX/SSTV Modem

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

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

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

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

No Matter What™ Guarantee

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

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

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

Get nine new ways of having fun

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MFJ-9600 G3RUH compatible 9600 baud modem. Specially designed

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New MFJ-1278T Turbo with fast 2400 baud modem

MFJ-1278T **\$359⁹⁵**



The new MFJ-1278T Turbo gives you *fast* 2400 baud packet -- *twice* the baud rate of any competitive multi-mode. By communicating faster you'll reduce chances for error, lessen congestion and more efficiently utilize our ham frequencies. You'll also get 1200/300 baud for compatibility with older TNCs. 2400 modem available separately, MFJ-2400, \$69.95. **New!** G3RUH compatible 9600 Baud modem, MFJ-9600, \$109.95.

quick "OK" command selects the mode!

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

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

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



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Multi-Gray WeFAX weather map received on 16.410 MHz using MFJ MultiCom and MFJ-1278 with multi-gray modem.



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is number one in a series of true collectibles. Only a limited quantity will be produced, and this is its first time to be featured in any magazine. Photo 7 is the premier announcement of "K4TWJ's Classics of Amateur Radio" calendar for 1992. It is approximately 10 inches wide by 15 inches long when hung on a shack wall, and each month's dates are complemented by a high-quality "pin-up" photo plus detailed story of a famous CW key, bug, or paddle from our glamorous past. Featured items include everything from Martin's Classic Rotoplex and Dow's Tilted Yoke bug, to the first wind-up code practice machine called the Omnigraph and a 1930s style transmitter. Yes, indeed! A rig you can assemble right from calendar details and use on the air today!

The calendar is available from major amateur radio dealers nationwide and from MFJ Enterprises, Inc. at 1-800-647-1800. The cost is only \$5.95. If you order the calendar from MFJ, add \$1.50 for first-class mailing in the United States. Foreign amateurs please check with your postal services and include additional/sufficient funds for air or surface mail, as you prefer (usually \$4.00 airmail postage).

This first-edition calendar is produced in black and white because of a limited budget. With your support, we can go color next year. The calendar was inspired by your continuing praise and appreciation of our "Classic Rigs" columns in CQ and my new *Keys, Keys, Keys!* book now available from CQ's Bookstore (telephone 1-800-457-7373 for a copy). Barring unforeseen circumstances, our calendar will continue during future years and feature many popular areas and items (including the classics) within amateur radio.

Approximately a year ago I discussed HF mobiling in this "World of Ideas" column and described the perfect "no transceiver needed" way to tune any mobile or fixed-station antenna. A battery-powered MFJ-204 Impedance Bridge or MFJ-207 SWR Bridge plus a little Digitrex Frequency Counter were the only items required. Soon after the article appeared in CQ, Digitrex disappeared from the amateur market. Numerous phone calls followed: some asking for a good substitute counter, some praising Optoelectronics' new Model 2810 or 2300 as even better counters. I checked out both items, and they are indeed winners. While either counter is great, the Model 2810 shown in photo 8 is presently being "Christmas specialied" with built-in rechargeable battery pack and AC adapter at a very attractive price.

The 2810 covers 10 Hz to 3 GHz, has a 10-digit LCD readout, and displays frequencies with accuracy to 1 Hz, so you can also use it to set older (crystalized) talkies right on repeater frequencies. Its "front end" is even sensitive enough so that you can snap a pull-up whip on the BNC connector and use it within 100 yards of "strange repeaters" or transmitters and



Photo 6—Amateur radio operator rings personalized with call and name are now available for OMs and YLs alike from H & M Jewelry. They are available in several styles and stone types.



Photo 7—Announcing the first edition of "K4TWJ's Classics of Amateur Radio" calendar. A limited number of these genuine collectibles are available right now from MFJ Enterprises and amateur radio dealers nationwide.



Photo 8—Whether tuning antennas, setting crystal-controlled VHF rigs on frequency, or working with class rigs, a digital frequency counter is super handy. Optoelectronics' Model 2810 shown here is exceptionally accurate and on sale this holiday season. Go for it!

HASTA LA VISTA BABY!

Terminate your Search for a Handi-Counter™. We're going to blow you away with this offer! *\$100. off our full range Model 2810.

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- Full range -10Hz to 3GHz.
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- BL10: LED Backlight.....\$ 15.
- BL28: EI Backlight for use in roomlight and low light.....\$ 45.
- BG28: Bargraph Signal Level Indicator.....\$100.
- TCXO 30: Precision ± 0.2 ppm 20 to 40°C temp. compensated time base.....\$100.

Universal Handi-Counter™ Model 3000, \$375. and Bench Model 8030, \$579. Both offer frequency, period, ratio and time interval.



OPTOELECTRONICS

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read their frequency directly on the display.

Optoelectronics' less-expensive 2300 counter covers 1 MHz to 2.4 GHz, has an 8-digit LED readout, and shows frequencies to within 100 Hz accuracy. This counter is also supplied with a 600 MAH rechargeable battery and a sensitive RF amplifier stage for near-to-unknown transmitter measurements. Optoelectronics' counters are also neat when working with classic rigs such as regenerative receivers and Hartley transmitters. Place one with a little ducky antenna near the receiver, and it will display your tuned-in (the regenerated) frequency. Key your self-excited transmitter, it will capture the display, and you can zero beat other stations just like you are running a modern transceiver.

Optoelectronics' counters are available nationwide, or you can order one directly by calling Optoelectronics at 1-800-327-5912 (mailing address: 5821 N.E. 14th Avenue, Ft. Lauderdale, FL 33334).

Three more special treats for CW aficionados and serious (all day) operators alike are WD8JNR's customized ashtray and coffee mugs shown in photo 9. The cut-glass ashtray or coaster for shakey-hands mug users sports an engraved hand/pump key in its base, and it looks beautiful. The mug is available in a 13 ounce or larger

(shown) 15 ounce version, and may also be emblazoned with a key, microphone, your callsign, or one of several amateur radio logos. That's right. Now for the first time you (yes, you!) can have an official CQ coffee mug! The mugs are glazed ceramic and glossy black. A number of other special items with custom designs are available upon request. For more information or to order the items mentioned above, contact "800-LINDA," WD8JNR, of Duncan's Custom Effects, 512 N. Mason, Saginaw, MI 48602 (517-752-4488).

A Terrific New Paddle

No Christmas column would be complete without the announcement of a brand-new electronic keyer/paddle, and we have a gem! The impressive iambic paddle shown in photo 10 has just been announced by Ditek Industries and should be available by the time you read this article. Bearing a striking resemblance to the Brown Brothers paddle of eras past, Ditek's new delight sports dual levers that are triple chrome plated and fitted with black-plastic fingerpieces. Stainless-steel straps at the lever's rear are used for movement. The mechanism is mounted on a glazed black steel base. A center spring is used to ad-

just tension for both levers, and separate adjustments are provided for dot/dash travel. An expanded model of this paddle contains an add-on electronic keyer with 50-60 character programmable memory. CW speed, weight, and memory use are controlled by small membrane switches on the keyer.

You can order the Ditek paddle/keyer by telephoning Ditek Industries at 1-800-762-9328. Sorry, but we do not have more information. This item is simply too new, and brochures were not available when I wrote this holiday column.

... And To All A Good Night

That wraps up this year's Holiday Gifts special, and I hope you enjoyed viewing the goodies as much as I did writing about them. Here's hoping at least one featured item appears in your bundle of gifts.

It is always great talking with you on the air, particularly friends who reply to our CQs or calls with an immediate "Hi, Dave" and other kind words. We look forward to seeing you at hamfests during 1992 and exchanging more ideas via this open-ended CQ column. We also have some great topics lined up for the coming year, so watch for them! 73, Dave, K4TWJ



Photo 9- These three samplings of amateur radio treats from Duncan's Custom Effects do not light up, beep, or work DX, but they definitely add 10 dB of enjoyment to being an avid radio amateur. Check out the neat CQ logo on the mug.

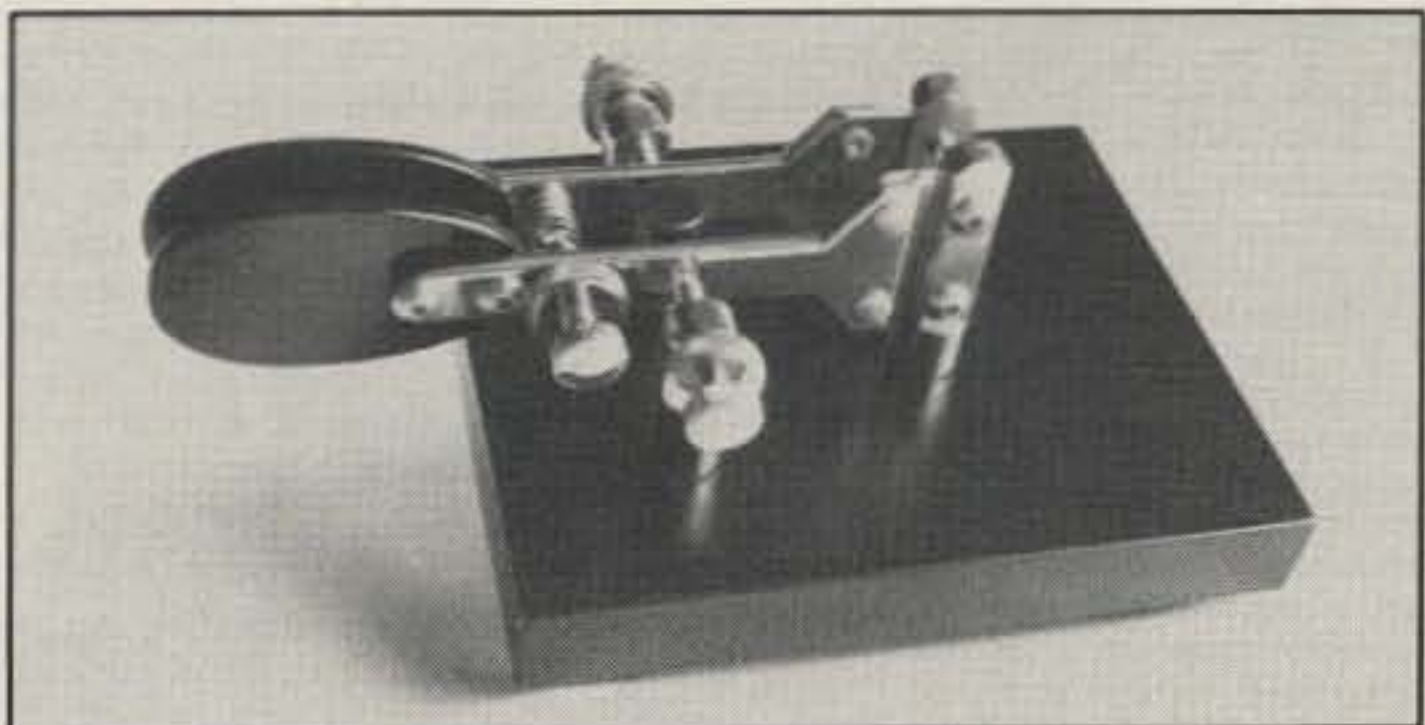


Photo 10- Ditek's brand new CW paddle is a real gem and it handles like silk.

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NO DUPLEXER NEEDED!

USE ONE RADIO AND ONE SIMPLEX FREQUENCY!**

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- DUAL RADIO SIMPLEX REPEATER
- CROSS BAND SIMPLEX REPEATER
- CROSS BAND DUPLEX REPEATER
- CROSS BAND SPLIT SIMPLEX / DUPLEX REPEATER
- 2 MINUTES & 48 SECONDS OF TIME
- VOICE MAIL
- DUAL RADIO SPLIT SIMPLEX REPEATER
- DUPLEX REPEATER CONTROLLER
- BI-DIRECTIONAL DUPLEX REPEATER
- REPEATER BACK-UP SYSTEM
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- AUTOMATIC VOICE IDENTIFIER
- AUXILIARY OUTPUT

\$399.⁰⁰ & UP

*no duplexer needed for simplex repeater functions
** for "one radio simplex repeater"

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Continuous coverage from 25.000 through 999.995 MHz.
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1096 Radio Mods - a complete listing of several modifications to many popular scanners, HT's, ect.

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1099 Kenwood Rig Control - control your TS440 and TS940 with your PC. Even works on the TS140.

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program for the Kantronics KAM.

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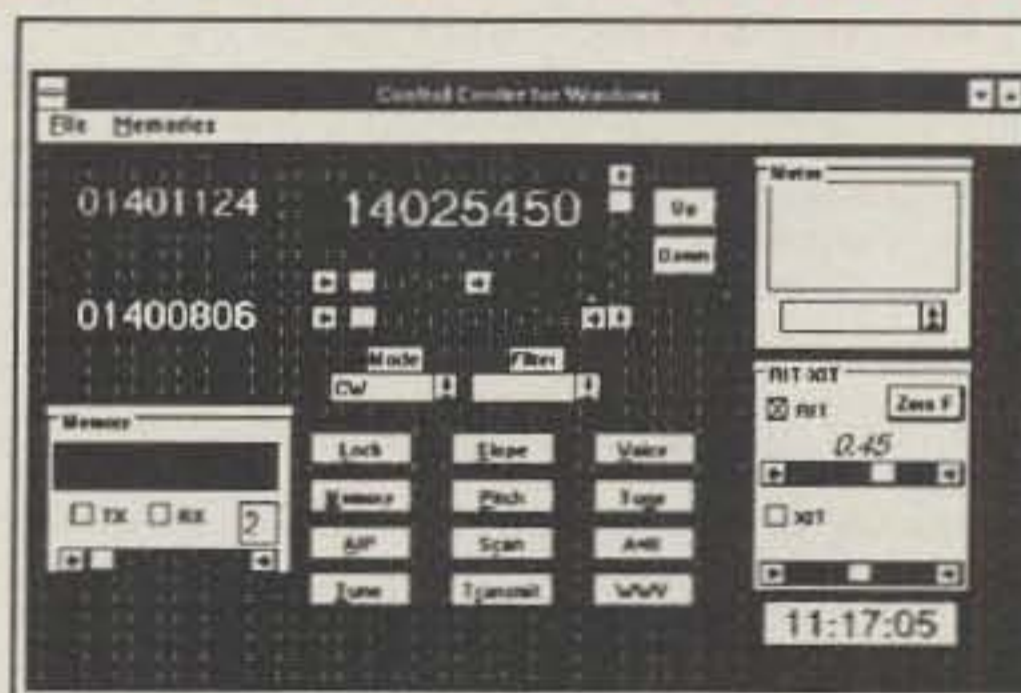
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M² Christmas List

	DESCRIPTION	BOOM	GAIN dBd	SUG PRICE
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40M1L	40 METER DIPOLE	NA	0.0	\$ 229.00
40M2L	2 ELE	20'	4.2	\$ 499.00
40M3L	3 ELE	30'3"	5.8	\$ 749.00
40M4L	4 ELE	42'	6.0	\$ 969.00
20M4	4 ELE	45'3"	9.0	\$ 649.00
18M3	3 ELE	18"	6.3	\$ 249.00
15M4	4 ELE	33'8"	9.0	\$ 369.00
15M6	6 ELE	44'10"	9.4	\$ 499.00
10M4	4 ELE	23'	9.0	\$ 269.00
10M7	7 ELE	45'	10.5	\$ 499.00
6 METERS				
6M5	5 ELE	15' 10"	9.3	\$ 149.00
6M7	7 ELE	25'6"	10.5	\$ 229.00
6M2WL	9 ELE	39'6"	12.4	\$ 379.00
6M2.5WL	11 ELE	50'2"	13.0	\$ 449.00
2 METERS				
SQOOLP	HORIZ OMNI	NA	4.8	\$ 59.00
EB-144	HORIZ OMNI/CIRC	NA	1.0	\$ 119.00
2M4	4 ELE	53"	7.5	\$ 59.00
2M7	7 ELE	8'10"	10.5	\$ 105.00
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2MCP22	22 ELE	18' 7"	12.5	\$ 225.00
2M6WLHD	19 ELE HD	41'8"	15.8	\$ 379.00
2M5-440XP	5 ELE / 10 ELE ON 440	5'		\$ 149.00
220				
222-7EZ	7 ELE	66"	9.8	\$ 79.00
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EB-432	HORIZ OMNI/CIRC	NA	1.0	\$ 109.00
420-50-5	5 ELE FULL BAND HD	28"	7.5	\$ 79.00
420-50-11	11 ELE FULL BAND	5'	11.3	\$ 99.00
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2M 4 PT	4 WY PWR DIV	NA	NA	\$ 79.00
70CM 2 PT	2 WY PWR DIV	NA	NA	\$ 59.00
70CM 2 FT	2 WY PWR DIV	NA	NA	\$ 69.00
70CM 4 PT	4 WY PWR DIV	NA	NA	\$ 79.00
VHF-50	"N" CONN PHASE CABLE	NA	NA	\$ 39.00
UHF-50	"N" CONN PHASE CABLE	NA	NA	\$ 35.00



CQ, CQ, CQ

Leave your CQ open to this page with circles and arrows in all the right places, so your family can get some ideas for your Christmas gift items (and other occasions). WE ARE CURRENTLY WORKING ON A VERY LARGE ORDER FROM THE NORTH POLE!

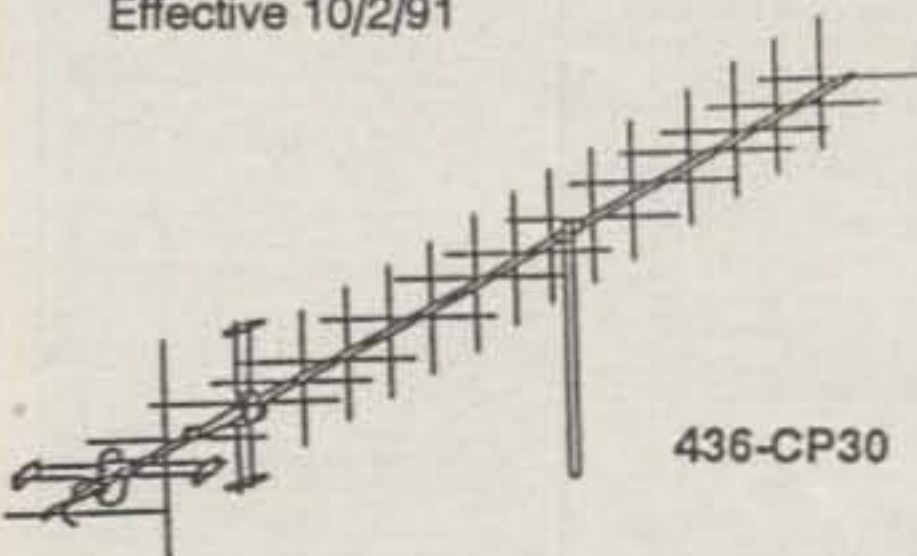
Santa reports that the last two M² ads have stirred more antenna interest than he has seen in a long time! His mail bags have been stuffed with QSL cards marked only with "Saw the M² ad.....If nothing else drop a catalog down my chimney"! Even XYLs and HARMONICS have written Santa BEGGING him to bring the OM a 2 meter SQLOOP so he will get rid of that weird thing on the back of the station wagon!

Santa has ordered ANTENNAS FROM 3-1300 MHz including several 40M3Ls, bundles of 6 meter 6M7s (Santa likes 'em cuz they're UPSable), a SLEIGHFUL of SQLOOPS, and other 2 meter OSCAR antennas. DON't worry he will also be bringing 222-7EZs, 440-18s and a whole bunch of the brand new 23CM35EZ Multi purpose Yagis, not to mention elevation rotors, power dividers, stacking kits even NEW portable antenna stands. (We haven't even told you about those yet).

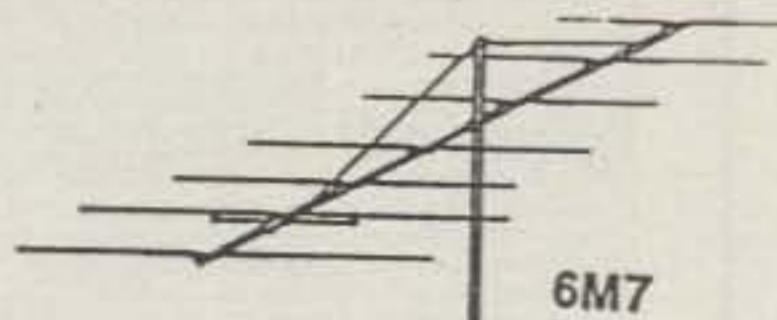
Santa also notes that the DX stations from around the world say that M² antennas are the best because they combine excellent mechanical features and materials (stainless hardware and machined parts) with a performance and size package that most towers and rotators can handle. M² antennas are built to defy Mother Nature!

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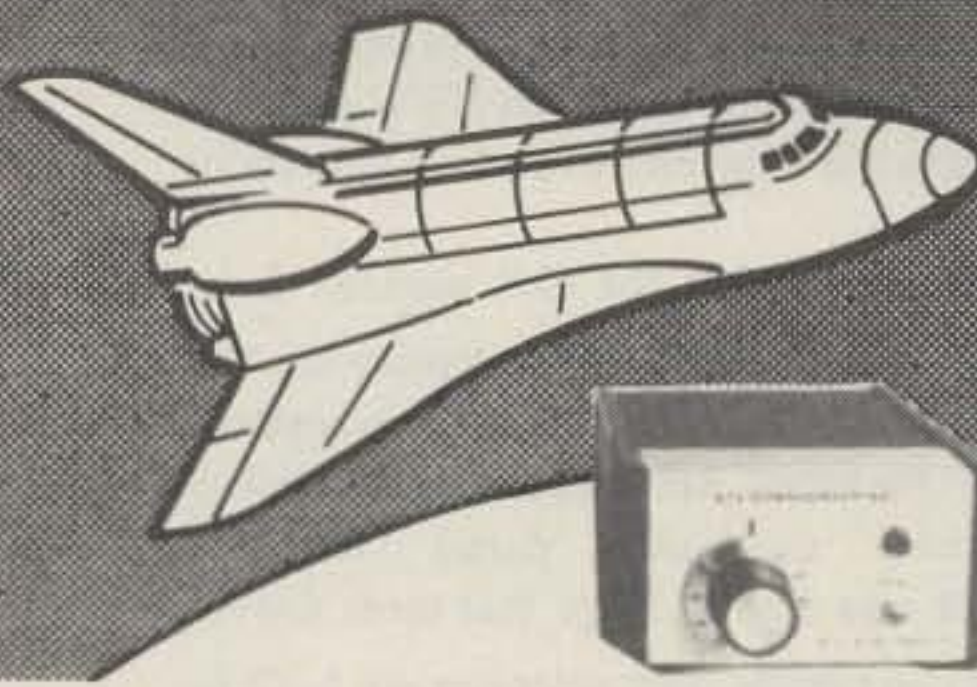
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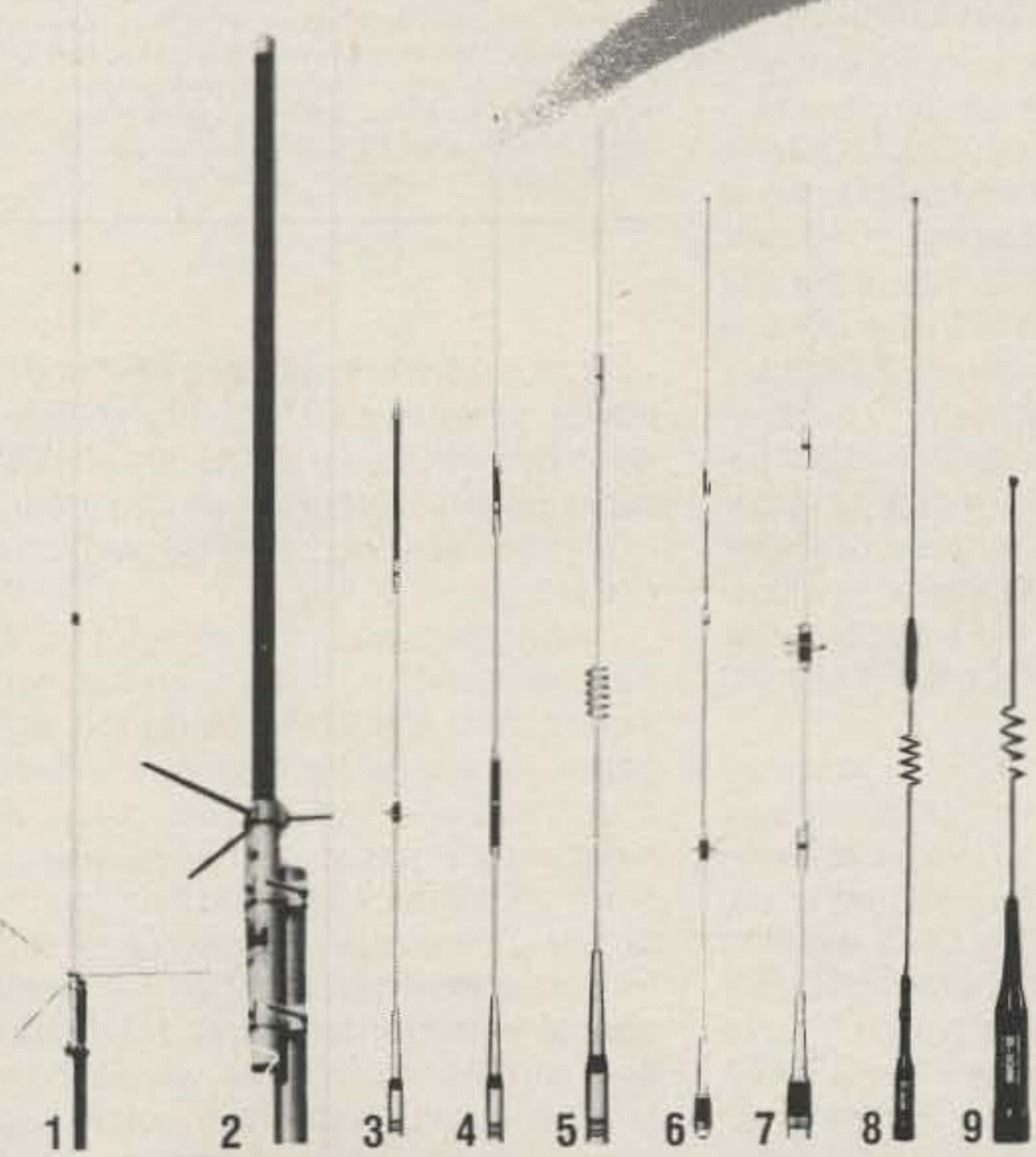
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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for December is:

**Alvin B. Unruh, W0AWP
USA-CA All Counties #725
All CW, 8-15-91**

"In 1988, at age 82, I decided to start county hunting. I accidentally blundered into the 1988 CH QSO Party, then in progress. It was the tail end of July. Several participants informed me of the CH CW net, then on 14,066.6 kHz (now on 14,056.5 kHz). I became involved with the hope of completing all counties before the Grim Reaper came calling. This concern may have been shared by some of my mobile friends, who, upon learning my age, became very cooperative.

"I completed all counties CW on July 15, 1991 at age 85, less than three years after starting. It was an unusual, exciting finish, which saw my last 25 counties in 6 states disappear in an 8-day period. Usually, for most county hunters, last counties are attained by long and patient waiting for the right mobiles to happen along.

"My big break was the CH convention in St. Paul, Minnesota in July 1991. Six county hunters—KA1CLV/M, W3DYA/M, KN4Y/M, KG5J/M, WA6VJP/M, and NG0T/M—wrote or phoned to ask if they could help run the needed counties enroute to the convention. KG5J/M and W3DYA/M detoured for eyeball QSOs. By the time the convention started, my needs had dwindled to six counties in two states. After the convention NG0T/M headed home via my last Nebraska county needed (McPherson), and W3DYA/M detoured to Kentucky enroute home to pick up my last five there. On July 15, just 14 minutes after Dan ran McPherson, Norm ran Russell, Kentucky for the last of all counties. I had difficulty realizing what had happened.

"Now I am wondering if I can qualify for two records simultaneously: the first, all counties worked CW in less than three years; the second, the longest span, time-wise, for all counties worked CW (nearly 68 years). I'd appreciate hearing from CW county hunters who can dispute either claim. The reason for these conflicting claims is that when I decided to try for all counties CW, I learned there was no time limit regarding contacts. So my 9BIO QSLs (1923-1925) were researched, counties



Al Unruh, W0AWP, USA-CA All Counties #725, All CW.

determined, and some were used. In 1925 the call 9BIO was allowed to expire, and in 1926 the present call (9AWP/W9AP/W0AWP) was received. It has been continuously held since, although this operator was inactive intermittently during about half of the nearly 68 years.

"When making application in 1989 for USA-CA endorsements for 500/1000/1500/2000 counties confirmed, between 500 and 600 'on hand' QSLs were used for a fast start. Thus the claim for the longest span.

"Although my first license was issued in 1923, I actually started a form of hamming in 1922, when a sked with a young would-be ham living about a mile away was made. We learned the code using bootleg low-power spark transmitters and Galena crystal detectors. Bootleg stations were common in those days, some signing their initials in lieu of call letters. When the call 9BIO was received in 1923, the license was signed by Herbert Hoover, Secretary of Commerce. It was pre-prefixes, pre-FCC. The CW transmitter used a UV202 so-called 5 watt tube in a self-excited oscillator, and a 2-tube regenerative receiver brought in signals from 32 states (see illustration). We worked on the old 200 meter band (1500 kHz on the present AM BC band).

"After marriage in 1929 I was transferred from Newton to Wichita, Kansas by the A.T. & SF RR. By 1930 I was back with a QRP push-pull oscillator transmitter using UV 117A tubes. My first QSO was with W9EFK in Minneapolis, Minnesota. Recently, 61 years later, W0EFK and I had our second QSO and discussed our QSO 61 years before. Gradually that QRP transmitter was replaced by more power, crystal

USA-CA Special Honor Roll

P.G. "Pat" Patterson, KQ1Z
USA-CA All Counties #724
All SSB Mobile, 8-7-91

Alvin B. Unruh, W0AWP
USA-CA All Counties #725
All CW, 8-15-91

David Bishop, WB9QNX
USA-CA All Counties #726
Mixed, 8-15-91

James G. Sanders, W4HSA
USA-CA All Counties #727
Mixed, 8-23-91

USA-CA Honor Roll

	3000		1500	
KQ1Z	754	KQ1Z	999	
		WA3RTY	1000	
	2500			
KQ1Z	833	1000		
		KQ1Z	1192	
		WB8WEZ	1193	
	2000			
KQ1Z	909	WA3RTY	1194	
WA3RTY	910			
N4SMH	911	500		
		KQ1Z	2539	

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.

control, and eventually by a VFO and high power, allowing spot frequency QSOs. All were homebrew. In the 1930s a RME-69 superhet with IF crystal was acquired, and it still sits near the operating position and still works.

"After election to the office of SCM for Kansas (ARRL) in 1940, I served in that capacity until 1948, including the WW II years. Over-age for first WW II military drafts, and with frequent publication of my name in QST magazine, I received a great many communications and electronics job offers. The sudden demands of WW II brought about the realization that qualified people were in short supply. Friends affiliated with Boeing-Wichita, where the construction of a B-29 bomber factory had recently been completed, told me they had

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CIRCLE 5 ON READER SERVICE CARD

a job for me if I decided to leave the railroad. I accepted, and became one of a group that worked on the electronics on the first B-29. During the B-29 program I was privileged to be in the forefront of testing and trouble-shooting the highly classified and newly developed radar navigational and bombing equipment.

"During the period between Boeing's B-29 and B-52 production years I worked as a commercial CW operator for KGPZ. The Wichita Police Department was a member of the (mostly west of the Mississippi river) Inter-State Police CW Network. A 9-channel 2 KW RCA transmitter and National HRO receivers did a good job. The net has since given way to advanced technology.

"With Boeing-Wichita's resumption of bomber manufacturing, now the B-52 (a plane that refused to become obsolete and was used in Desert Storm to subdue Iraq), I was one of the first electronics/radar test engineers to return and was involved in the design of a new test facility and electronics lab. In time I advanced through several levels of supervision, finally as General Supervisor of the Electronics Lab. I retired in 1969.

"As is often the case when a person's occupation and hobby become too similar, in the 1950s my long-standing amateur radio hobby took a back seat and we became involved in a new hobby of world travel and photography. The XYL soon tired of carry-



The first call held by W0AWP was 9BIO. This 1923 station provided some of the contacts for Al's USA-CA All Counties award. Note the absence of prefixes on QSL cards.

ing some of my photo equipment, rebelled, and purchased several cameras and became an avid photographer in her own right. We were privileged to take many self-planned trips, including visiting all six continents of the world and recording the people and their ways of life. We usually tra-

veled in rented cars with no time schedule. Exceptions to that approach were in the USSR, where we were members of a photographic cultural exchange, and in the islands of the Mediterranean. The tour ship-to-shore trips were well organized and made car rentals unnecessary. Also in-



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Torque Ft/Lb	506	1085	1480	417	750
Wind Load in Tower	10	25	25	15	20
On Mast	4	5	7	7.5	10
speed 360°	60-150 sec	60-150 sec	60-150 sec	60	60
Rev. Delay	None	2 sec	3 sec	None	None
Preset	Opt 3	Opt 3	yes	no	no
Power 120V 60Hz	80VA	140VA	200VA	26V AC	26V AC
Mast Dia.	2-2.5 in	2-2.5 in	2-2.5 in	2 in	2 in
Control wire	7 cond	7 cond	7 cond	8 cond	8 cond
Vertical max. load #	880	1540	1540	400	600
Horizontal wire	13	17	20	14	18

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cluded were visits to Turkey, Yugoslavia, Greece, Israel, etc. Before long we had become nationally known in certain circles, and both Mim and I were elected to Fellowship in the Photographic Society of America in recognition of our illustrated lectures presented at many photo conventions in the US and Canada. Unfortunately, due to amateur radio inactivity, no DX hams were contacted while traveling.

"Since returning to active ham radio operating in 1983, several objectives have been met, such as 9-band WAS (450 states confirmed), DXCC, and most recently the 1988-1991 USA-CA all 3076 county completion. Station equipment is a Kenwood

TS440 with a TS830 for backup. A ground-mounted Butternut HF6V is used on 14 MHz and higher, while a HF2V is used for lower bands. Each has 30 radials.

"Another of this county hunter's early breaks was the fact that a number of mobiles were running large areas of some states. An example was W1TEE/M, who provided me with 260 needed counties. Others—such as N0CYB/M, W4HSA/M, and W3DYA/M—provided more than 100 counties each. Many mobiles made special efforts to complete their home states.

"To be a ham is to be a member of a great fraternity. But in becoming a county hunter, one finds membership in an 'inner

circle' of highly dedicated, friendly, and cooperative amateurs who are willing to take their mobile rigs to out-of-the-way, less-frequented areas. They are accommodating and helpful in aiding county hunters make progress toward attaining their goals. They're the greatest!

"I'll probably not try for the second time around, as at age 86 next birthday there may not be time. But I'll be dropping in on the net from time to time to pick up a few counties and to say hello to members of a really great group. —73, Al, W0AWP."

Awards Issued

P.G. "Pat" Patterson, KQ1Z, filed his complete set of confirmed county contacts and received USA-CA All Counties #724, USA-CA 3000 #754, USA-CA 2500 #833, USA-CA 2000 #909, USA-CA 1500 #999, USA-CA 1000 #1192, and USA-CA 500 #2539, All SSB Mobile, dated 8-7-91.

Alvin B. Unruh, W0AWP, completed his paperwork and claimed USA-CA All Counties #725, All CW, dated 8-15-91.

David Bishop, WB9QNX, submitted his final list of confirmed county contacts and so received USA-CA All Counties #726, Mixed, dated 8-15-91.

James G. Sanders, W4HSA, completed his good record of confirmed county contacts and received USA-CA All Counties #727, Mixed, dated 8-23-91.

Norman E. Van Raay, WA3RTY, filed his good application for USA-CA 2000 #910, USA-CA 1500 #1000, and USA-CA 1000 #1194, Mixed, dated 8-19-91.

Roger W. Parks, N4SMH, received USA-CA 2000 #911, All SSB, dated 8-23-91.

Andrew A. Pitt, WB8WEZ, received USA-CA 1000 #1193, Mixed, dated 8-19-91.

A USA-CA 500 certificate was issued to P.G. "Pat" Patterson, KQ1Z, USA-CA 500 #2539, All SSB Mobile, 8-7-91.

Awards Available

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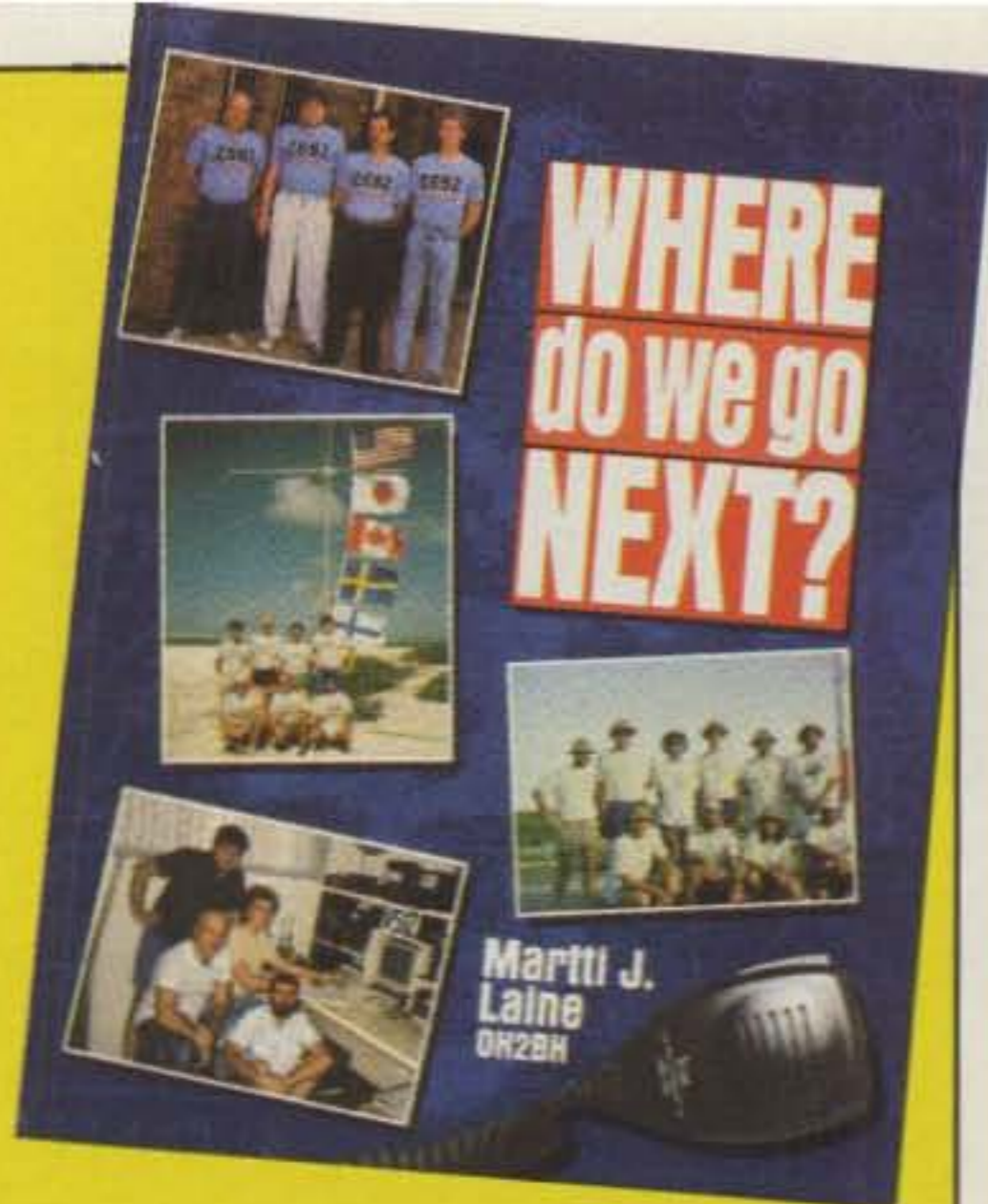
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Andy, UH6E, International Camel's Club Vice-President, and Victor, UH8EA, ICC President, display Victor's ICC plaque #1.

UC2AFZ, ICC Vice-President); UH2E/UA9TZ (UA9SGW); UV9CAF; UA9CFV, UZ9CWA, UH3E/UC2WL; RH7E; RH9E/UA3TT (ex-UA3TDX); UZ9CU (UA9CMW); UA9SAW; UH1E/RA3QJ; UH3E/UA9TF; RH2E/RA3QAK; and UC1AWK.

Send GCR list and fee of \$18.00 U.S., 30 DM, or 35 IRCs for each plaque to Huie A. Miller, W5BWA, ICC Secretary, 5812 Hiawatha Drive, Alexandria, Louisiana 71301 USA. Additionally, to receive the special badge for every plaque send 4 IRCs to RC2AR, ICC V.P., Andy Schislyonok, P.O. Box 33, Minsk-13, 220013 Byelorussia, USSR.

Rules for ICC Plaques follow.

1. *ICC International Camel's Club*: Make three contacts with ICC members. There must be one QSO with the ICC president, UH8EA (RH0E, RH0Y, ex-UH8EAA), Victor Pechorkin. Contacts with the same station from different QTHs are counted as different QSOs (example: QSO [SWLs] with DL/RC2AR, UH6E/RC2AR, RC2AR are counted as three different contacts).

2. *ICC Gold*: Owners of an ICC plaque may receive ICC Gold for 15 contacts with ICC members. QSOs on different bands are counted.

3. *ICC DX Hunter*: Contact 31 stations worldwide, including all call areas (1-0), so as to form the phrase "INTERNATIONAL CAMEL'S CLUB DX HUNTER" with the first letter of their callsigns. Any two letters of this phrase may be substituted by contacts with ICC members.

4. *ICC YL 88*: Make contacts with 88 YLs.

5. *ICC 5B YL 88*: Owners of ICC YL 88 may receive this plaque for contacts with 88 YLs on each HF band.

6. *ICC 10*WARC*10*: Make confirmed contacts with 10 countries on 10 MHz.

7. *ICC 18*WARC*18*: Make confirmed contacts with 18 countries on 18 MHz.

8. *ICC 24*WARC*24*: Make confirmed contacts with 24 countries on 24 MHz.

9. *ICC 3BWARC*99*: Make confirmed contacts with 99 countries on each WARC band.

10. *ICC Super WARC*: For obtaining all

plaques of the WARC series. This plaque is free.

11. *ICC Diamond*: For obtaining all 10 plaques of the ICC Super plaque series. This plaque is free, and every holder of this award becomes a lifetime honorary member of ICC and receives a special badge and color certificate.



One in the series of "Super Plaques" sponsored by the International Camel's Club, Byelorussia.

For more information on becoming an ICC Member write (SAE plus 1 IRC) to RC2AR. New ICC members are welcome!

H. A. "Tony" Miller, W5BWA, ICC Secretary, advises that he will be keeping any funds received in the USA until the plaques are received by the applicants and will personally guarantee satisfaction.

The Vityaz Award Program. The Museum of the World Ocean in Kaliningrad, USSR, sponsors the Vityaz program, which is dedicated to the famous Russian oceanography ships called *Vityaz*. Each of them made their own valuable contributions in the World Ocean research. The third *Vityaz* sailed until 1979. Now it is moored by the Pregol river bank in the center of Kaliningrad on exhibit by the museum.

The Vityaz awards are silk pennants showing pictures of each Vityaz. The rules show countries and areas visited by each Vityaz.

Vityaz pennants are available to any licensed amateur/SWL in the world. Contacts from April 22, 1979 are valid. There are no band/mode restrictions. Send GCR list, no QSLs, but the founder reserves the right to ask for QSL checking. The fee for each pennant is \$10 U.S., or the equivalent.

The possessor of all three pennants (amateurs only) becomes a member of Vityaz Radio Honor Roll. He gets a special badge and his QSL will be kept in an album at the Vityaz radio station. Therefore, send your QSL with your last application.

Applications must be sent to the Award Manager, Boris V. Osmak, UA2FO, P.O. Box 400, Kaliningrad, 236006, USSR. Fees

in U.S. dollars should be sent to: Correspondence Account of International Bank for Economic Cooperation, Credit Lyonnais, New York 01-00782-001-00; correspondence account of Investbank: IBEC Moscow 090049801; Museum of the World Ocean account at Investbank Kaliningrad N 0701234.

The "Vityaz 1" Pennant was established in honor of the corvette Vityaz (1862-1882). It is earned through QSOs/SWLs with at least 20 of the following countries (territories): BY, CE2 (reg. Valparaiso), CE5 (reg Bio-Bio), CE8 (reg. Magallanes), CE0A, CT3, D4, DU, FO (Tahiti), FO (Tuamotu), G, JA1 (pref. 11), JA3 (pref. 27), JA6 (pref. 42), JA8 (pref. 01), KHO, OZ, P2, P2 (New Ireland), PY, SU, UA1A (obl. 169), UA0L (obl. 107), VR6, VS6, ZB2, 3D2 (Rotuma), 4S, 5W, 7O, 9H, 9V.

The "Vityaz 2" pennant was established in honor of corvette Vityaz (1886-1893). It is earned through QSOs/SWLs with at least 30 of the following countries (territories): BY (Zhoushan Arch.), BY4A-I (Shanghai), BY5A-I (prov. Zhejiang), BY5R-Z (prov. Fujian), BY7R-Z (prov. Guandong), CE2 (reg. Coquimbo), CE2 (reg. Valparaiso), CT, CT3, D4, DL, DU, DU1 (Luson Is.), DU6 (Panay Is.), EA1 (reg. Galicia), EA7 (reg. Andalucia), F (prov. Bretagne), F (prov. Normandie), FO (Marqueses Is.), G, HL, JA1 (pref. 11), JA3 (pref. 27), JA4 (Oki Arch.), JA6 (pref. 42), JA8 (pref. 01), KH6, OZ, PY, SM, SU, SV, TA, UA1A (obl. 169), UA0 (Komandores Is.), UA0C (obl. 110), UA0F (obl. 153), UA0L (obl. 107), UA0Z (obl. 128), VS6, YB, ZB2, 3W, 4S, 7O, 7X, 9H, 9V.

The "Vityaz 3" pennant is established in honor of research vessel Vityaz (1947-1979). It is earned through QSOs/SWLs with at least 60 of the following countries (territories): A3 (Tongatapu Is.), A3 (Vavau Is.), AP, C2, C6, CT, CU, DL, DU, EA3 (reg. Catalonia), EA8, EA9 (Ceuta), ET, F, FH, FK, FO (Marqueses Is.), FO (Tahiti), FR/T, FT5Z (Amsterdam Is.), FT5Z (St. Paul Is.), FO (Tahiti), FR/T, FT5Z (Amsterdam Is.), FT5Z (St. Paul Is., G, H4, I, JA1 (pref. 10), JA2 (pref. 18), JA2 (pref. 20), JA3 (pref. 23), JA3 (pref. 25), JA4 (pref. 33), JA6 (pref. 40), JA6 (pref. 42), JA8 (pref. 01), JA9 (pref. 30), K6, KC6, KH6, KH8, OZ, P2, P2 (Admiralty Is.), P2 (New Britain), P2 (New Ireland), P2 (Ninigo Is.), P5, S7, SV, T30, T31, T32, T33, UA1A (obl. 169), UA6A (obl. 101), UA2 (obl. 125), UA0F (Sakhalin Is.), UA0F (Kuril Is.), UA0I (obl. 138), UA0L (obl. 107), UA0Z (obl. 128), UB5F (obl. 070), UF6Q (obl. 014), VE1 (Nova Scotia), VE7, VK2, VK4, VK6, VK8, VK9L, VK9N, VK9X, VP9, VQ9, VU (Kerala State), VU (Maharashtra State), VU (Tamilnadu State), VU (West Bengal State), YB, YJ, YL, ZK1 (North Cook Is.), ZK1 (South Cook Is.), ZL1, ZL2, ZL4, ZL8, 3B8, 3B9, 3D2 (Fiji), 4S, 5H, 5R (Madagascar), 5R (Nossi-be), 5W, 5Z, 6Y, 7O (Sokotra Is.), 8Q, 9M6,8, 9V.

Happy Holidays, everyone!

73, Dorothy, WB9RCY

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"The FT-1000 is an excellent top flight transceiver in all respects. It has all the features one would expect in a radio of this class...Of all the top of the range models..., the FT-1000 is the friendliest to use. The ergonomics has been well thought out with simple and obvious control of all functions..."

—Radio Communications (U.K.)

"The FT-1000 is indeed a fascinating new generation of HF transceiver...The receiver side is very impressive. The sensitivity, dynamic range, and selectivity figures are more than adequate for today's needs..."

—CQ Magazine

"Until now a RF output power of 100 watts applied as the norm for semiconductor component shortwave transceivers; some newer high class units offered 150 watts. The FT-1000 is set for a maximum RF output of 200 watts. During normal SSB and CW use the power transformer remains hand warm—an improvement over the past when a transformer would occasionally 'burn up'..."

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"The biggest attraction of the FT-1000 is the very quiet receiver. In a side-by-side comparison between the FT-1000, the ICOM IC-781, the ICOM IC-765, and the Kenwood TS-950, the FT-1000 came out the winner by a long shot...when comparing its receiver to those found in current equipment of the like monetary value from other manufacturers, the FT-1000 beats all!"

—73 Magazine

FT-1000



Direct Digital Synthesis (DDS), two ten-bit DDS plus three 8-bit DDS for fast lock-up time and lower noise than other traditional PLL systems.

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Dual Receive, allows simultaneous reception of two different frequencies utilizing two tuning knobs for easy spotting. And with optional BPF-1 module allows crossband dual receive.

100 Memories, a detented rotary selector can be independently tuned or mode of IF filter selection can be changed directly, like a VFO.

Digital Voice Storage (DVS-2), option provides instant playback of 16-second receive memory, plus two 8-second "CQ Contest" messages on transmit.

Automatic Antenna Tuner, built-in quick-response antenna tuner matches SWRs up to 3:1 on the amateur bands and includes 39 tuner-setting memories for quick band changes.

CW Spot, provides audible tone for aligning transmit signal precisely on incoming signals without transmitting.

CW Audio Peaking Filter, provides additional selecting on CW for weak-signal work. On/Off status is held in memory.

High Dynamic Range, features four high-IDSS JFET up-conversion first mixer for receiver strong signal handling.

Multimode Selection on Packet/RTTY, for maximum flexibility packet mode toggles LSB/FM while RTTY toggles LSB/USB.

IF Shift and Variable Bandwidth Controls provide intermediate bandwidths with adjustable center frequency for no-compromise interference rejection.

Front Panel RX Antenna Selector allows quick switching to your Beverage or loop receiving antenna.

Dual Mode Noise Blanker for automobile ignition noise or Woodpecker suppression.

All-Mode Squelch for silent monitoring between contacts.

Wide Variety of Cascaded Filter Selections, SSB/CW filter selections from 2.4 kHz to 250 Hz in both 2nd and 3rd IF sections.

Stereo Dual Receive, operator may select either mixed or stereo dual receive (one channel in each ear). Stereo headphones required.

BPF-1 Module (optional on std. model), don't be restricted to inband spotting only!

RF Speech Processor for extra punch in the big pile-ups.

Flywheel-Effect Main and Sub-VFO Tuning Dials, main dial includes finger hole for easy tuning.

Temperature-Compensated Crystal Oscillator factory installed in model FT-1000D, for extremely high stability in critical applications.

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"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Potpourri

The following items cover a wide range of topics, all of which provide valuable information for both the newcomer to amateur radio and the experienced operator.

1992 Amateur Radio Calendar

The 1992 calendar has photographs of interesting DX and contest subjects. As usual, a lot of useful reference material is included in the new calendar. Each calendar costs \$13.80 to American amateurs, which includes shipping costs. Orders should be mailed to KB1T Radio Specialties, Box 1015, Amherst, NH 03031. This calendar is a useful addition to one's shack. I particularly like being able to glance at the calendar to quickly see which contests are coming up. I like to give the contesters a few points.

Electrical Shock

The general public seems to credit all amateur radio operators with being experts in all matters related to electricity. This assumption provides us with a unique opportunity to advise our acquaintances with suggestions which can minimize the possibility of their becoming victims of electric shock. You can do your friends a favor by advising them of the following precautions. It is certainly advisable to make your own family well aware of these safety precautions, and to observe them yourself.

Antenna Installations. Every antenna should be installed in such a way that it cannot possibly fall and contact power lines if it comes loose. Stay clear of power lines while installing an antenna and antenna supports. If the antenna can be rotated, make sure it stays clear of the power lines as it is rotated.

Appliances. Keep all electrical appliances away from water. Bathtubs and swimming pools are danger points to be avoided. A battery-powered radio is preferable when reception is desired in close proximity to water. Use one which is not also connected to house power.

Balloons. Do not release metallic balloons outside because they can cause



Jim Coote, G3UGT, of Tyne and Wear, England, is a long-time friend and a very active operator. Note that his rig is set up in a rolltop desk.



Patrick Wesche, HJ3QWP, of Bogota, Columbia, is a 25-year-old architect. He is a German citizen who moved to Bogota during 1985. His station includes a Yaesu FT-101ZD transceiver, and ICOM AT-500 antenna tuner, and a B&W AP-10 multiband vertical antenna. Patrick operates only on 40 meters, where he contacted 71 countries in his first 11 months on the air.

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Olavi Haglund, OH8BGM, of Oulunsalo, Finland, is married with two children. Olavi works code all the time and 15 meters is his favorite band. His station includes an ICOM IC-725 transceiver and a triband Yagi-Uda antenna. In addition to amateur radio, Olavi likes to fish and to travel. He will go to Portugal later this year. He held OH2BGM from 1962 to 1985.



Mario Bartuccio, IT9JPK, of Enna, Italy, is a 29-year-old florist. Mario has been an amateur since 1988 and has worked amateurs in 231 countries. His station includes an ICOM IC-765 and a Hy-Gain 12AVQ vertical antenna. Mario is married and is the father of two daughters.

power outages when they come in contact with power lines. As an example, they caused this trouble during the 1984 Olympics in Los Angeles.

Fallen Power Lines. Always assume that any fallen power line is alive and dangerous. Avoid contact with it, and make an effort to have everyone else avoid it. Make sure your local power company is immediately advised about a fallen power line. If you cannot reach the power company (such as during the aftermath of a disaster), give the information to your local police or fire department personnel. Do not become impatient and drive (or walk) over a fallen power line.

Playing. Have children stay away from power lines. They may endanger themselves by getting near power lines when they climb trees or utility poles to free entangled airplanes, balloons, kites, or other toys. Advise them to keep clear of power lines when playing with kites and balloons. As stated before, metallic balloons present a special hazard.

Sailboating. Do not allow the mast to contact power lines. This danger is most prevalent where boats are beached and launched.

Working. The following points should be observed when working with or near electrical devices and power lines.

1. Do not use an electrical device (such as an edger, hedge trimmer, or lawnmower) if your hands and/or feet are wet. Also, do not use such devices where you would be standing on damp ground or in water.

2. When working outdoors, look to see where the power lines are located, and stay clear of them. Aluminum ladders, pool skimmers, and tree-trimming equipment are typical items which can cause one to accidentally come in contact with power lines.

Electrically Conductive Plastics. The electrical insulation properties of plastic materials are often useful. However, there are many applications that would be simplified by being able to use conductive plastics. Lockheed research engineers are developing electrically conductive plastics



Yuri Dzyuba, VE2XLT, of Montreal, Canada, held UB5LT in the Ukraine during 1966 to 1970. He immigrated to Canada in 1989, sponsored by VE2SEI. His station includes Yaesu FT-757GX transceiver, Cushcraft R-5 vertical, and a Canadian Windom. Despite the Ameritron AL-80A linear amplifier included in this picture, Yuri makes many 3 watt (QRP) trans-Atlantic contacts.

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DRZI 1991



Jun Moreto is 4F3BAA (ex-DU3BAA) in Malolos, Bulacan, the Philippines. He is also KK6FR (ex-KC6GHS) in this country. Jun has been an amateur since July of 1987, and is the president of the Ham Society of the Philippines (DX3H). He is an active contester with several awards.

for use in aircraft and other aerospace hardware.

Plastics cost less than metals, and they are lighter than metals. Conductive plastics will eliminate the need for metal antennas and metal sensing devices on aircraft. They will also provide shielding to protect sensitive equipment from possible harmful radiation.

Electrically conductive plastics will have many uses, such as in vehicles and home electronic entertainment devices. Conductive plastic could be used instead of expensive silicon in the fabrication of electronic components such as printed circuit capacitors and inductors. This change would reduce the cost of computers (and other electronic devices), which presently require silicon circuitry.

Plastics are used to bind high-strength fibers (such as ceramic or graphite) to form "composites," such as were used to reduce the weight of the Voyager, enabling it to circle the globe without refueling. Airframes of future aircraft will be predominantly composites.

The U.S. Air Force is investigating the possibility of using conductive composites to serve as de-icers and antennas built into wing, fuselage, and empennage surfaces. Plastics can be added to paint that can be used to provide electrical pathways on otherwise non-conductive surfaces. "Smart skins" could incorporate sensors for use in surveillance and threat detection. Such applications would improve aerodynamic characteristics by eliminating protruding antennas and sensors. Elim-



Fifteen-year-old Noah Bonnett, KA3VYN, of Silver Spring, Maryland, has already worked more than 150 countries. Noah is close to achieving DXCC (100 countries) and WAS (50 states) awards. Noah's cousin (Marc, WA3QWA) helped him get a good start in amateur radio.

CIRCLE 39 ON READER SERVICE CARD

inating protruding metal antennas will also minimize "radar signatures" associated with metal antennas on today's aircraft.

Electrically conductive composites will minimize the buildup of static charges on aircraft exterior surfaces. In addition, precipitation static (P-static) interference to communication and navigation would be reduced by these conductive materials.

Attempts have been made to make plastic materials electrically conductive by loading (doping) them with metal (or carbon) particles. However, this approach has several disadvantages. The loaded plastic may become so heavy that it loses a significant portion of the weight savings it normally enjoys over metals, and the mechanical properties of loaded plastics may be degraded; also, this approach is expensive. Electrically conductive plastics will avoid these degrading characteristics.

The concept of electrically conductive plastics has been the subject of several studies since about 1975, when they were discovered. However, early types were hard to process, and several of them ignited when exposed to air. The new plastics being developed by Lockheed (under the direction of staff scientist Dr. Teh S. Kuan) are highly stable and they can easily be blended with common structural plastics. Lockheed engineers started researching the possibility of developing electrically conductive plastic materials during 1985. Major progress has been achieved in producing useful new materials for the future. These conductive plastics are made by oxidizing aniline in the presence of any one of several acids, resulting in the formation of larger molecules that are electrically conductive. The resultant plastics are called polyanilines. High-volume manufacturing techniques may make it possible to produce electrically conductive plastics at a cost of about one dollar per pound.

It would be nice to be able to fabricate a Yagi-Uda (beam) antenna made of composites. It would be lighter and less expensive than a present-day aluminum tubing antenna. Also, it would not be subject to the corrosion that ruins our aluminum antennas. Our amateur radio equipment would weigh much less with conductive composites used in lieu of metal. A low velocity of propagation would result in shorter elements.

Conversation Expanders

If you tend to run out of things to say after you have given your name and QTH, plus a signal report, you could use the information in an encyclopedia or dictionary to expand your conversations. Most states have their own animal, bird, flag, flower, motto, nickname, seal, stone, and tree. Simply keep a reference source handy at your operating position and make use of it. If you

want several subject lists send an SASE to my California address.

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The Ameritron AL-82 Linear Amplifier provides maximum legal output power on 160, 80, 40, 20, and 15 meters, plus 80% of rated output on 12 and 17 meters. It can be modified to cover 10 meters, if proof of proper license class is provided. This amplifier uses a pair of 3-500Z tubes, which are driven to full output due to a heavy-duty

1800 watt hypersil transformer.

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This amplifier employs filament current in-rush limiting to safeguard tube life. The unit is well shielded to minimize interference. The built-in cooling system keeps the tubes below the manufacturer's maximum allowable heat ratings, even when the amplifier output is a continuous 1500 watts. The price is \$1995, plus shipping costs. Requests for additional information (and/or orders) can be sent to Ameritron, 921 Louisville Road, Starkville, MS 39759 (telephone 601-323-9715).

Ten Meter School Net

The CQ All Schools Net meets Tuesdays and Thursdays on 28,303 kHz, starting at 1630 UTC. All school groups are invited to participate in this net. If you just have receiving capability, listen to the information being exchanged.

Ten-Meter Maritime Mobile Network

Ralph Myra, N1FJL, of Augusta, Maine runs the Ten-Meter Maritime Mobile Network. This net starts at 7 AM (Eastern time) on 28,380 kHz, plus or minus a few kHz to minimize interference. This net has attracted participation by amateurs in about 120 DXCC countries. If you want to become involved in this net, and if the 10

meter propagation conditions are suitable, you are invited to check into this net.

HF Transceiver Needed

Pastor Michael Crowell, N5UJA, would appreciate the donation of a high-frequency transceiver. He needs one to communicate with missionaries in Mexico and Brazil. If you want to help him, you can call him at 817-322-4606; also, you can write to him at the Christ Lutheran Church, 4510 FM 1954-Route 6, Wichita Falls, Texas 76301.

Printed Aids

My previous columns contain information that is useful to new and aspiring amateurs. Many of these items have been reprinted for distribution to students of licensing courses I instruct. For ease of use, these printed aids have been separated into six categories. These categories are introduction, code, theory, station, operating, and miscellaneous. Outdated items are continually replaced with newer material. Fifteen dollars brings a complete set of current printed aids, including shipping costs. A list of these printed aids will be sent to anyone who requests it and sends a business-size (#10), self-addressed, stamped envelope to my California address. Any single item is available at no charge to anyone who supplies a self-addressed, stamped envelope. When a single item is being requested, it is advisable to supply a large (at least 9 by 12 inch) envelope and to include a couple of extra stamps (loose in your envelope) in case extra postage is required. Some items are long. Licensing course instructors are welcome to revise and/or duplicate these items to suit their requirements.



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

A New DX Country For You (And Me)!

I could hardly believe my eyes. DXCC has added the Penguin Islands to the list of current countries. Good Grief! Next thing the Penguin Islands will apply for membership in the United Nations. Ah, well. Since anything goes, I hereby offer DXers a genuine new country! It is easy to reach—7 miles by boat or 5 minutes by helicopter from civilization! Why plod for hours through a dusty desert, get shot at by natives, or be taken for a spy? Forget all this nonsense. Do DX the easy way. You can luxuriate in a fabulous beach resort at night, take the helicopter to the "new country" for 8 or 10 hours of feverish DX activity during the day, then return in time for a gourmet dinner and a good night's sleep. Why hasn't some gung-ho DXer taken up this amazing opportunity?

Too good to be true? It is true, and here's the story.

Off the Wailea coast of the island of Maui, Hawaii lies the island of Kahoolawe. It is quite large (about 7 miles long). Like Midway Island, it is under the control of the US Navy, not the civilian government of Hawaii. It is uninhabited—no electricity or water. It has the same attributes for DXCC as does Midway Island.

Oh, yes... There is one catch. Kahoolawe is known as the "Bombing Island." For many decades the Navy has used the island for target practice, and plenty of unexploded ammunition litters the island. Thus, access to the island is forbidden except to authorized Navy personnel. However, there is a boat dock and a safe area on the island, plus a helicopter pad.

In order to "make a new country" out of this island, the DXer must bring his own power, food, and water (and mine detector! hi). He could camp out on the boat dock, or return at night to one of the many luxury hotels on the Wailea coast. But he must first get permission from the Navy to set foot on the island.

To get the ball rolling, the DXer must work fast, as Hawaii is negotiating with the Navy for return of the island to civilian control. It would then cease to be a "new" country. Problem is, who cleans up the island and removes all the defunct ammo? At this writing, the problem is unresolved. Meanwhile, I hope some avid DXer who

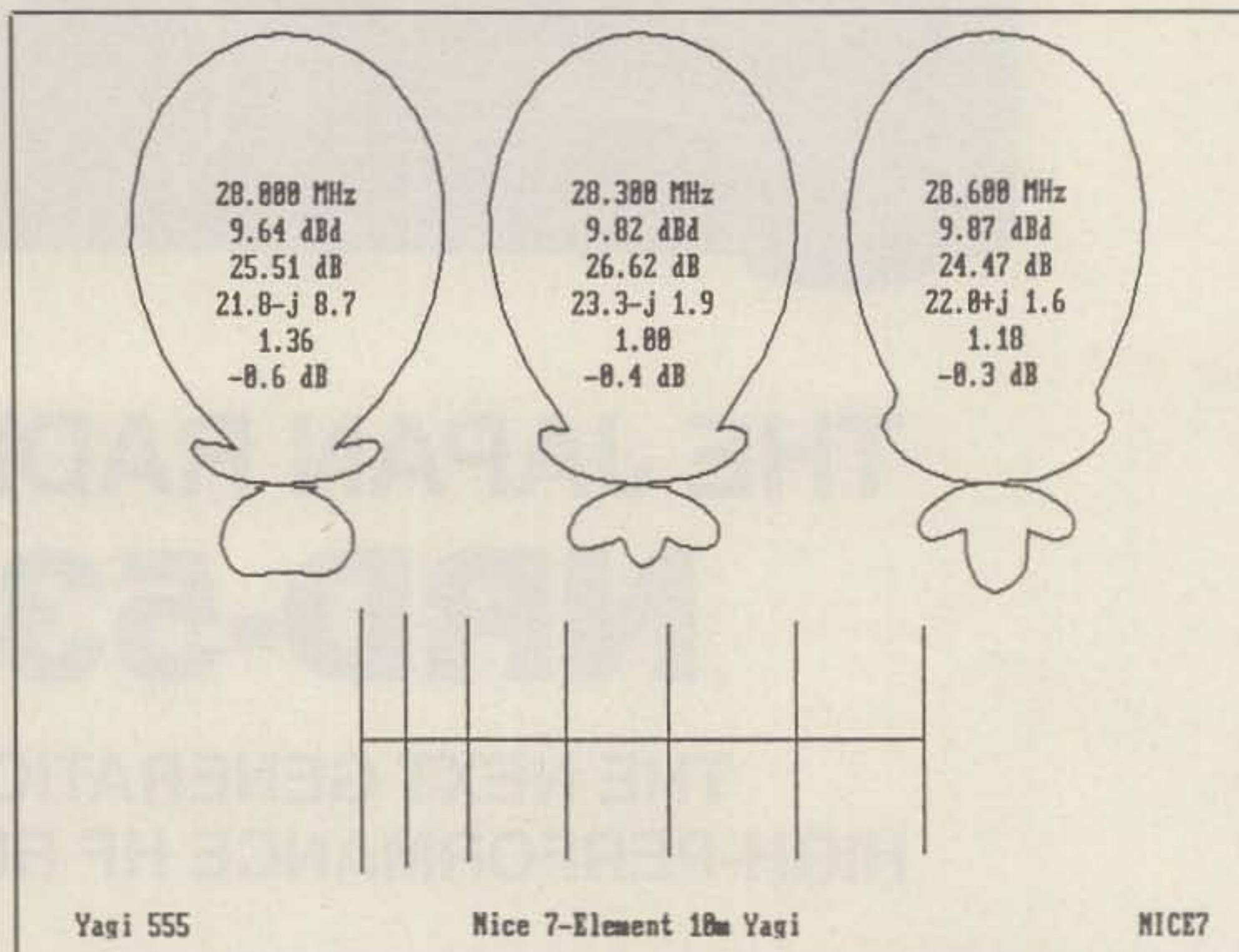


Fig. 1—Parameters of 7-element beam. Three frequencies are given with data for each. Line 1 is frequency, line 2 is gain over dipole, line 3 is front-to-back ratio, line 4 is input impedance, line 5 is SWR match to 50 ohm line, and line 6 is antenna gain compared to theoretically perfect antenna, showing loss due to element resistance. Outline of antenna is below plots.

has contacts in the Department of the Navy will find out who in the Hawaii Command is in charge of the island. Permission will have to be obtained from the Navy to land on the island. A lot of red tape will have to be cut. DXers are expert in cutting red tape. So there it is: an island within easy distance of civilization waiting to be activated as a new country! It's up to you! How about it, Martti, OH2BH?

(Whoever goes there, remember W6SAI told you about it. Make sure he is the first station you work!)

Faster Than the Speed of Light—Or Radio!

The August 1991 issue of *Microwaves & RF Magazine* has an interesting article concerning the problem of time delay in radio waves used for deep space and satellite communication systems. It may take

hours to communicate with a deep space probe via VHF or UHF radio. (Radio waves propagate at the speed of light—about 186,000 miles per second, not very fast considering the vast size of the universe.) The prevailing belief is that no energy can travel faster than light. However, there is

Yagi Dimensions

Driven Element	Position	Length
Reflector	0.00	105.75
Driven Element	37.50	100.75
Director #1	90.75	97.25
Director #2	174.00	94.50
Director #3	259.75	93.50
Director #4	369.00	94.75
Director #5	478.00	91.25

Boom Length = 40 ft. 0 in. = 480 in.
All elements = 12 ft. x 1 in. diameter
Plus .875 in. diameter tips

Table 1—Yagi dimensions (see fig. 1).

48 Campbell Lane, Menlo Park, CA 94025

Nice 7-Element 10m Yagi

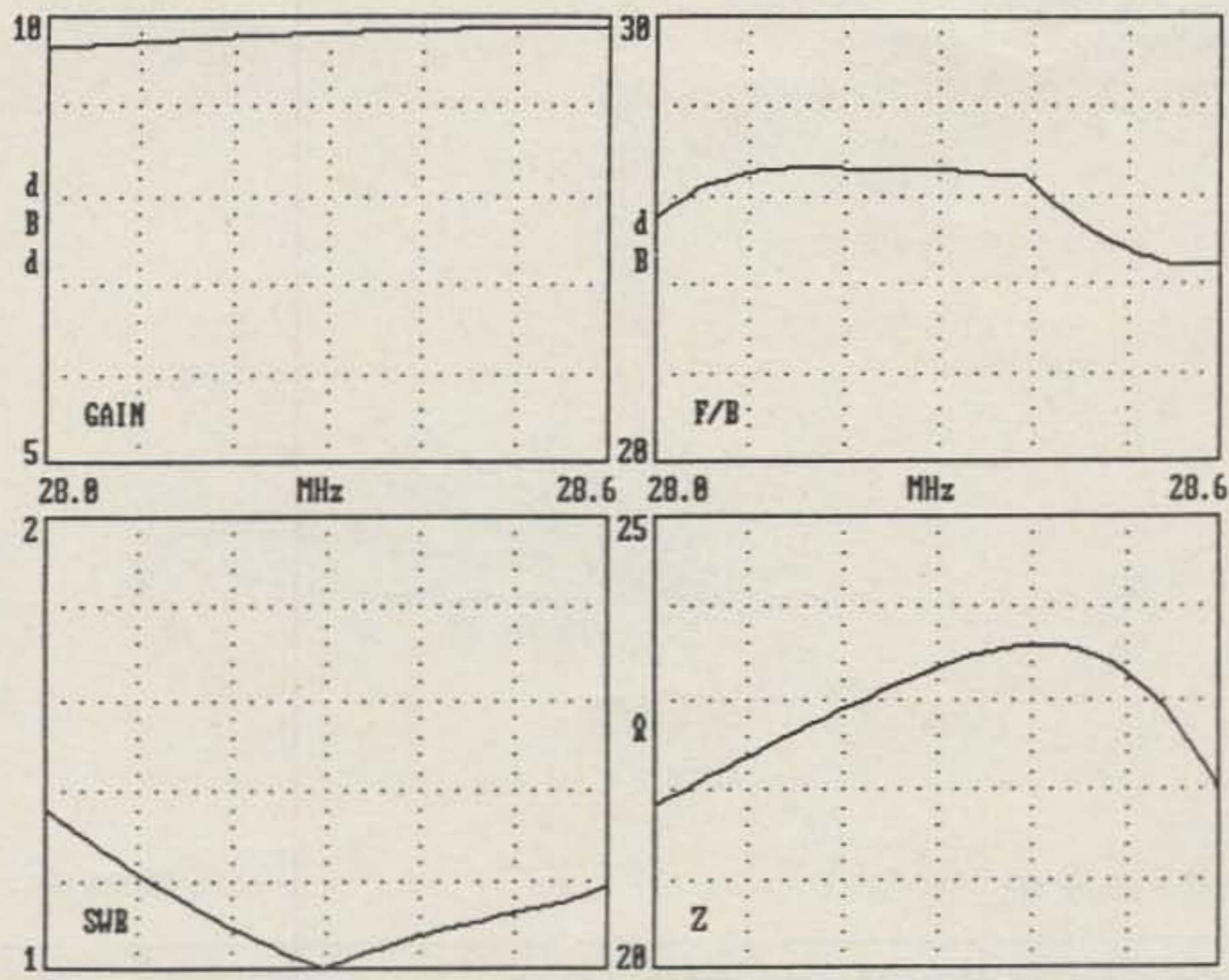


Fig. 2—Plots of antenna performance. Upper left, gain over operating range. Upper right, front-to-back over operating range. Lower left, SWR response. Lower right, input impedance. Curves derived from Yagi Optimizer program of K6STI.

experimental and theoretical support showing that non-transverse (non-TEM-mode) radio waves can be used to send UHF digital messages faster than light.

Experiments were conducted using a pulse-modulated 8.245 GHz microwave signal. The measured speed of the signal was greater than the speed of light, C. An

increase in speed of up to 40 percent was noted.

The article is complete with mind-numbing formulas, plus graphs and photos of the results. Since this is not the April Fools issue of the magazine, there must be something to this experiment! How will it affect UHF amateur radio? Time will tell.

Nice 7-Element 10m Yagi

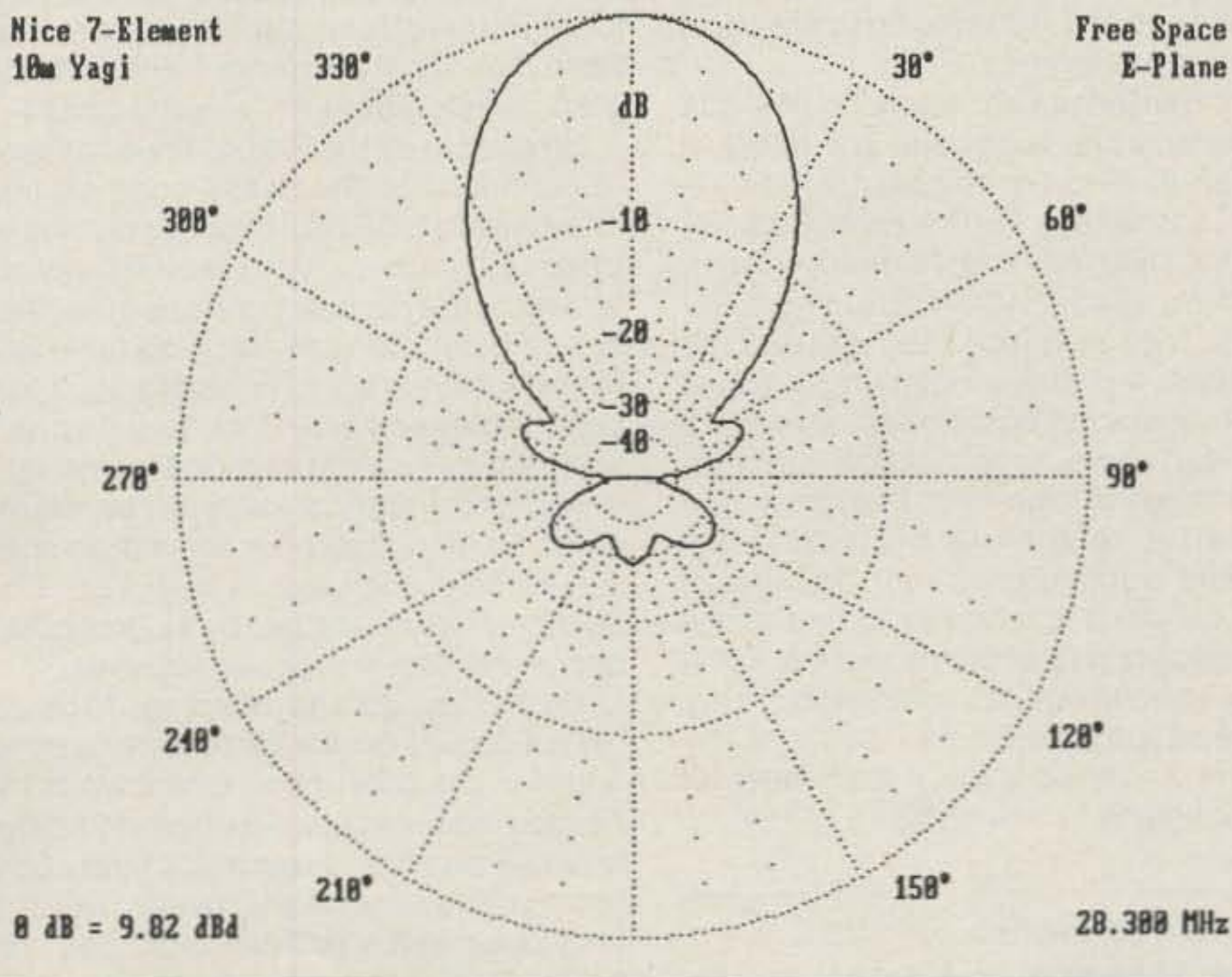


Fig. 3—Polar plot of 7-element Yagi. Beam is about 50 degrees wide at “-3 dB” points. Observe good front-to-back ratio.

A Big, Big Gun For 10 Meter DX

The sunspot cycle is on the way down, but it will remain high enough for good 10 meter DX for a year or two. Competition on 10 is getting mighty tough, and it takes a super-beam to break through the pile-ups. Here is a design for a nice 7-element Yagi on a 40 foot boom, optimized over the 28.0 to 28.6 MHz range by the Yagi Optimizer Program (YO 4.11) of K6STI. All data shown is for a height above ground of 70 feet. Fig. 1 and Table I give a quick summary of the array. Nearly 10 dBd gain is achieved over the operating range, with an average front-to-back ratio of about 25 dB. Input impedance is about 23 ohms at the design frequency (28.3 MHz).

Fig. 2 shows the parameters. Gain is close to 10 dBd, with a smooth front-to-back ratio curve. The SWR curve is very docile, running below 1.4-to-1 across the range. This permits quick QSY without time-consuming amplifier retuning.

Fig. 3 shows the polar plot. The -3 dB points of the pattern are at plus and minus 25 degrees. The split back lobes are comfortably low. Looking back at fig. 2, you can see that this pattern is nearly constant across the operating range.

The elevation pattern is shown in fig. 4. Note the main lobe of the array is at an angle of about 7 degrees. Nice! Over normal ground the nulls of the pattern will tend to fill in and it won't be quite so sharp as the computer indicates. In any event, the first lobe is right where you want it—just above the horizon!

I won't go into construction details, as they are covered in the *Beam Antenna Handbook*.² Suffice it to say that the design is for 1 inch diameter elements with 0.875 inch diameter tip sections. The boom is made of two 20 foot sections of aluminum irrigation pipe with two top guys to keep everything steady and ship-shape. Elements are mounted above the boom.

Telephone Interference Revisited

No doubt about it. Telephone interference is the number one headache of amateur radio. A quick review of the situation today is helpful.

Bob Smith, Jr., ND1H, points out some of the problems. He finds that line filters work okay on basic telephones, the degree of suppression depending upon the strength of the RF field and the type of filter. But, he says that when solid-state circuitry is added to the phone, line filtering may not solve the problem. Rectification of the signal occurs in these instruments. The *ARRL Handbook* as well as the *Interference Handbook*³ provide information about cleaning up internal telephone circuitry.

Bob points out that telephone RFI is caused by poor design of the instrument, not by transmitted RF signals, and sug-

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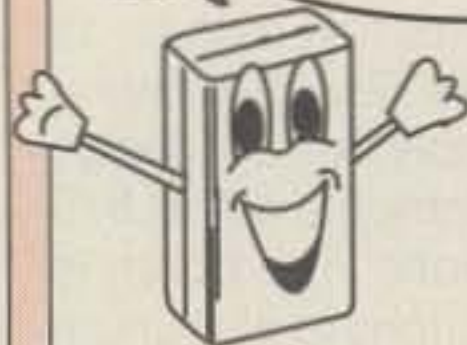
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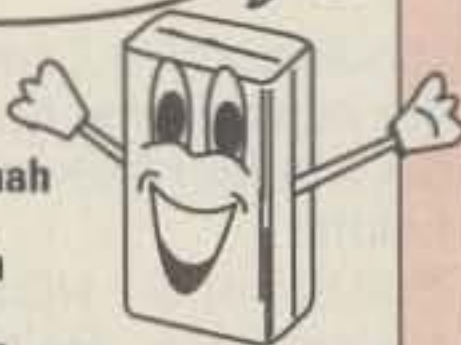
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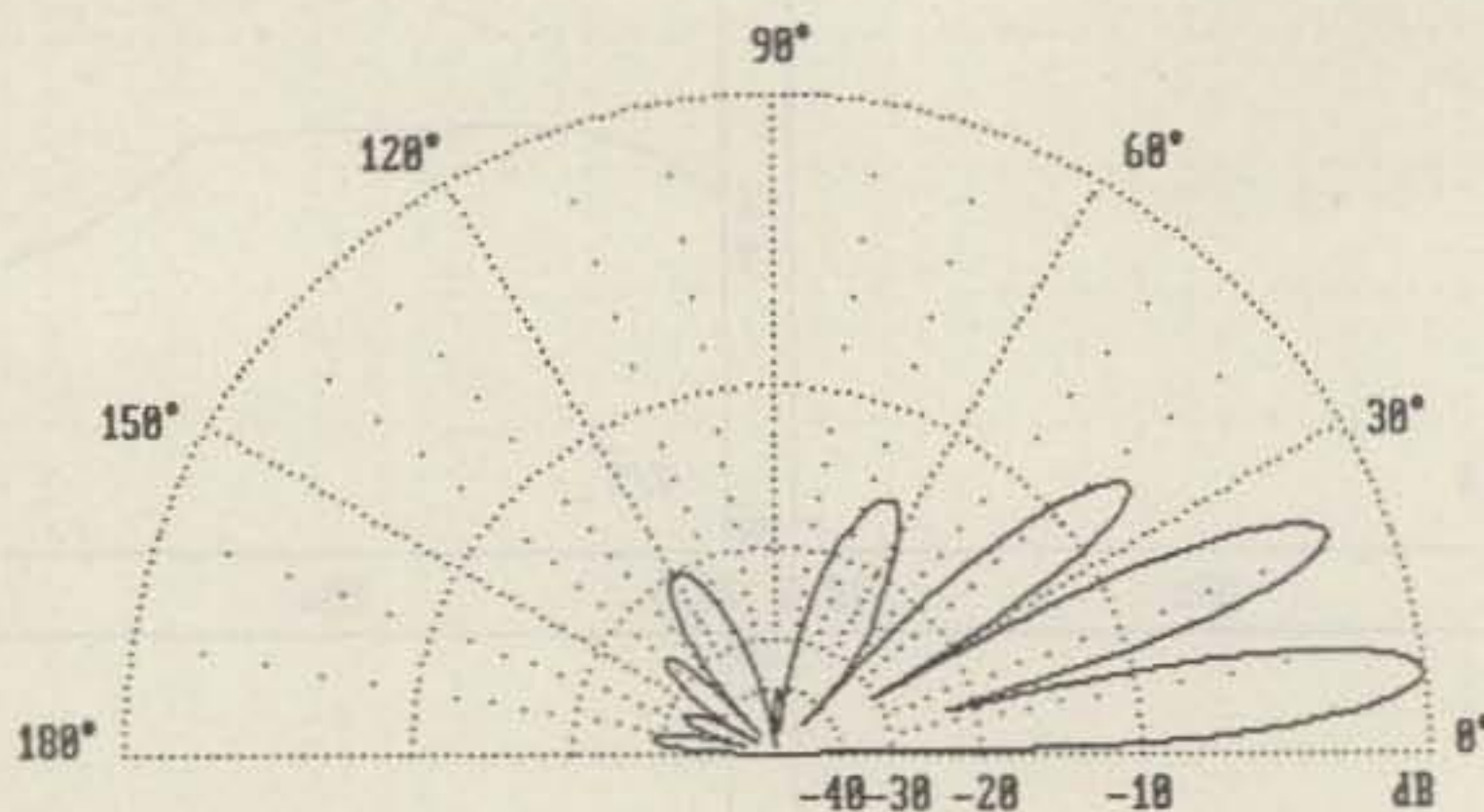
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0 dB = 15.66 dBd

28.380 MHz

Fig. 4- Elevation plot. Major lobe is at 8 degrees above horizon when beam is 70 feet high.

gests that FCC action is required. Installation of filter circuitry in all phone instruments should be mandatory. This will impact only the cheapest telephone equipment companies. The second action is to make instrument manufacturers provide effective filters at no cost upon request, since their units are the cause of the problem. Bob points out that currently manufacturers profit twice—once by selling cheaper, substandard instruments, and then by selling the cure at a considerable profit.

Finally, Bob suggests that if the FCC fails to act, amateurs and others concerned should contact consumer protection groups and Congress.

My experience with many homemade and commercial telephone line filters is that dual-winding, ferrite coils are satisfactory in most cases for the lower frequency bands (160, 80, and 40 meters) when low power (under 150 watts) is run. At higher frequencies the distributed capacitance of the windings takes over and attenuation drops rapidly as frequency rises. A low-pass, pi-section filter provides improved high-frequency rejection and better telephone protection for amateurs working on the 20, 15, and 10 meter bands. It is not easy to find a low-pass telephone filter on the market, but it is easy to build one, as I discussed in my April and July columns. If any of my readers know of such a commercial device, please let me know.

Shortwave Radio At the Hauptmann Trial

The world was shocked in the early 1930s

by the kidnapping of the Lindbergh baby. The tiny son of Charles and Anne Morrow Lindbergh was found murdered in a field not far from their home. Bruno Hauptmann was soon arrested for the crime and his trial became a media sensation. Of the reporters covering the trial, the best-known were those from the *New York Daily News* and the *Associated Press*, bitter rivals in the field of rapid news reporting. After a long trial, those listening to radio reports heard a news flash that the jury had found Hauptmann guilty with a recommendation for mercy, which meant life imprisonment. A few minutes later came a second news flash to the effect that Hauptmann had been found guilty of murder in the first degree, which meant the electric chair!

What caused the mixup? It was a result of confusion in shortwave code signals. The *Associated Press* reporter carried into the court room a tiny one-tube transmitter and battery supply concealed in a briefcase (fig. 5). Sitting at the press table with his concealed radio, he was to send four dots, repeated twice if the jury's verdict was "Guilty—recommended for mercy."

A short distance away, in an empty room, an AP telegrapher sat with an open line to the press room in New York City. Suddenly he was startled by a signal of four dots in his tiny shortwave receiver.

But the four dots he heard, sad to relate, did not come from the AP reporter's transmitter in the courtroom. Unknown to the *Associated Press* news-gatherers, the *Daily News* also had a reporter in the courtroom with a second shortwave transmitter hidden in a small overnight bag! His code signal that the jury had entered the courtroom was four dots. The *Daily News* reporter sent his signal and the AP

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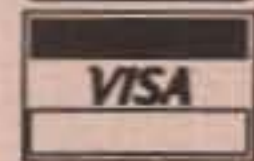
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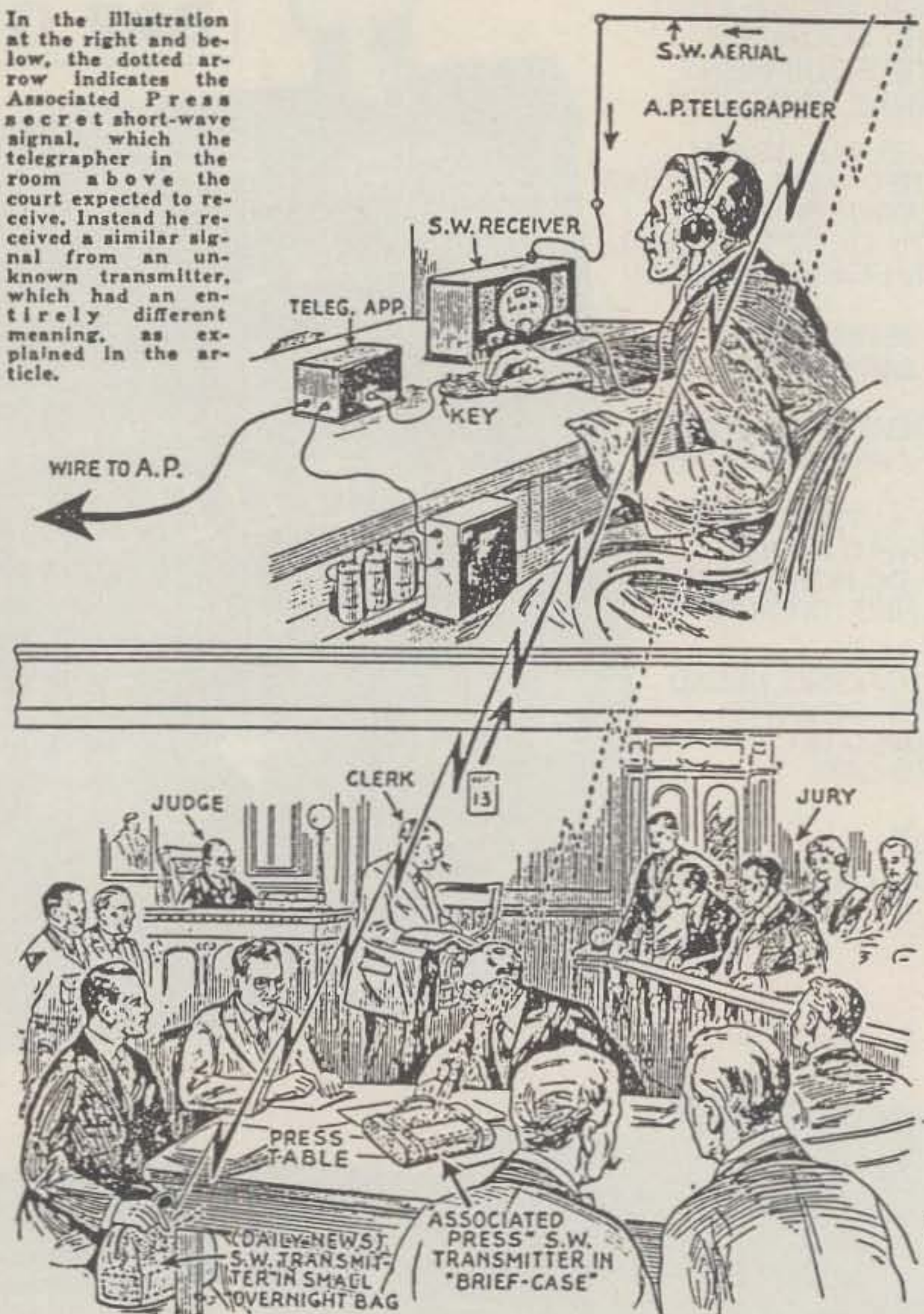
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CIRCLE 64 ON READER SERVICE CARD

SHORT WAVE CRAFT for JUNE, 1935

In the illustration at the right and below, the dotted arrow indicates the Associated Press secret short-wave signal, which the telegrapher in the room above the court expected to receive. Instead he received a similar signal from an unknown transmitter, which had an entirely different meaning, as explained in the article.



Unknown to the general public and in fact to any of the court officials in the famous Hauptmann trial, was the fact that two tiny short-wave transmitters were carried into the courtroom to signal the jury's verdict to the outside newspaper world. By a peculiar mixup in the signals the wrong verdict was signaled to the press and radio bureaus as explained in the accompanying article, but this was rectified a few moments later as radio listeners will recall.

Fig. 5- Portable transmitters flash jury verdict to waiting media during trial of Richard Hauptmann in 1935.

telegrapher heard it and flashed the word to a waiting world that life imprisonment was Hauptmann's fate! The mixup in signals sent the wrong information to the press, and the resulting confusion was not cleared up for several hours.

This clever idea backfired, much to the embarrassment of the news media, but it played an important role in the evolution of the newsman's ability to flash fast-breaking news to a waiting world.

Today's descendants of this primitive radio system are Cable Network News (CNN) and the other various news-gathering networks. Satellites and relay dishes take the place of the one-tube transmitter used over 55 years ago!

An interesting sidelight to this affair is that the police chief in New Jersey who figured so prominently in the capture of the kidnapper was Norman Schwarzkopf, the father of General H. Norman Schwarzkopf ("Stormin' Norman") of Desert Storm!

The Dead Band Quiz

Well! I thought I had really caught my alert readers off-guard with my clever September Quiz featuring a quote from *The Hunt For Red October*, by Tom Clancy. I was wrong. I salute the following sleuths who guessed the quote correctly and who knew all about Jack Ryan's aversion to flying:

KB7SS, WY0Z, KJ6LD, AA4WX, Bernie Gratz, WM1V, N2KIX, WG5O, WB6IYM, K9AY, K0MFI, NZ5T, N6TPT, N7KA, KA0ZIA, WB3HOT, N4VQG, WB6SYN, N9ALK, AA1M, NZ3I, KA4RRU, KC9C, WA1DEY, KK6CY, KE0CR, KD5IA, WD4CNZ, AA5IE, N4VPN, W4UNP, NR3Z, KD5YG, AD0V, KA4IVP, K1SC, KB2XR, NC8I, W9XD, AG6D, WB5TUF, KG5ME, KC4NHB, K4JBY, KC4GR, N6DXX, N4XMX, WA2KDB, KB2GCG, N0AON, K3NCO, AA8CL, N7RSP, KD5RQ, N5PZS, WA5WHN, W3WPY, KE0RP, WA0KHN, KB0ABC, K1XA, KS4Q, AA8BB, K2UFT, K6QJ, Steven Hartman (congrats on your ticket!), KC4YXD, Delaney Packard, and N3IQN.

The following nostalgia buffs recognized the musical sign-off of "The Old Maestro," Ben Bernie (and all the Lads), a popular orchestra leader of the late 1930s and early '40s: WA4FST, W3WPY, AA4WX, and N4VPN. Congratulations to all, and special thanks to W6PRH, W1JR, WA5JCI, and KK6CY for their personal notes.

Finally, a late note from K3AQH concerning masking tape that has turned to stone on an old panel. Bob says to apply (lots) of Carter's Rubber Cement to the tape. Wait five or ten minutes and then rub it off. A second or third attempt may have to be done in really tough cases.

A New Dead Band Quiz

Ha! This will stump all of you, I'm sure. Who was Frank Dailey? What was the Meadowbrook? Where was it located? What were the Aragon, the Trianon, the Palomar, and the Blue Room? What did all of these have in common and what part did they play in the early days of radio broadcasting? Finally, what were the famous words that "Uncle Don" was supposed to have uttered into an "open" microphone?

These questions should keep you occupied until the bands open up! 73 to all and Lots of Love from your New York Correspondent . . .

(Note: The drawing and information on the Hauptmann trial were taken from the June 1935 issue of *Shortwave Magazine*, a Gernsback publication.—ed.)

Footnotes

1. T. Koryu Ishii and George C. Giakos, Dept. of Electrical and Computer Engineering, Marquette University, Milwaukee, WI 53233. Reported in the August 1991 issue of *Microwaves & RF*.

2. Orr, *Beam Antenna Handbook*, Radio Publications, Inc., available from CQ Bookstore.

3. Nelson, *Interference Handbook*, Radio Publications, Inc., available from CQ Bookstore.

73, Bill, W6SAI

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CIRCLE 63 ON READER SERVICE CARD

ALL ABOUT THE WORLD ABOVE HF

Play It Safe

All of us have a soapbox item that we feel we have to write about. Mine is safety. This month I want to get on my soapbox for a short time. Please bear with me for a part of the column this month while I editorialize safety.

Several years ago I wrote for the now defunct *CB Magazine*. One of my articles was entitled "Play It Safe . . . Don't Let CB be the Death of You." I think that I should subtitle this column "Play It Safe . . . Don't Let Ham Radio be the Death of You." Since you, the VHF and above operator, are the most likely of the amateur population to experiment with your equipment, it is only appropriate that you know how to be safe. Therefore, what I have to write about will be addressed to you. However, you should share this part of the column with all of your amateur friends (after all, they may decide to read the whole column and ask you what is so exciting about VHF and above!).

As you can guess, the principal theme of this column is safety. I want us to look at the whole amateur radio station, from the outside to the inside, to see where we can be safe or safer than we are presently. When I was a teenager, I was the Safety Officer of the South Bay Amateur Radio Society in Chula Vista, California. One task that I assigned myself to do was to go to all of the club members' shacks and perform a safety inspection. I made a safety checklist from the chapters pertaining to safety in the *ARRL Handbook*. What I will write about is from that experience of being Safety Officer, from experiences of my friends, and from personal experience. Perhaps you can profit from our collective experience.

Some of us like to pride ourselves on having a shack look like Editor Alan Dorhoffer, K2EEK's desk. While Alan's desk does not pose any safety threat (at least as far as I am aware, OSHA, the Occupation, Safety and Health Administration, has not condemned it), your messy shack does pose a threat. There is a Chinese proverb concerning a disaster looking for a place to happen. Your messy shack has found that place for the disaster to happen.

Your Antenna Installation

Let's look at the shack from the top down,

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by starting at the antenna. Before beginning any work, you should plan every step. You should draw a diagram and a plot plan showing the location and height of the antenna support, the length of guy wires, and the location and relative height of any power lines. The foremost thing to remember about antenna installation is the power line. According to OSHA, the minimum distance between an overhead power line and your antenna is 10 feet. Your local ordinances may require a larger separation. Check with your electrical utility company for the regulations in your area. You should look at wherever the power lines run and plan as if your antenna were to come down. If your antenna is higher than the power lines, ask yourself if it will fall into them on its way down. If you are planning to install your antenna on top of a dwelling that has a service drop from the utility pole, ask yourself if your antenna will fall on or anywhere near that service drop.

Next you should determine the kind of support you will use for your antenna. The light weight of many VHF antennas allows for the relative easy use of push-up or telescoping masts. Many times these masts are installed on the roof of a dwelling.

First, if you are going to install that mast on the roof, I would recommend that you not use a mast longer than 30 feet. Although masts come in telescoping sections that reach a height of nearly 50 feet, the extra 20 feet makes the installation potentially very unstable for the amateur installer. The 27 or so feet of the mast, coupled with the usual 15 feet of the peak of the roof, places your antenna up around 40 feet. That is plenty high enough for most casual weak-signal work. In fact, Mark Ammann, KM0A, has worked almost 300 grid squares on 2 meters with an antenna installation of a height of less than 30 feet and 150 watts! Also, use a new or undamaged mast. If it is damaged in any way, discard it.

Next always have a buddy with you. Any antenna installation goes easier and is safer with someone helping you. Also, you and your buddy should wear hard hats. Something you aren't expecting to be above your head may find your head as a target.

In order to extend the mast, it is necessary to climb up a ladder to reach the top of the mast and pull up. Always use an electrically safe ladder for any antenna work.

One made from wood or a nonconducting material will be satisfactory. Your buddy should hold that ladder steady all of the time you are on—even when you are on the first step of the ladder.

If you are going to install the mast on the roof, make sure the roof is safe and dry. If it needs repair, stay off until it is repaired by a skilled person. If it is wet, stay off and fill out QSL cards. When you go up on the roof, take a handheld with you. It may be a bit embarrassing to ask someone on the repeater to come over and pick up and reset the ladder for you. However, it is far safer than your jumping off the roof and resetting the ladder yourself.

Remember, when you are on the roof, you can fall off. Know where cables, guy wires, and tools are with relationship to your body. Wear shoes that have the necessary traction for walking on the incline of the roof. If the incline is too steep for you, stay off.

When installing the mast on the roof, make sure that the bottom of the mast has no way to move. Use a tripod that is securely bolted to the roof and supported from underneath the roof with reinforcement to secure the mast to the roof. Before you put the rotator and the antenna on the mast, calculate the amount of guy wire you need to reach the top section of the fully extended mast. Do this beforehand as a part of your project diagram.)

Next carefully extend the mast, without the rotator or antenna, and attach the guy wires to the guy points securely but with enough slack so that the mast is not binding when it is fully extended. Now you can install the rotator first, then the antenna. Do not attempt to install the rotator and antenna simultaneously.

Never install an antenna that is too large for the capacity of the mast. If you have some doubt, go to a place that sells television antennas and look at the largest log periodic they sell. If your antenna is bigger than that, use a tower or some other support. That long boom antenna may seem relatively light when you lift it. However, it presents a tremendous torque when whipped back and forth by 60 MPH winds. There is enough torque to damage the rotator and cause the antenna to free-wheel on the mast or even to twist the mast. If you want to install a long boom antenna on the roof, use a properly installed and guyed roof-mounted tower and

a mast with a minimum outside diameter of 2 inches. Always use a rotator that can support the wind load of the antenna. Always use guy wires that can handle the wind load of the antenna, rotator, and mast. Make no compromises on anything ever.

Once the antenna is in the air, make your mast turning adjustments for calibrating the rotator control box. I have found that a large pipe wrench snugly affixed to the base of the mast makes this job very easy. Then tighten the guy wires and the bolts on the tripod to secure the mast.

Finally, you have now created a lightning rod with your antenna/mast installation. Therefore, attach one end of a number eight size wire to the base of the mast and connect the other end to an earth ground via the shortest path possible. An earth ground is an 8 foot long copper rod pounded into the ground its entire length. I know that after 6 feet the hammer and arms are very tired. However, you must resist the temptation to saw off that remaining length above ground. Use no substitutes for a proper earth ground.

If you are planning to put up a tower, first check with the local authorities about engineering requirements, zoning regulations, and restrictions concerning tower installation. Always use a tower and rotator strong enough to withstand the wind load of the antennas you are installing. If your tower is to be guyed, make sure the guy wires are the proper strength and will not travel into power lines should the guy wires snap. Carefully follow the manufacturer's instructions when installing the tower. Also, consult the *ARRL Antenna Handbook* as a source of background information while you are installing your tower/antennas. The first chapter is on safety. Before proceeding with any work, you might want to read that chapter.

Throughout this and any antenna installation give yourself plenty of time to complete the installation. Take your time putting the antenna up, and keep your mind on your work. It is not a good idea to be putting up any antenna hours before you absolutely have to use it. I know that Field Day or a big contest encourages swift emergency-type installation of entire stations. However, I think that it would be prudent to go through a dry run exercise prior to quickly installing any antenna setup. This way you can go slowly and work out the bugs associated with that particular installation.

If you are planning to work during a time of the year when it is hot, have plenty of thirst quenchers, juice, and bananas available. Take frequent rest breaks and replace your lost liquids and potassium with the above drink and food items. Sodas and beer are not good sources of the nutrients your body needs under these circumstances.

When you are on the tower, wear a safe-

ty belt designed for your weight. Check it every time before you use it for cuts or nicks in the leather. If it is cut or nicked, discard it and get a new one. Have all members of your team wear hard hats. You may forget about that antenna or gin pole that is just above you as you are looking down while climbing up. Also, one never knows when a wrench or an antenna may come down. Resist the temptation to follow the item down. If it falls, even if it is your new \$300 antenna, let it go. It can be replaced. Can you?

Ground your tower to at least three ground rods installed in a triangle around the base of the tower. These ground rods need to be connected together with each other and to each leg of the tower. If your tower is a crank-up model, be sure that someone you know who can be contacted in an emergency understands how to lower the tower.

One final thing about antennas: Do not work around or near any antenna that has power applied to it. According to ANSI, the American National Standards Institute, your body has an increased susceptibility to RF damage in the 30 MHz to 300 MHz range. Remember, the 6, 2, and 1.25 meter amateur bands fall within this frequency range. Also, keep in mind that your microwave oven uses microwaves to cook meat. Like it or not, your body is a piece of meat. A friend of mine once worked on a fire control radar antenna when it was live. He told me later that he felt parts of his body get warm from the RF radiation. The jury is still out on whether or not RF radiation can cause cancer or cataracts. However, it is better to be safe than sorry.

Your Shack

The electricity to your shack should be on separate circuit breakers. The location of these circuit breakers should be shown to responsible members of your family. The circuit breakers should be the kind that can be "locked out." That means that they should be designed so that a lock can be attached to them to prevent them from being thrown "on" when they are off. The wiring to the shack should be the modern three-wire (hot, neutral, and ground) type of adequate current carrying capacity relative to the circuit breaker used. All receptacles should be the three-wire grounded type. Plenty of receptacles should be available so that no one receptacle is "loaded up" with a number of plugs. The wiring and circuit-breaker installation should be done by a qualified electrician. The ground for the shack should go to an 8 foot ground rod as close to the shack as physically possible.

Care should be taken to protect the shack from electromagnetic pulses (EMP) and lightning. Surge suppressors should be installed in the electrical lines to prevent surges from power company variations

and from nearby lightning strikes from causing damage to your equipment. Lightning arrestors should be installed in the lines of the coax. A way should be provided for grounding all the coax lines during a lightning storm. The ground wire connecting each piece of equipment should be flat, braided copper, at least a half inch wide in order to prevent the ground wire from becoming an antenna. Each connection to every piece of equipment should be mechanically sound, and should be checked periodically to maintain that mechanical sound connection.

Your Conduct

Unless you are qualified, never work on anything "live." By "qualified," I mean that you have attended a school, received proper training, and been certified to work on the equipment. Two reasons should cause you to think twice about working on "live" equipment. First, voltages as low as 40 volts can kill you and 3000 volts can overkill you. Therefore, in order to work on high-voltage equipment you must have special high-voltage certification. Second, leaking RF may possibly cause some physical problems. An RF burn is most painful and heals very slowly because you cook from the inside out. Ask that hamburger you cooked in the microwave oven how long it will take to recover from its "RF burn." Stay off the air during an electrical storm. No band opening is that important! Finally, remember the safety rule: "When in doubt, don't."

While these paragraphs by no means entirely cover the subject of safety, it is hoped that they will cause you to think about what you are doing. The hardest subject for me to write about is the Silent Key. And the last way I want to write about you is your becoming an accidental Silent Key. Please be safe!

The two books from the ARRL, mentioned above, are available from the CQ Bookstore (1-800-457-7373) and are invaluable references for your amateur radio library.

For those of you who are club newsletter editors, permission is granted (and, indeed, encouraged) to you for reprinting the above paragraphs pertaining to safety, provided that credit is given to CQ magazine and to me, your column editor.

While the above information on safety has been presented somewhat lightheartedly, please never be cavalier about your own safety. I have been in amateur radio for over 30 years and know of several hams who paid dearly for ignoring safety. The Elmer of my fiance (Carol King, K5CPZ) died shortly after giving her the Novice exam when he walked a pole into an overhead power line. A couple of years ago an Extra class "N5" in Texas fried himself when he came in contact with the high-voltage power supply of his linear (he died

three days after the accident). More recently, a good friend of mine in Oklahoma City almost lost a finger twice when he tried to rush the installation of a 6 meter beam.

I know that you can play it safe with the hobby, and I hope this part of the column will help you take time to think "safety."

Clubs and Newsletters

Some of you have asked about clubs and newsletters available to you. What follows is a list of what I have to date. If your club or newsletter is not listed, please let me know and I will mention it in a future column.

Six Meters

Six Meter International Radio Klub (SMIRK)—Membership: Work six members and collect their numbers. Send your log data to: Ray Clark, K5ZMS, 7158 Stone

Fence, San Antonio, TX 78227, along with dues of \$6.00. Ray publishes a newsletter infrequently due to job responsibilities.

The 50 MHz DX Bulletin—As mentioned last month, Shel Remington, N16E, has taken over publication of this newsletter from Harry Schools, KA3B. The newsletter address is: P.O. Box 1222, Keaau, HI 96749. The subscription rate is \$20.00 per year.

Two Meters

Sidewinders on Two (SWOT)—This is a fairly active national organization that maintains a listing of 2 meter nets throughout the country. Membership: Work two members and collect their numbers. Send your log data to: Howard Hallman, WD5DJT, 3230 Springfield, Lancaster, TX 75134, along with dues of \$10. He publishes a newsletter monthly.

Terrestrial VHF+ and 2-Meter EME News—These two newsletters are published by John M. Carter, K0IFL, P.O. Box 554, Union, MO 63084. Subscription

to "Terrestrial VHF+" is \$14.50 and subscription to "2-Meter EME News" is \$12.00. John also maintains a very valuable listing of who is active on 2 meter EME and a data base of who is on from what grid square throughout the VHF-UHF spectrum. Contact him concerning the prices of each listing.

222 MHz

220 Notes, the National 220 MHz Newsletter—This newsletter is published by A. B. "Art" Reis, K9XI, 308 Eastgate Ct., New Lenox, IL 60451. Subscription rate is \$6.50 per year.

432 MHz

432 and Above EME News—This newsletter is published by Allen Katz, K2UYH, Electronic Engineering Department, Trenton State College, Trenton, NJ 08650-4700. Subscription to his newsletter is free as long as you keep him supplied with sufficient SASEs (number 10 envelopes, please). He does accept contributions to pay for overseas subscribers' postage.

Microwave

North Texas Microwave Society—Although their name places them in Texas, their membership is international. They publish a monthly newsletter, "FEED-POINT," and membership dues are \$12.00 per year. Send your money to Wes Atchison, WA5TKU, Rt. 4, Box 565, Sanger, TX 76266.

General

The Mount Airy VHF Club serves the MD, DE, PA, DC, NJ, and NY areas. They call themselves "The Pack Rats" and publish a monthly newsletter entitled "The Cheese Bits." A subscription fee of \$7.00 should be sent to Bob Fischer, WB2YEH, 7258 Walnut Avenue, Pennsauken, NJ 08110.

The Eastern VHF/UHF Society—This club services the eastern seaboard and New England areas. Send an SASE to Thomas J. Kirby, W1EJ, 1 Meadow Knoll, Pelham, NH 03076 for membership information.

The Central States VHF Society—This regional organization covers the Midwest and Southwest. It holds an annual convention somewhere in the region on or around the last weekend in July. Proceedings are published by the ARRL and are available from the League for \$12.00 plus \$3.00 shipping. Next year's convention will be held in Kerrville, Texas and hosted by Bill Tynan, W3XO, QST editor of "The World Above 50 MHz." Membership and mailing information should be directed to Robert A. Taylor, WB5LBT, 10715 Waverland, Baton Rouge, LA 70815.

The West Coast VHFer—This newsletter serves the West Coast and the adjacent eastern states. It is edited by Bob Cerasuolo, WA6IJZ, P.O. Box 685, Holbrook, AZ






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86025. Subscription rate is \$12.00. An annual get-together is held in California around the second or third week of May. Write to Bob for the details.

This is all the information on clubs and newsletters I have for now. If I missed your club or newsletter, I apologize.

On The Air

For those of you who get this magazine in late November, you might want to immediately turn on your 6 meter radio. Several propagation experts have predicted that this cycle's second peak will occur this time of the year. It is entirely possible that significant F2 propagation is occurring while you are reading this column. It may be the last chance for this type of propagation for several years. So go into the shack (after you make it safe, hi) and get on 6 meters right away.

The Geminids meteor showers are scheduled to show up on December 12-13. These showers provide north to south paths (however, look in other directions as well). They are not around as many days as the Perseids, but they may prove to be nearly as intense. As of this writing (late September) I am still hearing talk of how good conditions were with the Perseids showers.

A Final Word

Please complete your survey and send it to me by December 20. This is traditionally the month for reflection. The end of the year and holiday time cause us to think about what is most important to us—our families. Remember that one of amateur radio's creeds is to be balanced. This is a hobby. This month we talked about making it safer. My wish for you is that next year you will have the best fun you can have with your hobby, while always remembering the most important people in your lives. Often these people stand by while we have that fun, go on that DXpedition, activate that grid square, or set that new world record. Take some time next year to make these people feel as important as they are to you.

One other thing. We all know how crowded the HF frequencies have become. We also know how friendly and helpful our fellow VHF and above operators are to us, especially those of us new to the spectrum. Perhaps a theme for us should be "You meet the nicest people above the crowd."

Please keep your notes and newsletters coming. I really appreciate them, even though I can't always acknowledge them individually. If you have late-breaking news, call me at 405-528-6625. Yes, there is an answering machine on the line, and I look forward to hearing from you very soon.

73, Joe, N6CL

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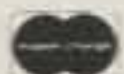
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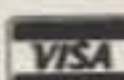
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The Next Frontier—High-Speed Modems

Relocation from Central Georgia to Tennessee provided us with an opportunity to move into a furnished apartment in metro Nashville while Jean Ann, WB4EDZ, and I searched for a home with a pleasant atmosphere. It didn't take long for us to find the exact environment for my writing, for my packet radio beta-test lab, and for some super fishing.

As if the home had been designed for my needs, or to my specifications, we found exactly what we were looking for near Gallatin, Tennessee, about 25 miles north of Nashville. Nestled in a place called Cages Bend on a beautiful resort lake called Ole Hickory, we found our dream home. The kids are grown, married, and it's just the two of us now, so we are going to make the most of the season.

Now for the avid country and western fan, this is a paradise by any stretch of the imagination. Less than a mile in any direction there are the homes of several of the biggest names in country music. Classical music being one of my favorites, country music has just as big a place as do my other CDs in my listening library.

I was also welcomed to the neighborhood in an exciting fashion just in time for my birthday.

A Big Boom For Buck's Birthday

I was looking forward to Saturday, when I would get to sit around the computer room and work with my packet equipment and run some tests on the new antenna that we had just put into the air. It was a Diamond F-23A, and from what I had seen of it, it was making everything else I had tried lately look small by comparison. The Diamond F-23A is slightly over 15 feet in length and has almost 8 dB of gain, and it showed.

There were several antennas in the air, including the 40 meter doublet that is supported between two Canadian maples that are well over 75 feet in height.

It was Thursday afternoon at the office, and I was trying to get most of my work caught up so I could leave on time Friday evening for the weekend of fun that lay

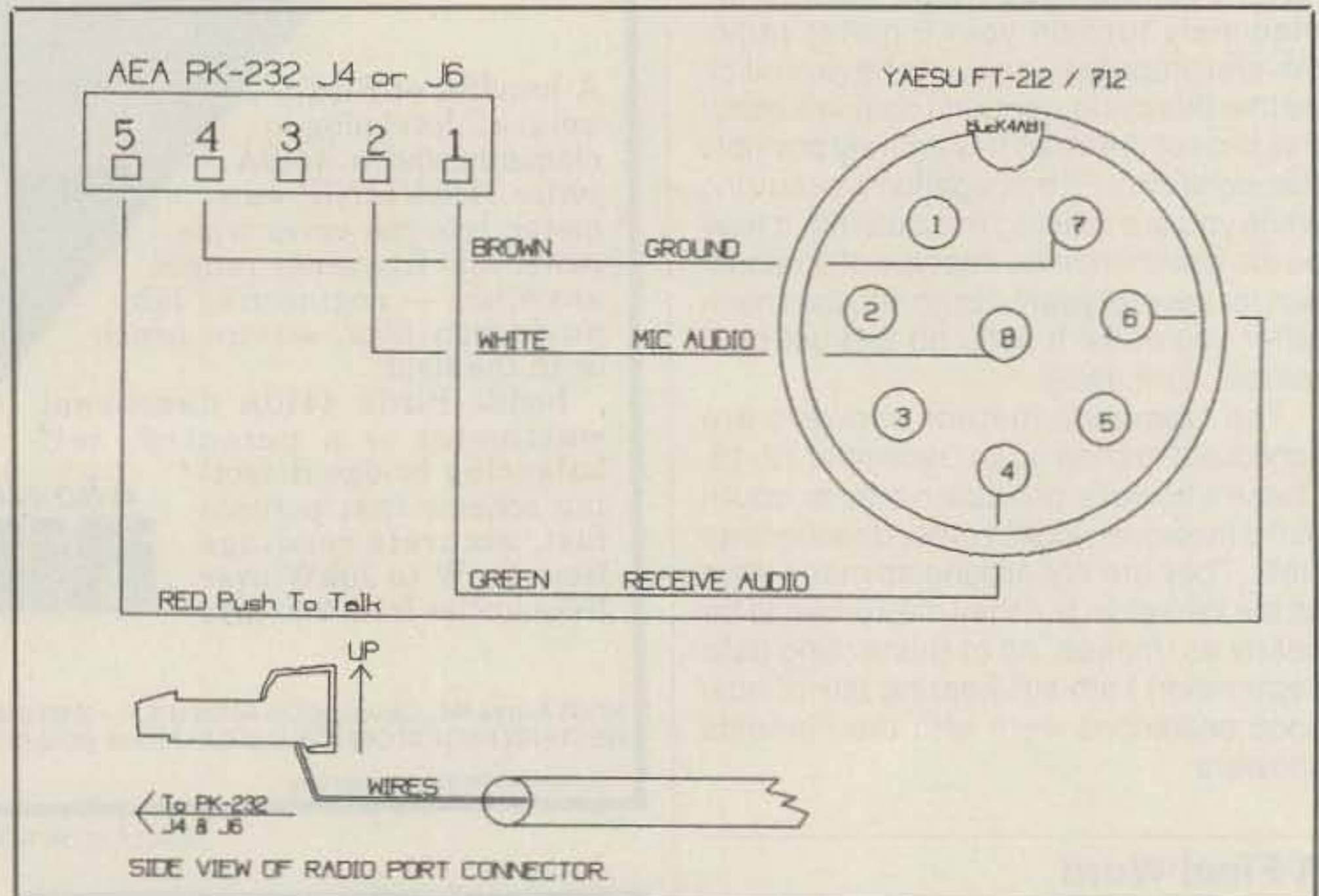


Fig. 1—Interfacing the Yaesu FT-212 to the AEA PK-232/MBX.

ahead. My office is atop of one of the tallest buildings in Nashville, Tennessee. I can view the city and surrounding countryside in all directions. Most of the time the view is pleasant and provides a contented working environment.

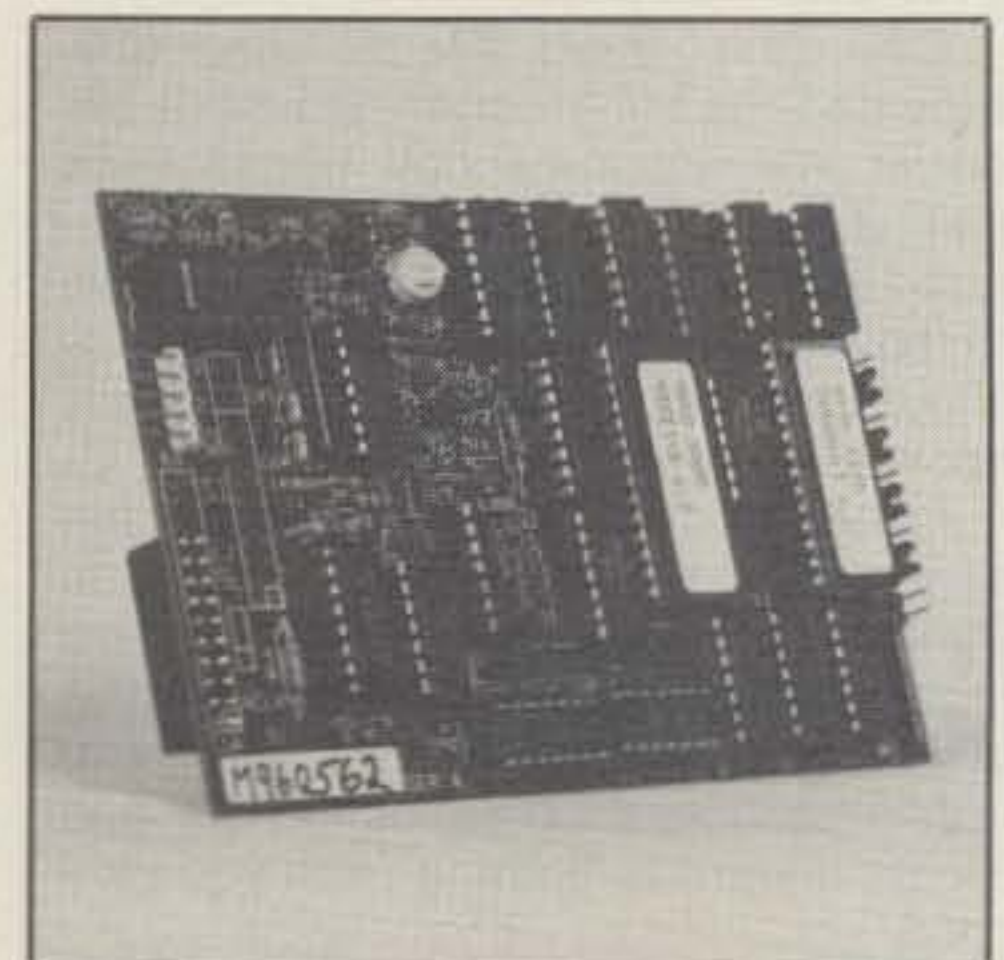
On this day the surroundings were not so clear. In fact, there was a storm moving in that was bringing a sudden cool snap to our area. It was predicted earlier that the temperature would drop almost 40 degrees within 24 hours. This prediction should have been a warning to me.

I looked up from the computer where I was compiling some data and glanced outside. The sky had darkened by heavy clouds, and we were in them. We are high enough that the building level where I'm located is surrounded by storm clouds.

My phone rang, and it was the XYL, Jean Ann, WB4EDZ. She told me she had just returned home from the city to find that all the ceiling fans were not working. She told me that other appliances were not working, including the garage door opener.

Oh, no! It couldn't be! But it was. I left the office and went to my home, about 25 miles north of Nashville. When I turned into the driveway, the first thing I (didn't

see) noticed is that my Diamond F-23A was missing. So was my WinTenna 9209. I drove around to the rear of my home and look closer. The F-23A was indeed *gone!* The 9209 was there, but the fiberglass portion of it was shredded and was barely able to support the weight of the new stainless-steel tip.



The PacComm NB-96 9600 baud modem.

P.O. Box 158673, Nashville, TN 37215



The Radio Shack Archer surge protector. This model is inexpensive and features an indicator light to tell you that it is working. It is catalog number 61-2791.

Not wanting to think the worst, I went inside. Jean Ann told me she had already checked the large-screen TV and it was okay. I felt a little relief, as that 55 inch screen was my birthday gift from her—a few days early. Then she bopped me with the big one: "There is a bad odor in your computer room." She muttered something about the air-conditioner not working, but the air-conditioning had just moved into last place for the moment.

My next stop was at the door of my computer room. I stopped alright! There was the smell of burnt phenolic, resistors, integrated-circuits, and whatever other scorched electronic component smell that a seasoned ham can associate with. I walked over to my chair, sat down, and began looking over the mess. There were signs of smoke or soot all over the room.

The ends of connectors were blown out of the sockets.

The one part of my station that I felt might be immune to this kind of mutilation was in a shambles. The batteries that are (were) part of my solar system were intact, but the cables that had connected them to the rest of the equipment were separated as if they had been ripped apart at the fuse holders by some mighty power—and as a matter of fact they had. The same applied to the power cables to the DC supplies that had equipment attached. Here is the real punch: The supplies were *not* turned on!

I began checking everything that was connected to any kind of power source. Everything in the room was destroyed, trashed, or would not show any signs of even a puff of smoke when attached to their respective power source. I opened the KAM. It was covered with soot, and the PC board was blackened. The same thing with my MFJ-1278 all-mode controllers. The Alinco DataRadio 1200s were zapped as well. Only a few weeks ago I had purchased the new Yaesu FT-757 at the Huntsville Hamfest. It too was trashed.

The phones were all dead. Thus, we were out of the wireline telephone service for over three days. Thanks to my Cellular-One phone we were still in contact with the rest of the world. The cellular phone was worth its weight in platinum.

The Yaesu FT-757 was sitting on top of one of my 386 PCs. When I attempted to lift it off the PC, it would not move. It was welded to the case of the PC. It was not until the insurance adjuster(s) arrived the following day (my birthday) that it was removed, and then it took two adjusters to pry them apart. I have to hand it to the State Farm folks. They make no bones about it when it comes to caring for their customers. Mitch Warren, the local agent, was there to listen to my sobs and to get us operating ASAP.

I shipped the smoking guns (the 386 PCs) to Sierra Technologies, where I had purchased them last year. I needed to have them repaired or I asked Randy to at least try to recover the data from the hard drives. My main concern was the recovery of the

data on the hard drives, as they contained all my columns and several future articles, not to mention all the time-consuming drawings that I had created in CADD 5.05.

Caveats, Cautions, and Concerns

The list of damages goes on, but I learned a lot from these losses. My wife is okay, and I am as well. There is a lot to consider when you begin to recover from such a mishap. Thanks to Robert Perkinson, KC4NEH, I now have several ground rods all around my home, and they are bonded together to provide a better ground than the poor ground that was provided by the home-builder and electrical contractor.

For what it's worth, I now have MFJ coax switches on all my antenna cables that come into the computer room. The purpose of these coax switches is so that I can place them into the "Ground" position before leaving the room. The MFJ coax switches provide a connection to an outside ground supplied by the user.

I have a separate disconnect on the utility power entering the room. In addition I have installed a similar disconnect between my Fowler Solar Electric panel array and the solar storage system.

An Ounce of Prevention

I discovered something that seemed at first to be coincidence until I began to realize there was a trend. I had used the GTE/Sylvania MOVs (metal oxide varistors) on several appliances throughout our home. The big-screen TV was attached to the utility power via one of these MOVs, and it was not damaged. The refrigerator was plugged into one of the GTE/Sylvania MOVs, and it was not damaged. The older 8088 PC in the room where most of the damage occurred had not been harmed; it was attached to the AC power via an MOV. In all, I had six MOVs in use, and in every case there was no damage to the device that was attached to it. Needless to say, every outlet in my home is now outfitted with an MOV.

Some notes of interest:

- Our VCR was connected to the same power outlet as the big-screen TV. The big-screen TV had an MOV in-line and it was unharmed. The VCR had *no* MOV in-line, and it was trashed!

- If you have more than one computer, or if your coverage of computer-related equipment is more than that listed in your home-owner's policy, it might be to your advantage to review the policy with your insurance agent.

- List all the computer equipment on a separate "rider." Include printers, monitors, and modems. Any item associated with data collection or processing is considered to be part of the computer system by many insurers.

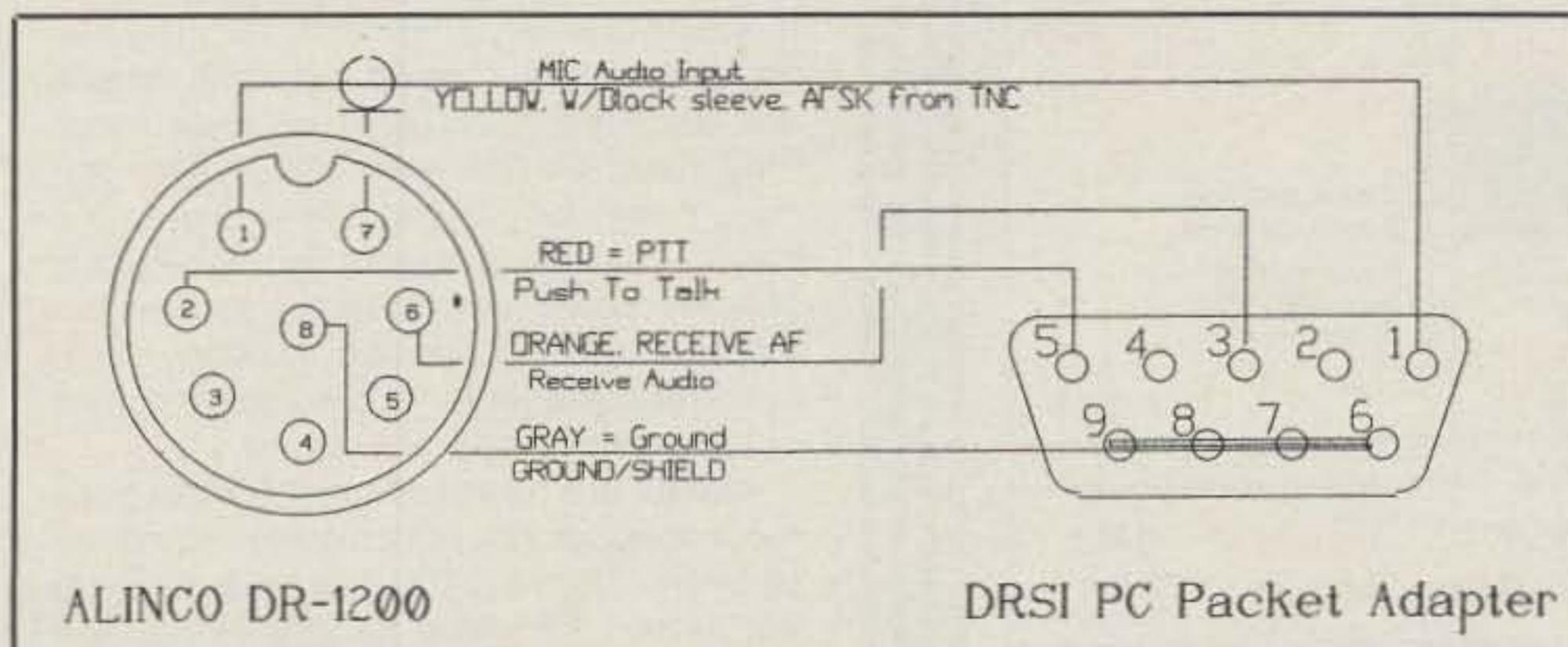


Fig. 2—For the Notebook: The Alinco DataRadio interfaced to the DRSI PCPA. The wire colors shown are furnished as part of the connecting harness supplied with the DR-1200 DataRadio.

• Amateur radios and transceivers are *not* part of the computer system, although the radio can be attached to the modem/TNC. Yes, a TNC can be considered a modem or part of the data-gathering/processing equipment by some insurance companies. For the benefit of those who wish to prepare for a blast such as I've experienced, I have listed several types and kinds of MOVs that I am now using or have used in the past. The reason I use the past tense "have used" is because after an MOV has been hit, or has done its job so-to-speak, it must be replaced. The price of the MOV is cheap when compared to the cost of the device or apparatus that it can save.

I do not recommend the so-called protective, surge suppressor, power strips. The reason I mention these is because one of the 386 machines was plugged into such a device. Not only was the 386 trashed, but the switch in this surge-suppressing outlet bar was welded on by the hit. Plugged into the same AC outlet (duplex) was the old 8088 PC with an MOV attached. It is alive and well.

Here is a partial list of the MOV devices that I have used: GTE/Sylvania spike/surge suppressor; RCA SK-400 spike/surge protector; Archer (Radio Shack) No. 61-2792 w/status indicator light; Tandy (Radio Shack) No. 26-1395A twin outlet w/reset and Status indicator light; Tii transient

voltage surge suppressor Model No. 428.

It is good to note the three latter devices have status lights which extinguish if the internal MOVs are destroyed or otherwise fail. My cellular-phone battery charger was plugged into the Tii protector and survived. However, the Tii protector did not. The status "glo-lamp" no longer lights. In substance, if the light is on the protector is okay, and if the light is out there is no longer any protection from the spike suppressor.

New Acquaintances And Old Friends

I ran into a friend whom I had not QSOed with in almost 40 years. He is SYSOP of a packet BBS near Tullahoma, and he is having a ball with packet radio. To those of us who remember him from the days of Rome, Georgia, he is Bill, W4IKK. But to those in east and middle Tennessee, he is now "Itchy." Bill—Itchy, that is—recently celebrated his 75th birthday. I'm told that Itchy is still climbing his tower and making packet fun around Tullahoma, Tennessee. Thanks for the letters, Itchy. Keep having fun.

As for the new packeteers I mentioned earlier, they are now supporting the growth of the ROSE network here in the middle Tennessee area. A few of the new packeteers who are helping build this network and enhance packet use in this area are Perk, KC4NEH; Bill, N4SSB; Keith, KB4KCU; Mike, KC4ECD; Bobby, KO4GF; Richard, N4UBR; John, WB4RRK; Al, WA4TLZ; and a list that is growing larger each week.

Less than six weeks ago over half the names and callsigns I've just mentioned had only thought about packet radio. They are now packeteers who are in the process of building a Kantronics Weather Node and implementing part of a new statewide 9600 baud trunk—not to mention linking into other areas of the state of Tennessee to support a statewide emergency communications network.

Nashville has a sophisticated packet traffic distribution system that was developed by the area packeteers for the purpose of moving messages in and out of this area in an expedient manner. The element here is one of pride and commitment, and some are so proud of the system that they are often defensive about other formats being introduced to the system. In their own way, they have a right to be proud of how smooth the system works. This forwarding and distribution network could become a model for some other regions of the country that I've visited.

Maybe in a future column, if I can get a more concise description of the "Nashville Network" from the MTPA president, Steve Waterman, I'll relate it to the rest of the packet world.

Speaking of Steve, via his elaborate APLINK station he too plays a large part in how the traffic is handled in and out of

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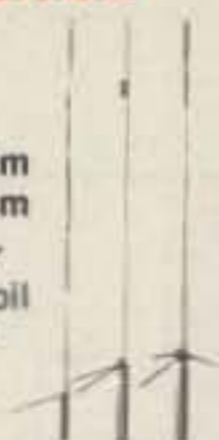
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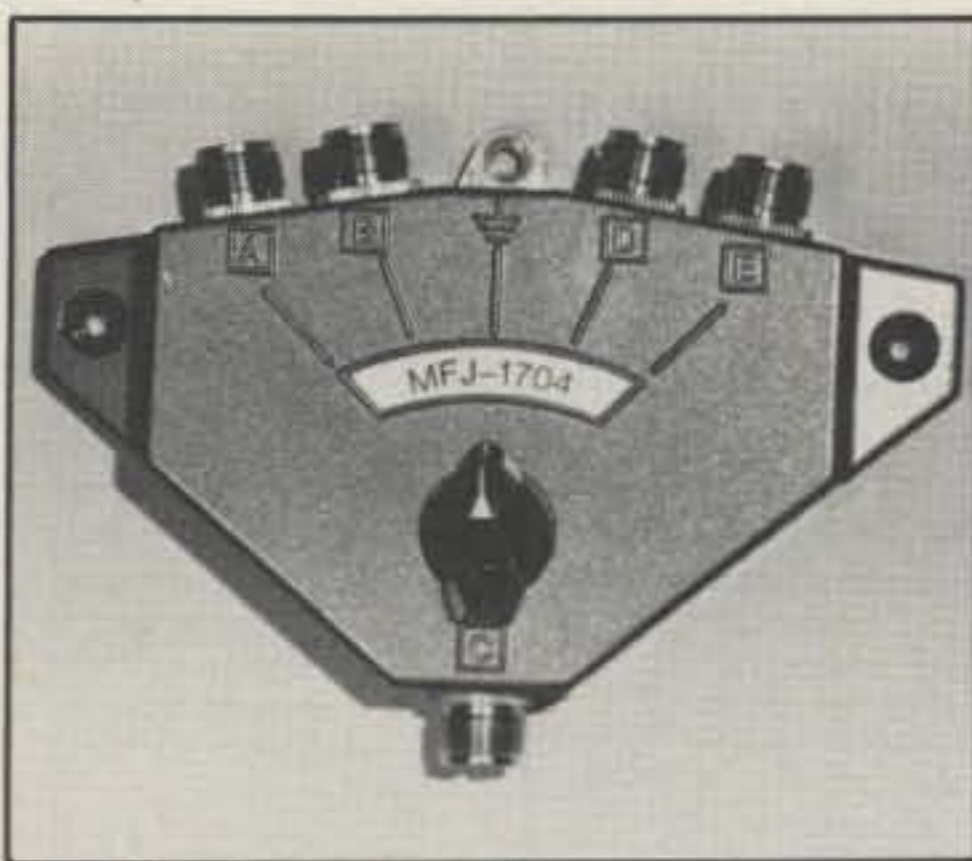
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It's a good idea to switch everything to ground when you leave the shack. This is the MFJ-1704 four-position coax switch, which is one type you can use to switch your antennas to ground.

the state. Steve will be co-chairing a digital forum at Dayton in April. We'll hear more about the system there.

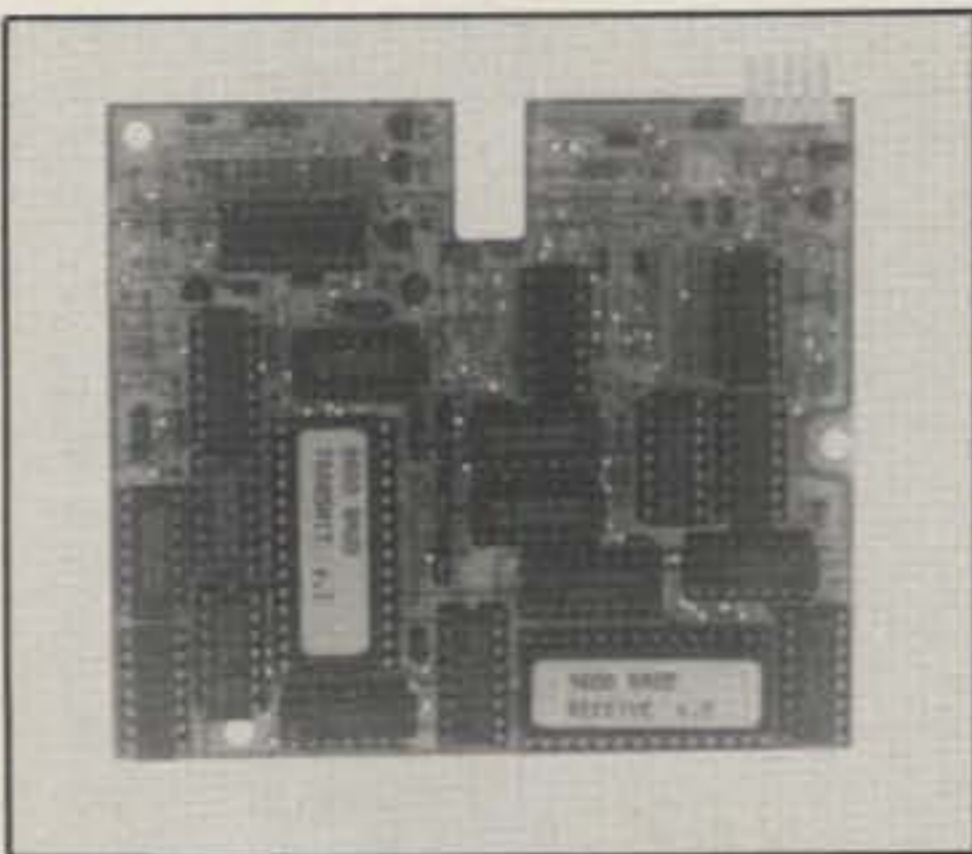
It's Time For A Change

Any way you crack it, packet radio has become a mode of the third magnitude. Within ten years packet has done to amateur radio what FM did for VHF and what single sideband did to AM. In less time than we care to think about packet has leaped into the ham shack of just about every amateur who owns a computer.

In the decade just passed we saw packet go from only a handful (counting the fingers of both hands) of packeteers in 1982 to a number that is now greater than a hundred thousand and growing daily. This number has not stopped increasing. Even more interesting is how the number of existing packeteers hasn't yet reached anywhere near the number that has yet to enter our ranks.

Why is Packet So Interesting?

Packet radio is by its very nature the most sophisticated of all our modes of digital communications. Moreover it is error-free (being error correcting on the fly)! As many readers already know, and many have wit-



The MFJ-9600 bps modem design.

nessed in my forums around the southeast, through the use of packet radio there are a number of features that are now enabled that were never possible a few years back.

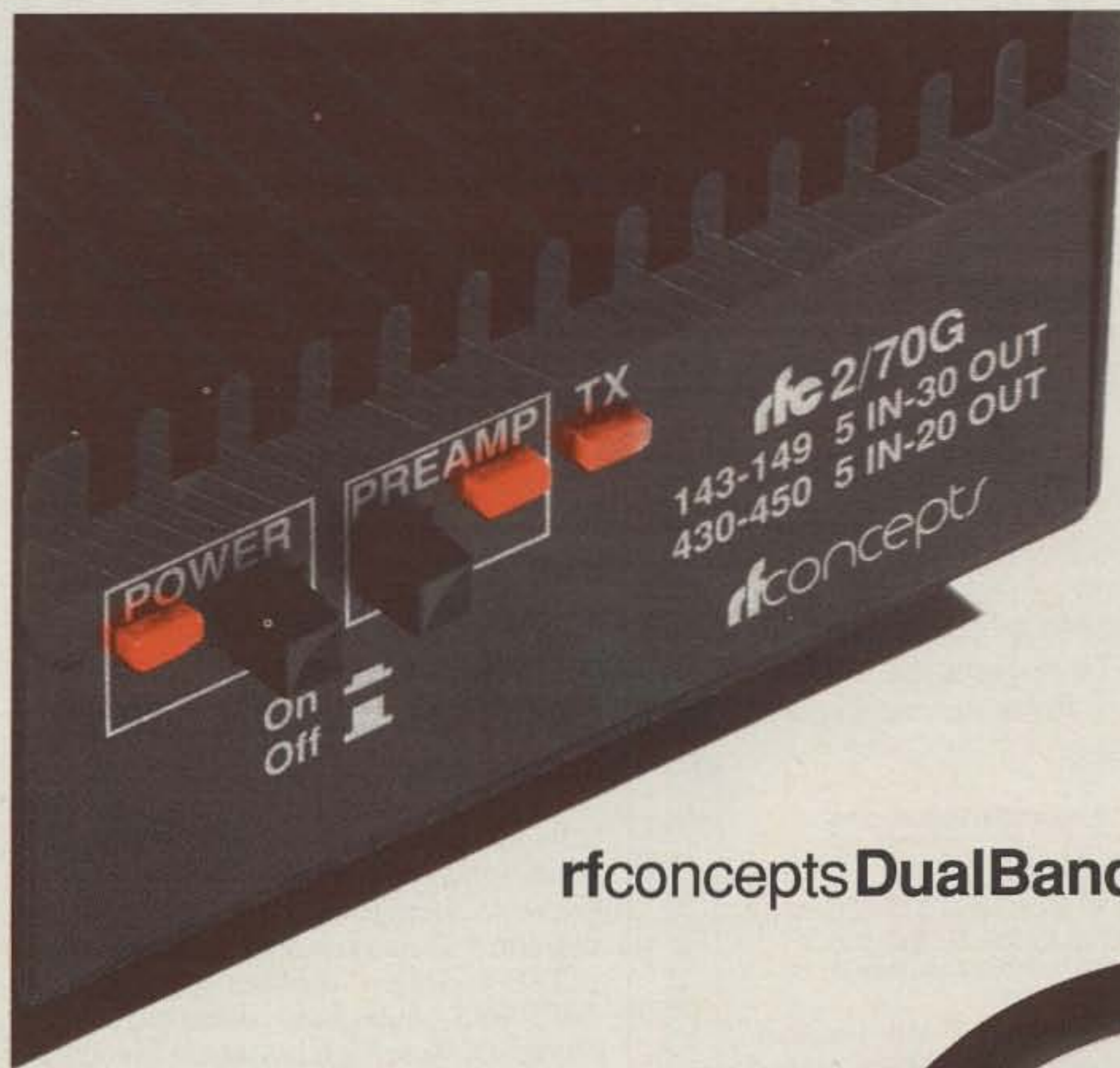
Recently I was demonstrating some of my packet picture transfers to a group at an eastern hamfest. There were several in attendance who had never heard about the error-free picture transfers via packet. They had no idea that a 256 color picture could be sent from one packet station to another packet station and appear on the screen as it was being received. In addition, the picture was being spooled to the disk, saved as it was being received, and displayed on the screen.

The Next Frontier

In a recent letter from a friend in England who is one of the packet world's foremost packet radio modem designers, I was appraised of the western attitudes toward packet as viewed by the packet world outside the United States. This friend is James Miller, the designer of the G3RUH 9600 baud modem for packet.

Before I go into the discussion of his letter, I need to provide some history as to why I've not covered these high-speed modems in detail.

I recall a conversation with a TAPR official at the TAPR booth three years ago at



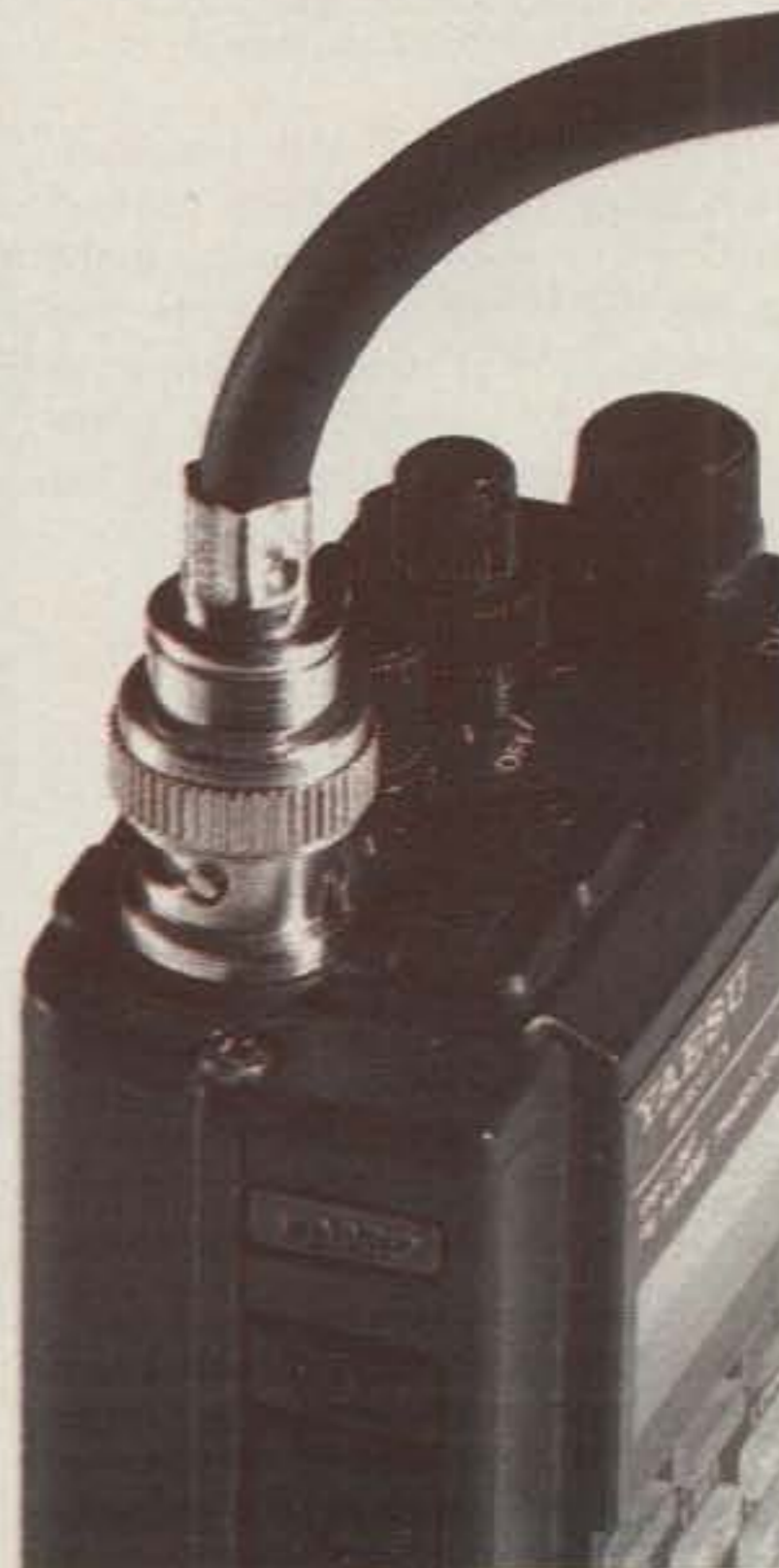
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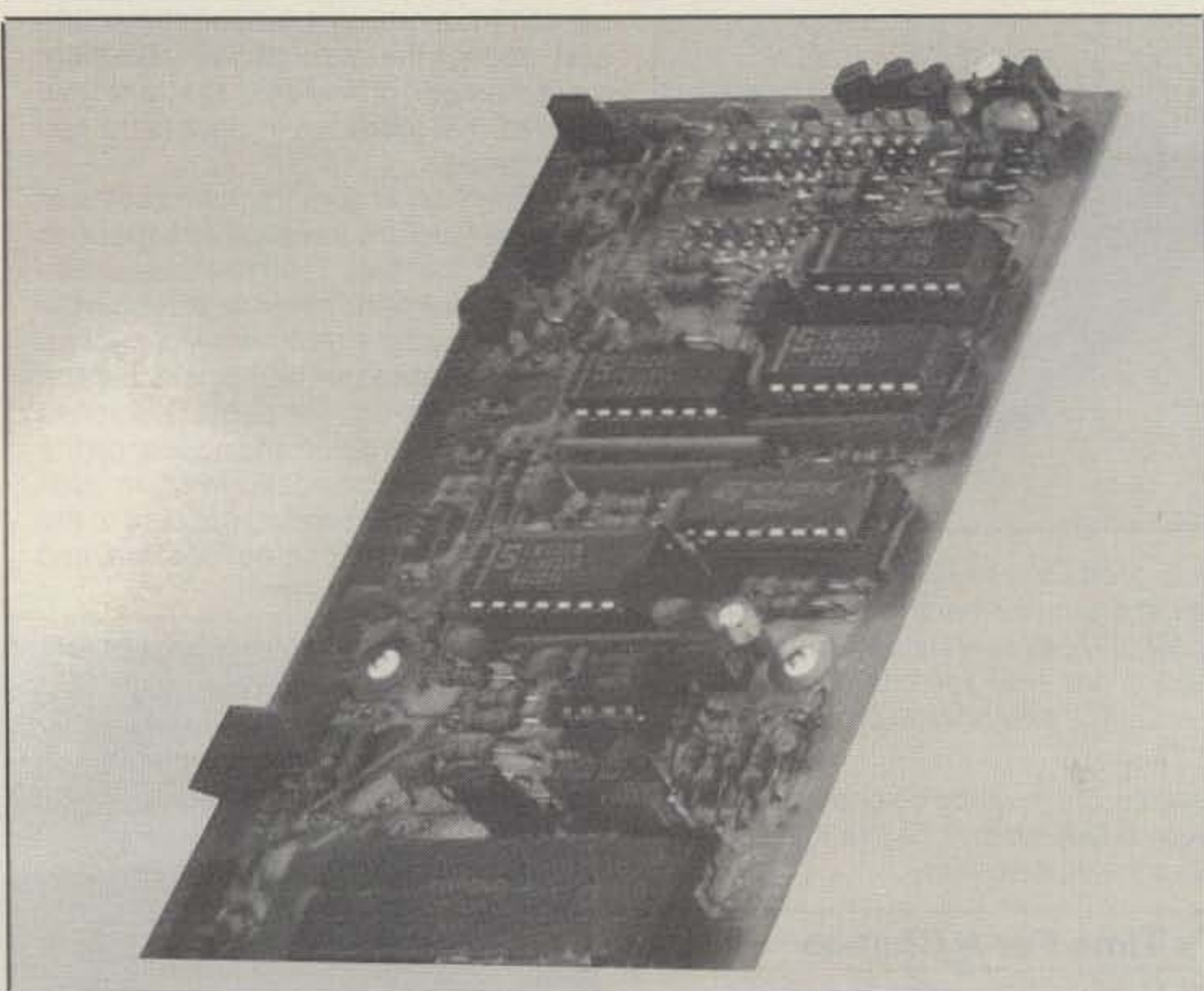
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England Patent #2,046,529. Other Patents Pending



The Kantronics 9600 baud modem, which is used inside the Kantronics Data Engine.

the Dayton Hamvention. He was briefing us on the new integrated transceiver, TNC, and high-speed 9600 baud modem. While promoting this "surprise" package, we were told that it would arrive the following day, as it was in the final construction stages at the TAPR lab.

Sure enough, the pretty blue box did arrive as reported—two of them late Sunday afternoon before the closing of the Hamvention. We never saw them operate because we were told "there were a couple of parts that had not been received back at TAPR." Thus, the demonstration of the TAPR 9600 baud system never happened. I have yet to see the prototype that I was promised for beta-testing.

Even now, three years later, there has been very little activity from the TAPR group about their integrated 9600 baud modem.

I don't receive much input from TAPR as to what their plans are, except when I place an occasional phone call to them to ask about a particular topic. I would think that TAPR would like the coverage that can be provided through this column. In the past I have picked up some bits and pieces from the PSR, but I no longer receive that newsletter. At this writing I'm not aware of which 9600 bps format they are supporting, if any at all. In any case, most of the leading TNC manufacturers are now, or will soon, support the G3RUH and K9NG 9600 bps modem format.

The Proof is Here

The G3RUH 9600 baud modem has been

demonstrated in the PacComm NB-96, the Kantronics DE-9600, and the MFJ-9600 TNCs with great success. The G3RUH and the K9NG modems use a similar approach that makes them compatible with one another.

Gwyn Reedy, W1BEL, PacComm's president, put the first of the G3RUH modems into the marketplace via the PacComm NB-96. This 9600 bps modem development gave PacComm the edge to add the 9600 bps modem into the Tiny-2 TNC. Later the design was marketed in a modified version so as to fit internally into the now popular MFJ-1270B and the MFJ-1278 Turbo Multi-Mode Controller.

Where's The Bauds?

Why then has the U.S. waited so long to adopt this stable and usable 9600 bps modem? It seems that only Kantronics has put together a full-blown 9600 baud RF modem and transceiver combination. Aside from this combo from Kantronics, there's not much to try for except to join the hackers who are making do with the available choices that can be found in commercial transceivers.

With minor modifications the G3RUH modem can be fitted to the AEA PK-87 and 88. The exceptions are the early Kantronics TNCs, which do not support the modem header disconnect pattern of this 9600 baud modem.

If you plan to integrate the MFJ-9600 modem into your TNC/radio combination, it would be advisable to first determine if the transceiver that you hope to use has

true or direct FM and not phase modulation techniques. The phase modulated transceivers are *not* the radios to be used in a high-speed data transmission application. More on this later.

Which Radios Can Be Used At 9600 Bauds?

James, G3RUH, thoughtfully supplied us with a list of radios with which his modem has been successfully used at 9600 bauds. I won't hesitate to add that by the time you read this month's column, this list will have increased by ten times. With his permission to reproduce portions of his letter, here is part of that list of transceivers.

Alinco DR-1200 DataRadio

ALR series: ALR-72, ALR 709

Kantronics DVR 2-2 Data Radio

ICOM IC series: 25, 38, 228, 271, 290, 471

Kenwood TR series: 7500, 7700

TM series: 211, 212, 221, 231, 431

TS series: 700 and 770

Standard C58, C140

Yaesu FT series: 212, 221, 230

The G3RUH 9600 baud modem is also being used in the UO-14 satellite stations around the world and by thousands of terrestrial packet links worldwide.

For those readers who have already had success with other radios, please send us the mods written as you have made them, and I will be happy to include them in future articles for others to use. We are happy to make this kind of installation information available so the hobby can move forward

to meet the demand and growth in our ranks.

To make this effort work we must modify the varactor direct FM modulated stages for data input and connect the receive AF output at the quadrature detectors.

Maybe soon we will see one of the packet OEMs come out with the latest "wheel and whistle" version of yet another formatted modem.

NO! Let's go with the modems that we already have and the ones that have been tried and tested, whether it be Steve Goode's or James Miller's approach. *They are compatible.*

Indeed, there is one transceiver manufacturer who has stated that they plan soon to introduce a radio that will have the needed tie-points brought out to an accessory connector. This kind of support is what we packeteers are looking for. These connections are for the varactor data (FSK) input and the quadrature detector outputs (before the diodes, please). This is something that will allow the appliance operators among us to make the needed connections without tearing the guts out of a good radio.

My brother Mike, N4NAU, and Mike, KC4GWF, near Anniston, Alabama are using the MFJ version of the G3RUH modems in the MFJ-1270B TNCs attached to a pair of ICOM IC-38A's operating at 223.580 MHz. The MFJ-9600 modem is fully compatible with the plug-on disconnect header in the MFJ TNC.

The MFJ-9600 bps modem design is licensed from James Miller, G3RUH, and is in use worldwide. James has also designed into his modem the first precept of Digital

Signal Processing (DSP) to be used by the packeteer as a means of creating a flexible transmit wave-form filter design that can compensate for audio differences in virtually any radio.

The one feature that stands out with the G3RUH modem in the Kantronics, PacComm, and MFJ TNCs is the digital generation design of the transmit audio wave form. The precise shaping limits of the signal bandwidth can be made to sculpt the exact amplitude and phase response in the receiver dedicated circuits. The result is a compatible filter system within the data detection circuits for optimum data recovery and minimum errors.

I'm going to take on the next step into our packet future. James and Steve, how are things coming with the nineteen-thousand two-hundred (19,200) baud modems?

In a couple of years we will be complaining about the crowded conditions on the slow 9600 baud frequencies. For now we have a medium that works, is available, and is supported.

Correspondence with Mr. Miller may be sent to: James Miller, G3RUH, 3 Benny's Way, Coton, Cambridge, CB3 7PS England, UK.

The Rochester APS

We received word from Gary R. Skuse, KA1NJL, that the Rochester Amateur Packet Society meets on the second Thursday of each month at 7:30 PM at the Monroe County Social Services Building in Rochester, New York. They also sponsor the ROCHNY node (K2JD-1) of the NEDA (North East Digital Association) network. The club chairman is Fred Cupp, W2DUC @ WB2WXQ.NY.USA.NA (or at the club's personal BBS, RAPS). The club's newsletter is called "RAPSsheet."

As we have said before, send in information about packet activities in your area, and we will do our best to print the information in this column.

In Response To A KNAT-BYTE Letter

For those who wrote asking for an alternate source of solar panels, we found a limited supply of the ARCO 16-2000 (16 volt @ 2 amperes, or about 35 watts). The panels are removed from service, but for our purpose they appear to be as good as new. The cost of the panel, including shipping, is \$155. Seems Steve has one set price for the shipping, and that's a good deal in my book. Here is the address for the supplier: Fowler Solar Electric Inc., 13 Bashan Hill Road, Worthington, Massachusetts 01098 (413-238-5974).

That's it for this year, and I hope you have very happy holidays, and a new year that is filled with good health, happiness, and friends.

Happy Packeting de Buck4ABT.

K4ABT @ W4HHY.TN.USA.NA

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Antenna Notes—Part II

Last month we featured a potpourri of antennas and accessories topics. Antenna subjects included discussion of new products from Austin Custom Antenna, NCG/Comet, and PolyPhaser. We also highlighted the "ELSIE-FASER" L/C phase unit from R&D Electronics. Turning to software, we focused on TCOM-777, Quikyagi II, Autolog Plus, BMKMULTY, and the Norton Utilities.

This month we'll continue in the same vein. There's a good deal to cover, so let's begin.

Antenna Notes

M2 Enterprises Antennas. M2 Enterprises is going strong with its HF, VHF/UHF, and cross-polarized antennas; they offer a set of five brochures that individually describe their separate product lines. The M2 antennas are based on proven designs by Mike Staal, K6MYC, who was a KLM cofounder and until 1986 was the antenna designer at KLM. Mike takes pride in the quality of the M2 machined parts and the antennas' mechanical features.

Six different HF computer optimized Yagis and log periodics are offered, as well as a variety of 6 and 2 meter, 220 MHz, and 70 cm models. Several cross-polarized models are available for 2 meters and 436 MHz, as well as the unusual 2 meter and 432 MHz "Eggbeaters." In case you're not familiar with them, the Eggbeaters are designed for both fixed and mobile operation to produce an omnidirectional horizontal polarity at the horizon. Above the horizon, the pattern transforms to right-hand circular polarization, thus making the antennas quite suitable for OSCAR satellite use.

M2 Enterprises also offers a variety of accessories for properly stacking, phasing, and matching their antennas. They also sell several elevation and azimuth rotors, including the Orion OR-2300 azimuth rotator which we described in the January 1990 column.

For a set of the brochures, contact M2 Enterprises, 7560 N. Del Mar, Fresno, CA 93711-6856.

MAXRAD Antennas. Recently we received a flyer from MAXRAD (Elk Grove, IL 60007) that listed their 1991-92 amateur antennas and accessories. The four-page flyer displayed a surprising range of VHF and UHF fixed and mobile antennas, rubber duckies, and permanent and magnet mobile antenna mounts. MAXRAD sells a number of loaded mobile antennas that cover a variety of single-band and dual-band combinations from 27 through 450 MHz. These antennas make use of two different types of loading coils.

One of these is their premium "chrome" load-

ing coil designed to provide high performance in harsh environments. The coil's fittings are triple-plated brass and its jacket is of heavy-wall double-sealed construction. The loading coil itself is wound on a delrin coil form to enable it to withstand heavy shocks.

The second is their "molded" coil which features sturdy weatherproof construction. The top stud and mounting threads are insert-molded into an attractive housing that leaves no openings and eliminates the chance of water leakage. The loading coil itself is made from a tinned copper spring wound on a delrin coil form that gives the coil the ability to absorb heavy shocks yet perform well.

COMTELCO Antennas. A surprisingly complete line of American-made mobile and base station antennas for 28-928 MHz is offered by COMTELCO Industries, Inc. COMTELCO has been in business since the late 1970s and long has been a major supplier of commercial two-way communications products.

The eight-page COMTELCO catalog shows several classes of antennas suitable for amateur VHF and UHF use. Mobile antenna series offered include interchangeable multi-whip quarterwave, dual-band (144/440 MHz) models; 440 MHz "gain" types; 902 MHz elevated feed-point models; and single-band base-loaded models covering from 28-440 MHz. Fixed-station antennas include fiberglass "minibase" models for 440 and 902 MHz; base-station verticals for 144, 440, and 902 MHz; and 440 MHz and 902 MHz seven-element Yagis.

COMTELCO also offers commercial-quality mobile mounts and accessories. They make available many of the subassemblies and accessories that allow the enterprising amateur to build up an antenna that meets his or her specific needs. One interesting and inexpensive (\$2) accessory is a battery tap that clamps onto the heavy cable leading from the vehicle's battery to allow easy and direct hookup of a transceiver's power cable.

For a catalog contact COMTELCO Industries, Inc., 501 Mitchell Rd., Glendale Heights, IL 60139.

Antenna Mart Products. The Antenna Mart Division of Wall Industries offers several useful antenna accessories. One of these is the KC4UZ Antenna Sidemount. This interesting device allows you to mount multiple antennas on the side of your existing tower. The accessory is engineered for HAM III and IV as well as Tailtwister rotors, features 300 degree rotation, has brushed struts, and handles long-boom HF antennas. The sidemount is priced at \$247.50.

Antenna Mart also offers several remote antenna switches. The W0MLY SW Series are six, seven, and nine-position weathertight remote switches that handle 5 KW RF and feature neon indicator lights to tell which antenna is in use at a given time. The switches claim 0 dB insertion loss and are said to produce no

significant effect on SWR. The standard units are equipped with UHF-type coax connectors, although other connectors can be supplied. Prices range from \$229 to \$259 depending on the number of switched positions. Other types of remote switches are available for phasing verticals, reversing rhombics, and other applications.

For more information contact the Antenna Mart, P.O. Box 699, Loganville, GA 30249.

Wintenna Antennas. A new 16-page mobile and base-station communications catalog from Wintenna shows a wide range of mobile antennas including AM broadcast, TV/FM, CB, cellular and cordless telephone, scanner, and amateur types, as well as an extensive line of brackets, mounts, cables, and accessories. The variety of mounts offered is impressive and is of real use if you want to securely plant an antenna on a van, RV, or truck.

Amateur mobile antennas include the popular "Ham Stick™" single-banders for amateur bands from 75 meters through 440 MHz; HF models are available for any frequency from 3.7 to 54 MHz. VHF and UHF models include two types of "gain" collinears as well as more conventional $\frac{1}{4}$ -wavelength verticals.

Several VHF and UHF amateur base-station antennas are offered, two of which appear to be useful for the apartment or condominium dweller. The firm offers single-band, suction-cup, window-mount verticals for 220 and 440 MHz as well as on-glass-mounted verticals for these same two bands. Two types of collinear base-station verticals and a $\frac{1}{8}$ -wave end-fed vertical also are available for 2 meters, 220 MHz, or 440 MHz. Also sold is the Multi Wave™ Multi Band Base Station Bracket Kit which lets you use any 2 meter, 220 MHz, or 440 MHz vertical antennas in a custom tri-band system.

Although Wintenna offers a good selection of amateur antennas, I was more intrigued with their Boomerang™ series of AM/FM/TV/CB antennas. These are the low-profile trunk- or rooftop-mounted wing-shaped antennas popular on limousines, vans, trucks, and other vehicles and boats large enough to sport a built-in TV set. I was surprised to see the variety of Boomerangs offered. These included 12 dB gain amplified models, models with LED bulbs in the wing edge or "crash avoidance lights" in the mount, models that handled CB and cellular telephone transmission as well as broadcast reception, and marine designs. I always wondered where to obtain these jazzy and futuristic antennas, and now I know!

For a catalog contact Wintenna, Inc., 911 Amity Road, Anderson, SC 29621-7097.

B&W Antenna Tuners. I fondly remember "the good old days" when Barker & Williamson was heavily into amateur gear production alongside now-departed ham gear names such as E.F. Johnson, Collins, Hallicrafters, National, Hammarlund, Globe, and several others. In the 1950s

317 Poplar Drive, Millbrook, AL 36054

and 1960s W3BZ and W3GC produced the high-quality, 180 watt B&W 5100-B AM and CW transmitter, the accessory 51SB-B SSB generator, and the L-1000-A "full gallon" ground grid, pi-network linear amplifier. All three were thoroughly enjoyed by those who could afford the premium gear and widely envied by those who could not.

For several years B&W has focused on supplying a variety of commercial, amateur, and SWL antennas, as well as a good selection of RF components and accessories—including inductors, chokes, coax switches, TVI filters, dummy loads, and wattmeters. B&W seems to be edging back into the "hardware business" with two made-in-the-USA antenna tuners (transmatches), the VS-300A 300 watt and the VS1500A 1500 watt tuners (not to mention the 1500 watt PT-2500A linear). The VS-300A covers 1.8 to 30 MHz; handles up to 300 watts; accepts coax, balanced line, or singlewire feedline; has a built-in 4:1 balun for balanced line; and includes a built-in SWR/wattmeter and antenna switch. It's priced at a very reasonable \$111.

The "big brother" tuner is the heavy-duty VS1500A, which handles up to 1500 watts RF power with practically any type antenna over the same frequency range. The tuner is of the series-parallel capacitor connection (SPC) design. The tuner also boasts vernier tuning of a continuously variable roller inductor for ease of adjustment and it has a built-in 4:1 balun. The VS1500A is priced at \$499.

For additional specs and a catalog, contact Barker & Williamson, 10 Canal St., Bristol, PA 19007.

Vehicle Window Antenna Mount. Have you resisted drilling a hole in the family chariot for a mobile antenna mount? If so, and you're tired of holding your handie-talkie (HT) out of the window to communicate, KUBY Kcommunications has a solution. It's a HT and scanner window-mount assembly that features a lip that slips over the top of your side window glass. The assembly comes with a BNC connector so that in most cases all you have to do is transfer the HT's rubber duckie to the assembly, which also comes with 10 feet of coax with connectors.

The handy device is priced at \$19.95 plus shipping and is available from KUBY Kcommunications, 19254 Tranberger St., Rowland Hills, CA 91748.

By the way, if you've resisted drilling a hole anywhere on your chariot for fear of ruining its trade-in value, with the popularity of cellular telephones you might want to think twice about that rationale. Drill the hole and later, when you trade in the vehicle, replace the amateur antenna with an inexpensive cellular telephone antenna. Promote the antenna as one of the installed options—sort of like putting in a fancy swimming pool on your property and increasing the value of your home accordingly.

DX Engineering Update. In the July 1990 and March 1991 columns we discussed some of the high-quality monoband Yagis and accessories offered by Dick Ewing, KO7N, and Bill Sattler, N0XX/7. As you may recall, we took note of the fact that these two gents have a "no B.S." policy in their antenna advertising and try to keep their gain and performance claims reasonable. In keeping with this philosophy, their full-line catalog of antennas and antenna accessories is devoid of fantastic claims and instead contains a good deal of their antenna design and construction philosophy as well as solid technical details. This is the kind of information that sadly is lacking in many antenna catalogs and

spec sheets.

Last time we looked at DX Engineering, they were about to expand their HF Yagi product line to include products at both ends of the HF spectrum, antennas for 40 meters and for 6 meters. Bill and Dick have now done that, and they also offer 12 and 17 meter WARC band monobanders as well as two log periodics. Accessories offered include a phase box for use in stacking two Yagis, Yagi stacking and phasing assemblies, a tower sidemount assembly, and a new 5 KW remote coaxial switch using sealed relays to handle up to five antennas.

The 40 meter Yagis are strictly full size for best results and nearly uniform performance across the entire band; two-, three-, and four-band models are offered which exhibit gain of up to 7.2 dBd, depending on model. The 12 meter Yagi is available in four-, five-, and six-band models, while the 17 meter Yagi is available in four- and five-band versions; gain is slightly higher than their Yagis for other bands due to the narrow bandwidth of the WARC bands. The 6 meter Yagis emphasize gain rather than F/B ratio or bandwidth and are available in five-, six-, eight-, and ten-element versions.

The log periodic is an interesting design alternative and was offered because many customers wanted to have a big 20 meter Yagi but also wanted a *single* beam to cover "the other bands." This resulted in a log periodic directional antenna (LPDA) that, like other LPDAs, offered continuous frequency coverage over its entire design range of 18–30 MHz with a low SWR (1.5:1 or less). The \$595 antenna, with 11 elements on a 24 foot beam, claims a 7.5 dBd gain. A 13-element, 20–10 meter (13.9–30 MHz), 36 foot boom LPDA recently has been introduced; it's priced at \$1075.

For a very informative antenna catalog, contact DX Engineering, Inc., 618 Spaulding Ave., Brownsville, OR 97327.

Garant Windoms Revisited. In the May 1989 issue we took note of the Garant Windom antennas, a line of modified Windom wire antennas for HF use. The antennas are based on the classic 1928 off-center-fed dipole design by Loren Windom, W8GZ, which allowed the user to work several HF bands with a single antenna. Windom used an openwire feedline, but the Garant Windoms are fed with 52 ohm coax rather than with openwire line. A special balun (called a duplex-balun by Garant) is inserted at the appropriate point of the flattop to permit the feeding of what is basically a high-impedance antenna with a low-impedance feedline. The Garant antennas are designed so as not to require an antenna tuner or transmatch.

Six different designs are available to enable you to work up to nine different HF bands (including the 17, 15, and 12 meter bands) with a single flattop. Each of these designs is available in 500 W PEP and 2 KW PEP models. You need a 67, 137, or 255 foot straightaway for the flattop, depending on the model, although you can install the antennas as inverted-Vees or as horizontal L-shaped dipoles in smaller spaces. The antennas range in price from \$118 to \$292 (U.S. funds), depending on model.

For specs and an interesting report of testimonial letters received by the manufacturer, contact Allband Radio Products, 3378 Douglas St., Victoria BC Canada V8Z 3L3.

New from Electron Processing. We've noted the many antennas and accessories offered by Electron Processing several times before, most recently in the March 1990 column. To recall, EP offers many accessories, including

several active (amplified) vertical receiving antennas, various window-mounted antennas, a multiple receiver adapter, mobile through-the-window couplers, scanner boosters and filters, preamps, indoor receiving antennas, and other accessory goodies.

For some time EP has offered its "Scanner Stick," a rugged little 25–1000 MHz broadband base-station antenna. EP recently introduced the upgraded "Super Scanner Stick," an amplified version that covers the same frequency range but also includes an internal 15 dB gain preamp powered by 115 VAC current. It's priced at \$80.

Another new product is the "Multiwire-4," a complete 130 foot shortwave wire receiving antenna that includes four different length wire elements; it's designed to cover all popular SWL bands from 0.5 MHz to 30 MHz. The antenna consists primarily of four wire elements of different lengths that are joined together at the feedpoint in a compact coupling box. The antenna can be installed in several different configurations that require from two to five end supports. Included with the \$100 antenna is a "static bleed" device that's built into the coupling box and is designed to reduce static and noise. End supports are not included.

I also see that the new EP flyer includes two intriguingly titled amateur books by EP's John Martin, WB2VT, to help you "get on the air on the cheap." One is the *Poor Hams Survival Guide* at \$15. The second, "for those who can't afford the survival guide," is *Cheap Ham Tips* at \$6.

For more information contact Electron Processing, Inc., P.O. Box 68, Cedar, MI 49621.

Rotor Suggestions de WA0KKC. Dick Mollentine, WA0KKC, sent us a couple of "quick and dirty" antenna rotor suggestions that we'll pass along. Dick notes that if you're having trouble with either your rotor or thrust bearing binding up because of a cracked tower, install heavy coil springs under the mounting bolts that hold the rotor to the mounting plate, using suitable flat and lock washers. Doing so should affect only the pressures causing the binding, usually relieving them enough to prevent binding. (*Of course, if your tower is seriously cracked, take care of that problem first.*—ed.)

Dick also offers the advice that on antenna rotors where the top section joins the bottom section, it would be prudent to coat the outside with a bead of silicon glue to keep moisture out. Also coat the point where the control wires are attached.

Soft Topix

ANTENNA ARRAYS Software. A new and specialized wire antenna design and analysis program for the IBM PC is offered by A/V Technology International, Inc. The software is ANTENNA ARRAYS, and it allows you to design both broadside and endfire driven arrays, rather than more common parasitic arrays. (Broadside arrays are those in which the main direction of radiation is perpendicular to the array's axis and to the plane of the elements; they consist of parallel halfwave dipoles. Endfire arrays are made up of a number of parallel elements in one plane the main direction of radiation of which coincides with the direction of the array's axis.)

The ANTENNA ARRAYS software handles computations for up to 16 dipole elements, although larger array capabilities are available as an option. The software allows you rotate the

THE WONDERFUL WORLD OF HAM RADIO



Here's a new book by Richard Skolnik, KB4CLS, *The Wonderful World of Amateur Radio*. It's drawing considerable attention as a much-needed introduction to amateur radio for young people. Hopefully the book will fill some of the "holes" in most school and public library shelves in terms of material on amateur radio. The book is \$7.95 and is distributed by MFJ Enterprises, Inc., and MFJ dealers.

elements' polarization and view and compare the resultant radiation patterns in both the horizontal and vertical planes. Tabular and graphic displays are presented.

The software is priced at \$59.95 and is available from AV Technology International, Inc., P.O. Box 97, 432 Cherry Street, West Newton, MA 02165.

Total Ham Plus. A very comprehensive amateur radio database management package, Total Ham Plus, is offered by Dick Miller, WD4AZG, for the IBM PC. We briefly reported on its shareware predecessor, Total Ham, in the December 1990 column.

Dick's been hard at work over the past year or so to develop the Total Ham Plus program. The new version features regular, net, or contest logging modes; checklists for DXCC, WAC, WAS, WAZ, and county hunting; QSL card processing and label generation; log printouts; customized beam headings; lightbar-style menus; sophisticated reports and printouts; and extensive documentation. The program is priced at \$59.95 on 5.25 inch diskettes, or add \$5 for 3.5 inch diskettes.

For more information contact Dick Miller, WD4AZG, at Remware, Inc., P.O. Box 1566, Manassas, VA 22110.

QSL Record and Calculate. Namlulu Communications, 1120 Meadowview Road, Willard, OH 44890 offers QSL RECORD for the IBM PC. It's designed to help gain and keep control of your QSL cards. The user-friendly program has a sophisticated sort function using several different criteria. The program is priced at \$19.95; a demo version is available.

A second program, CALCULATE, offers 32 major electronics formulas to solve at least 119 different types of problems involving frequency, impedance, inductance, capacitance, power, temperature, Ohm's law, and more. The program is \$17.95.

Both programs automatically detect the presence of color or mono video monitors and are available on either 3.5 or 5.25 inch diskettes.

GEMRADIO Logging System Update. In the August 1988 column we reviewed an early version of the GEMRADIO database and logging

Fast Direct Screen Display
Copy Move Erase File Utility Appl Remote Key Pick Sort Options Quit

Local	Source	GATEWAY-C	File	Size	Time
.. <Parent	DIR	1-27-90	1:03		
README	1373	2-11-91	3:50		
TEST	ARC 988	5-14-91	14:21		
F	CNF 12633	5-14-91	15:13		
ATCLOCK	COM 217	2-11-91	3:50		
BRIDGEL2	COM 10893	2-11-91	3:50		
COMTEST	COM 1555	2-11-91	3:50		
CP	COM 3313	2-11-91	3:50		
DEVICES	COM 979	2-11-91	3:50		
MV	COM 3372	2-11-91	3:50		
READCLK	COM 103	2-11-91	3:50		
RM	COM 1576	2-11-91	3:50		
RUNL2	COM 4642	2-11-91	3:50		
SETCLK	COM 497	2-11-91	3:50		
BRIDGEL2	DEV 9356	2-11-91	3:50		

Items: 24 Files 22 = 292k Free:1358k

F1 Help F3 Slave F5 Remote Source F7 Source Path F9 Source Tree
 F2 Insight F4 Macros F6 Remote Dest'n F8 Dest'n Path F10 Dest'n Tree

Fig. 1- Brooklyn Bridge Filer Options Menu. You can run the Brooklyn Bridge from the DOS command line or from menus using the special Filer program; it's a special DOS shell that also lets you communicate between two computers connected through their parallel or serial ports. When using Filer you can set up two types of menus—the Short Menus, which contain the most commonly used options, and the Long Menus, which contain all available options. The Options Menu, shown here, gives you access to several configuration alternatives that temporarily control the display of the Filer's main screen. You have the option of saving your configuration selections to disk.

system. It was developed by Dr. Antonio (Toni) Salvadori, VE3NXQ, a computer science faculty member at a major Canadian university. As we noted then, Toni originally wrote the program for the Apple II, but because of memory limitations on that machine, he rewrote it for the IBM

PC. Now I see from a recent mailing that Toni has updated the software to at least Version 6.

To review, GEMRADIO is a general-purpose menu-driven logging program for the IBM PC and compatibles which sports several unique features. For example, from the program's

Copy the File at the Cursor only if it is NEW to the destination
Copy Move Erase File Utility Appl Remote Key Pick Sort Options Quit

File at cursor	Source	GATEWAY-C	Destination
Marked files	rc	1-27-90	1:03
All source files	>	1-27-90	1:03
Reveal file			3:50
Contents of	File at cursor		3:50
Dir at cur	Marked files		14:21
Tree branch	All source files		15:13
Entire drive	Reveal NEW files		3:50
New files	Contents of dir		3:50
	Dir at cursor		3:50
	Tree branch		3:50
	Entire drive		3:50
CP	C		3:50
DEVICES	C		3:50
MV	C		3:50
READCLK	COM 103	2-11-91	3:50
RM	COM 1576	2-11-91	3:50
RUNL2	COM 4642	2-11-91	3:50
SETCLK	COM 497	2-11-91	3:50

Items: 24 Files 22 = 292k Free:1358k

F1 Help F3 Slave F5 Remote Source F7 Source Path F9 Source Tree
 F2 Insight F4 Macros F6 Remote Dest'n F8 Dest'n Path F10 Dest'n Tree

Fig. 2- Brooklyn Bridge Filer Copy Menu. The Copy Menu functions allow you to make an exact duplicate of a selected file from the source computer and place it on the destination computer; the original file on the source computer is not affected by the process. If the file you're copying exists on the destination, the Filer asks if you want to overwrite the file. Numerous copy options are available.

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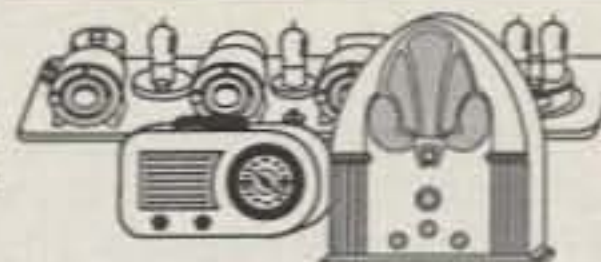
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editing menu you can get a listing of QSOs from partial calls or dates. Also, the "radio stats" function lets you keep track of DXCC, WAC, WAZ, WPX, oblasts, U.S. counties, and any missing countries on any band or mode. You can apply for the WPX award using GEMRADIO's printout, print QSL labels using any of four different formats from the QSL function, and retrieve any set of records from the database using any criterion.

The program's utilities menu boasts several interesting functions, including the ability to keep track of QSL manager addresses, print mailing labels and log forms, and provide the long- and short-path bearings and distances to DX countries. The database menu option allows conversion of log data from several other popular logging programs.

GEMRADIO includes built-in help and is available either on one 3.5 inch or two 5.25 inch diskettes with a 90-page manual. It is sold with a money-back guarantee and is priced at U.S. \$35 from Antonio (Toni) Salvadori, 17 Colborn St., Guelph ON Canada N1G 2M4.

KT5X Contester Update. Fred Maas, KT5X, is an old hand at developing logging programs; he's been working on loggers for at least the last six years. Fred offers a specialized contest logger, the KT5X Contester, an early version of which we described in the August 1988 column. The current version is promoted as a highly versatile logger that's adaptable to practically any contest activity. You can configure a particular log to the requirements of whichever contest you're working. Duping is automatic, and the program automatically counts multipliers per contest, band, or mode.

Fred's contest logger has a number of other useful features. For example, the program calculates QSOs per hour; bearings are available during logging by either prefix or grid square; and dupe sheets and QSL labels also are available. A unique "Sweepstakes library" is incorporated in the new version; it includes a substantial portion of the stations actually encountered during Sweepstakes to let you know if the station is a new section multiplier.

The KT5X Contester is available for \$39.95 from Desert Designations, Rt. 9, Box 86-H, Santa Fe, NM 87505.

Brooklyn Bridge Update. In the August 1990 column we examined Brooklyn Bridge V3.0 and were impressed by this unique software. It's a comprehensive file transfer and file management program that allows you to quickly and easily copy, erase, sort, select, rename, organize, and move files on any IBM PC compatible computer and—more importantly—between two computers, including laptops, PS/2s, etc. The program works its magic through a cable that is connected to the parallel or serial ports on both PCs.

As we pointed out, two distinct variations of the program that provide very different approaches to file transfer are included in the same package. One is a version that uses a command line technique and involves specially configuring the PC at boot-up. Included is a second version that provides for slick menu-driven operation from a special file manager appropriately named "Filer." While the command line method gives you the most powerful features, the Filer program provides almost all of the command line capabilities and is quite simple to use.

In the latest version, V3.5, Fifth Generation Systems has put a lot of effort into developing the Filer, since they found that many users were using it as a DOS shell, even when they weren't transferring files. Some of the new V3.5 features include full mouse support, instant launch of programs from the new Applications Menu, an improved directory selection that lets you copy whole directory trees or entire disks, a global file viewing function, the capability to directly view many files in their native formats, an ability to locate duplicate files across an entire drive for easy deletion, and more.

For more information contact Fifth Generation Systems, 10049 N. Reiger Rd., Baton Rouge, LA 70809-4562.

Fig. 1 shows the Brooklyn Bridge Filer Options Menu, while fig. 2 depicts the Copy Menu.

Short Bursts

Getting Young People into Ham Radio. With the advent of the no-code license, there undoubtedly will be many young people who will become interested in obtaining their amateur

radio "tickets." Unfortunately, there are few books written specifically with the youngster in mind. Worse, few public and school libraries have much on their shelves about amateur radio.

Richard Skolnik, KB4CLS, has developed a very informative young person's book on amateur radio, *The Wonderful World of Ham Radio*, designed to properly introduce young people to amateur radio. The book is fun to read and shows youngsters what the hobby is all about and why it can be a valuable part of their lives. It also describes how amateurs learn about computers, electronics, geography, and more through ham radio. The book is heavily illustrated with interesting photos of students learning about and using amateur radio equipment. Importantly, the book shows how to get a ham license and set up a station.

The 38-page book sells for \$7.95 and is distributed by MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762, or through MFJ dealers.

Another Call for Help. When writing to us about something that may have appeared in the column, please mention the date of the column to which you refer, if you know it, so that we can go directly to the issue. Be sure to enclose a SASE or IRCs (if overseas) for a personal reply.

Also, we've mentioned before that we enjoy checking out new amateur radio software and hope that readers will continue to submit their shareware, freeware, and commercially marketed programs so that we can share the information with CQ readers.

However, the volume of amateur radio software programs we receive has increased so much recently that we're finding it difficult to handle all the programs. As a result we've had to take some measures to keep them all under control. One step is to discontinue reviewing unfinished or beta test software; it's got to be complete and available to the ham public for us to cover it in the column. Another step is to discontinue giving feedback to the author other than through the printed column. Note, too, that we're not equipped to use or review some types of specialized software, so the best we can do in such cases is to simply mention the software and how to obtain it. Presently all we can handle is IBM PC compatible, non-Windows software.

Also, we ask that when sending us software you include a copy of the *printed* documentation; please don't ask us to crank out reams of disk-based documentation. With the volume of software we receive, it's just not practical to do so. Also, it's helpful to include copies of any advertising literature and/or spec sheets that go with the software; these help us in writing up your product. Too, you'd be amazed to discover how many disk mailers arrive without so much as a note or letter attached to the disk; sometimes there's an on-disk letter, sometimes not. How can we communicate your product to readers under such conditions?

Wrapping It Up

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

Overheard: Within each and every big problem there's a small problem that's valiantly struggling to get out.

73, Karl, W8FX

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NEWS/VIEWS OF ON-THE-AIR COMPETITION

A Beginner's Primer for Contesting—Part I

The experienced hobby enthusiast often takes for granted their hard-earned knowledge. Contest operators are no exception. This month I want you to place yourself in the shoes of a new tester. In fact, many of you may already be there!

I began my contesting career by operating the Novice Roundup in 1970. To this day, I will never forget the combined exhilaration and confusion from that single operating event. I remember studying the rules, trying to make sense of a series of phrases and colloquialisms such as contest exchange, multipliers, off-times, and QSO points, to name a few. As I stumbled through the event, I wished there was someone I could ask who could tell me more. Needless to say, it was a distressing situation which has caused me to have empathy for the fellows who have written to me in recent months asking for a column such as this.

As discovered in the surveys I've run over the past few years (and the current one is no exception), testers are at the risk of extinction unless we identify, train, and motivate a new and enthusiastic group to replace the aging lot of current pros. If you are an experienced tester, this month's column may not be personally useful to you. However, as experienced testers we should strive to use these words to facilitate our own attempts to bring youth into the fold. If you're new to the sport, read on and let the games begin!

Some Fundamentals

The logical question is "What is a Contest?" Contesting's beginnings took place over 60 years ago. The concept was originally developed in an attempt to improve the operating ability of amateurs around the world and promote growth of the state of the art. Those goals are not only admirable, but reflect many of the same tenets to which we subscribe today.

To the novice tester, a contest is nothing more than a scheduled operating event, usually on a weekend, designed to encourage QSOs with as many other amateurs as possible over a fixed period of time and frequency spectrum. These events

Calendar of Events

Nov.	23-24	CQ WW CW DX Contest
Dec.	7-8	ARRL 160 Meter Contest
Dec.	14-15	ARRL 10 Meter Contest
Dec.	15	ARCI QRP CW Sprint
Dec.	21-22	JT-80 Anniversary Contest
Jan.	1	ARRL Straight Key Night
Jan.	4-5	ARRL RTTY Roundup
Jan.	4-5	Michigan QRP Club CW Contest
Jan.	18-19	HA DX Contest
Jan.	18-19	ARRL VHF Sweepstakes
Jan.	24-26	CQ WW 160M CW Contest
Jan. 25-Feb. 2		ARRL Novice Roundup
Feb.	2	North American CW Sprint
Feb.	8-9	QCWA CW QSO Party
Feb.	8-9	YLRL YL/OM SSB QSO Party
Feb.	9	North American SSB Sprint
Feb.	15-16	ARRL DX CW Contest
Feb.	21-23	CQ WW 160M SSB Contest
Feb.	22-23	YLRL YL/OM CW QSO Party
Mar.	7-8	ARRL DX SSB Contest
Mar.	7-8	QCWA SSB QSO Party

range from domestic affairs to worldwide events such as the CQ World-Wide DX Contest.

Contest operating ability and knowledge are acquired skills that only come from experience. While many operators have some "instinctive proficiency" (e.g., capability to copy fast CW, good hearing, etc.), the fastest way to increase your skill is to meet other testers and dive right into the fray.

Unfortunately, contests can also be intimidating. On CW there are seemingly hundreds of stations sending at least 200 WPM. When listening to SSB, you stumble onto world-class experts working each other at rates of 50,000 QSOs per hour. The new competitor says, "That's not an environment for me!" The key is to remember that each and every station you hear in a contest started like you. The champions of the 90s were the newcomers of the 70s.

There are a few basic points to always keep in mind while operating (much more will be conveyed about this topic next month):

1. Always sign your entire callsign when calling another station.

2. Accuracy is more important than speed. However, try to say/send the minimum amount of information necessary to

complete a valid QSO as defined by the rules.

3. Practice, practice, practice. Not every contest is a "free for all." Many competitions are low key and offer a more subdued environment in which to hone your operating skills.

4. Practice your operating skills outside of contests. There is no substitute for improved CW skills and good ears on SSB.

5. Never give up or feel dismayed. Success in contesting is always a relative term. Most competing stations will never win. Those having the most fun compete against their previous accomplishments or a variety of other personal goals.

Contesting's Confusing Terms

The experienced tester uses a different vernacular. I discover this time after time when a non-amateur looks at my column and undertakes the impossible task of understanding the subject. What follows is hardly a complete list, but it is a beginning step to unleashing the confusion that comes from our jargon.

Broken QSOs: Contest QSOs that have been proven to be illegitimate during the post-contest log-checking process. These types of contacts occur when a callsign or a portion of the exchange is copied incorrectly. It is rare to find entries with no occurrences of this type (new or experienced operators).

Check Sheet: Somewhat antiquated by the advent of computer logging, this is a "paper method" for tracking stations that you have already worked in real-time. The use of a check sheet (in lieu of computers) can help you avoid wasted time in making QSOs with stations that you have already worked before.

Club Competition: Contest clubs are not only a way to lead and encourage new operators into the world of contesting, but they also engage in "mini-competitions" between themselves. You will often see the cumulative scores of club members appearing in contest results such as the CQ World-Wide and ARRL DX Contests, or ARRL Sweepstakes.

Disqualification: Contest operations are scrutinized and suspect to disqualification in ways that are very similar to any other competitive sport. Runners of the 100 yard dash, for example, can be dis-

More CQ WW DX Contest Errata

First, there are corrections to the corrections we listed in the November "1990 CQ WW Contest Errata" box in this column. The list of entries from Spain were **SSB** logs and not CW logs.

Also, the CW Single Operator 10 meter log from D68GA, with over 2 million points, arrived too late for inclusion in the results.

qualified after their second false start. New contest operators should not operate with the fear of disqualification. Most disqualification criteria are designed to identify flagrant abuse of the rules and/or sloppy operating. Each contest usually defines its own disqualification criteria, which should be reviewed before the beginning of the contest.

Duplicates: Contest rules and regulations are generally very specific about the accuracy of our log submissions. For example, a basic contest QSO is not considered valid unless the minimum information (e.g., contest exchange and callsign) is transferred between stations. When a station is worked more than once on a single band (or on any other band in some contests such as the ARRL Sweepstakes), it is considered a duplicate QSO and must be removed from the contest log prior to final submission.

Exchange: The exchange is a pre-determined information set required by the rules to be interchanged between participating contest stations. Contests vary in the content of this requirement. Some common examples include: RS(T) plus QSO Number (e.g., 599001), RS(T) plus CQ Zone, RS(T) plus QTH (DXCC Country, State, County, ARRL Section), etc. This information, in addition to the callsign, is the basic information required to claim a valid contest QSO.

High-Claimed Scores: Many contest sponsors publish a list of high-scoring stations in each major category immediately after the contest. This does not reflect the contest's final results, but is designed to provide an early indication of the contest's top scores prior to log checking.

Multi-Operator: This is one of the operating classifications in contesting. The most familiar form of multi-operator events is the ARRL Field Day. Multi-operator stations can use a single transmitter (e.g., "multi-single" class) or multiple simultaneous transmitters (e.g., the "multi-multi" class).

Multiplier: The multiplier in a contest is one of the mechanisms used to compute a competitor's final score. The actual definition of a multiplier varies by contest. In the CQ World-Wide Contest multipliers are DXCC countries and CQ Zones. Other contests use U.S. states or counties, ITU Zones, ARRL Sections, prefixes, etc. The final score of a contest operation is usual-

ly derived from multiplying the total number of complete QSOs (or QSO points) times your total multiplier.

Operating Period: All contests specify a certain amount of operating time. The major DX contests are usually scheduled for 48 hours. Many others limit total operating time to a subset of this period. In addition, when you take a break, you are often required by the rules to use a minimum time for this "off-time" activity. Refer to individual contest rules for more details.

Operating Frequencies: In order to reduce contest QRM across an entire band, many sponsors suggest certain frequencies for contest operation in their event. This is especially true for specialty events such as state QSO parties. This practice is usually not practical for major events such as the CQ World-Wide due to their high participation level.

QSO Points: Many contests attempt to apply a "weighing factor" to QSOs when computing final scores. For example, a valid QSO within your continent may only be worth 1 point, while contacts with other continents are worth 3 points. Generally, the final score of a contest log is computed by adding all of your QSO points together and multiplying them by the total multiplier (see multiplier definition). Refer to various contest rules for further examples.

Rate: The rate measurement is a method to evaluate the speed with which you are working contest QSOs. It is often used as a measurement of your performance and helps guide the decision-making process for band/mode selection at any point in time. Rates are usually measured on an hourly basis (e.g., 60 QSOs/hour).

Run: This is an operating technique characterized by a contest station remaining on a single frequency for a sustained period of time working other stations that respond to the call "CQ Contest." Contest runs can range from a few minutes to several hours where the operator can log 300-plus stations per hour in its extreme. Although larger contest stations are more likely to experience this operating environment, smaller operations can often enjoy this style of operating for short periods of time.

"Search and Pounce": This method of operating is the opposite of the run. It is characterized by taking the action of tuning up and down the band looking for new stations to work. This is a common mode of operation when the contest is slowing down or conditions are poor. Smaller stations use this operating method more frequently, as they sometimes lack the "horsepower" to sustain long stretches of contest runs.

Single Operator: This is the operating category in which you operate by yourself (as opposed to the multi-operator definition). In recent years there have been additions to this class such as QRP and assisted (e.g., using packet radio/2 meters as a way to help find needed multipliers).

Spotting: With the advent of packet radio, more and more contesters are using this technology to identify or spot rare stations for other competitors. Spotting is common among contest club groups and other packet users.

Closing Comments

Next month's column, "A Beginner's Primer for Contesting—Part II," will focus on specific operating methods and the more esoteric aspects of the sport. Some of the questions that will be covered include:

1. What kind of radio/options should I be using?
2. What about antennas?
3. How do I choose my operating category?
4. How can I maximize my score from a small station?
5. Are contests only for big stations?
6. Where can I get more information about contests?

As is always my tradition, I wish for you and yours a safe and joyous holiday season and Happy New Year in 1992. And remember, the deadline for the March issue is January 1st.

Happy Holidays!

73's, John, K1AR

ARRL 10 Meter Contest

0000Z Sat. to 2400Z Sun., Dec. 14-15

This is the 19th 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 cate-

gory (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 15th to: ARRL 10 Meter Contest, 225 Main Street, Newington, CT 06111.

ARCI QRP Homebrew CW Sprint

2000Z to 2400Z Sunday, December 15

Like the Summer Sprint, this is also a shorty, only 4 hours. The emphasis is on the use of homebrew equipment. Rules are again lengthy and complicated. I recommend you get a detailed copy from K5VOL. Following is a brief summary.

Classes: Single operator, single and all band only.

Exchange: RST and state, province, or country. ARCI members will include their

membership number, non-members their output power. Call must be followed with "HB" or "C" indicating type of equipment used.

Scoring: Contacts with members 5 points. With non-members 2 points. If on different continents 4 points. Add 5 points if station worked is also using homebrew equipment.

Multiplier: Sum of different states, provinces, and countries worked on each band.

Power Multiplier: 1-5 watts output $\times 7$. Less than 1 watt $\times 10$. Over 5 watts is a check log. Output is one-half of input power.

Power Supply Multiplier: Commercial $\times 1$, battery supply $\times 1.5$, solar/natural $\times 2$.

Homebrew Bonus: Plus 2000 if transmitter is homebrew, 3000 if receiver, and 5000 if transceiver. Used on each band.

Final Score: Total QSO points \times state, province, country multiplier \times power multiplier, \times power supply multiplier and + homebrew bonus.

Frequencies: 1810, 3560, 3710, 7040, 7110, 14060, 21060, 21110, 28060, 28110, 50060 kHz.

Awards: Certificates to the top three

all-band and single-band overall winners. And to the top scores in each state, province, and country with two or more entries.

Include a summary sheet showing the scoring, a dupe sheet for entries with 100 or more 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.

Mongolia JT-80 Anniversary Contest

0000Z Sat., Dec. 21 to 0000Z Sun., Dec. 22

This worldwide contest has been organized by the Mongolian Radio Sport's Federation to celebrate the 80th anniversary of the National Liberation Movement of Mongolia.

Classes: Single Operator, Multi-Single, or SWL on a single mode (SSB or CW).

Exchange: Signal Report RS(T) and serial number (59001). JT stations send RS(T) and first year of license.

Scoring: Contacts with Mongolian stations are worth 5 points. Credit 3 points for QSOs with other continents and 1 point within your own continent. Multipliers are DXCC countries and each JT station worked per band. Final score is total QSO points times the sum of multipliers per band.

Frequencies: All amateur bands 160-10 (excluding WARC bands).

Awards: Gold, silver, and bronze trophies will be awarded to the top three scorers in each operating class. Other awards will be supplied to any station submitting a log with greater than 80 QSOs.

Submit separate logs for each band, including the usual summary sheet and signed declaration. Logs must be received no later than two months after the end of the contest. The committee's address is: JT-80 Contest Commission, P.O. Box 639, Ulaanbaatar-13, Mongolia, Asia.

ARRL Straight Key Night

0000Z to 2359Z, Jan. 1
(7 PM Sat. to 7 PM Sun., EST)

This is a friendly meeting on the air using a straight key only. Suggested frequencies on 80, 40, and 20 meters are 60 to 80 kHz up from lower band edges, 10 kHz from lower Novice bands.

Use SKN instead of RST in the exchange to clue in other stations. Include a list of stations worked plus your vote for the best fist heard during that period (not necessarily one you've worked).

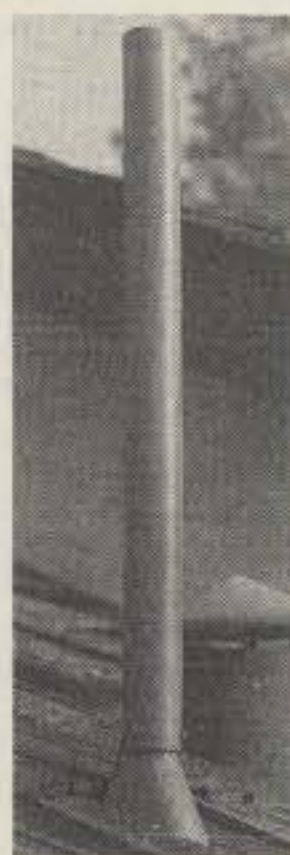
This is not a contest, so any additional chatter is encouraged.

Send your report and vote for "best fist" and "most interesting QSO" to ARRL SKN, 225 Main Street, Newington, CT 06111 by January 10th.



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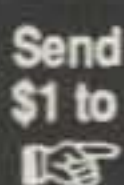
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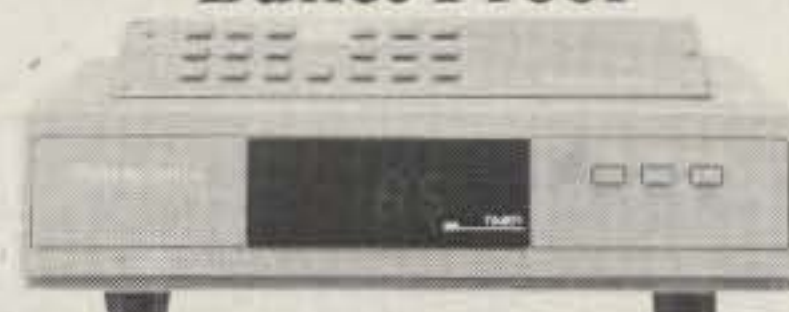
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REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

Are We Ready, Ham Radio Business Communications? FCC Suggests New Concept of Secondary Communications Based on the Amateur Service Having "Excess Capacity"

The FCC's top Amateur Service regulator dropped a "bombshell" at the National Convention of the American Radio Relay League held in Saginaw, Michigan a couple of months ago. Ralph Haller, who heads up the agency's Private Radio Bureau and is himself an Extra class amateur (N4RH), suggested a new category of subordinate on-the-air amateur radio activity. The "Secondary" communications classification would allow amateurs to participate in previously prohibited communications when the amateur bands are not being used for presently authorized operation.

Among other changes, the proposal would allow amateurs to conduct personal and club business over amateur frequencies; to make increased use of amateur spectrum by or for local governments, non-profits, and the news media; and would permit payment of teachers to operate amateur stations in the classroom as part of their salaried responsibilities. Although an exemption exists for the ARRL, no one may be paid for transmitting amateur communications. The lone exception was specifically adopted by the FCC some years ago to permit transmission of telegraphy practice and information bulletins.

Even permission to "order pizza" and other personal on-the-air business transactions would be granted. In short, the "no business communications" ban would be lifted.

Amateurs now provide some communications for others. However, they must refrain from providing regular organizational or business communications for which landline telephone or cellular systems, business radio frequencies, or other services are available. Amateur safety-of-life and property communications support is permitted, but should stop when the emergency is over and when other radio services should be used—even if the other services would cost money to use.

Those traditional policies would end under the new proposal. The FCC has sug-

gested that the League file a Petition for Rulemaking to begin the changes.

Key to the concept is that amateur radio is supposed to have "excess capacity"—more spectrum than it needs—and that the extra capacity could be opened up for non-amateur or quasi-amateur use. Emergencies would continue to take priority. Regular amateur communications would be classified into nine categories and non-amateur communications would take a secondary status.

The suggested changes are intended to reduce the pressure on the FCC from some net, bulletin, and phone-patch operators; "swap shops"; volunteer groups; marathon organizers; bike, dog, and you-name-it races; missionaries; and organizations who want more liberal rules about what communications are permitted. The lobbying, letter writing, and Congressional inquiries on this subject seem to be having an effect. The changes could transform amateur radio into more of a "Personal and Business Radio Service."

The FCC staff made it very clear to us that this really was not their recommendation. They were merely suggesting a way that could positively respond to the hundreds of requests and inquiries they receive annually about amateur participation in certain communications.

Filing ARRL Reports By Packet

One amateur asked the FCC about filing ARRL Field Organization reports over amateur packet radio. He also wanted to use amateur radio to transmit other routine organizational traffic such as those for the League and other emergency groups.

Communications relating to immediate safety of human life and protection of property are, of course, allowed on the amateur bands. The key words here are "routine" and "immediate safety and protection. . . ." An exception to the "routine prohibition" is allowed only for emergency training exercises by amateurs in conjunction with local civil defense. And even these must be kept to not more than one hour a week.

"I understand that you cannot go so far as to make a list of the do's and don'ts of amateur radio. However, we look to you for

clarification on this matter. . . . Also, we have to look at the new hams who are coming into packet radio due to the no-code license. I am sure there will be some confusion on their part and we need to help them get started without conflict between the League and 97.113."

The FCC replied, in part: "Section 97.113(a) specifically prohibits an amateur station from transmitting any communication the purpose of which is to facilitate the business or commercial affairs of any party. . . . (T)he term 'business,' in this instance, is used in the broadest context. It includes all types of communications that are intended to facilitate the regular business or commercial affairs of any party, whether individual or organization, whether for-profit or not-for-profit, whether charitable or commercial, or whether government or non-government.

"... In your case, if amateur service frequencies are used to facilitate the collection or reporting of information for the ARRL, then the amateur service is being used to facilitate the regular business or commercial affairs of the ARRL. The use of the amateur service to transmit this information is prohibited by Section 97.113(a) of the Commission's Rules."

Letter Kicked Off Discussions

We understand that this rule interpretation launched a series of meetings between the ARRL and the Commission about the business rule. The result of those meetings was revealed in a speech given by the FCC Private Radio Bureau chief to the ARRL National Convention in Saginaw, Michigan, August 24.

Here are the remarks of Ralph Haller, N4RH:

"We can't help but be impressed with the pioneering work you are doing with your new high-speed systems. Not only are you able to accommodate the influx of new operators, but it appears from what you are telling us, you have an excess capacity.

"We understand from your letters and phone calls that you are anxious that your excess capacity be used to help alleviate the demands being placed on the maritime frequencies, the common carriers, the

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public safety frequencies, the government systems, the business frequencies, and so on.

"The existing absolutely-no-business rule, unfortunately, often stands in the way of your helping out. Its well-meaning purpose is to help preserve the character of the amateur service. It is a device to prevent the exploitation of the amateur service. It does, with all the subtlety of a meat ax!

"We know that it is an unpopular rule within the amateur community. Quite frankly, we have always been more than a little uncomfortable with it. As frequency managers, we feel overly bureaucratic when we have to tell you that you must not use your unused amateur service frequencies for non-amateur purposes.

"After all, the real anti-exploitation rules are rooted in your respect for the principles for which your frequencies are made available to you, and by your good judgment."

(Following is a slide that was shown by N4RH. In this column the slide presentations by N4RH are each shown in a gray box.)

Non-Amateur Communications: Suggestions Based on Requests, Secondary Usage

- Parade logistic support
- Non-profit organizations
- Government agencies
- Public safety agencies
- Classroom instruction
- Sell apparatus
- News media information
- Club business
- Personal business
- NOAA, WWV, etc.
- Other?

"We have suggested to your League Officers, therefore, that they consider the possibility of asking for rule making to allow your excess capacity to be used on a secondary basis for certain non-amateur communications.

"This catalog was compiled from your letters and phone calls over the years asking for permission to use the amateur service frequencies for non-amateur communications.

"Obviously, your non-amateur communications would have to be limited to only those areas where the FCC regulates communications because of the prohibitions in the International Regulations. Domestically, however, you might use your frequencies to provide logistical support for a parade, race, marathon, or similar gathering.

"You might provide communication assistance to a non-profit organization, charitable organization, or public-safety agency;

"You might participate more fully in governmental systems like Skywarn;

"You might help provide classroom instruction in schools;

"You might sell or trade to amateur operators electronic apparatus;

"You might provide information to your magazines and newsletters;

"You might conduct your radio club business over the air;

"You might conduct your personal business, including ordering pizzas;

"You might provide information to the news media, including broadcast stations, newspapers and magazines;

"You might also rebroadcast the programs from other stations like the NOAA weather, Voice of America and WWV."

Precedence

Amateur Service Frequency Usage
Suggestion based on Section §97.101

- PRIORITY
Providing emergency communications
- PRIMARY
Conducting amateur communications
- SECONDARY
Conducting non-amateur communications

"Providing emergency communications would continue to have the top precedence. The primary usage of your frequencies, moreover, would continue to be your regular amateur service communications. When, and only when, those two traditional usages are insufficient to completely occupy your bands, the unused frequencies would be available to you on a secondary, non-interference basis, to carry on non-amateur service communications."

Providing Emergency Communications From Part 97, Subpart E

- Operation during a disaster
- Safety of life
- Protection of property
- Station in distress
- RACES (except drills)

"The number one priority is covered by Subpart E in your rule Part 97. For some 42 years, providing emergency communications has been at the very top of the list of purposes of the amateur service in the United States. There would be no changes in these rules."

Amateur Service Communications Primary Usage

From Section 97.503(c)

- Rules
- Station operating procedures
- Radio wave propagation
- Amateur Radio practices
- Electrical principles
- Practical circuits
- Components
- Signals and emissions
- Antennas and feed lines
- Other?

"The primary usage of the amateur service frequencies is also treated in Part 97. This list should look familiar to you. These are the very topics about which you had to learn in order to pass the examinations for your license. Exchanging ideas on how to best operate an amateur station would continue unchanged."

Business Rule Prohibited transmissions

[Suggestions based upon Phil Karn/KA9Q letter to QEX and on ARRL.]

- No amateur operator shall sell a communication service that uses amateur service frequencies.
- The control operator of an amateur station may accept compensation for periods of time during which the station is transmitting:
 - Morse practice
 - Information bulletins
 - Classroom instruction

"We have been talking with your representatives about the best way to codify a

"After all, the real anti-exploitation rules are rooted in your respect for the principles for which your frequencies are made available to you, and by your good judgment." . . .

**Ralph Haller, N4RH
FCC, Washington.**

new rule. This suggestion is based upon a letter that appeared in your QEX magazine. It would simply state that 'No amateur operator shall sell a communication service that uses amateur service frequencies.'

"The exception for W1AW to pay its control operators would continue. It adds the new exception that you want to include for classroom instruction.

"The quantity of secondary communications your systems could carry would be determined by several factors. For instance, the excess capacity of your systems in your specific locale would be an important factor. Providing communications for a race in Alaska is an entirely different situation than it would be if the race were held in a more densely populated area where more stations engage in amateur communications.

"This approach may also help solve some of the problems you have been having in managing your high-speed automatically controlled systems. You would be able to transmit, on a secondary basis, the type of messages that gave rise to the unfortunate incident on your packet system earlier this year.

"I hope that you will give this suggestion your careful attention. You could be of great assistance to those in need of better communications, and properly imple-

mented, this approach should have no adverse effect upon what you are now doing."
(end of Haller speech)

Conducting Business On The Amateur Bands

I ordinarily do not editorialize in this column, but it appears to me that the concept of "unused amateur service frequencies" is a *red flag* indicating that something unusual is going on—something that is contrary to what we have been saying as amateurs. I feel the concept of allowing non-amateur business on the amateur bands because we have "excess capacity" is dangerous.

If there are amateurs who believe that our spectrum should be opened up to non-amateur communications, then they should document this excess capacity. They should keep the results from Congress—where our elected representatives are signing on to H.R. 73, a bill to protect our "excess" spectrum from encroachment by other services. We'll also have to hide the data from the FCC's Office of Engineering and Technology, which has been told by thousands of amateur commenters that we intensively use our spectrum and thus no reduction is acceptable.

But maybe they're right. Maybe the no-business rule is silly, quaint, and inconvenient. We passed tests. Why should we

have to pay for cellular phones when we can call Domino's Pizza over the auto-patch?

Why should we require race organizers, churches, firefighters, NOAA, the Voice of America, or amateur publications to spend money on mobile radios, telephone service, FAXes, data links, or the U.S. Mail when the amateur service is available for free?

Why shouldn't we be allowed to provide non-emergency service to television and radio broadcasters? News-gathering is fun. Why require broadcasters, police, and mariners to use the spectrum allocated for their use?

Is 97.113 antique, or does it keep amateur radio unique?

Letter Received From Ex-FCC Official

Ray Kowalski was an official with the FCC for nearly two decades before leaving to enter the field of communications law in the private sector. His last position at the FCC involved supervising several radio services, including the amateur service. Although not a ham, he wrote to us about the Haller proposal. Ray has very strong feelings and deeply held principles about the service. I'd like to share some of his thoughts with you.

"Although it is now nearly four years since I left the FCC, I still like to keep

abreast of developments in the Amateur Radio Service. From time to time since my departure for the private practice of law, I've been able to assist you and others who have retained my services in matters relating to ham radio.

"I recently learned of a proposal that was floated by Ralph Haller, Chief of the FCC's Private Radio Bureau, at the ARRL National Convention in Saginaw, Michigan on August 24, 1991. Although I have not seen widespread discussion of this proposal, I, for one, view it with alarm. In my view, this proposal contains within it the seeds of destruction of the Amateur Radio Service as we know it.

"So let me do what I can to get the dialogue going by telling you why I feel the way I do. Undoubtedly, this will be viewed by most of your readers as a contrarian position.

"There presently exists in the Amateur Radio Service a tension among the principles that dictate the basis and purpose of the Amateur rules. These principles are stated in the very first Amateur rule, Section §97.1 of the FCC's rules. These principles declare that the Amateur Service is at once a hobby, a training ground, a medium of international goodwill, and a source of voluntary noncommercial communications, particularly emergency communications.

"At times, the implementation of these principles results in conflicts among users

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Dick Goodman, WA3USG
(73 Magazine, June 1991)

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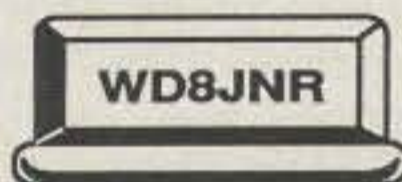
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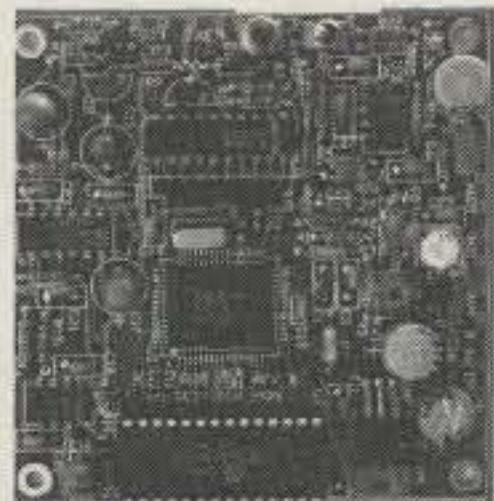
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as well as among the regulations themselves. This is why I say there is a tension among them. But it is a healthy tension, one that reflects the living and vibrant nature of Amateur radio. The forces favoring one principle may be strengthened by events or fashions of the day, but they never get too far before the forces favoring the other principles combine to rein them in and keep the system in equilibrium.

"Mr. Haller, however, has made a proposal that will upset the balance. If his proposal becomes law, the voluntary noncommercial communications component would be expanded. Based on my experience, both in and out of government, this expanded component would quickly overwhelm the rest of amateur radio.

"Mr. Haller has proposed that amateur radio frequencies, to the extent that they have EXCESS CAPACITY, be used to support non-amateur communications on a SECONDARY basis and WITHOUT COMPENSATION.

"Before I go much farther, let me say that Ralph Haller and I are well acquainted. We worked together for many years at the FCC. I believe I know Ralph and I believe he places great value on the Amateur Radio Service and its licensees. Thus I do not believe that he would deliberately make any suggestion that would not be in the best interests of the Service. In fact, I could almost believe he made this suggestion with tongue in cheek, as a way to show the incessant stream of petitioners for this or

that exemption from the 'no business communications' rule (Section 97.113) the logical outcome of their petitions. However, since he made the suggestion at an FCC Forum, I must conclude he is serious.

"Mr. Haller envisions amending the Amateur rules to permit amateurs to provide communications assistance to public safety agencies, charitable organizations, schools, news media, governmental agencies, and others. Think of it: you could set up and run communications for parades and marathons; conduct club business; even order a pizza on your 2m autopatch, guilt free!

"If there is excess capacity on the ham bands, the service needs to fill that capacity with more hams, not business users." . . .

Raymond A. Kowalski
ex-FCC official, Washington.

"As long as the communications made use of excess capacity on Amateur spectrum and did not interfere with the traditional hobby-type and emergency (i.e., disaster, safety of life, protection of property) communications and as long as you did not get paid for it, it would be legal.

"Judging from the number of requests for waiver of the no-business communications rule I saw when I was at the FCC, I would have to say that this proposal would have a seductive allure for many amateurs. Most amateurs I have met are anxious to donate their time and communications savvy to causes like those mentioned above. (Although some just get an emotional payoff out of playing the role of communicator.) So I don't have to tell you all of the good things that could come out of a proposal like this. But at what price? Like the Sirens' song, this proposal must be resisted, for in this most appealing direction lies shipwreck.

"First, exactly what is 'excess capacity'? I take the term to mean that the Amateurs have more spectrum than they can use for normal Amateur communications either now or in the foreseeable future. Mr. Haller has taken the existence of excess capacity as a given. Is this point conceded by the Amateur Community? If so, it is a dear price to pay in exchange for the weakening of the no-business communications rule.

"The last time the FCC perceived that the Amateur Service had excess capacity, they removed 2 megahertz of that capacity in General Docket 87-14. Now it appears that the FCC is not even waiting for a spectrum re-allocation proceeding. Rather than moving the excess spectrum to other radio services, it will simply allow the incursion of outsiders into the Amateur Service.

"Believe me, once this camel's nose gets under the tent, there's no getting rid

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Say You Saw It In CQ

of it . . . and there's no stopping the eventual appearance of the head, neck and shoulders.

"And who are these outsiders? In almost every situation I can think of, they are groups who already have spectrum at their disposal. The federal government has so much spectrum, there are bills in Congress to pry out 200 megahertz of it and distribute it to non-government users. Local governments and public safety entities are eligible in their own land mobile services. Broadcasters and news media have their own relay frequencies. Even ordinary businesses have vast blocks of spectrum available.

"So why is there so much demand to use Amateur frequencies? Because it's cheap to do, primarily. Ham gear is as good as (if not better than) most land mobile equipment on the market. Yet it is available at a fraction of the cost. Also there are no pesky air time charges for using ham radio, the way there are with cellular calls. Finally, the licensing arrangements are more flexible: all you need is your 'house ham' to provide the call sign and you're ready to go! These interests are only too willing to take advantage of the good nature and general willingness of hams to be of service whenever they can. They have found a way around a shortage of funds or an internal bureaucracy. The hams, for their part, think they are helping a worthy cause. But if you look deeper, you see that they are subsidizing an effort that could, if it needed to, provide its own communications.

"Next, what about 'secondary' communications? This is a term of art that means the communications may not cause harmful interference to communications that are 'primary' in the band and are not protected from harmful interference from those primary communications. (See Section §2.104(d)(4) of the FCC's rules.) This is a nice concept, but it is difficult to enforce.

"As a practical matter, there are no communications police readily available to protect the rights of the primary communicators in any given instance. In other words, the protection of traditional amateur communications achieved by relegating non-amateur communications to secondary status is largely illusory. It is much like saying cellular communications are private, because there is a law against monitoring them.

"Finally, let me see if I have this straight: the Amateurs would let everybody else use their frequencies, even for commercial, profitable purposes such as broadcasting, but what makes it legal is that the Amateurs will not receive any monetary compensation. I would make this deal every day for my land mobile clients, if I could! Spectrum is so scarce, we do not care where it comes from or on what basis. And the price is right.

"Undoubtedly many good causes will

come forward in favor of Mr. Haller's idea. The problem is that there is no way to draw the line and allow only the 'good causes' to take advantage of relaxed no-business communications rules. If one ham can coordinate a parade, then another ham can coordinate a professional golf tournament. If one ham can assist police patrols, another ham can coordinate plant security. If one ham can order a pizza on the way home from the kids' soccer game, another ham can check for messages on the way back from a sales call. In short, you cannot get just a little bit pregnant.

"The flexibility already contained in rule Section §97.113 and the entire Subpart E of the FCC's rules, which is devoted to emergency communications, is already very broad. Parades, races, marathons and other public gatherings already have relief. So do swap meets and news events. There is even an exemption for space shuttle communications. These rules are flexible enough to allow most of the worthwhile communications that hams are interested in providing. The wholesale abolition of the business barrier is as bad as the wholesale prohibition of business communications, which, as we can see, is not as strict as Mr. Haller makes it out to be.

"Massive changes are afoot in the world of two-way communications. Mr. Haller's

land mobile staff just initiated PR Docket 91-170, the so-called 'spectrum refarming' proceeding, which has the potential to completely revise the land mobile communications regulatory framework in order to free up spectrum to support developing technologies. Do you think Mr. Haller's idea to use ham radio to support business communications is coincidence? Politically, this should be a time of spectrum vigilance for Trojan horse proposals. If there is excess capacity on the ham bands, the service needs to fill that capacity with more hams, not business users. Because, there are more of them than there are of you. Think about it."

The letter was signed: "Raymond A. Kowalski of the law offices of Blooston, Mordkofsky, Jackson & Dickens, Washington, D.C."

Again, in all fairness to Ralph Haller, we have to make it crystal clear that his office is merely responding to multitudes of requests from amateurs and amateur organizations.

I have a very serious problem with any concept that is based on the supposition that we have more spectrum than we need for legitimate amateur communications. Do we really want this proposal? Certainly not in its present form!

73, Fred, W5YI

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The Best DX Season Ever

The end of the year is a good time to look back over the past twelve months and evaluate what kind of year it has been. This certainly has been an exciting year for DX, with Sunspot Cycle 22 rebounding and an unprecedented number of extremely rare countries on the air. And not just "on the air," but on the air in a big way, with multiple operators and thousands of contacts. In fact, 1991, and the two years preceding, may well be the best three-year period in the history of DX.

Sunspot Cycle 22, which peaked in July 1989, reached a secondary peak in early 1991. While not the first Sunspot Cycle to rebound to a second activity peak, Cycle 22 came back farther than any other cycle, perhaps due to its fastest-even rise from minimum to peak—only 34 months. While Cycle 22 didn't exceed the previous cycle to move into the number two ranking, it didn't miss by much. The high levels of solar activity provided DXers with good high-band propagation, very workable long-path openings, and some DX possibilities on some bands practically around the clock. The only thing we didn't have were the widespread 10 meter openings, when stations from all corners of the globe come in simultaneously. (We did enjoy a little of this wonderful propagation, but most old timers felt the 1957-58 peak was better.)

More important than the excellent propagation, however, was the extensive DXpedition activity, especially from the rarest countries. The Top Ten Most Wanted countries tend to remain the same for many years running. There are excellent, long-lasting reasons why the Most Wanted are that way, and these reasons don't change rapidly—until now.

There are two reasons why countries are very difficult to work: physical problems and political complications. Some countries are so remote, in such harsh environments, that only a major operation with multiple operators and thousands of dollars of donations can hope to safely succeed. Examples of this are Bouvet 3Y, South Sandwich VP8, and Heard Island VK0. Putting countries such as these on the air requires organization, fund-raising, lots of research, and persistence.

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LUNDY
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Photo F. ELIN
Fratercula arctica - Puffin - Macareux moine

The Expeditions Dominique Elin, which will operate from Aland Island this month, offers philatelic QSL cards.

The other reason why countries are not on the air is political: amateur radio is simply not permitted in the country, usually because of the fear of spying and potential threats to the present government. The Top Ten Most Wanted three years ago were mostly in this category: (1) Albania ZA, (2) Bouvet, (3) Burma XZ, (4) Yemen 7O, (5) PDR Yemen 4W, (6) Vietnam XV, (7) Afghanistan YA, (8) Laos XW, (9) Spratly Island 1S, and (10) Bangladesh S2. Of the rest of the Top 50, 25 were rare because of the difficulty of getting operating permission, and not because of any physical problems getting there.

This situation has changed dramatically within the past three years, and probably has more to do with the availability of rare countries on the amateur bands than good band conditions, major DXpeditions, DX foundations, and the widespread use of high-tech radios. The increasingly global nature of commerce and communication has broken down isolationist barriers and made all countries more dependent on international relations. Also, it hardly makes sense to ban amateur radio when residents of any country have direct facsimile communications around the world.

Even in those countries still torn by civil war or active fighting, amateur radio has gained a foothold. The idea of major amateur operations from Afghanistan, Ethio-



Several Tadzhikistan amateurs are looking to complete their Worked All States on 40 and 80 meters this winter. Look for Serge, UJ8JX; Alex, UJ8JCQ; Nodir, UJ8JMM; and Serge, UJ8JI (shown here at the UJ9JWU club station), on the low bands this winter.

pia, Burma, Spratly Islands, and others seemed absurd only three years ago, but YA0RR, ET2A, XY0RR, 1S0RR, etc., have made believers out of thousands of skeptical DXers.

Perhaps the best news is the fundamental change in the way many formerly isolationist countries have come to view amateur radio. When Albania, the most inward looking country in the world, opens its arms wide to amateur radio, you know

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Endorsements

Mixed: 450 WK3Z, ZP5JCY, HB9BHY, JA1-20762/BV, 500 WK3Z, ZP5JCY, HB9BHY, JA1-20762/BV, 550 WK3Z, JE1RRK, ZP5JCY, HB9BHY, 600 WK3Z JE1RRK, ZP5JCY, HB9BHY, 650 IK2LEY, VE1HA, K2H2F, ZP5JCY, HB9BHY, 700 IK2LEY, VE1HA, K2HWF, ZP5JCY, HB9BHY, 750 IK2LEY, ZP5JCY, HB9BHY, PA0JMJ, 800 IK2LEY, ZP5JCY, HB9BHY, PA0JMJ, 850 ZP5JCY, HB9BHY, PA0JMJ, 900 ZP5JCY, PA0JMJ, 950 ZP5JCY, PA0JMJ, 1000 ZP5JCY, PA0JMJ, 1050 ZP5JCY, 1100 KM5R, ZP5JCY, 1150 KI3L, KM5R, ZP5JCY, 1200 KI3L, ZP5JCY, 1250 KI3L, N3ED, ZP5JCY, 1300 N3ED, ZP5JCY, 1350 ZP5JCY, 1400 ZP5JCY, 1450 ZP5JCY, 1500 ZP5JCY, 1600 ZP5JCY, WB2YQH, 1650 ZP5JCY, 1700 ZP5JCY, 1750 ZP5JCY, 1800 ZP5JCY, 1850 ZP5JCY, 1900 ZP5JCY, 1950 ZP5JCY, 2000 ZP5JCY, 2050 ZP5JCY, 2100 ZP5JCY, 2150 ZP5JCY, 2200 ZP5JCY, W2FXA, 2250 ZP5JCY, 2300 ZP5JCY, 2350 ZP5JCY, 2400 W1BWS, ZP5JCY, 2450 ZP5JCY, W1BWS, 2500 W1BWS, ZP5JCY, 2250 W1BWS, ZP5JCY, 2600 ZP5JCY, 2650 SM3EVR, 2700 SM3EVR, 3000 N6JV.

SSB: 350 IT9JPK, TG0FRACAP, 400 IT9JPK, IV3JDD, VE7CXN, 450 IT9JPK, IK2LEY, KZ5ZD, 500 IT9JPK, IK2LEY, I6YEF, 550 IT9JPK, IK2LEY, I6YEF, EA3EJI, NK0S, 600 IT9JPK, IK2LEY, EA3EJI, NK0S, 650 EA3EJI, 700 N3ED, 750 N3ED, 750 N3ED, 1000 K2EEK, 1050 KF7RU, 1100 K3ZPG, LUBDY, 1150 LUBDY, 1350 KH3JJH, 1400 HK3JJH, 1450 HK3JJH, 1500 HK3JJH.

CW: 350 W2VT, ZP5JCY, K1CVR, KA5RNH, BV2TA, JP1RIW/BV, 400 W2VT, ZP5JCY, K1CVF, KA5RNH, BV2TA, 450 W2VT, ZP5JCY, K1CVG, KA5RNH, BV2TA, 500 W2VT, ZS6NT, ZP5JCY, KA5RNH, BV2TA, 550 W2VT, ZP5JCY, KA5RNH, BV2TA, 600 W2VT, ZP5JCY, KA5RNH, BV2TA, 650 W2VT, ZP5JCY, KA5RNH, BV2TA, 700 ZP5JCY, BV2TA, 750 ZP5JCY, 950 N3ED, 1000 N3ED, 1550 KL7AF, 2500 W3ARK, 2550 W3ARK.

10 Meters: N1IBQ
15 Meters: JE1RRK, IK2LEY
20 Meters: IK2LEY, ZS2BCR
40 Meters: TRG9AJR, IK2ILH

Asia: K1CVF
Africa: KM5R, EA3EJI
No. Amer.: IK2LEY, N1IB
So. Amer.: KM5R
Europe: JE1RRK, EA3EJI

Award of Excellence: KC8PG, ZP5JCY

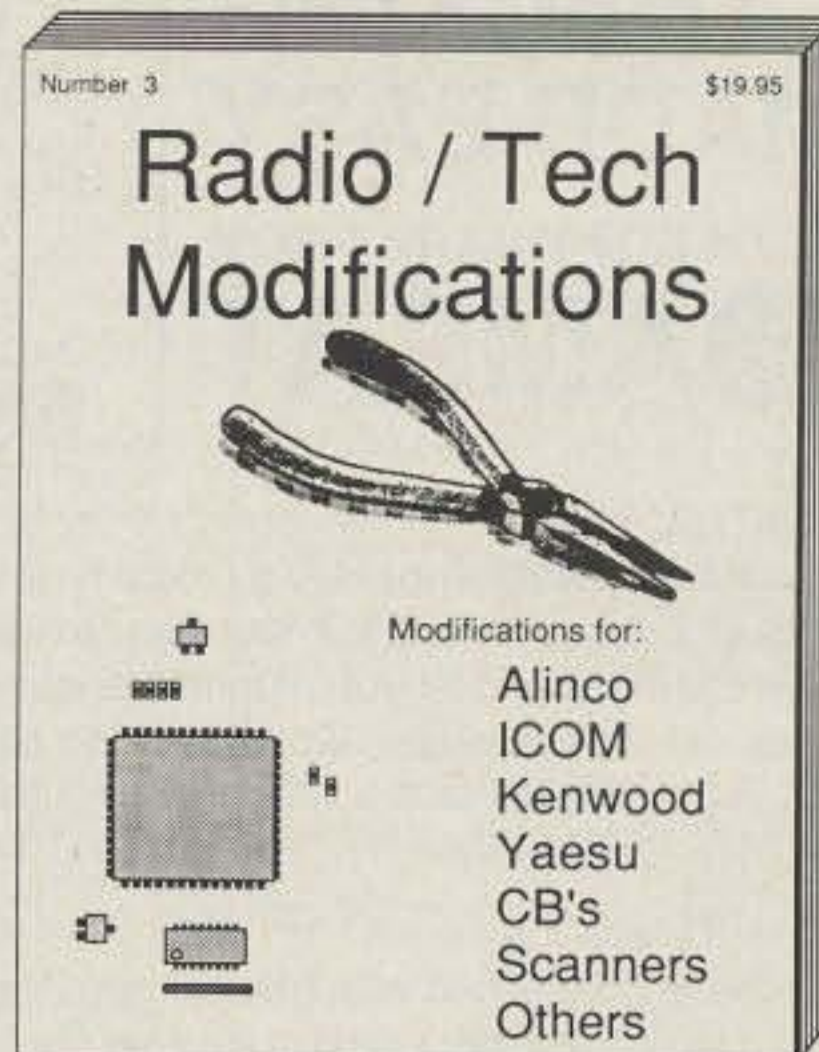
Award of Excellence 160M Bar: ZP5JCY

Award of Excellence Plaque Holders: I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2**, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KB0G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YLW4, NN4Q, KA3A, VED7WJ, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VE3FXR, N4MM.

Award of Excellence Plaque Holders with 160 Meter Endorsement: FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, H18LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KB0G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, K9QRF, NN4Q, W4UW, NX0I, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O.

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CIRCLE 40 ON READER SERVICE CARD

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the world has come a long way in the past few years. Bangladesh is another country that recently "approved" amateur radio, thanks to the help of the International Amateur Radio Union; Eric Biorck, WZ6C; and others. Mozambique, Malawi, Burkino Faso, Laos, Angola, and others have gone from countries with little or no amateur radio activity to places with multiple operations and active resident amateurs. Look for this trend to continue, as countries realize that (a) amateur radio is no significant threat to their government, and (b) an active amateur service is a great way to get self-training electronics technicians to compete in today's global economy.

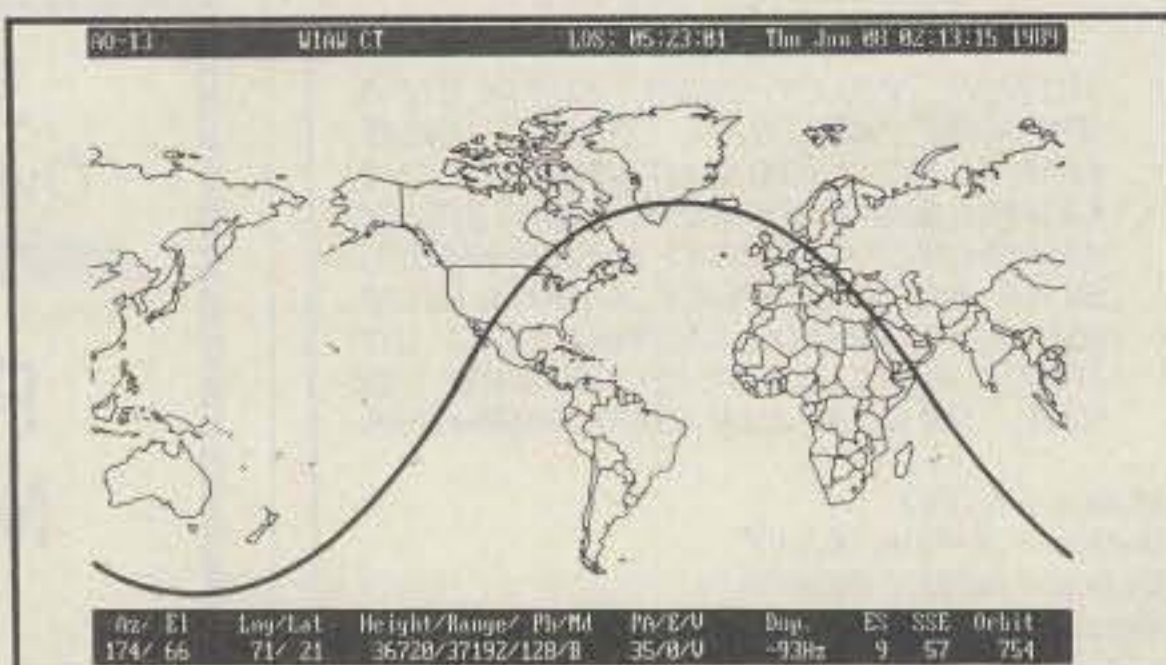
This combination of factors has made for profound changes in the DX world. For much of the post-WW II history of DX, it has taken ten or more years to reach the DXCC Honor Roll. (DXers must have a confirmed DXCC country count within ten of the number of current DXCC countries to be eligi-

ble for the Honor Roll.) The Honor Roll reflected years of DX persistence and effort: staying up at night to catch short-lived, one-man DXpeditions; remaining continuously active to keep abreast of the latest DX news and rumors; and honing DX skills to be among the first to work a rare station who might make only a few hundred contacts before moving on. "Working them all" was an impossible dream for DXers who joined the fray in the past 20 years, with Albania and Burma off the air for decades.

All this has changed, much of it in the past few years. An active amateur, armed with a tribander, a modern 100 watt transceiver, subscriptions to a DX newsletter or two, and access to the PacketCluster™ spotting network could be on the Honor Roll in less than three years. If we go back a couple more years, the only three DXCC countries not readily workable are Iran EP, South Sandwich VP8, and Clipperton FO.

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Line representation of QuikTrak 4.0 World Map

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The dismantling of some towers should be done with the use of a crane in order to minimize the possibility of member, guy wire, anchor, or base failures. **Used towers in many cases are not as inexpensive as you may think if you are injured or killed.**

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1 N4VZ

15 Meter SSB

396 JK2IKQ 397 WD4KXB

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858 AK7K 859 WD4KXB

10 Meter CW

118 KC8PG 119 JH3JJS

12 Meter CW

2 SM3EVR

15 Meter CW

213 EA7AZA 215 KC8PG
214 N4OT

20 Meter CW

403 N4OT 405 KC8PG
404 OH3FQ

40 Meter CW

145 G3MXJ 146 KC8PG

17 Meter Mixed

6 W7ULC

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40-10M SSB N2JNZ

Phone

603 W4TMN

All CW

2 WA1G

All Band WAZ SSB

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3815 I8XVP 3820 W8AKS
3816 NS8R 3821 OA4ANR
3817 G0LRX 3822 ZL1WG
3818 WO2T

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7075 WA4F 7081 K4AVU
7076 KM4ZO 7082 ND2K
7077 JR2DPL 7083 OH1MGZ
7078 K7TED 7084 JA4IYL

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is \$4.00 for subscribers and \$10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

South Sandwich is due on in March, and another Clipperton operation may come together this summer. That means a reasonably active and moderately skilled DXer could work all DXCC countries but one in less than six years! (And EPs are easy to work, but so far the DXCC desk has not accepted any of the current EP QSLs for DXCC credit.)



Lennart Svensson, SM5ENX, operated from Oblast 117 UA3Z/ in July, making more than 1000 contacts using a homebrew UW3DI transceiver. Members of the UZ3ZYD club include (from left, back) RW3ZC, RA3ZBO, RA3ZFW; (front) RA3ZN with son, RA3ZAP, UA3ZOO, RA3ZH, SM5ENX, and RW3ZA.

On the one hand, this is wonderful news for DXers. No longer do you have to add longevity to your other DX skills to "work them all." The average age of Honor Roll DXers will drop precipitously in the coming months, as QSLs from Burma, Albania,

South Sandwich, Bangladesh, and others arrive. The Honor Roll formerly listed about 10% of all active DXers (and lots of dead ones; Silent Keys remain on the Honor Roll for a couple of years). Within the next year, I wouldn't be surprised to see more than

5 Band WAZ

As of August 31, 1991, 331 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

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- ZS6BCR
- K9UWA
- IK4GME
- JA7JWF
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|------------|-------------|
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| K6YRA, 199 | W0PGI, 199 |
| PY7ZZ, 199 | W2YY, 199 |
| DL9WW, 199 | W9WAQ, 199 |
| K0CS, 199 | I8IGS, 198 |
| KB0G, 199 | VE7AHA, 198 |
| UA4RZ, 199 | SM6AHS, 198 |
| AA4KT, 199 | K1ST, 198 |
| K7UR, 199 | W1JR, 198 |
| K9EL, 199 | 4X4DK, 198 |

740 Stations have attained the 150 zone level as of August 31, 1991.

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 9H1EL to LA120
 9H30Z to DL1SBR
 9H8E to HB9DLE
 9J2AD to I0WDX
 9J2HN to JH8BKL
 9K2JH to KE4JG
 9L1US to WA8JOC
 9M2HB to AA6BB
 9Q/KC6YDN to KC6YDN
 9Q5FF to WA9PCI
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 C9RZZ to SM7DZZ
 CQ4DX to CT4DX
 CR0LBD to EA4KK
 CY0SAB to VE1CBK
 CY9CWI to VE2CW
 D2/RT5UY to RT5UY
 D2/UT4UM to UT4UM
 D2ACA to LZ2DF
 D44AA to OZ5II
 DL1SCQ/TF9 to DL6DK
 EA9TY to FB9HW
 ED2IZ0 to EA2LZ
 ED7TI to EA4KK
 ED8LB0 to EA4KK
 EJ7FRL to EI2BB
 EK250RA to UA9OBA
 EN50PQ to UA1ZO
 ES1RA/UM to ES1RA
 ES7R/0 to ES7FU
 EX8V to UF6FFF
 F5EU/ST2 to F6CYY
 FD1NBX/P to FD1NBX
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 FJ5BL to F6AJA
 FK8FI to F6GZA
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 UA6U/VE6JO to VE6JO
 UA9K/RA9LI to RA4HA
 UB6G/UA3DQH to RB4GA
 UD6DKW to W3HNK

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 UR7G to RB7GG
 UR8U to RB5UU
 V63DJ to KA3DBN
 V63ST to KB6CC
 V73AX to K4ER
 V73AZ to KX6DC
 V8500 to N200
 V85XYL to N200
 VE1MQ to VE1BTT
 VK2DXI to VK2DXI
 VK7RX to AB4XM
 VK8SD to K1SE
 VP2EI to KD6WW
 VP2EPN to KA3DBN
 VP2EST to KT8Y
 VP2M/AA6MV to AA6MV
 VP2MA0 to WN50
 VP2MLD to KC4DWI
 VP2VE to WA2NHA
 VP2VI to AB1U
 VP5VEF to WA4SGR
 VP5VPX to W4NPX
 VP8BFH to WA3ZKW
 VP8CDJ to GM4KLO
 VP8GAV to GM0LVI
 VQ9CQ to KA6V
 VQ9RR to N3GOK
 VR6YL to WD6GUD
 VS6/N200 to N200
 VU2LE to K6JG
 VU7JH0 to VU2APR
 XE1VIC to KV6U
 X060S to CE60S
 XT2BW to WB2YQH
 XU1NQ to OK1NQ
 YB8ASX to K0IEA
 YB8HX to KA6KNN
 YC4GDZ to YB4FNN
 YJ8AFU to NA5U
 YJ8NX to VK2FCA

YJ8RN to N9DRU
 Z21BA to N5FTR
 Z21HQ to DF2RQ
 ZD8WD to G4RWD
 ZD9BV to W4FRU
 ZF20Q to W8BLA
 ZF20P to N4UCK
 ZK1RY to HB9DCP
 ZK1XB to HB9DKO
 ZP6CW to ZP6XDW
 ZS1ACJ to N1EYZ
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 44000 USSR
 4S7WP to P.O. Box 80, Colombo,
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 BZ10K to P.O. Box 6111, Wang,
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 Lebanon
 R420A to P.O. Box 115,
 Volograd 400066 USSR
 SV0CJ/5 to P.O. Box 349,
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 VP8CGL to P.O. Box 260, MPA
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 Z21HS to P.O. Box 4110,
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March 23, 1991

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tries in the past five years. With about 250 countries on the field-checkable list, this means the Active Honor Roller would have to catch 50 of the 75 most difficult countries in the past few years. This should be readily attainable, but would require considerable vigilance.

I already hear the screams of horror from the DXCC desk in Newington. "No, not another DXCC award! We've just barely dug out from the backlog caused by introducing single-band DXCC awards." Admittedly, another DXCC award would be about as welcome in Newington as a virus in the League's computer system. (Actually, probably less so, because you can get rid of a computer virus, but you can never get rid of a DXCC award.) However, by allowing electronic QSO credit, eliminating handling QSL cards, the program might be feasible.

In any case, DXers will have some time to think about their next challenge, and a more honorable Honor Roll, while waiting for their QSL cards from the latest operations from rare countries.

December DX Events

One reasonably rare DXCC country that is due on around Christmas is 1A0KM, the Knights of Malta station in Rome. QSL SSB contacts via 101J, and CW contacts via 10JX.

After the past three years of major operations from rare countries, many DXers are branching out into other DX award programs, such as WPX and IOTA. IOTA chasers can look for David Reinhart, WA6ILT, who will be operating from several Caribbean spots around Christmas. Look for WA6ILT/C6A from Great Stirrup Cay (NA-113) December 23, WA6ILT/6Y5 from Jamaica (NA-097) December 25, ZF2QH from Grand Cayman (NA-016) December 26, and from Cozumel off the coast of Mexico (NA-090) December 27. Davis will be on 10 meters only, on 28025-30 kHz on CW, and 28300-350 kHz on SSB. QSL home call.

Another IOTA operation this month will be OH0/FF1PGG from Aland Island (EU-002) December 21-28. The operators are avid stamp collectors, as their Lundy Island card shows. They'll provide a card with special Aland Island stamps for DXers who include US\$2 or 2 IRCs with their cards. QSL direct to Expeditions Dominique Elin, 24 rue de Berne, 80090 Amiens, France, or via the REF bureau.

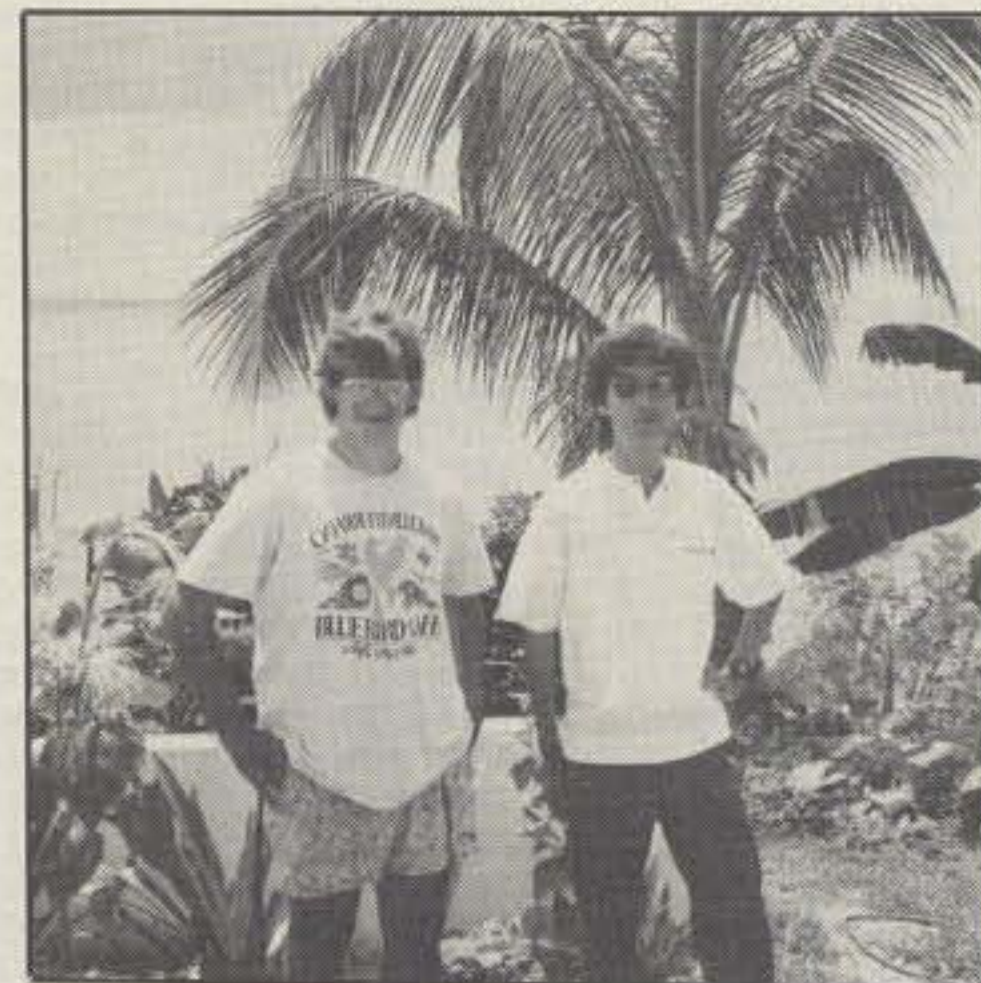
73, Chod, VP2ML

QSL Notes

Carl "Mac" McDaniel, W3HCW, handles cards for **CO2OM, 6T2MG, VK6AJW, ED0BOD, TR8JH, HC2FN, CE3MCC, TA4A, RA0AL, 9L3GB, 5N0ASW,**

EP2DL, EP2MRD, EP2ASZ, EP2HSA, and **EP2MA.** Cards for EP2HZ go direct only, and cards for VP8CEO go to KL7H/6. Mac is listed as manager for **V51MA,** but is yet to receive any logs, so he is not able to answer cards. His address is 2116 Reed St., Williamsport, PA 17701.

QSL **ZF2AH** to WA6VNR, but not to the



Paul Meacham, VP2EXX (left), is by far the most active amateur on Anguilla. Paul will be returning to the States soon for college, and his father, VP2ES, may be moving to the Dominican Republic. On the right is Mitsu, JH4IFF, who operated RTTY from Anguilla as VP2E/N2HNQ.

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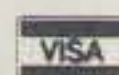
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1900	IK2CBD	1903	K2ENT

CW

835	W8BLA	836	K2ENT
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SSB Endorsements

320	K4MZU/323	310	K8YVI/312
320	W2FXA/323	300	T12JP/307
320	EA2IA/323	300	N4KEL/M/306
320	W0SFU/322	300	ZL1BOQ/304
320	KS2I/322	300	VE2GHZ/304
320	WA4JT1/322	300	W5XQ/303
320	N7RO/322	300	LU7HJM/301
320	KB8DB/322	275	EA3KW/294
320	VE3MRS/321	200	W8BLA/222
320	K2ENT/321	200	IK2CBD/204
320	K2JLA/320	200	KA4TMJ/202
320	AA5NK/320	200	KW9Q/200
310	AA4AH/319	150	WA8MEM/199
310	WB6PSY/318	150	OA4ANR/181
310	KF7SH/316	150	G0LRX/152
310	XE1OX/314	Mobile	KG7DJ
310	KU9I/313		

CW Endorsements

320	YU1HA/323	310	WA4JT1/315
320	K9MM/323	300	N7RO/307
320	W2FXA/322	300	KB8DB/307
320	DL1PM/322	275	W6YQ/299
320	AA4KT/321	275	K2JLA/290
320	K1MEM/321	250	T14SU/255
310	K3UA/319	250	KM5R/250
310	W2UE/318	200	N4KEL/M/233
310	EA2IA/316	150	WA8MEM/199
310	K2ENT/316	3.5/7 MHz	WA8MEM
310	AA5NK/316		

Total number of active countries is 323. A new CQ DX RTTY award is now available. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

1991 Callbook address; use any previous year, or use the address for N6RLE.

QSL the July IOTA operations of **9H3IN**, **9H3IN/9H8**, and **9H8E** via Sigi Bill, HB9DLE, Box 34, CH-5300 Turgi, Switzerland.

There is a new QSL bureau for Diego Garcia in the Chagos Islands: **VQ9 QSL Bureau**, c/o Russell D. Shaw, KA0MXI/VQ9RS, NSF Box 16, FPO AP 96464.

KA3DBN is now QSL manager for **V63CJ** and **V63DJ**.



Dr. Rick Dorsch, NE8Z, recently operated as HC1MD and other calls from Ecuador. QSL to K8LJG.

K9UIY continues to answer QSL requests for **T32BS**, **AH3C**, **KN0E/KH3**, and **KN0E/NH3**.

QSL the recent Annobon Island **3C0CW** operation via Pedro Espuna Crespo, EA3CW/EA3CUU, Clavells 11, 17800 Olot, Gerona, Spain.

ZS6BCR reports that all direct requests for **ZS9Z** cards have been answered and are in the mail, except for those few that requested cards for **ZS9Z/ZS1** or **V51Z** in the same envelope; those have been forwarded to OH2BH for the additional cards. Chris apologizes for the delay in QSLing, which was due to his moving five times, medical treatments, and trying to finish his university studies.

Frank, K4RZ, continues to provide cards for Larry Frustaglio's **KL7MU/HZ** Desert Storm operation.

The Northern Ohio DX Association has taken over the QSLing for **4U1UN**, the

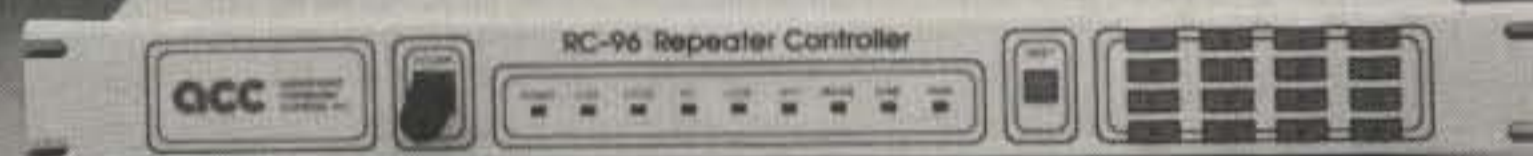
United Nations Headquarters station. Cards should be sent to Jim Tullis, W8CZN, 7226 Huntington Drive, Hudson, OH 44236.

QSL **5R8AL** via F6HUJ, not via WA4VDE.

And on the continuing controversy between the UQ1GWW/YL1WW club and Igor Kuzhelev, several readers report that Igor is a good QSLer, and that numerous requests to the club address (Box 50, Riga) have gone unanswered. More recently, some readers report some success with Box 50.

Regarding Spanish names, Dr. Andres Goens, YS1AG, reminds DXers that people in Spanish-speaking countries have two last names, one from each parent (the mother's name is last). If you omit these names, your QSL request may be sent to the wrong person. Use the full name as given in the Callbook.

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THE SCIENCE OF PREDICTING RADIO CONDITIONS

1991: Another Good Year for HF Propagation

As 1991 draws to a close, from the standpoint of HF propagation it leaves its mark in the record book.

This was the year in which solar activity was expected to decline slowly, but steadily, to a level of approximately 115 by the end of the year. But it didn't happen that way, as Mother Nature gave a bonus to the users of the HF spectrum.

The present sunspot cycle, the 22nd observed since records have been kept, reached its peak during July 1989 with a count of 158. From that date, until November 1990, the cycle declined slowly, but steadily as expected, to a smoothed sunspot level of 141. Then it happened. Instead of declining further, during December 1990 the cycle began to increase again. It continued to increase, reaching what appears to be a second peak during February 1991 with a count of 147.

The latest monthly mean sunspot number available at press time, as was determined by the Royal Observatory of Belgium for September 1991, is 125. This results in a smoothed sunspot number of 146 centered on March 1991. The values of smoothed sunspot number, upon which the progress of a solar cycle is measured, lags behind the latest monthly mean number by six months. This drop in one point in the sunspot count between February and March may indicate that the cycle is again in a phase of slow decline.

While we won't know for sure for another six months what the final sunspot count for 1991 was, it is almost certain that it will run on the order of 10% higher than originally expected. That is, from a high of 147 in January to an estimated low in excess of 125 by December. In practical terms to radio amateurs and other users of the HF spectrum, this means that nature has given us an extra year of relatively high solar activity to enjoy, along with the associated improved propagation conditions on most bands.

Fig. 1 traces the progress of Cycle 22 in terms of sunspot numbers and 10.7 cm radio flux levels.

Record Radio Storminess

There was also a down side to HF propaga-

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for December 1991

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 5-6, 10, 29	A	A	B	C
High Normal: 2-3, 7-9, 11-14, 21, 23-24, 30	A	B	C	C-D
Low Normal: 4, 19-20, 28	B	C	D	D-E
Below Normal: 1, 15, 18, 22, 25, 27, 31	C	C-D	D-E	E
Disturbed: 16-17, 26	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 1, good (B) on the 2nd, good (B) again on the 3rd, good-to-fair (B-C) on the 4th, excellent (A) on the 5th and 6th, etc.

tion conditions observed during 1991. A record-breaking number of giant solar flares erupted on the surface of the sun during June and August. While the cause of solar flares is not yet known, they are believed to be associated with sudden changes in the magnetic fields within and in the vicinity of large sunspots. They occur suddenly as violent explosions during which an enormous amount of matter is ejected from the sun. Among this matter are vast quantities of ultraviolet energy, X-rays, and cosmic radiation traveling at the speed of light, and charged particles (electrons and protons), which travel at much slower speeds. While the cause of solar flares is still unknown, once the radiation reaches the earth's atmosphere, their affects are well known.

The ultraviolet, X-ray, and cosmic radiation, traveling at the speed of light, blankets the lower levels of the ionosphere within about eight minutes after a flare occurs.

Bulletin

This issue of CQ should reach most readers before the start of the CW weekend of the CQ World-Wide DX Contest, November 23 and 24. Here is a fine-tuned, updated, day-to-day, general propagation forecast for the contest weekend made at press time. All indications continue to point toward generally good conditions during most of the contest period. There is an increasing possibility that the contest weekend might begin at the tail end of a moderate radio storm, but conditions are expected to improve during November 23, with at least a Low Normal rating to most areas of the world, with High Normal likely for openings to southern and tropical regions.

Conditions on November 24th should approach High Normal to most areas of the world. A sunspot number in the range of 125 is forecast for the contest weekend, with the 10.7 cm solar flux level expected to be 175 or higher. If this forecast materializes, and we are not surprised with an unexpected radio storm, it is possible that conditions during the 1991 CW Contest may be good enough to result in record scores on both the 10 and 15 meter bands.

This causes heavy absorption and attenuation of HF.

The charged particles, traveling at much slower speeds, reach the ionosphere from 18 to 36 hours after a flare has been observed. This causes heavy attenuation, weak signals, excessive fading, auroral displays, polar blackouts, and radio

Days of Radio Storminess

Month 1991	Below Normal	Disturbed
June	10	11
July	1	7
August	4	12
September	6	7

Table 1—Days during the period June through September 1991 when HF conditions were rated Below Normal or Disturbed as a result of solar flare activity.

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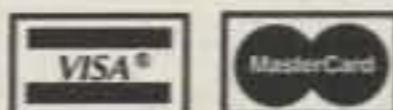
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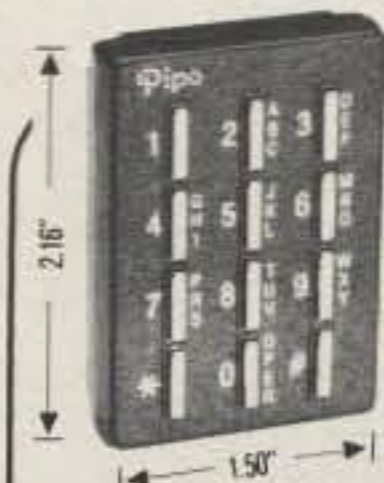
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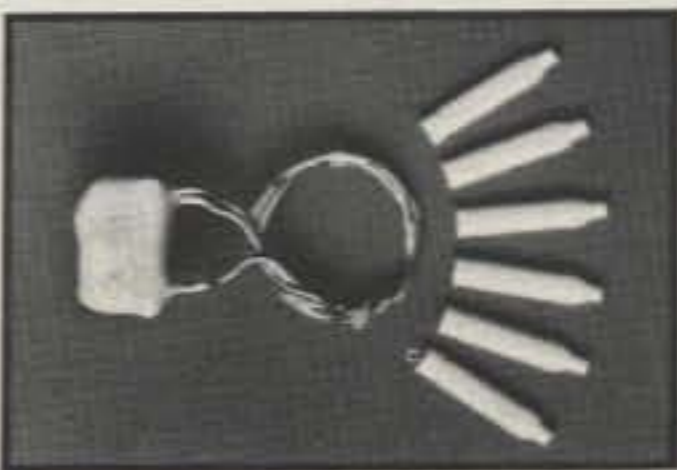
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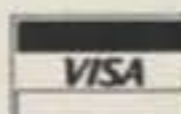
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HOW TO USE THE DX PROPAGATION CHARTS

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 Charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado, 80302.

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CIRCLE 79 ON READER SERVICE CARD

Dec. 15, 1990 to Feb. 15, 1992 Time Zone: EST (24-Hour Time) EASTERN USA TO:

	10/6 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central	07-08 (1) 08-09 (2)	06-07 (1) 07-08 (2)	03-06 (2) 06-07 (3)	14-16 (1) 16-17 (2)
Europe & North Africa	09-13 (4) 13-14 (2) 14-15 (1) 09-11 (1)**	08-14 (4) 14-15 (2) 15-16 (1)	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)	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) 11-12 (3) 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 Zone: PST (24-Hour Time)
WESTERN USA TO:**

	10/6 Meters	15 Meters	20 Meters	40/80 Meters
Western & Southern Europe & North Africa	06-07 (1) 07-08 (2) 08-10 (3) 10-11 (2) 11-12 (1)	06-07 (1) 07-08 (2) 08-09 (3) 09-11 (4) 11-12 (2) 12-13 (1)	05-06 (1) 06-09 (2) 09-12 (3) 12-14 (4) 14-15 (3) 15-17 (2) 17-19 (1) 22-01 (2)	18-20 (1) 21-00 (2) 00-01 (1) 19-23 (1)*
Central & Northern Europe & 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) 17-18 (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)
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			00-05 (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.

storminess ranging from slight to severe for periods up to several days.

A record number of solar flares were observed during June and August 1991, with a lesser, but still large number also reported during July and September. Table I records the number of days during each month from June through September 1991 that were Disturbed or Below Normal as a result of radio storminess caused by

solar flares. Note that during June 21 days were in this category, and during August the count was 16.

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

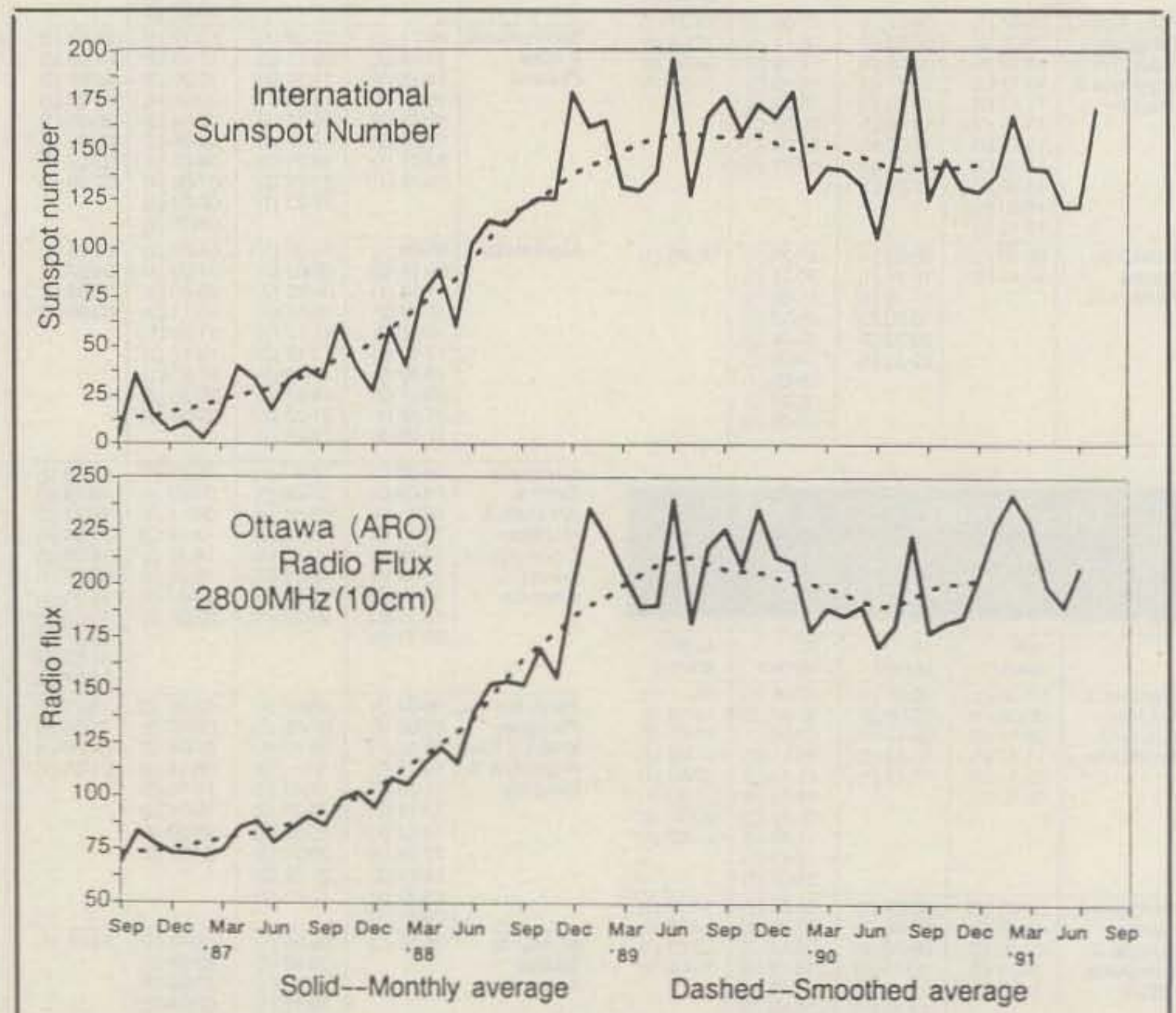


Fig. 1—Progress of solar cycle 22, sunspot count and solar (radio) flux at 10.7 cm. (From Hirman/Greer SESC)

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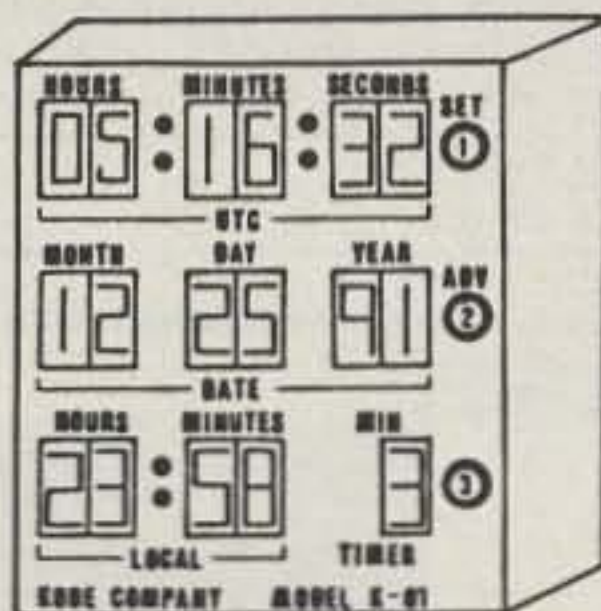
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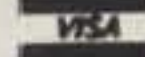
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CIRCLE 113 ON READER SERVICE CARD

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 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 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 Prop-

agation Charts valid through mid-February. Short-Skip Propagation Charts for December appeared in last month's column.

VHF Ionospheric Openings

The best times to check for worldwide 6 meter openings on this band have been given earlier in this column. They are also indicated by ** in the *DX Propagation Charts*. The combination of high solar activity and seasonally high ionization in the F-2 layer may produce some good 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.

There is considerably less likelihood for 6 meter trans-equatorial (TE) openings during December, but some should be possible between the southern tier states and countries deep in South America. The best time to check for TE openings is during the evening hours between 8 and 11 PM.

Quite a bit of meteor shower activity is expected this month, and this should result in improved conditions for meteor-scatter type openings on the VHF bands for distances up to approximately 1000 miles. The *Geminids*, a major meteor shower, should begin on December 12 and last for about three days. Maximum intensity is expected at about 5 PM EST on December 13, with an estimated meteor rate of about one a minute. The *Ursids*, a considerably less intense shower, is expected to take place on December 21 and 22. It should peak at approximately 2 AM EST on December 22, with a meteor rate of approximately 15 an hour.

Auroral displays often increase during December and are most likely to occur when HF conditions are Below Normal or Disturbed. Check the Last Minute Forecast at the beginning of this column for those days during December that are expected to be in these categories. On these days there is a good possibility for short-skip auroral type propagation to take place on the VHF bands for distances up to approximately 1000 miles.

Season's Greetings

The year 1991 was another good year for high-frequency propagation. With the holiday season upon us, let's hope that Mother Nature has placed into Santa's bag continued good propagation conditions for 1992, as a gift for radio amateurs everywhere.

The Editor of this column wants to take this opportunity to extend to readers his warmest wishes for a Merry Christmas, Happy Chanukah, and a peaceful and rewarding New Year.

CU on the amateur bands and monthly in this column during 1992!

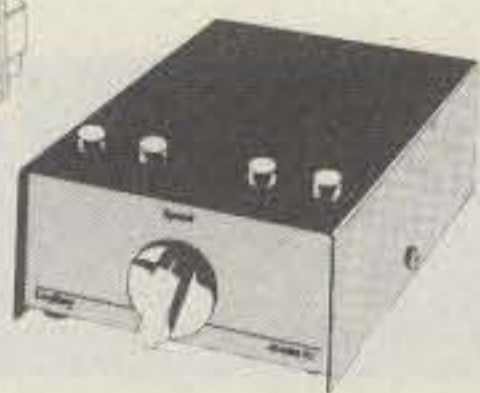
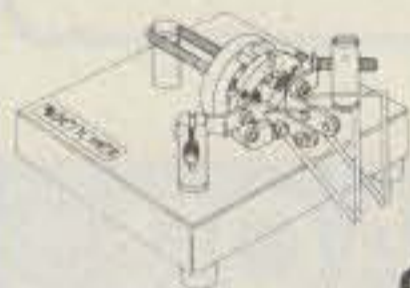
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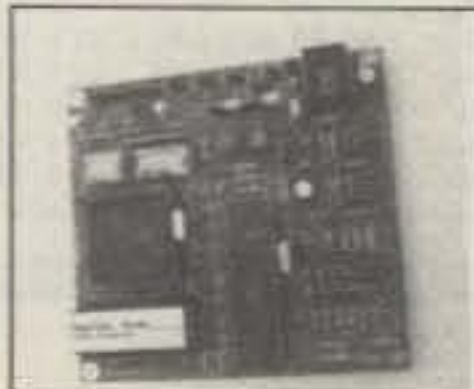
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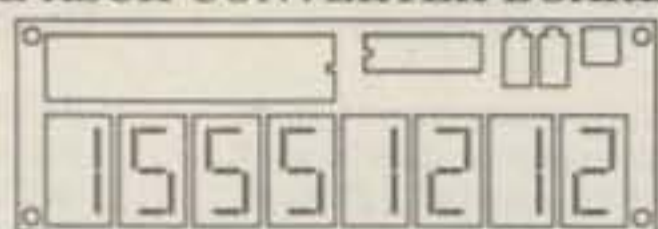
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GMT	Time	Mode	Call	Name	DXCC	Ch
00/18/91	11:29	SP6TPM	ZL7		21.7	Ch
00/24/91	19:04	T771	ZL9		21.8	Ke
00/24/91	23:53	US6VU	ZL9		21.9	Au
00/24/91	00:21	501A	ZP		25	Pa
00/26/91	23:57	457MP	ZS		253	So
00/27/91	03:23	KP2A/KPS	ZS		258	Na
00/27/91	03:02	KP2A/KPS	ZS		259	Pr

Log Entry

DATE/UTC: 00/25/91 00:36:35

Award Type: DXCC [ZC]

Mode: 160 80 40 30

Call: ZC4AB Name: Allen BBT Freq: 21.250 QTH

750 SSB [E] 59

Power: Pwr Mde Award ID Comment Distance

Prefix: ZC Country: Cyprus (Br. bases) Cont: AS Bearing: 56 DEG 5156 Mi

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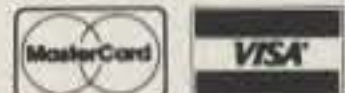


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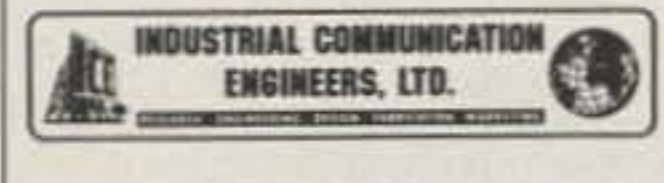


SPECIFICATIONS	
Attack time	Zero to 10ns, depending on induced waveform.
Surge current	8/20 us., 20,000 amps
Operating Temp.	-65 to 125 Celsius
Discharge inductor	Toroidal, insulated.
Back-EMF GDU	600-1000V, ceramic body construction, G.I. Clare
VSWR	Less than 1.1:1 over rated spectrum
Insertion loss	Less than .1db
Impedance	50-75 ohms
Hardware	15-3 stainless hardware 6-32 stainless steel ground lug, 1/8" thick 5032-H32 case, 6-32 mounting hardware
Finish	Natural aluminum
DC resistance across	47K to 250K ohms, resistive
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Warranty	One year standard

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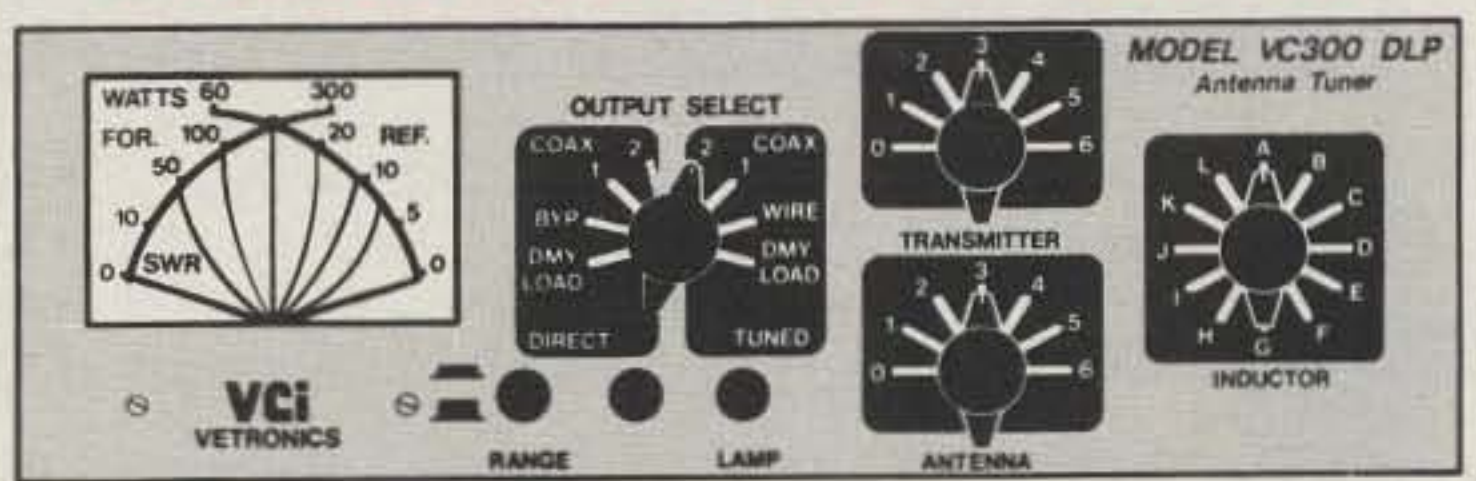
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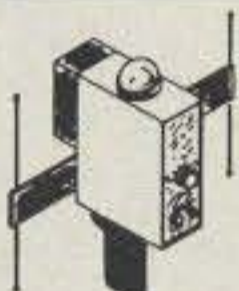
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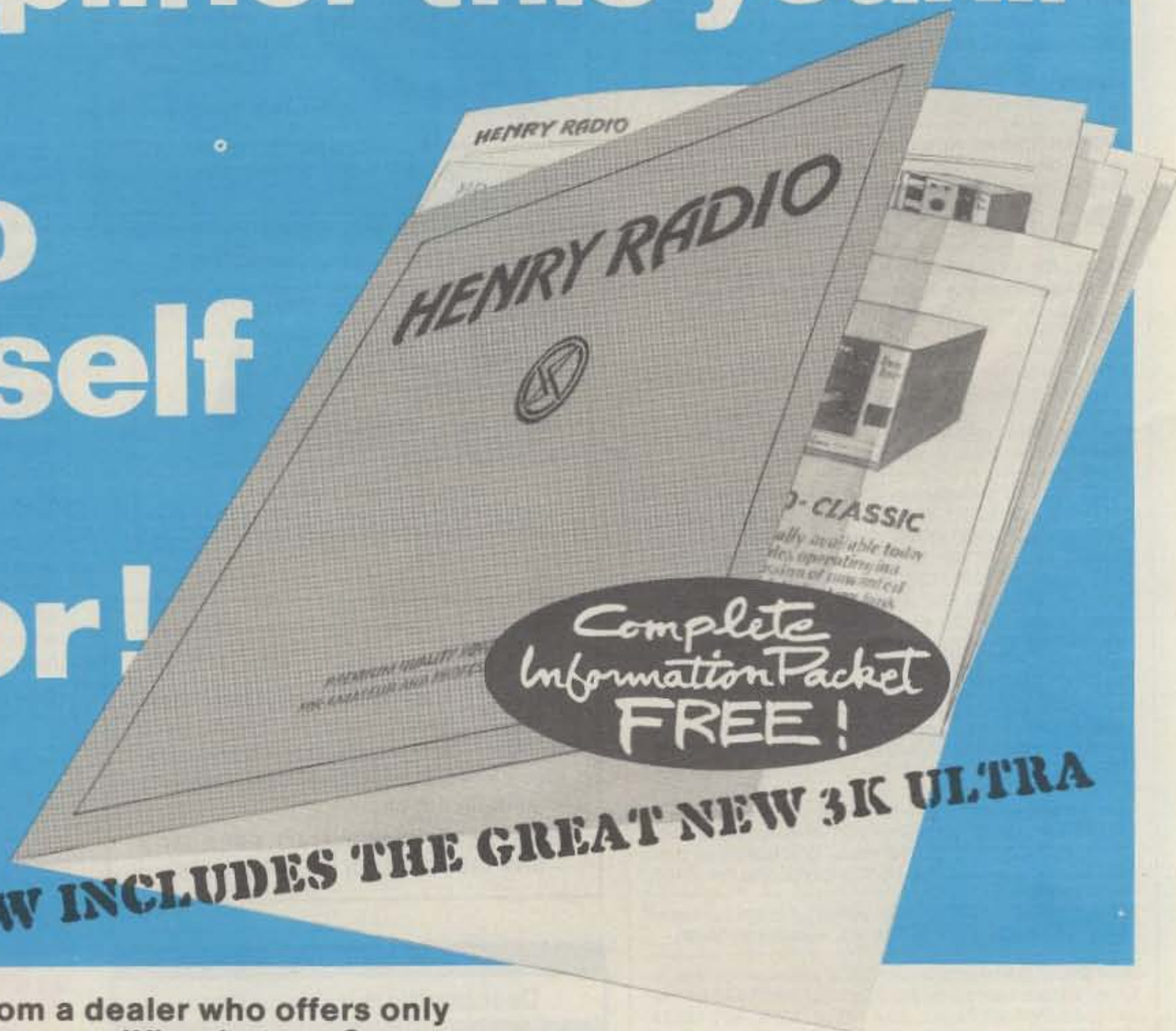
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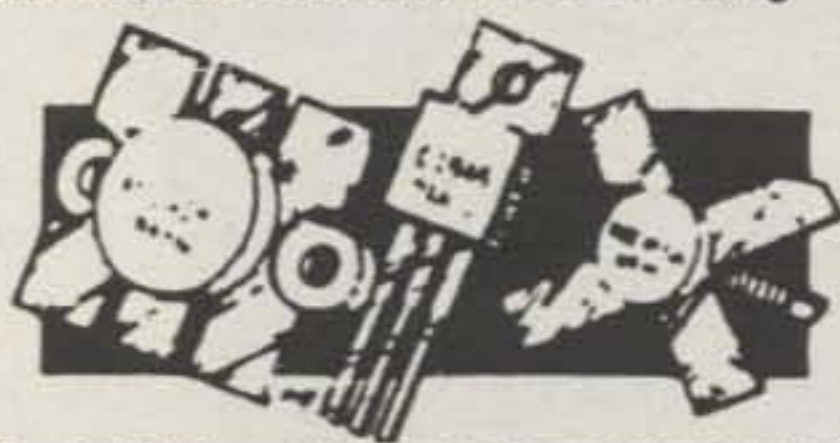
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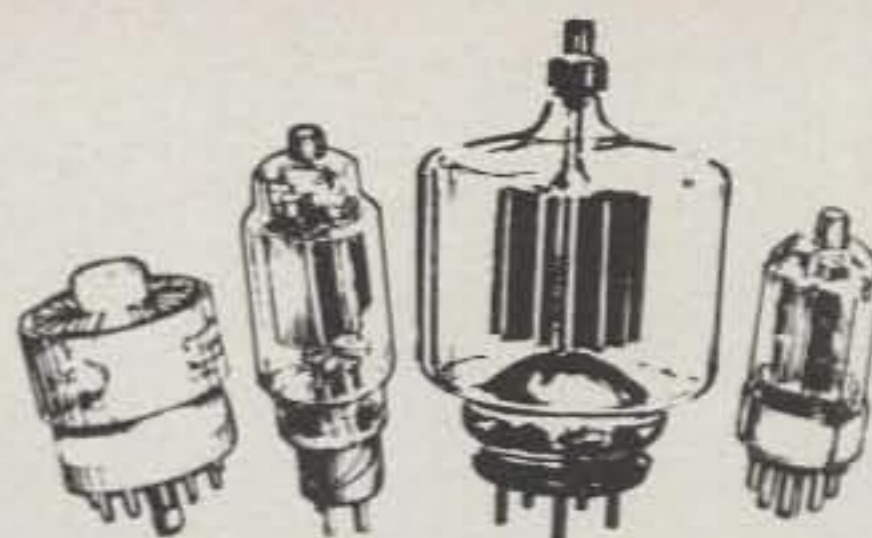
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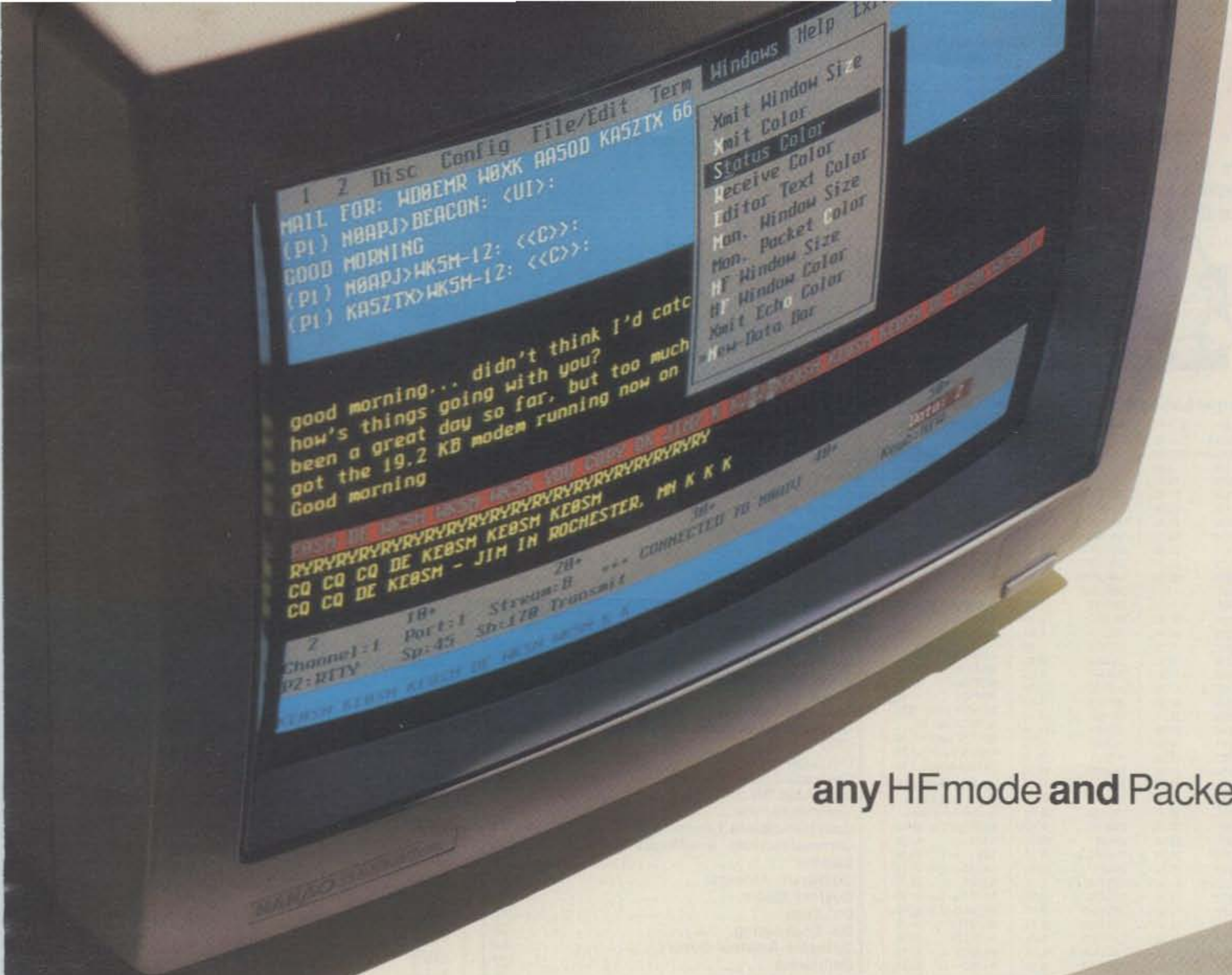
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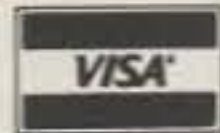
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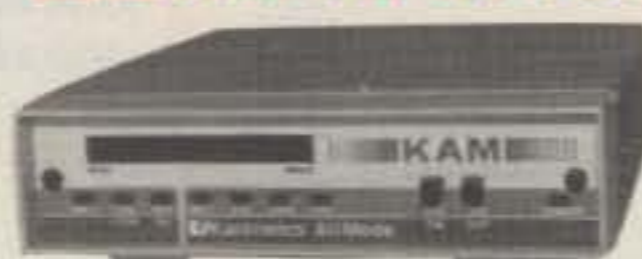


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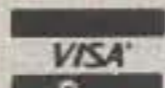
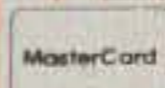
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- Receives 100 kHz-30 MHz
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- 2 Meter/440 MHz
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- Operate 2 Meters and Receive 25-905 MHz
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- Receive AM, FM and Wide-FM
- Up to 5 Watts Output
- 3 Tuning Systems



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- 45 Watts Of "True FM"
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 - 40 Memories
 - Extended Receive
 - Built-In PL Encode/Decode
 - Auto Repeater Shift
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YAESU

FT-470

2 METER/70CM
PERFECTED

- Simultaneous Receive On Both Bands
 - Built-In PL Encode/Decode
 - 10 Memories Each Band
 - 2.3 Watts with 5W Optional
- CALL FOR ALL THE DETAILS!



ALINCO

DJ-560

TWIN BAND
HANDHELD

- Rx 130-173.995 MHz
400-519.995 MHz
 - Up to 5 Watt Output
 - Multiple Scanning Modes
 - Direct Freq. Selection
 - 40 Memory Channels
 - Cross Band Full Duplex
- CALL TODAY!



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- Receive 137-173.995 MHz
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948 300W HF Tuner....	\$109.95
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815B HF SWR Cross/NDL..	\$59.95
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207 HF SWR Analyzer...	\$89.95
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CALL TODAY!



CAROL CABLE (Columbia Cable)

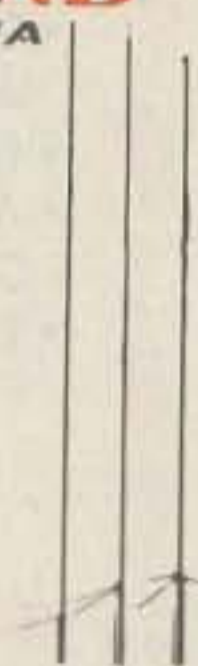
4080 Rotor Cable..	22¢/foot
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- CTCSS En/Decoder

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• RS12A	\$73	• VS35M	\$179
• RS20A	\$90	• RS50A	\$205
• RS20M	\$112	• RS50M	\$225
• VS20M	\$128	• RM50M	\$259
• RS35A	\$144	• VS50M	\$237

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FT-415/815

2M/UHF Handheld Transceivers

FT-415: 130-174 MHz Rx 140-150 MHz Tx

FT-815: 430-450 MHz Rx/Tx

41 Memories (All memories store separate transmit and receive frequencies for "odd splits")

2 VFOS

- ① DTMF Calling and paging built-in
Built-in VOX
- ② Back-lit Keypad and Display (with time delay)
- ③ DC Direct Operation (Automatically Charges Battery with 12 Volts, FNB-25 only)
- ④ Four Power Levels (With FNB-27 Battery)
Direct Keyboard Entry for All Functions
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- ⑤ CTCSS Encode/Decode Built-In
5 Watts Output With FNB-27 or DC Direct
- ⑥ Rugged Case Construction
Automatic Power-Off (APO) Turns Radio Off Automatically After 30 Minutes
DTMF 10 Memory Autodialer, Built-In
Selectable Frequency Steps (5, 10, 12.5, 15, 20 or 25 KHz)
Four Ways to Scan (Band Scan, Memory Scan, Memory Skip, Programmable Scan)

Optional Accessories:

NC-42 1-Hour SMART Desk Charger

E-DC-5 DC Adaptor With Noise Filter

MMB-49 Mobile Mounting Bracket

YH-2 Headset for VOX Operation

FBA-12 AA 6-Cell Holder

Some accessories and options are standard in certain areas. Check with your Yaesu Dealer for details.

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Performance without compromise.

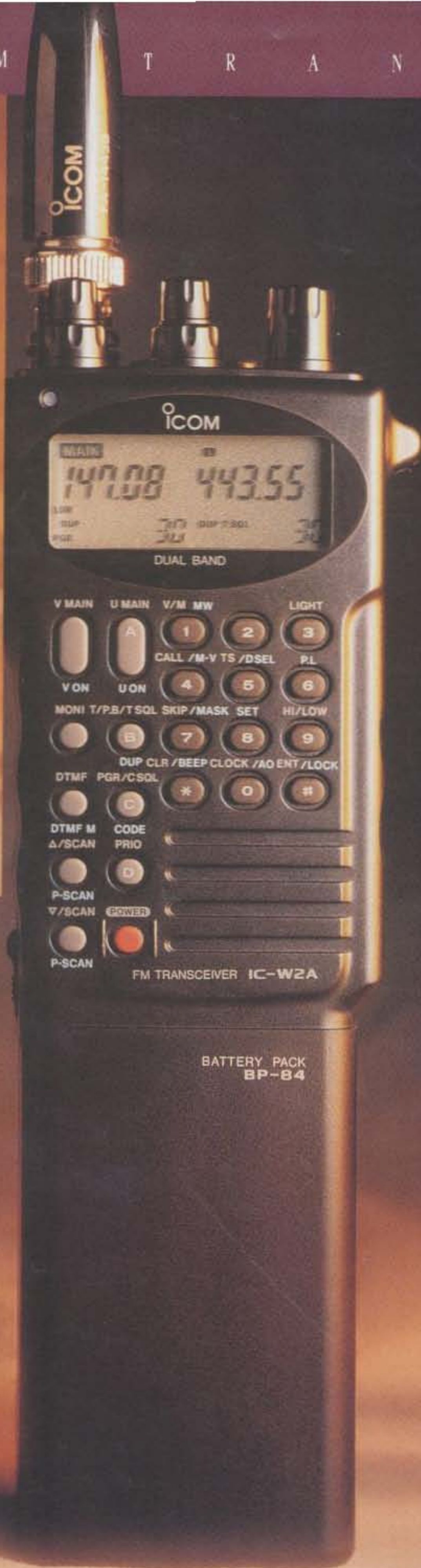
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Shown Actual Size

Specifications subject to change without notice
Specifications guaranteed only within amateur bands
One Year Limited Warranty on all Amateur Products



IC-24AT
Dual Band
Transceiver



IC-W2A
Dual Band
Transceiver

ACTUAL SIZE

Icom continues to dominate the industry with exceptional product design and innovation. The IC-24AT firmly established Icom as the leader in dual band technology. Now the IC-W2A gives you the advantage of choosing the dual bander best suited for your needs.

The new IC-W2A dual band handheld sets the pace with its sleek design and superior characteristics. Designed for the user who demands the finest features available, the IC-W2A boasts simultaneous dual band receive. Listen to one band while talking on the other! Three tuning systems, high speed scanning with priority watch and 60 memory channels add to the luxurious IC-W2A.

Both the IC-W2A and IC-24AT give you full operation on the two-meter and 440MHz amateur bands with outstanding wideband receive capability.

Each unit features up to five watts of power, programmable scanning, priority watch, a battery saver, DTMF pad for memory channel autopatching, 24 hour clock with timing system, multi-function LCD readouts...the list is infinite. See the IC-W2A and the IC-24AT today at your authorized Icom dealer.

SETTING THE PACE IN DUAL BAND DESIGN

For full details and specifications on the IC-W2A and IC-24AT, call the Icom Brochure hotline at 1-800-999-9877.

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