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CQ

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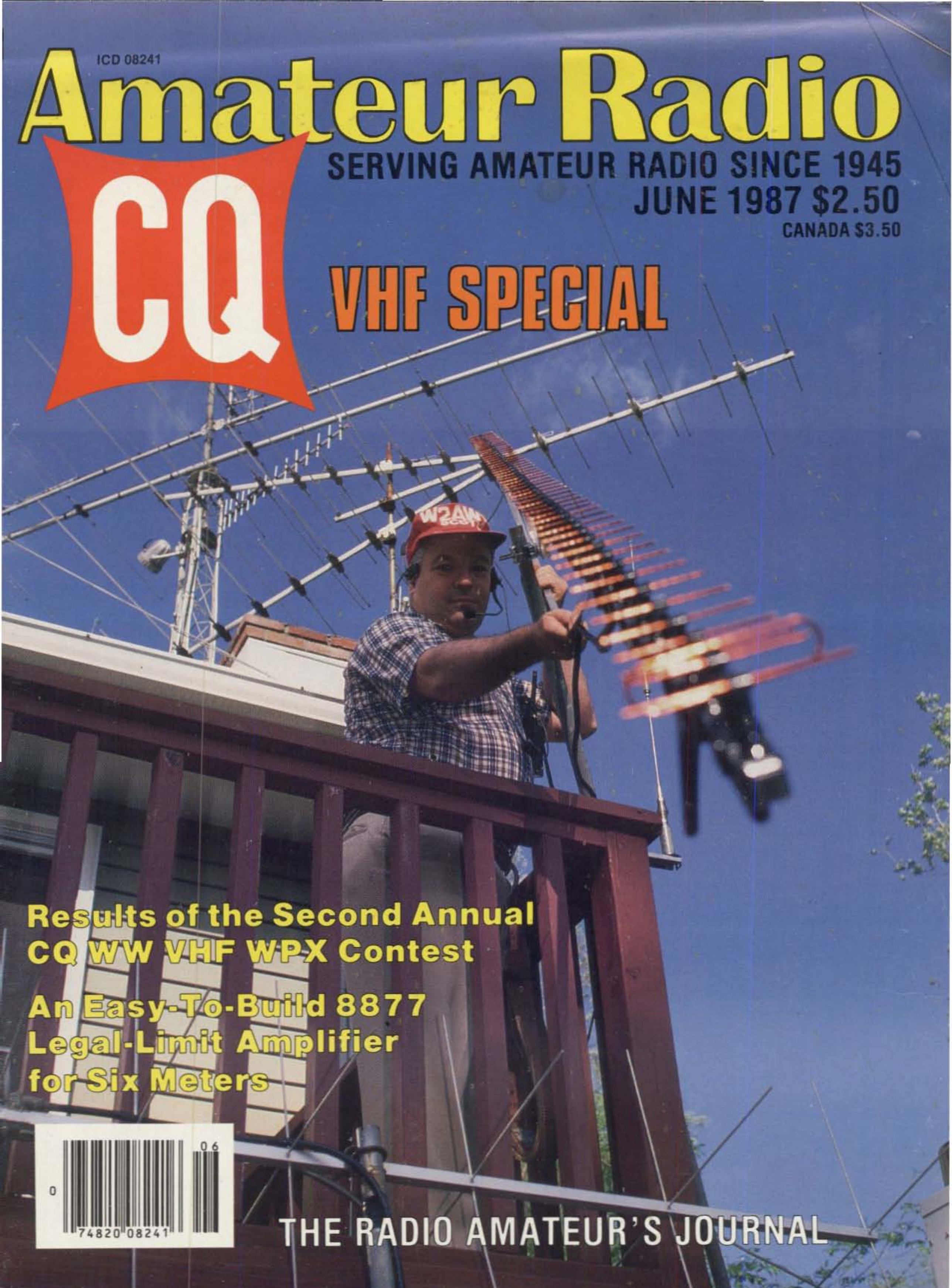

Results of the Second Annual CQ WW VHF WPX Contest

An Easy-To-Build 8877 Legal-Limit Amplifier for Six Meters

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THE RADIO AMATEUR'S JOURNAL

KENWOOD

NEW! Computer Interface!

"DX-cellence!"

TS-940S

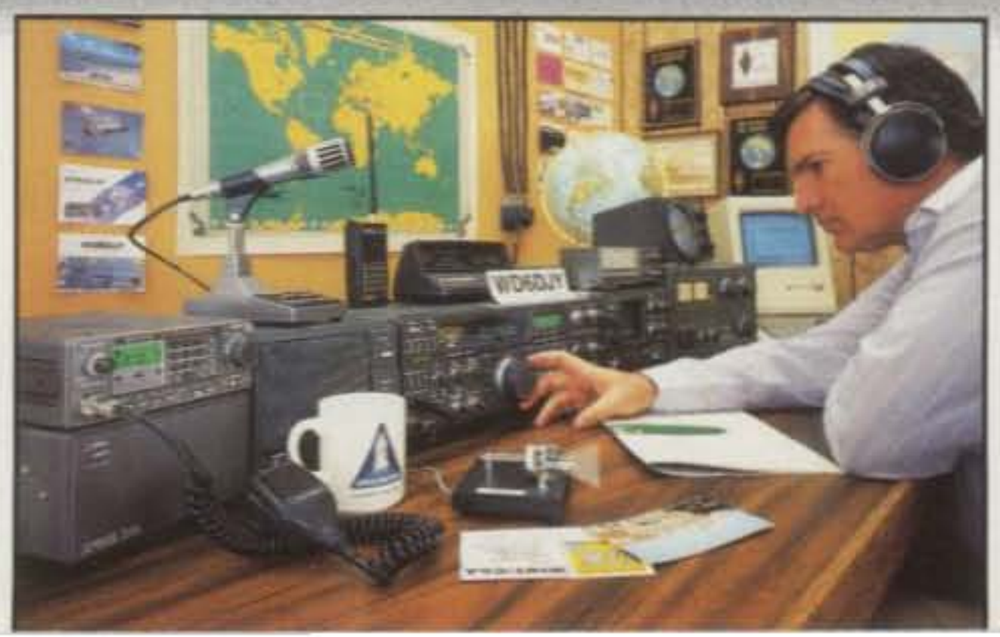
The new TS-940S is a serious radio for the serious operator. Superb interference reduction circuits and high dynamic range receiver combine with superior transmitter design to give you no-nonsense, no compromise performance that gets your signals through! The exclusive multi-function LCD sub display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

- **100% duty cycle transmitter.** Super efficient cooling system using special air ducting works with the internal heavy-duty power supply to allow continuous transmission at full power output for periods exceeding one hour.
- **High stability, dual digital VFOs.** An optical encoder and the flywheel VFO knob give the TS-940S a positive tuning "feel."
- **Graphic display of operating features.** Exclusive multi-function LCD sub-display panel shows CW VBT, SSB slope tuning, as well as frequency, time, and AT- 940 antenna tuner status.
- **Low distortion transmitter.** Kenwood's unique transmitter design delivers top "quality Kenwood" sound.
- **Keyboard entry frequency selection.** Operating frequencies may be directly entered into the TS-940S without using the VFO knob.
- **QRM-fighting features.** Remove "rotten QRM" with the SSB slope tuning, CW VBT, notch filter, AF tune, and CW pitch controls.
- **Built-in FM, plus SSB, CW, AM, FSK.**
- **Semi or full break-in (QSK) CW.**
- **40 memory channels.** Mode and frequency may be stored in 4 groups of 10 channels each.
- **Programmable scanning.**
- **General coverage receiver.** Tunes from 150 kHz to 30 MHz.
- **1 yr. limited warranty.** Another Kenwood First!

Optional accessories:
• AT-940 full range (160-10m) automatic antenna tuner • SP-940 external


Interface IF-232C/IF-10B

speaker with audio filtering • YG-455C-1 (500 Hz), YG-455CN-1 (250 Hz), YK-88C-1 (500 Hz) CW filters; YK-88A-1 (6 kHz) AM filter • VS-1 voice synthesizer • SO-1 temperature compensated crystal oscillator • MC-43S UP/DOWN hand mic. • MC-60A, MC-80, MC-85 deluxe base station mics. • PC-1A phone patch • TL- 922A linear amplifier • SM-220 station monitor • BS-8 pan display • SW-200A and SW-2000 SWR and power meters.



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

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

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Communications & Test Equipment Group
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KENWOOD

NOW BUILT-IN CTCSS!

By Popular Demand!

TH-21BT/31BT/41BT

The smallest HT™ is now even better! The new "BT-Series" gives you a plus—a built-in DIP switch programmable CTCSS encoder! Now you can access more than one "private line" over the air! The original TH-21A Series (The Smallest HT™) is still available from the VHF leader—Kenwood!

- **High or low power.**
  Choose 1 watt high—enough to "hit" most local repeaters; or a battery-saving 150 mW low.
- **Pocket portability!**
  Kenwood's TH-series HTs pack convenient, reliable performance in a package so small, it slips into your shirt pocket! It measures only 57 (2.24) W x 120 (4.72) H x 28 (1.1) D mm (inch) and weighs 260 g (.57 lb) **with PB-21.**
- **Expanded frequency coverage (TH-21BT/A).**
  Covers 141.000-150.995 MHz in 5 kHz steps, includes certain MARS and CAP frequencies.
  TH-31BT/A: 220.000-224.995 MHz in 5-kHz steps.
  TH-41BT/A: 440.000-449.995 MHz in 5-kHz steps.

- **Easy-to-operate, functional design.**
  Three digit thumbwheel frequency selection and top-mounted controls increase operating ease.
- **Repeater offset switch.**
  TH-21BT/A: ±600 kHz, simplex.
  TH-31BT/A: –1.6 MHz, reverse simplex.
  TH-41BT/A: ±5 MHz, simplex.
- **Standard accessories:**
  Rubber flex antenna, earphone, wall charger, 180 mAH NiCd battery pack, wrist strap.
- **Quick change, locking battery case.**
  The rechargeable battery case snaps securely into place. Optional battery cases and adapters are available.
- **Rugged, high impact molded case.**
  The high impact case is scuff resistant, to retain its attractive styling, even with hard use.

Optional accessories:
- **HMC-1** headset with VOX
- **SMC-30** speaker microphone
- **PB-21** NiCd 180 mAH battery
- **PB-21H** NiCd 500 mAH battery
- **BC-2** wall charger for PB-21H
- **BC-6** 2-pack quick charger
- **DC-21** DC-DC converter for mobile use
- **BT-2** manganese/alkaline battery case
- **EB-2** external C manganese/alkaline battery case
- **SC-8/8T** soft cases with belt hook
- **BH-3** belt hook
- **AJ-3** thread-loc to BNC female adapter
- **RA-8A/9A/10A** StubbyDuk antenna
- **TU-6** sub-tone unit (TH-21AT/A only)

More information on the Smallest HT™ is available from Authorized Kenwood Dealers.

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2201E. Dominguez St., Long Beach, CA 90810

TH-series transceivers shown with optional StubbyDuk antenna.
Specifications and prices are subject to change without notice or obligation.
Complete service manuals are available for all Trio-Kenwood transceivers and most accessories.

KENWOOD

3 Choices 70 W/45 W/25 W

Three Choices for 2m!

TM-2570A/2550A/2530A

Feature-packed 2m FM transceivers

The all-new "25-Series" gives you three RF power choices for 2m FM operation: 70 W, 45 W, and 25 W. Here's what you get:

- Telephone number memory and autodialer (up to 15 seven-digit phone numbers). **A Kenwood exclusive!**
- High performance GaAs FET front end receiver
- 23 channel memory stores offset, frequency, and subtone. Two pairs may be used for odd split operation
- 16-key DTMF pad with audible monitor
- Extended frequency coverage for MARS and CAP (142-149 MHz; 141-151 MHz modifiable)
- Center-stop tuning—**a Kenwood exclusive!**

- New 5-way adjustable mounting system
- Automatic repeater offset selection—**another Kenwood exclusive!**
- Direct keyboard frequency entry
- Front panel programmable 38-tone CTCSS encoder **includes** 97.4 Hz (optional)
- Big multi-color LCD and back-lit controls for excellent visibility
- The TM-3530A is a 25 watt version covering 220-225 MHz. The first full featured 220 MHz rig!

DCL Introducing... Digital Channel Link

Compatible with Kenwood's DCS (Digital Code Squelch), the DCL system enables your rig to **automatically** QSY to an open channel. Now you can automatically switch over to a simplex channel after repeater contact! Here's how it works:

The DCL system searches for an open channel, remembers it, returns to the original frequency and transmits control information to another DCL-equipped station that switches **both** radios to the open channel. Microprocessor control assures fast and reliable operation. The whole process happens in an instant!

Actual size front panel

Optional Accessories

- **TU-7** 38-tone CTCSS encoder
- **MU-1** DCL modem unit
- **VS-1** voice synthesizer
- **PG-2N** extra DC cable
- **PG-3B** DC line noise filter
- **MB-10** extra mobile bracket
- **CD-10** call sign display
- **PS-430** DC power supply for TM-2550A/2530A/3530A
- **PS-50** DC power supply for TM-2570A
- **MC-60A/MC-80/MC-85** desk mics.
- **MC-48B** extra DTMF mic. with UP/DWN switch
- **MC-43S** UP/DWN mic.
- **MC-55** (8-pin) mobile mic. with time-out timer
- **SP-40** compact mobile speaker
- **SP-50B** mobile speaker
- **SW-200A/SW-200B** SWR/power meters
- **SW-100A/SW-100B** compact SWR/power meters
- **SWT-1** 2m antenna tuner

Complete service manuals are available for all Trio-Kenwood transceivers and most accessories.
Specifications and prices are subject to change without notice or obligation.
Specifications guaranteed on Amateur bands only.

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The Radio Amateur's Journal

ON THE COVER: Here's Scott Kostenbauder, W2AWX, of Poughquag, NY working on his 55-element 1296 MHz Yagi. That's a lot of aluminum up there, Scott. Watch out for power lines. Photo by Larry Mulvehill, WB2ZPI.

JUNE 1987 **VOL. 43, NO. 6**

FEATURES

DEPARTMENTS

Zero Bias AN EDITORIAL

During the course of a month I get scores of club bulletins here at the office and occasionally a few at my home. They come from all over the country, and several come from overseas. I read them all and try to get a sense of what is happening with clubs—their problems, their triumphs, and their sense of commitment to amateur radio.

Every so often you'll read a bitter editorial by an editor who is giving up trying to motivate the club members. The frustration is plain to see, the apathy is apparent, and most of all it would seem that the club has lost sight of its goals or really never defined what those goals are. Unfortunately, that's true with a lot of organizations, not only amateur radio clubs. Most special-interest groups or clubs should be more than an excuse to get out of the house one evening a month and hang out with the guys.

On the other hand, occasionally you open up a club bulletin and read an extremely positive statement. In March I received the monthly copy of the *Voice of 76*, the bulletin of the Santa Clara Valley Repeater Society. The first page is marked SAVE and is a pull-out information sheet written by their president, WA6IXY. It is an invitation for all licensed amateurs to become members of the society. It lists what the group has to offer in the way of repeaters and their affiliations with public-service groups. Obviously, this is a service-oriented group. The letter states a purpose, the group's aims, and what it has to offer, along with meeting schedules and frequencies. The back of this letter has a membership application and a list of club officers and directors with their phone numbers. I suppose this can be posted on community bulletin boards or handed out by various members. Although this solicitation is specifically aimed at licensed amateurs (from Novice on up), I don't know if they have any means of dealing with people who are interested in *becoming* amateurs. My only thought is that this was one of the very few positive, active solicitations for membership I've seen.

Most club bulletins are somewhere in between, either looking for that magical someone who can light a fire under them or recognizing their own problems with membership. I'm also happy to see the number of clubs who are giving and attempting to give licensing courses. That could be a big public service in itself. We may not all be equipped to handle large public-service tasks, or a specific need may be met by another group or agency. We all, however, can be of service to amateur radio and the community by training and teaching future amateurs.

VHF

This month we present the results of the Second Annual CQ WW VHF WPX Contest. The activity is there, the enthusiasm is there, and they're all waiting for you this year, July 18–19 (see the February issue for rules). Our VHF Editor, Steve Katz, WB2WIK, also presents the first of a series of construction articles on high-power amplifiers for the VHF/UHF bands. The first part shows how to construct the power supply and the 6 meter deck. The power supply will power all the ensuing amplifier decks for 2, 220, and 432. With a full summer of hamfests and fleamarkets ahead of us, there's plenty of time to find some of the components needed to build this project.

Worked A Novice Lately?

Have you been listening in on 10 meters lately? The activity has increased and there are Novices and Technicians venturing forth. Have you worked any yet? It's not always local stuff coming through or just cross-town ragchewers. The other day I heard some LU stations working some of the New England gang. They were not only making contacts, but the LUs were also actively searching out counties. Right now it's sort of like 6 meters in the early 50s, and the occasional opening does tend to keep you on your toes. Why not help a newcomer and work some DX at the same time?

Travels With CQ

This is being written about a week before the big one in Dayton, so I can't report on the Hamvention before next month. The week after Charlotte, Arnie and I drove down to Timonium, Maryland for their big event. Timonium is north of Baltimore, and the hamfest traditionally had been a one-day affair. This year they were trying two days, and it would seem that some of the folks were confused about what was happening. Normally a Sunday event, Saturday saw a semi-light crowd and very large fleamarket. By Sunday the fleamarket was down by more than half, but the crowds were much larger and generally different people than Saturday's group. It was a nice change for us to have a car at a hamfest, as it made it much easier to bring home the elusive goody or two from the fleamarket.

One of the things that I've always thought of doing but put off was a food review of hamfests. Most hamfest food is like bad airline food at best, but people try to make it good. As an exhibitor at a hamfest we generally are there early in the morning to set up the booth, so exhibitors tend to look at food somewhat differently. Some hamfest committees really go out of their way to make exhibitors comfortable and keep them well fed. The leading group this year by far has been the Miami group. They did an outstanding job in providing a comfortable lounge to take a break, and the quality of the food was good. The Best Breakfast Award I would have to give to the concession staff at Timonium. They prepared full breakfasts for one and all at the crack of dawn for an extremely reasonable price. It was good, too. I guess I'll wait until the end of the year to decide which hamfest gets the Pits Award for the worst food, and the one to which you should bring your own food or eat before you come. To be perfectly fair about it, though, some of us could stand to miss a meal or two and shed a few pounds. I'll take notes throughout the remainder of the year and report back to you as the roving food critic for amateur radio hamfests.

Getting back to Timonium, I think that when people get the idea that it is a two-day show things will straighten out. We were also treated to what I was told was the Timonium tradition—namely rain. However, the rain was not that heavy and didn't last that long. It certainly didn't put a damper on the event, and those of you who have suffered the vagaries of Dayton weather wouldn't even have noticed it.

We've got a few new hamfests this year to add to the *CQ* caldendar, and I'll let you know what they were like after the fact.

Dan Britt, K4URK

One of the things to which you become accustomed when making the hamfest circuit each year is seeing the same faces and the gentle kidding and commiserating with fellow exhibitors. At many hamfests you can take a quick walk around to see who is exhibiting and who couldn't make it for one reason or another. Generally at most of the southern hamfests you would see Mr. and Mrs. Dan Britt of Britt's 2-Way Radio manning their booth. Dan, always poker-faced, never let on whether it had been a good show for them or not, except on those rare occasions when he couldn't contain himself and a big smile appeared on his face. It was like the little boy in the TV ad who tries the cereal and likes it. The quality of a show could be measured in a humorous way by whether Dan smiled or not.

On April 6, Dan Britt, K4URK, passed away. With his passing, Britt's 2-Way Radio also passes on, as Mrs. Britt, ailing herself, cannot carry on the business. We'll all miss seeing them at shows, and we'll especially miss that big smile which could light up an exhibit area.

73, Alan, K2EEK

New PK-232 Breakthrough

Six Digital Modes - Including Weather FAX

A new software enhancement makes the AEA PK-232 the only amateur data controller to offer six transmit/receive modes in a single unit.

* **Morse Code**
* **Baudot (RTTY)**
* **ASCII**
* **AMTOR**
* **Packet**
* **Weather FAX**

$319.95 AMATEUR NET
$379.95 AEA RETAIL

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

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

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

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

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

Brings you the Breakthrough

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Lynnwood, WA 98036
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Announcing

• **Portsmouth, Virginia** - The Portsmouth ARC will operate W4POX from the *Lightship Portsmouth* at the Portsmouth Seawall Festival, June 5, 6, and 7 from 1500–0200Z. Frequencies around 3890, 7230, and 14290 MHz. For commemorative QSL, send your card and SASE to W4POX, 2800 Greenwood Road, Chesapeake, VA 23321. For QSL and a large commemorative certificate, send your card and a 9″ × 12″ envelope with two units of first-class postage.

• **Ohio Wine Month Special Event** - The Wireless Institute of Northern Ohio (WINO), sponsored by the Lake County ARA, will be on the air to commemorate Ohio Wine Month on June 6 from 2300–0300Z on 3860 and 7235 kHz, and on June 7 from 1500–1900Z on 7235 and 14235 kHz using the call KO8O from Madison, Ohio. For 8½″ × 11″ QSL certificate send legal-size SASE to KO8O—WINO Weekend, 7126 Andover Dr., Mentor, OH 44060.

• **Walt Disney World Special Event** - The Walt Disney World ARC will operate the club station WA4ABQ celebrating the 15th birthday of Walt Disney World in Orlando, Florida, from 1200Z June 6 to 0000Z June 7. Suggested freq. will be 28.360, 21.360, 14.290, 14.335, 7.235, and 3.835. For certificate and/or QSL, send SASE to Walt Disney World, ARC, P.O. Box 22737, Lake Buena Vista, FL 32830.

• **N6BSA Boy Scout Commemorative Station** - The Los Angles Area Council of the Boy Scouts of America will host a Council-wide Camp-O-Rama on the campus of the California State University at Dominguez Hills the weekend of June 6–7. Commemorative station N6BSA will be on from 1500Z June 6 through 0200Z June 7. Special QSL cards will be available. QSL with an SASE to N6BSA, Boy Scout Camp-O-Rama, P.O. Box 5082, Torrance, CA 90503. Operation will be on the following: HF phone—3.915, 7.255, 14.255, 21.350, 28.450 MHz. VHF phone—145.690, 223.500 simplex; 146.235 (+) WA6RJA/R; and 224.600 KA6N/R. VHF Packet—145.090 simplex, 146.745 (–) N6GPP/R.

• **Cumberland, Maryland Bicentennial** - A Special Event station will be operated by the Mountain ARC at the Western Maryland Railway Station as part of Cumberland's annual Heritage Days Festival June 12–14. W3YMW will operate in the lower end of the 75, 40, 20, 15, and 10 meter General phone bands. For a special steam train certificate (QSL with either 9″ × 12″ SASE, with 29¢ postage, or—if you don't mind it being folded—a business-size 22¢ SASE) send to Mountain Amateur Radio Club, P.O. Box 234, Cumberland, MD 21502. Besides the Special Event station, members of the Mountain ARC Club who make contacts during 1987 will have special Cumberland Bicentennial QSL cards to confirm contacts.

• **Brookfield Zoo, Boy Scouts of America** - The Chicago Suburban Radio Assn. will operate Special Event station N9BAT from the Brookfield Zoo, Brookfield, Illinois on June 13th from 1500–2300Z on SSB 7.250 MHz and 14.250 MHz. A 2 meter FM station will be on 146.55 MHz. A CW operation is planned using alternately on the hour 14.050 MHz and on the half hour 7.120 MHz. A full-color QSL card will be made available by the Brookfield Zoo to all stations that reply with their QSL card and a #10 business-size SASE to N9BAT, Special Event, P.O. Box 88. Lvons. IL 60534.

• **West Mineral, KS** - The Wichita ARC will operate WØSOE June 20 and 21 at the site of Big Brutus in Cherokee County, Kansas. Suggested frequencies phone 3.875, 7.250, 14.250, 21.325. Big Brutus is the second largest coal shovel in the world and is a Kansas landmark. Send QSL and SASE via Wichita ARC, WØSOE, 707 N. Main, Wichita, KS 67203.

• **Inland Empire ARC Special Event** - On June 22–26, at 1700–0800 UTC the Inland Empire ARC will operate a Special Event station in honor of the Annual West Coast Girl Scout Jamboree. A commemorative certificate will be issued via WA6ZEF (1248 N. Cypress Ave., Ontario, CA 91762) when accompanied by a QSL card and #10 SASE. Frequencies will be in the General phone sections of the 75, 40, 20, and 15 meter bands. The station will also operate in the new Novice and Technician portion of the 10 meter phone band.

• **HARK's VX3** - The Heritage Amateur Radio Klub (HARK) has obtained permission to use the special prefix VX3 from June 22 to July 5 to commemorate Cobourg, Ontario, Canada's Sesquicentennial. Operations will be in Victoria Hall in Cobourg. Special QSL cards have been printed and it is planned to exchange greetings with Coburg, Australia; Coburg, W. Germany; and Coburg, Oregon. Operations will be as follows: On 80 meters CW 3550 kHz and SSB 3800 kHz. On 20 meters CW 14,050 kHz, SSB 14,143 kHz, SSB 14,200 kHz, and RTTY 14,180 kHz. On 15 meters CW 21,025 kHz and SSB 21,250 kHz. On 2 meters 146,550 kHz. QSL to Heritage ARC, 156 Maher St., Cobourg, Ontario K9A 4S3 Canada.

• **W8MCB From Ottowa ARC** - The Ottowa ARC will operate W8MCB from 1700Z June 26 until 2300Z June 28 to celebrate the 175th anniversary of establishment of the fort during the War of 1812. Operation will be in the General portion of 80, 40, and 20 meters. For a commemorative certificate send QSL and SASE to Paul Baumgarte, WD8RJR, RR #3, Box 341, Delphos, OH 45833.

• **NABER Testing Schedule** - The National Association of Business and Educational Radio (NABER) has announced the 1987 testing schedule for the NABER Two-Way Radio Technician Certification Examination. The NABER exam is offered every other month at over 100 locations nationwide. The testing dates are as follows: Saturday, July 18: Saturday, September 19; Friday, October 2—Atlanta, Georgia only (Expo East); and Saturday, November 21. In addition to the nationwide test administrations listed above, NABER also offers upon request special administrations of the NABER exam at companies and vocational-technical schools for groups of five or more. For more information on the NABER exam and the test site nearest you, contact the NABER Technician Services office at (703) 739-0309.

(Continued on page 91)

Talk Power For Peanuts. HL-1K/A Kilowatt Tabletop HF Amplifier

Improve your peanut-whistle with some talk power from THL. Really good signals can be had with modest power and antenna set-ups and the FCC says that really high power is not necessary in most cases. That is good news for the HL-1K/A since the output (500W PEP) appears to be in line with their thinking. The HL-1K/A is type accepted by the FCC for use in the U.S. amateur bands. Solid construction (using reliable ceramic tetrodes with a proven track record) and compact size fit in almost anyone's budget and available space. Write Encomm today for the full details.

- *WARC COVERAGE
- *600 W PEP Max 1.8 thru 21 MHZ OUTPUT
- *CERAMIC TETRODES 2x 4CX250B
- *QUIET OPERATION
- *DUAL METERING SYSTEM
- *EXPORT MODEL
  AVAILABLE OUTSIDE U.S.A.
  1.8-28 MHZ WARC Bands.
  (NOT AVAILABLE IN U.S.A.)

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Our Readers Say

Nostalgia Appreciated

Editor, *CQ:*

I want to thank you and the staff of *CQ* magazine for publishing articles of interest to radio equipment collectors, nostalgia buffs, and "AM'ers" from time to time. It is indeed perceptive of you to recognize the fact that *many* amateurs are involved in facets of our hobby that are not often addressed by the predominance of current amateur radio publishing. The obsession with "state-of-the-art" technology is not shared by all hams.

I am sure that it will interest and perhaps even surprise some of your readers to know that there is a strong and growing nostalgic spirit in the ranks. Those of us caught up in it busy ourselves with many activities involving old equipment collecting and restoration, tube-type equipment construction, and modes and operating practices popular in a bygone(?) and golden era of ham radio.

Hundreds of like-minded amateurs have returned to operating the "Ancient Mode" in what has recently become known as the "A.M. Windows" of 1.885, 1.988, 3.885, and 7.290 MHz. Many newcomers are heard, some using old gear and some using SSB transceivers in the AM mode. They often make remarks like "I didn't know operating AM could be so much fun!" and, from those fortunate enough to have a true AM receiver, "Wow, this AM really has much better fidelity than single sideband!" A lot of them express that they have grown weary of their "rice boxes" and the "plug-in-appliance" type of amateur radio. They are delighted to discover that some QSOs still include discussions of a technical nature and that not all radio construction projects must use chips, transistors, and circuit boards.

You and *CQ* are to be congratulated for being bold enough to make an occasional departure from what we consider the "usual" type of articles. Your efforts are appreciated by many more than you realize!

Michael A. Carroll, NI4N
Hendersonville, TN

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

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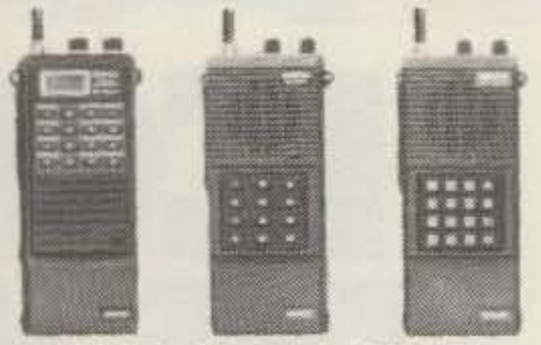

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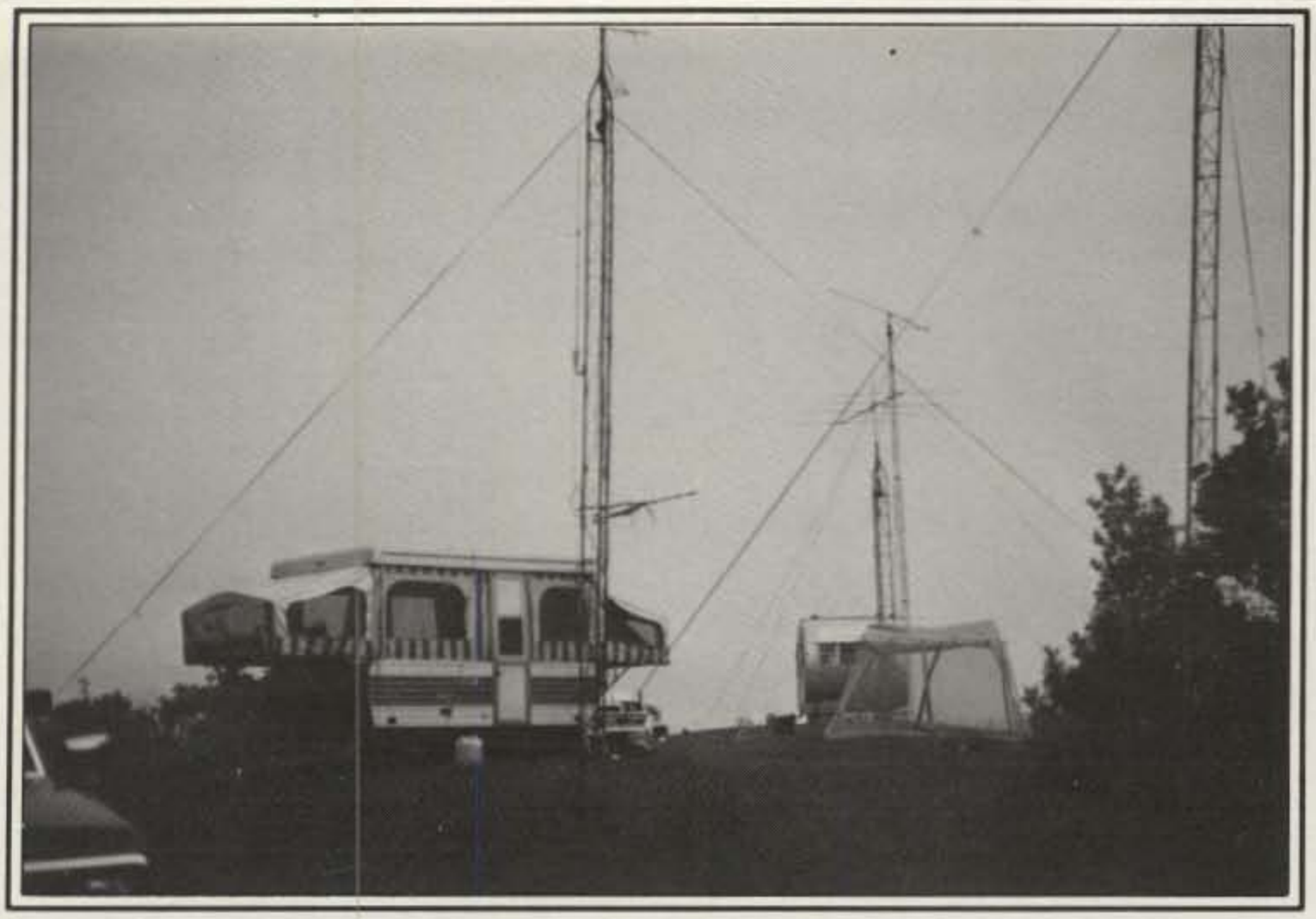

The NN8H M/M setup showing all but one of the towers. These guys placed #3 nationally and had a lot of fun!

Three operators at the world's highest scoring VHF WPX Contest station, I4EAT/3, Mt. Marmolade, Italy. Shown are I3EVK, I4IND, and IK4DCO.

The Results of the Second Annual CQ World-Wide VHF WPX Contest

BY STEVE KATZ*, WB2WIK

The weekend of July 19–20, 1986 brought hot weather to much of the world. Surely the northeastern U.S. was wilting from the heat and humidity, but this didn't prevent eager contesters from setting new records in the second annual *CQ* WW VHF WPX Contest!

Without the lure of a certificate to each and every entrant (as in our inaugural contest for 1985) the 1986 contest at first appears less successful. However, upon closer inspection we find many new records and generally higher scores, indicating excellent participation in our still-blossoming operating event. For example, the 1985 contest yielded 127 entries (25%) with scores of 100 points or less; the 1986 contest yielded only 22 entries (10%) in this category. The 1985 contest showed some 306 entrants (61%) submitting scores of less than 1000 points. The 1986 contest shows only 90 entrants (41%) in this category.

So, while we have fewer logs submitted for the 1986 contest, those submitting their scores were obviously more serious in their participation. And the higher scores surely indicate a larger number of stations on the air. Now what we must do is convince all those who participate to fill in their logs and mail them! **You**, the active contester, can help. It only takes a few seconds to ask every station you work to please submit his log. My plaintive plea goes something like, "Thanks for the point—please be sure to send in your log. You never know, you might win something. And even if you don't, you'll make those who do feel better about it. Thanks again!" While operating at multi-op station KC2PX, I made such a comment to many stations contacted. You do it, too. It will help us gather more entries, so those who win will do so in a much larger apparent field.

We received a lot of excellent comments from entrants, and some are printed elsewhere in this writeup. We're surely learning more about this contest administration stuff, and we'll be refining the rules as we go along to help make the VHF WPX more successful. The 1985 contest used serial numbers for the exchange, and many American and European entrants suggested going to grid squares instead. The 1986 contest used grid squares for the exchange (although we're not real picky about this; since the multipliers are prefixes, we won't disqualify anyone who doesn't get it right) and this time we got a lambasting from the Japanese, who aren't familiar at all with the Maidenhead grid system. In fact, we didn't get much JA participation in '86, and the grid exchange was the main reason.

After assessing the hundreds of comments received, we may go to a more universal—and some would say more exciting—scoring system for the 1988 contest. We still stand by the prefix concept, and will have a new *CQ* VHF WPX Award to go with it, but we may add some sort of distance multiplier to better reward successful DX efforts.

K7IDX/7, WA, wrote to say the "grid locator should be optional. Many stations do not know their grid or care." This is the reason we used serial numbers only for the 1985 contest. We'll solve this problem, or die trying.

An insightful letter from PE1AHX/W4, who operated from EM86 on the NC/TN border, indicates once again that the number of prefixes achievable is going to be a number that is similar, if not equal, to the number of grid squares. Using only 2 meters, Catharinus made 241 contacts with 78 prefixes in 70 grids. He used a computer program to calculate the distance to each station worked based on their locator grid (assuming each station to be precisely in the center of his square) and tabulated his results as follows:

0–199 km (0–124 mi)	36 QSOs
200–499 km (125–310 mi)	88 QSOs
500–749 km (311–465 mi)	72 QSOs
750–999 km (466–620 mi)	40 QSOs
1000 + km (621 + mi)	5 QSOs

Obviously, Catharinus was getting out very well! He raises the question, "How is the problem with stations operating in other than the call area indicated by their callsign solved in

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the HF WPX Contest, where no grids are exchanged?" Good question. I think the HF contesters have more experience with following the rules, and a greater number of stations participating in the HF WPX Contest are actually contesters. That is, a greater percentage of stations on the air during the HF WPX actually intend to submit a log; they're not just "giving out points." Still, there have been problems in the long-running *CQ* (HF) WPX Contest, and I don't know that they'll ever all be solved. We can only encourage folks to tell us where they are, regardless of their callsign, and assume they're telling us the truth.

Some ops complain the 48-hour contest period is too long. As a true contester, I always felt that shorter periods were too short! Personally, I'd always feel bad about spending 80 or more man-hours setting up, and 40 man-hours breaking down, a portable operation just to operate a 28- to 36-hour contest. At least 48 hours gives me two early-morning opportunities to work meteor scatter, just in case 6 meters never opens up. And Friday night is an excellent time to look for tropo activity, since a lot of folks can't get on during the weekend itself.

I think Bill, WA2UDT, put it best: "The contest length gave me a chance to (1) Friday night—dinner with XYL; (2) Saturday—purchase a new lawn mower and check in at plant for power shutdown; (3) Sunday—try out new lawn mower and reseed lawn. Have morning coffee with XYL. All above interspersed with turns at the rig!" Despite all these activities, Bill turned in the #3 score nationally in the single-op/multi-band QRP category.

John McKendy, VE1BF, organized a club called "The MUF Contest Group" and set up a multi-op from FN66 in New Brunswick province using the call VE1XH. They didn't set the world on fire, but had a lot of fun and provided both a new prefix and grid square (for those collecting them) to many stations worked. The group promises to return to Crabbe Mountain (elevation 1320 feet) and do it again in the '87 VHF WPX. That's the spirit!

N5HYV in LA worte to say he "... had a ball! I worked Quito, Ecuador, HC1BI at 1924 UTC Sunday and heard TI2NA but could not understand his English. My total new grids worked during the contest was 90 . . ." Holy cow! Six meters played very well, indeed, for the second annual VHF WPX Contest.

WA7TUX from UT wrote that his "biggest thrill was getting into New York and Maine for two new states and my best 6 meter DX since joining the ranks a year ago." Those complaining about conditions might want to note that WA7TUX was running QRP and a dipole.

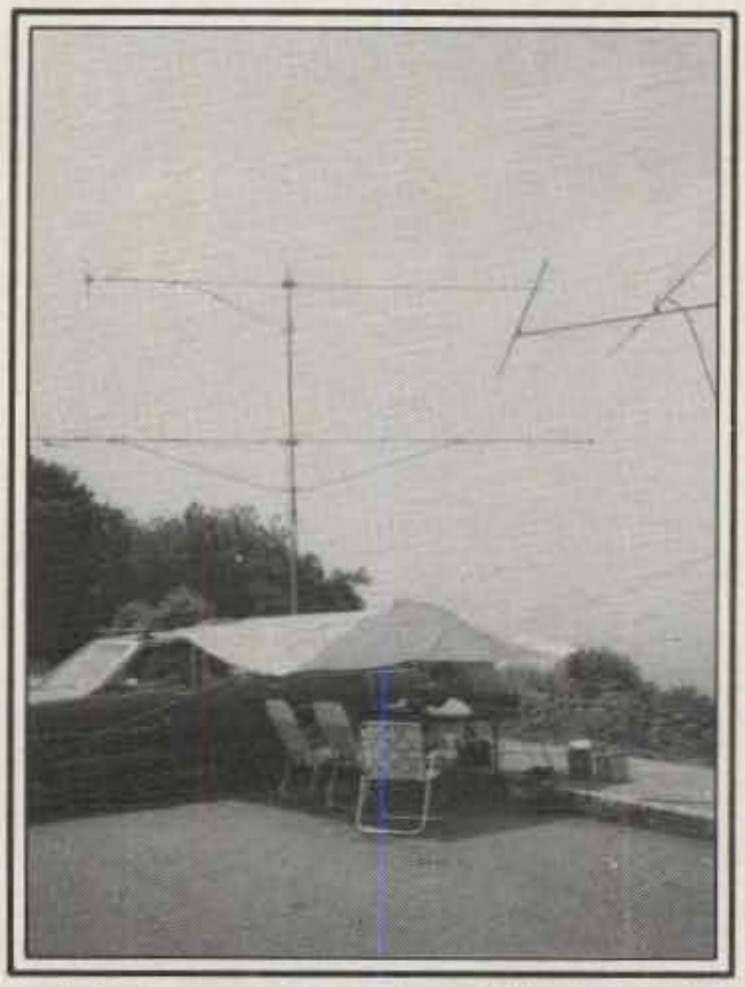
NC9F, the #1 scoring single-op/multi-band QRP entrant, comments: "Another fun-filled summer weekend . . . I plan to compete in this category again, but with upgraded antennas on 6, 2, and 220. The addition of 1296 will also help my score. One final benefit to the QRP operation was that my neighbors also got to enjoy the contest!" Well done, Tim.

WB2ELB, the #2 scoring S/M QRP entrant, has a few suggestions to offer newcomers: (1) "Instant QSY to other bands is a great asset. When you contact a 'rare one' ask if they are active on any of the other bands that you have and if so, work them there immediately. (2) Know what the activity hours are for the bands you have. (3) Don't forget the FMers. Even if all you can put up is a ¼-wave vertical, do it. (4) If you are QRP, don't waste a lot of time calling

The 1986 CQ World-Wide VHF WPX Contest Trophy Winners

North America			
N8DJB	8820	S/S QRP	Sponsor: The South Pickering (Ont.) Amateur Radio Club
KB7IJ/5	47362	S/S	Sponsor: The Mt. Airy VHF Club (Packrats)
NC9F	40680	S/M QRP	Sponsor: Microwave Modules Ltd.
W1VD	212741	S/M	Sponsor: Warren Whelan, WB2ONA
N7AMA	10586	M/S	Sponsor: The "PX" Shack
W1XX	184864	M/M	Sponsor: Cushcraft Corporation
KA7YOU	5724	FM	Sponsor: Steve Katz, WB2WIK
KU4V	18232	Portable	Sponsor: The Rochester (NY) VHF Group
Europe			
HG5OV/7	7353	S/S QRP	Sponsor: Pete Putman, KT2B
GJ4ICD	89612	S/S	Sponsor: Microwave Modules Ltd.
EA8XS	924	S/M QRP	Sponsor: David Penttila, K1COW
IC8EGJ	2706	S/M	Sponsor: Warren Whelan, WB2ONA
F6IFR/p	133100	M/S	Sponsor: Antennes Tonna (F9FT)
I4EAT/3	339200	M/M	Sponsor: Geoff Brown, GJ4ICD
EA2AMU	1650	Portable	Sponsor: Don Busick, K5AAD
Japan			
JA2DDN	975	S/S QRP	Sponsor: Tom Colyard, N4EJW
JA6RJK	19600	S/S	Sponsor: Mike Crawford, WA2VUN
JL1MWI	1116	S/M QRP	Sponsor: SCORE
JI3BFG	2040	S/M	Sponsor: Warren Whelan, WB2ONA
JA3YKQ/3	176	M/S	Sponsor: Pete Putman, KT2B
JA2YKA/2	12978	M/M	Sponsor: Phil Anderson, W2HWG
JE1PIK	3120	FM	Sponsor: Steve Katz, WB2WIK
JM3JNY/3	570	Portable	Sponsor: David Penttila, K1COW

Now these guys look serious! Some of the NN8H M/M crew, including (L–R): WB8ATA, K8AQM, N8ABW, KA8POW, KE8FX, NN8H, KDØPF, KD8SF, and KA8MXF. The sign on the trailer reads, "Eastern Michigan Contest Club" and "1986 CQ WW VHF WPX Contest."

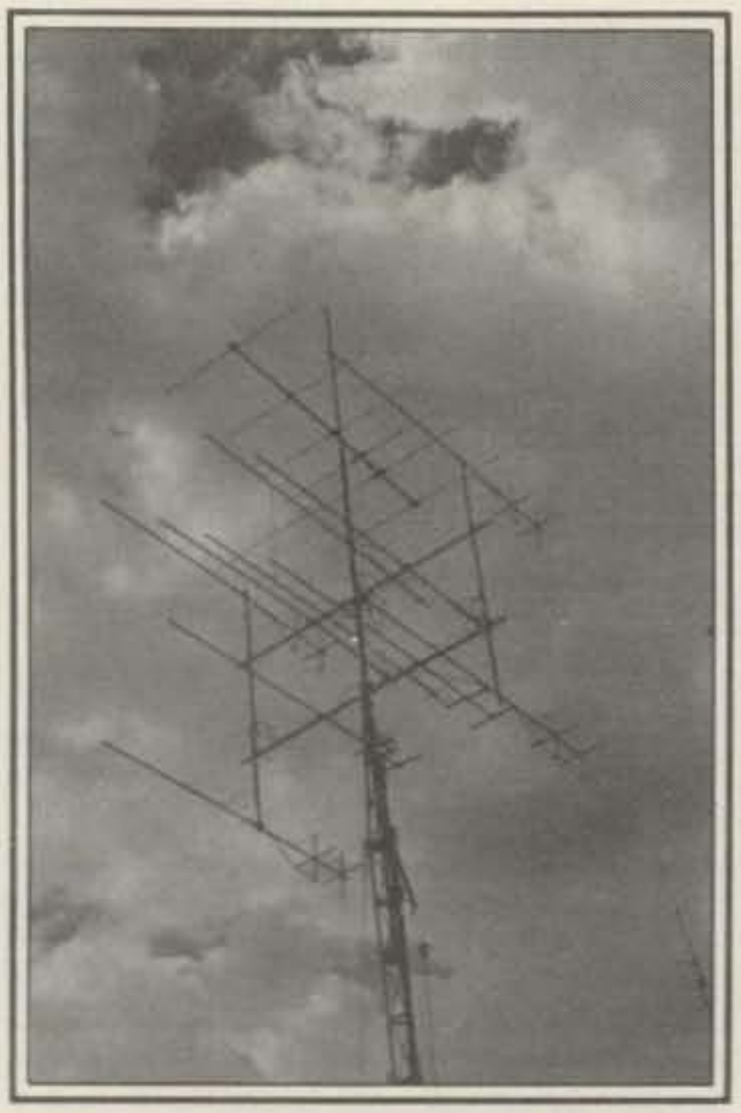


A shot of some of the setup at KD4LT on 5234 foot high Balsam Mtn, NC. Looks like they were cozy while striking up their 18K point score.

The N8CGY multi-op group set up at West Bluff in the upper peninsula of Michigan. Their EN67 grid was quite rare, as it is 95% water. Due to heavy fog, rain, and poor propagation the group dismantled their station early in the contest, but they enjoyed the spectacular view while the WX was clear!

CQ. (5) If you are single-op, multi-band and 6 meters opens up . . . pursue the 6 meter opening as vehemently as you can. (6) Get as little sleep *during* the contest as possible." Interesting, these comments parallel those I wrote in my June 1986 article entitled "How to Operate the CQ World-Wide VHF WPX Contest." I had a few more, too. You might want to take a look at that writeup if you can get a copy. Thanks, Ev, and congratulations on the fine showing.

The operators at multi-multi group NN8H (#3 nationally) in MI almost doubled their 1985 score despite some upsets, described by Jim, NN8H: "We had a bit of excitement at 3:00 AM Saturday when the 6 meter tower fell. This created the condition of the rotor control box appearing to be possessed as it took off on its own! But the unsinkable crew put 6 meters back on the air in about 1½ hours working with flashlights . . ." Boy, do I know the feeling, Jim. Operating atop Mt. Equinox, VT back in 1970, we survived a full-blown summer thunderstorm with lightning dancing between our antennas and winds up to 60 mph. The 6 meter tent collapsed from the high winds and heavy rains, and our 6 meter operator saved the equipment by staying with it until the storm passed. Aren't contests fun?



VHF antenna farm at ZS60B, S/M, So. Africa.

Franco, I4LCK, the #2 single-op, single-band entrant from Europe, complained of "very bad WX, rain and storms, no good conditions and low activity . . ." but still managed to work 155 stations and 59 PXs on 70cm! Franco, your achievements are outstanding—and just wait until we've properly promoted the VHF WPX in Europe and the activity picks up. I4LCK will no doubt double his '86 score in the future.

Well, it had to happen. Somebody was destined to break the 1985 World High Score, and somebody did. Or rather, some*bodies*, the I4EAT/3 multi-op group, who smashed the 1985 record set by F6KAW by 126,374 points by going multi-band in '86. What a showing! I4EAT/3 worked 1034 stations and 265 PXs on three bands to set a new World High Score record. Readers won't believe this, but Fausto Minardo, I4EAT, complained of bad conditions! He wrote, "... this year we were in a large area of low pressure. We got bad weather for the full contest (snow all Saturday) with limited propagation in all directions except east where we had the opportunity to make some good QSOs (LK1KDZ and YO6AFP)." Just so we U.S. operators can "eat our hearts out" (just an expression), I might as well publish the I4EAT/3 breakdown: 862 Qs, 173 PXs, 76 grids, and 19 countries on 144 MHz; 135 Qs, 69 PXs, 42 grids, and 12 countries on 432 MHz; 37 Qs, 23 PXs, 16 grids, and 5 countries on 1296 MHz. And that was during bad conditions?

Speaking of smashing records, the single-op, multi-band record set by NA1L (W1XX op.) in 1985 was rather pulverized by W1VD (K1JX op.) in '86. Clarke blew away all competition and actually outscored the highest-scoring multi-ops by working 795 stations and 229 prefixes from the W1VD (CT) superstation, thus more than doubling the previous year's record score. I should mention that Clarke also won all three ARRL VHF contests in 1986 and thus should be congratulated as "VHF Contester of the Year" or something. Unbelievable showing, Clarke. I hope you have the energy to work the VHF WPX again this year.

But don't feel bad for John, W1XX. For the '86 contest he took along a few friends and operated portable from Mt. Equinox, VT to set a new U.S. multi-op record! Using six bands, the W1XX group made 746 QSOs with 212 prefixes to break the 1985 multi-op record set by NV6O/2 by nearly 15,000 points. The NV6O/2 multi-op group "SCORE" was on again in '86 using a different callsign, KC2PX (what better callsign for a PX contest?) and made a #2 showing in the multi-multi category, working 708 stations and 201 prefixes from their NJ QTH. It was a race to the finish between W1XX and KC2PX who, being only 250 miles apart, could hear each other throughout the contest. We both wondered who was winning, but now we know: The stalwart New Englanders took the trophy.

The W0KEA group operated three bands from a 10,000 foot elevation QTH on the Flat Tops of western CO, to yield the #4 multi-multi U.S. score, an excellent showing for that part of the country. Philip, W0KEA, wrote, "We were in the middle of a sheep pasture, complete with 6,000 sheep, sheepherders, sheepdogs, and the works." He complained that the "portable" callsign rule is still not being followed (or even well understood), but said participation was better than the previous year. Working 428 stations and 143 prefixes from CO isn't easy, and the group is to be congratulated for their efforts.

N7ALX/7 sent in this sunset photo silhouetting what appears to be a Cushcraft 215WB 2 meter beam above his camper. ALX's NV site was 4900 feet above sea level.

CT3BX and CT3DK operated from a portable site on Madeira Island, running two bands QRP. Hern and Manuel used 100% homebrew antennas. Here Hern, CT3BX, is shown repairing their 25-element 70 cm Yagi, a modification of the 21-element F9FT Tonna design.

While we're talking multi-multi, an honorable mention must go to the KA4WJA (FL) group, who traveled to grid EL79 to make their portable operation a "grid expedition" as well. An hysterical letter from Carol Scoglio, XYL of KA4WJB, details their operation from St. George's Island, off the coast of Appalachicola, FL: "We racked up 187 QSOs on 6 meters, and 74 QSOs on 2 meters. Best DX was Costa Rica, but Canada, California, and Seattle were reached. Considering all— +100 degree temperatures, no rain, no running water, almost no shade (except our tents), low tides, 26 bags of ice, 24 gallons of water, 22 gallons of gasoline, raccoons, horseflies, sunburns, saltwater boils, and the ever-present sand everywhere (even in the peanut butter)—it is an expedition we'd all do again. But maybe not for another 5 years or so!" They owe many thanks to the Ranger station on St. George's Island. I hope this group is not too exhausted to try another operation (maybe an easier one) in the '87 VHF WPX.

How about the other "races"? Well, in the U.S. single-op single-band category KB7IJ/5 walked away with the honors, outscoring the nearly-tied second- and third-place entrants,

KI3L/5 and NW5E, by more than 12K points. Rick, KB7IJ, wrote, "GREAT contest, conditions unbelievable! E-skip, ground wave, double hop, backscatter, you name it! Sounded like 20 meters during the *other* WPX contest. Congrats all around." I guess that's enough enthusiasm to get us all planning for our 1987 VHF WPX.

In single/single QRP N8DJB outpaced N5BFM with 8820 points (2 meters) to BFM's 6175 (6 meters). Just goes to show that there's no one strategy to this thing.

KU4V edged out K7IDX/7 for top honors in the (U.S.) portable category, working 212 stations and 86 PXs on 6 meters. Wayne (KU4V) worked VUCC in less than 36 hours from his Dismal Mountain, VA (EM97) portable site. Meanwhile, Bruce (K7IDX) made 329 Qs and 50 PXs using only 2 meters from his portable site in WA. I should mention that Bruce would have won the FM only category if his entry had been scored that way: He made 309 Qs and 49 PXs using the FM mode!

The highest single-op single-band score in the world was once again made by Geoff, GJ4ICD, from Jersey, Channel Islands. Using 400 watts output from a 3CX800A7 amplifier and a 10-element Parabeam, Geoff made 1042 Qs and 86 PXs on 2 meters. His log indicates his best DX to have been CT3DX at 2204 km (1369 mi.)! Despite this incredible showing and a doubling of his last year's score, GJ4ICD still complained of poor activity. Well, we've recruited Geoff to be our official European VHF WPX Contest promoter and we've supplied him with all the necessary materials to do the job. Hopefully, the 1987 contest will turn out more European entries.

In the single/single QRP category for Europe, HG5OV/7 won out over fellow Hungarian HG5MY/7 with 7353 points versus MY's 4968. Both stations used only 2 meters to make 129/57 and 108/46 QSOs/PXs, respectively. Congratulations, Peter!

While the Japanese operators were befuddled by our rules change for 1986, they turned in at least a couple of excellent scores: JA6RJK took the single/single category by completing 350 contacts with 56 prefixes on 6 meters, while the multi-multi group JA2YKA/2 made 193 Qs with 63 PXs, turning in a score of 12,978 points to win their category.

Disappointments: Canadian activity was poor (3 entries), and worldwide activity outside Europe and Japan still appears to be essentially nonexistent, based on logs received. Three entries were received from South Africa, one from the Canary Islands, and one from West Indies, but where are the logs from Central America, the rest of the Carribbean, etc.? We can see that there was some activity in these places, based on logs and comments from entrants, but we haven't received any entries from these DX operators.

Assignment: Please, everyone reading this, make an attempt to spread the word about the *CQ* VHF WPX Contest. Tell your friends and on-the-air contacts about the contest and how much fun it can be. And once they're hooked, convince them to send in their logs! The VHF WPX has so many awards categories that nearly anyone who makes a concerted effort has a good chance of winning a certificate, or better still, a trophy. The 1987 World-Wide VHF WPX Contest is scheduled for July 18–19. Join us in a fun weekend!

Thanks to the members of the *CQ* VHF WPX Contest Committee for their continued support and help: K1TR, KT2B, NA2O, WA2FXB, WB2OTK/4, K5YY, and N6NB. Special thanks to Pete, KT2B, for spending untold hours on the computer, keying in names, addresses, and entry data. And thanks to our trophy sponsors, without whom we could not afford such magnificent awards.

Details of the 1987 VHF WPX Contest were printed in the February issue. We expect considerably increased participation, and, *with your help* we should receive more logs than ever. Write to SCORE, P.O. Box 1161, Denville, NJ 07834 or to *CQ* magazine for rules reprints and/or logs and entry forms. Let's make the 1987 VHF WPX one to remember!

73, Steve, WB2WIK

The placid setup at W0KEA/0 M/M in Colorado. Where are the sheep?

Stalwarts WB6YIY, left, and WB4AYE/6 heating up the airwaves on 50 and 432 MHz at WB4AYE/6, M/M.

Operator's Comments

I would like to congratulate you for initiating a worldwide VHF contest. As with every new idea you have to fight a long way against poor information, personal laziness, and bad conditions. Nevertheless, it's a great idea and next year I'll put a greater effort into this contest . . . *DG1PJ*. We had more fun than anticipated. Following on the heels of the June VHF QSO Party and Field Day, we were leery of how much activity there would be for the VHF WPX. Activity on 144, 220, and 432 was low, but 6 meters more than made up for it. Many thanks for conducting the contest . . . *WB4AYE/6*. Activity level was very good for this area considering the newness of the contest. Running QRP was really interesting. I'll admit I had to work pretty hard on 2 meters for those 300 mile QSO's. Another fine effort, thanks for your help and hard work . . . *NC9F*. I really like the idea of another large VHF UHF contest; the timing seems right, but I was disappointed with the lack of 432 MHz activity. I apologize to the stations who called me several times before I heard them. I have since added a GaAsFET preamp! I picked up one new state and two new grids. Would like to work next year's VHF WPX Contest, but my wedding is scheduled that weekend! . . . *WB2DNE*.

Running QRP, you hear, "Sorry OM, you're in my noise level, try again later" quite a bit! . . . *AB1U*. I had to work over the contest weekend, so operation was limited to 3 watts from the IC-502 into a ¼-wave mag mount on the car's roof. Great opening Sunday afternoon. Heard stations from LA to SD early, while the opening shifted north and west later in the day. Thanks for the contest. I plan on a more intensive operation next year . . . *NS6X*. Increased last year's 77 points to 792 points for a ten-fold increase with the same rig and antenna. Better openings, and living by the rig for two days, seemed to be the difference. The contest brought my grid square total to 100 on 6 meters . . . *WA7TUX*. As usual for us on the west coast, conditions were bad for most of the contest, but finally on Sunday morning it opened up. I turned on the SB110A at 6:30 AM and the first thing I heard was a W8. It stayed open for the whole day on Sunday . . . *N6CW*. The real high point was WA5S (EL16) loading up the family flivver and driving west to give me EL06. Now, that is *real* service! I got a total of 16 new grid squares . . . *W4OO*.

Here in Arizona there are 8 grid squares that are rare. Pete (WA7JTM) and I picked DM45. During the weekend we had 3½ inches of rain, plus lightning, wind, and hail. We worked XE2WMJ, who is new to 6 meters, and had a very enjoyable contest. We're looking forward to next year . . . *N7AMA*. Our island campsite was only attainable by water, all roads having been washed out last year. We left at 8:00 AM Friday with 2 cars, a truck, boat and trailer, a smaller Jon boat, a duty trailer with 70 feet of tower, 2 beams, and a huge assortment of all kinds of gear. After 5 boat trips, and 6 hours later, we were all at the site. The 2 meter band never opened to any extent, but 6 meters came alive in the afternoons and evenings. At times, John (KA4WJA) QSOed four calls a minute . . . *KA4WJB*. Please show band score (like WW HF WPX). It is impossible to compare traffic on VHF and UHF/SHF bands for overall score! Thanks for FB trophy . . . *I4LCK*. We were able to improve our score over last year due to an extraordinary amount of hams mobile in our area and several pieces of new equipment, and most importantly, two new antennas.

Diehard multi-ops (L–R) KA4WJA, KA4WJB, KB4FUZ, and KB4RBB are prepared to tackle the world from their EL79 Florida campsite.

As usual, we all had fun and are looking forward to next year . . . *NN8H*.

I went portable to Blue Moon Hill, the highest point in the area. The results? Well, you see 'em! . . . *WB2ELB*. Many stations do not sign /7 or /M or whatever. They just use their call as is. This can be interpreted in the location part of the exchange . . . *K7IDX/7*. Living in an area sparsely populated by hams, we had to try to attract the attention of American stations, to get them to point their antennas to FN66. This problem, combined with generally poor propagation, accounts for our low QSO rate. The local black flies did considerably better, averaging five bites per minute! . . . *VE1XH*. Keep the grid locators as part of the exchange; they tend to keep interest peaked. Looking forward to next year and more 220 MHz activity! . . . *WA2UDT*. A rather high number of stations were at more than average distance. It was difficult to work anyone in the 2, 3, or 0 call area, even though the stations I did work were very loud. Where were they? I operated with more power this year (100 watts versus 3 watts last year), which did help a lot. Also, the antenna had 17 instead of 5 elements. The contest was fun in spite of the very quiet Sunday. Maybe next time even better . . . *PE1AHX/W4*. Fun! . . . *AF9L*.

Could use better condx on 2 M and more power on 6 M . . . *WA2SLY*. Great fun! After only 2 weeks on 2 M SSB, I'm hooked! . . . *NR8S*. Worked 14 new grids with just a mobile antenna on the roof . . . *KA6SNY*. Totally lost my voice after Friday night . . . *KA1DHO*. It was a thrill working into L.A. area with 10 watts! . . . *W6YVK*. No one knew of this contest . . . *KA6VKP*. My first contest since becoming a ham in December '85. This is what being a ham is all about. Keep up the great work! . . . *KB4QKP*. Would like to see a QRP portable class also. Did not get to do a full-blown operation, but will be back next year with the KWs . . . *W5NZS*. This was my first contest. Thanks again for sponsoring a fine contest . . . *N4OAS*. Tested out my new station during your contest and it survived (so did I)! . . . *KA3KHZ*. Biggest thrill was working K9VGE/9 in EN46 for a new grid . . . *AF9Y*. Thank you for holding a wonderful contest! . . . *N5JDT*. Called W1XX on CW for about 30 minutes before he heard me and congratulated me for persistence! . . . *WB2YEH*.

Could only spend limited time in contest. It was 95 degrees on Saturday. Drank lots of Kool-Aid . . . *WD9IDC*. Missed most of 6 M opening. Nice summertime contest . . . *KW2T*. Worked W6JKV at his home QTH after working him in the Azores Islands two weeks earlier . . . *W7US*. What a come down from last year! My 6 meter rig went out at 1600Z on Sunday just as band opened! . . . *KA6ING*. Keep up the great work . . . *WB0ZKG*. Wish there was more activity! . . . *N4HB*. The WX was 100% 25 degrees (C) and more. Our operattion took place in an old volcano crater, very beautiful sightseeing . . . *CT3BX/DK*. W5's cannot compete with W3's, Europe, etc.—Unfair! . . . *WB5YDE*. Missed Saturday PM opening (working). Missed early Sunday AM (sleep). Finally caught one Sunday afternoon . . . *W7ABX*. Finally, an opening to W6 during a contest! . . . *N6CW*. My first contest with you. The summer has been poor . . . *WP4ACV*. Except for FM, 220 was a bust out here . . . *KA9MGR*. We were on Balsam Mtn, NC at 5234 feet. The view was great . . . *KD4LT*.

My first contest. I enjoyed the band opening on Friday evening. Only operated about 13 hours, but I had fun . . . *N4LFW*. I was very surprised to hear the new rules from JA2YKA/2. I didn't know the rules had been changed at all! . . . *JP1DMX*. Tns FB contest! . . . *JH7VEP*. Had not too much time to take part, but enjoyed it very much! . . . *DL8ZAW*. Biggest thrill was working PE1AHX/W4 for new grid on 2 meters. Also worked one new state on 432 . . . *KB3PD*. TVI!! Got calls all the way. Finally quit Sunday morning . . . *KA9DZM*. This is my first contest ever on ham radio . . . *KA2WJU*. I suggest including the grid as part of the score. Prefixes are mostly luck these days . . . *AA4FQ. (Ed. note: And working grids isn't luck?)* Great contest! Very nice opening on 6 meters late Sunday. See you next year! . . . *KI6O*. Ate 2 lbs. of peanuts and 3 gallons of water. Think I'll get pizza next year! . . . *KE8BU*. First time involved in any type of contest and had fun; worked a few new grids . . . *KD8JQ*. 14 new grids! . . . *N7BUP*. Not one VA neighbor worked in 48 hours . . . *N2CJP/4*. My first contact out of the U.S. (VP9GE, Bermuda) . . . *N2GBY*. Propagation lousy but had a good time . . . *N5FYZ*. Activity very good . . . *W2HRW*. No propagation to the east but a fun contest anyway . . . *W8NJR*. Will have to find a big hill! . . . *NA2A*. Saturday's opening was impressive. Shorten contest (sanity problems!) . . . *WA0PWE*.

Just a lot of fun . . . *WA4JNE*. Happened upon the contest by accident while building a solar panel for the FT-290 . . . *WA6GFR*. Too bad we don't have propagation to Japan on 2 meters. At least there would be someone to work! . . . *WB3DNA*. This was my first contest and I loved working it as much as *CQ* magazine. Thanks for both . . . *N8HIN*. 100 degrees F at 4900 feet—great sunset. Closest contact 100 miles. Not too many towns, very few hams around here . . . *N7ALX/7*. Fun giving out EN77 . . . *WB8TGY/VE3*. Nice opening last few hours—eight new grids, one new state . . . *WI6I*. I enjoy the contest. Keep up the good work . . . *WD8IFC*. Picked up new state (NV), heard SD; worked 8 new grids . . . *KY9P*. Let's do it again next year, OK? . . . *WD0FLJ*. The activity in Japan was very low this year. I think there are two reasons. One, JARL misled us to exchange serial number. Another is that grid locator is not popular in Japan. Almost nobody knows grid locator. In Japan, we use prefecture code and JCC, JCG code more than 20 years. These codes are used in JARL contest, and very popular. You must change the rules . . . *JI3BFG*. Played 18 holes of golf, babysat, went to church twice, and still had 344 QSOs. 6 meters was great! 7 new grids on 6 . . . *N0LL*. There should be additional trophies or certificates in sections . . . *N2BJ*. A local buddy came on to see how I was doing, and it turns out he's a new PFX! . . . *N8AXA*.

Multi-Op Station Operators

JA3YKQ/3: JJ3KGE, JL3UGB. **JA2YKA/2:** JF2DQJ, JG2MTC, JI2UHH. **JA1ZCX/1:** JM1WBP, JN1VNG, JP1JAA. **CT3DK/BX:** CT3DK, CT3BX. **ED6WPX** & EA6TC. **F6IFR** & F6CWW, F6GWV, F6BPX. **G0CQW/A** & G0CLY, G0CJJ, G0EZZ, G0EGN. **HG5KDQ:** HG5FM, HG5WE. **HG8KAX:** HA8LKB, HG8LKC. **HG0KDA:** HA0HG, HG0HA. **I4EAT/3** & I4IND, I4YRW, I3EVK, IK4CZF, IK4DCO, IK4DCY. **IA0KM:** I0AMU, I0AKP, I0HOC, IK0CAK. **OK1KHI/P:** OK1AGE, OK1AXH, OK1FBI, OK2BWY, OK1FAO. **KY1K** & KA3OPR, WA1YXL. **KA1BB/2** & NE1A, KA1DFI. **W1XX** & W1OD, KB9NM. **KC2PX** & AK2F, KD2I, KT2B, W2HWG, WA2VUN, WB2WIK. **KX2J** & KA2AAP, KA2HSK, KA2RBW, NQ2O, N2WK, WA2LAQ, WA2MOP, WA2SHN, WB2MKN. **KA4WJA** & KA2WJB, KB4FUZ. **KD4LT** & WD4NAE, K4HAV. **KB5MY/6** & WA6TBO. **WB4AYE/6** & WB6YIY. **N7AMA** & WA7JTM. **NN8H** & N8ABW, WB8ATA, WD9INF, KD8SF, KA8MXF, KA8POW, N8EWS, KD0PF, K8AQM, KE8FX, KA8THW, KA8JJF. **N8CGY** & N8GNI, KA8NCV. **KA9QGT** & KA9GQF. **W0KEA** & N0BRI, N0DVL. **W0SOE:** KF0M, KB0DW, N0FFO, N0FUJ, NO0Y. **VE1XH** & VE1CD, VE1TE, VE1BGX, VE1BF. **VE7PRC:** VE7BEE, VE7ASY.

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Note: Entrants are listed in order of descending score, regardless of category competition, within each call area or country. Boldface calls are category winner in each call area or country. Certificate winners are the highest scoring entrants in each category of competition, in each state (U.S.), province (Canada), call area (Japan), or country.

Entries contain information as follows: Station callsign; state (U.S. only); category of competition; #QSOs; #PXs; total score; bands used. A = 50 MHz. B = 144 MHz. C = 220 MHz. D = 432 MHz. E = 902 MHz. F = 1296 MHz.

NORTH AMERICA

W1VD	**CT**	**S/M QRO**	**795**	**229**	**212741**	**ABCDF**
W1XX	**VT**	**M/M**	**746**	**212**	**184864**	**ABCDEF**
WA4PFN/1	MA	S/M QRO	210	79	18644	ABCD
K1TOL	**ME**	**S/S QRO**	**189**	**74**	**13986**	**A**
AB1U	**CT**	**S/M QRP**	**120**	**71**	**12567**	**ABCDF**
AA2Z/1	CT	S/M QRO	123	68	9996	ABDE
K1FO	CT	S/S QRO	78	30	4680	D
K5MA/1	MA	S/S QRO	96	41	3936	B
KY1K	**CT**	**M/S**	**130**	**30**	**3900**	**B**
NE1A	CT	S/S QRO	71	31	2201	B
AI1K	RI	S/S QRO	51	27	1377	B
K1TR	NH	S/S QRO	67	22	1474	B
KA1CDZ	NH	S/M QRO	30	19	665	ABCD
NA1G	**MA**	**S/S QRP**	**29**	**18**	**522**	**B**
W1GXT	MA	S/M QRO	24	18	450	ABC
KA1DHO	MA	S/S QRO	13	11	143	A
N1ABY	CT	S/S QRO	12	9	108	A
KH6CP/1	CT	S/S QRP	5	4	20	B
KC2PX	**NJ**	**M/M**	**708**	**201**	**167031**	**ABCDF**
N2BJ	**NY**	**S/M QRO**	**486**	**164**	**106108**	**ABCDF**
KX2J	NY	M/M	294	125	44125	ABCD
W2HRW	NJ	S/M QRO	291	104	31824	ABD
WB2ELB	**NY**	**S/M QRP**	**226**	**105**	**25620**	**ABC**
WA2UDT	NJ	S/M QRP	146	86	14878	ABCD
KA2WJU	**NJ**	**S/S QRO**	**56**	**115**	**6440**	**B**
NB2T	**NY**	**S/S QRP**	**130**	**40**	**5200**	**B**
NA2A	NY	S/M QRO	58	35	2345	BD
WA2SLY	NY	S/M QRO	73	29	2117	AB
WB2ODH	NY	S/S QRP	76	22	1672	B
WA2GPA	NJ	S/S QRO	47	25	1175	B
WA2ALM	NJ	S/S QRO	43	21	903	B
KA1BB/2	**NY**	**M/S**	**31**	**21**	**651**	**B**
NR2E	NY	S/S QRP	31	20	620	B
KW2T	NY	S/M QRO	38	24	912	AB
N2GBY	NJ	S/S QRP	26	20	520	A
WB2YEH	**NJ**	**Portable**	**16**	**12**	**192**	**A**
WA3YON	**PA**	**S/M QRP**	**88**	**63**	**7056**	**ABCDE**
KB3PD	**DE**	**S/S QRO**	**150**	**47**	**7050**	**B**
KA3KHZ	DE	S/S QRO	130	47	6110	B
WB2DNE/3	MD	S/S QRO	40	20	1600	D
WB3DNA	PA	S/S QRO	44	26	1144	B
KA4WJA	**FL**	**M/M**	**261**	**105**	**27405**	**AB**
WS4F	**GA**	**S/M QRO**	**205**	**100**	**25100**	**ABCDF**
KD4LT	GA	M/M	184	96	18816	ABD
PE1AHX/W4	**SC**	**S/S QRO**	**241**	**78**	**18798**	**B**
KU4V	**NC**	**Portable**	**212**	**86**	**18232**	**A**
W4OO	FL	S/S QRO	195	84	16380	A
N4HB	VA	S/M QRO	136	82	13284	ABD
N4MM	VA	S/M QRO	120	72	8640	AB
N4OAS	KY	S/S QRO	125	68	8500	A
WA4JNE	**FL**	**S/M QRP**	**89**	**60**	**5340**	**AB**
WB4NIX	AL	S/S QRO	93	57	5301	A
AA4LE	**AL**	**S/S QRP**	**87**	**56**	**4872**	**A**
KS4S	NC	S/S QRO	75	50	3750	A
N4LTA	SC	S/M QRO	71	50	3650	ABD
KB4SRE	KY	S/S QRO	64	43	2752	B
WB4WXE	GA	S/S QRO	53	41	2173	A
AK4U	KY	S/S QRP	50	29	1450	B
N4LFW	**FL**	**FM ONLY**	**58**	**23**	**1334**	**B**
N2CJP/4	NC	S/M QRO	38	28	1148	ABD
AA4FQ	KY	S/M QRO	35	23	805	AB
WB4YLR	GA	S/S QRP	18	18	324	A
KB4QKP	FL	S/S QRP	12	7	84	B
WL7AZB/4	GA	S/M QRP	6	5	30	AB
K5UR	**AR**	**S/M QRO**	**466**	**182**	**93548**	**ABCD**
KB7IJ/5	**TX**	**S/S QRO**	**398**	**119**	**47362**	**A**
KD5RO	TX	S/M QRO	284	114	41724	ABDF
KI3L/5	NM	S/S QRO	290	119	34510	A
NW5E	TX	S/S QRO	384	87	33408	A
N5HYV	LA	S/M QRO	197	125	26125	ABD
N5JJ	TX	S/S QRO	172	80	13760	A
WA5UFH	LA	S/M QRO	144	75	11550	ABD
N5BFM	**NM**	**S/S QRP**	**95**	**65**	**6175**	**A**
W5LTR	NM	S/M QRO	46	28	1540	BDF
N5JDT	**NM**	**Portable**	**31**	**21**	**651**	**B**
W5FYZ	LA	S/S QRO	60	14	840	B
WB5YDE	LA	S/S QRP	54	14	756	B
NW5K	LA	S/S QRO	34	22	748	B
W5NZS	OK	S/S QRP	23	18	414	A
WB4AYE/6	**CA**	**M/M**	**207**	**94**	**19176**	**ABCD**
N6CW	**CA**	**S/S QRO**	**167**	**77**	**12859**	**A**
KI6O	**CA**	**S/M QRO**	**127**	**76**	**9880**	**ABD**
KB5MY/6	**CA**	**Portable**	**105**	**43**	**5590**	**ABCD**
W6PFE	CA	S/M QRO	71	35	2660	ABCD
WI6I	**CA**	**S/S QRP**	**61**	**40**	**2440**	**A**
KK6C	CA	S/M QRO	55	44	2420	AB
KA6VKP	CA	S/S QRP	82	15	1230	B
WA6OYS	CA	S/S QRP	42	15	630	B
WA8LLY/6	CA	S/M QRO	24	21	525	ABD
WA6SNN	**CA**	**S/M QRP**	**20**	**13**	**351**	**BD**
W6YVK	CA	S/S QRP	26	13	338	B
KG6AO	CA	S/S QRO	25	13	325	B
NS6X	CA	S/S QRP	18	14	252	A
KA6SNY	CA	S/S QRP	16	15	240	A
K6PFW	CA	S/M QRO	13	11	165	ABD
KA6ING	CA	S/M QRO	12	11	143	ABD
NR6E	CA	S/M QRO	10	9	90	AB
WA6GFR	CA	S/S QRP	9	6	54	B
NF7X	**WA**	**S/M QRO**	**212**	**92**	**21620**	**ABCD**
K7IDX/7	**WA**	**Portable**	**329**	**50**	**16450**	**B**
N7AMA	**AZ**	**M/S**	**159**	**67**	**10586**	**A**
W7US	**AZ**	**S/S QRO**	**126**	**73**	**9198**	**A**
KD7IY	ID	S/M QRO	115	70	8190	ABD
KA7YOU	**WA**	**FM Only**	**137**	**36**	**5724**	**BCD**
KT7V	**WY**	**S/S QRP**	**92**	**52**	**4784**	**A**
N7BUP	AZ	S/S QRO	68	34	2312	A
WA7TUX	UT	S/S QRP	33	24	792	A
N7ALX/7	NV	Portable	41	16	656	B
W7ABX	NV	S/S QRO	28	23	644	A
KI7T	WA	Portable	31	16	496	A
KT7G	WA	S/S QRO	16	12	192	A
KA7WOZ	WY	S/S QRO	3	3	9	B
NN8H	**MI**	**M/M**	**594**	**171**	**119700**	**ABCD**
N8AXA	**OH**	**S/M QRO**	**127**	**90**	**12510**	**ABCD**
N8DJB	**OH**	**S/S QRP**	**147**	**60**	**8820**	**B**
KT8W	**WV**	**S/S QRO**	**105**	**49**	**5145**	**B**
WA8MIL	MI	S/M QRO	81	48	4320	BD
W8NJR	OH	S/S QRO	78	43	3354	B
NR8S	MI	S/S QRP	78	37	2886	B
KD8JQ	OH	S/S QRO	67	33	2211	B
W8LSC	WV	S/M QRO	46	38	2356	ABD
N8CGY	**MI**	**M/S**	**66**	**30**	**1980**	**B**
WB8AAX	MI	S/S QRO	41	23	943	B
N8BJN	OH	S/S QRO	37	23	851	B
N8HIN	OH	S/S QRP	32	19	608	B
WD8IFC	OH	S/S QRP	20	18	360	B
KA8NRC	OH	S/S QRP	8	8	64	A
KE8BU	OH	S/S QRP	17	11	187	B
N8GNI	MI	S/S QRO	14	10	140	B
WB9MSV	**IL**	**S/M QRO**	**271**	**154**	**51436**	**ABCD**
NC9F	**IL**	**S/M QRP**	**286**	**120**	**40680**	**ABCD**
KA8MRI/9	IN	S/M QRO	263	145	40310	ABD
NE9O	IN	S/M QRO	252	112	28336	ABD
KA9MGR	IL	S/M QRO	206	95	20615	ABC
AF9Y	**IN**	**S/S QRO**	**182**	**68**	**12376**	**B**
N9EXU	IL	S/S QRO	179	53	9487	B
KA9DZM	IN	S/S QRO	91	53	4823	A
AF9L	IN	S/S QRO	55	37	2035	A
KA9QGT	**IL**	**M/M**	**61**	**33**	**2013**	**AB**
KY9P	WI	S/S QRO	50	34	1700	A
KA9QIK	IL	S/M QRO	39	29	1392	BD
W9YCV	WI	S/M QRO	29	20	640	BD
WD9IDC	**IL**	**Portable**	**31**	**17**	**527**	**B**
KR9G	IL	S/S QRP	16	13	416	D
NA9N	IN	S/S QRP	16	12	192	B
W0KEA	**CO**	**M/M**	**411**	**143**	**61204**	**ABD**
N0LL	**KS**	**S/M QRO**	**344**	**116**	**41180**	**ABD**
W0SOE	KS	M/M	146	92	15548	ABCDF
KA0TLJ	**IA**	**S/S QRO**	**120**	**32**	**3840**	**B**
W0VB	MN	S/S QRO	97	31	3007	A
WA0PWE	**KS**	**S/S QRP**	**71**	**36**	**2556**	**A**
KC0ZR		S/S QRO	53	25	1325	B
WD0FLJ	MO	S/S QRP	20	18	720	D
WB0ZKG	IA	S/S QRO	31	22	682	A
WA0DCB	IA	S/S QRO	10	9	90	A

VE1XH	**NB**	**M/M**	**45**	**18**	**810**	**AB**
VE7PRC	**BC**	**Portable**	**33**	**21**	**693**	**A**
WB8TGY/VE3	ONT	Portable	8	6	48	AB
WP4ACV	**PR**	**S/S QRP**	**5**	**5**	**25**	**A**

Europe & Africa

DL8ZAW	**S/S QRO**	**24**	**21**	**504**	**B**
DG1PJ	**S/S QRP**	**10**	**10**	**200**	**D**
SM6CLU/6	**S/S QRO**	**47**	**13**	**611**	**B**
SM5RCR	**S/S QRP**	**2**	**2**	**4**	**B**
EA2AMU	**Portable**	**66**	**25**	**1650**	**B**
EB9EF/1	Portable	15	12	180	B
ED6WPX	**M/S**	**1**	**1**	**1**	**B**
ZS6WB	**S/M QRO**	**67**	**13**	**1274**	**ABDF**
ZS6OB	S/M QRO	60	11	814	ABD
ZR6AGN	**S/M QRP**	**31**	**7**	**245**	**ABD**
YO4BBH/P	**S/S QRP**	**6**	**4**	**24**	**B**
CT3DK	**M/M**	**26**	**18**	**540**	**BD**
CT4KQ	**S/S QRP**	**18**	**4**	**72**	**A**
GJ4ICD	**S/S QRO**	**1042**	**86**	**89612**	**B**
I4EAT/3	**M/M**	**1034**	**265**	**339200**	**BDF**
I4LCK	**S/S QRO**	**155**	**59**	**18290**	**D**
IA0KM	M/M	244	48	14544	BDF
I4XCC	S/S QRO	204	68	13872	B
I4RHP	S/S QRO	134	51	6834	B
IC8EGJ	**S/M QRO**	**71**	**33**	**2706**	**BD**
I3NOO	S/S QRO	69	36	2484	B
I3VYK	**S/S QRP**	**55**	**23**	**1265**	**B**
IO5MZY	S/S QRO	50	23	1150	B
IW2BZY	**S/M QRP**	**24**	**20**	**560**	**BD**
HG5OV/7	**S/S QRP**	**129**	**57**	**7353**	**B**
HG5MY/7	S/S QRP	108	46	4968	B
HG8KAX	**M/S**	**122**	**32**	**3904**	**B**
HG5AGP	S/S QRP	47	20	940	B
HG5KDQ	M/S	30	18	540	B
HG5AND	S/S QRP	21	8	168	B
F6IFR/P	**M/S**	**1100**	**121**	**133100**	**B**
F6HMQ/P	**S/S QRO**	**607**	**58**	**35206**	**B**
OH6YF	**S/S QRO**	**4**	**2**	**8**	**B**
G8CQW/A	**M/M**	**64**	**13**	**1053**	**BD**
G6LOH	**S/S QRO**	**57**	**16**	**912**	**B**
OK1KHI/P	**M/M**	**659**	**142**	**103660**	**BD**
OK3YCM/P	**S/S QRP**	**57**	**20**	**1140**	**B**
EA8XS	**S/M QRP**	**37**	**21**	**924**	**BD**

Japan/Oceania

JA6RJK	**S/S QRO**	**350**	**56**	**19600**	**A**
JA2YKA/2	**M/M**	**193**	**63**	**12978**	**ABD**
JE1PIK	**FM Only**	**39**	**20**	**3120**	**F**
JI3BFG	**S/M QRO**	**61**	**30**	**2040**	**ABD**
JP1AVZ	FM Only	66	28	1848	A
JL1MWI	**S/M QRP**	**32**	**18**	**1116**	**BD**
JA2DDN	**S/S QRP**	**39**	**25**	**975**	**A**
JM3JNY/3	**Portable**	**30**	**19**	**570**	**AB**
JH1FJK	S/S QRP	11	10	440	F
JK1OTP	S/M QRP	31	11	341	AB
JA3QOS	S/M QRO	19	13	312	ABD
JA1DTS	S/S QRP	18	14	252	A
JA3YKQ/3	**M/S**	**16**	**11**	**176**	**A**
JH7VEP	S/S QRP	14	11	154	A
JA1ZCX/1	M/M	13	8	112	AD
JA1RJU	S/S QRP	11	8	88	A
JL3AZA	S/S QRP	11	7	77	A
JP1DMX/1	Portable	10	7	70	A
JG2NKF	S/S QRP	7	6	42	A
JA1AAT	S/S QRP	7	5	35	B
JK1GLA	S/S QRP	5	5	25	B
JO1CRA	S/S QRP	3	1	6	D

CQ

CQ REVIEWS:

The ICOM IC-u2AT 2 Meter Handheld Pocket Transceiver

BY DAVE INGRAM*, K4TWJ

As everyone will surely agree, hand-held FM transceivers are among the most popular items in amateur radio today. These portable gems are indeed miniature communications systems, and I personally can't visualize going anywhere without one. Carrying a full-size talkie is challenging to me, however, because they're a mite large and hefty for comfortably transporting in a coat pocket or clipped to a belt. When ICOM first announced the Micro-2AT hand-held/pocket transceiver, my XYL Sandy, WB4OEE, and I each enthusiastically ordered one.

Generally speaking, the IC-u2AT is "traditional" in physical layout with an upper area speaker and mike, center tone pad, and bottom slide on/off battery pack. The unit is well balanced with a professional "feel," and there aren't any loose areas that flop or wiggle. The talkie's thin design is great for carrying in a shirt pocket, and its top-mounted rocker switches make frequency tuning and/or memory selection a snap. A standard BNC connector is used for the antenna, so you can use the rig's included mini-duck or slip on one of the readily available gain antennas for extending range. A standard "wall charger" is also included in the u2AT package.

The u2AT includes exceptionally wide frequency coverage, receiving 140.0 to 169.9 MHz and transmitting from 140.0 to 149.9 MHz. In addition to operating 2 meters with plenty of overlap, it's ideal for monitoring public services, utilities, mobile phones, and continuously available NOAA weather broadcasts in the 162 to 163 MHz range. Since those frequencies can be stored along with your favorite repeaters in any of the u2AT's 10 memories, you can have everything at your fingertips when needed.

A top area LCD readout indicates operating frequency, memory, S level on receive, and relative power output on transmit. Since frequencies are displayed in four digits, a scale of zero to four small bars is also included for marking 130, 140, 150, 160, and 170 MHz ranges. The display is backed by a self-timing green nightlight that's controlled by a button below the push-to-talk switch. There are two switches on the u2AT's rear—a high/low power switch and a SIMplex/+DUPlex/−DUPlex switch. If you select + or − DUP, press the nightlight button, then switch on the rig, its preprogrammed 600 kHz repeater offset is displayed. The offset can then be changed as desired via the top rocker switches. Additional top controls are volume, squelch, PL tone on/off, repeater input check switch, and transmit/battery monitoring LED.

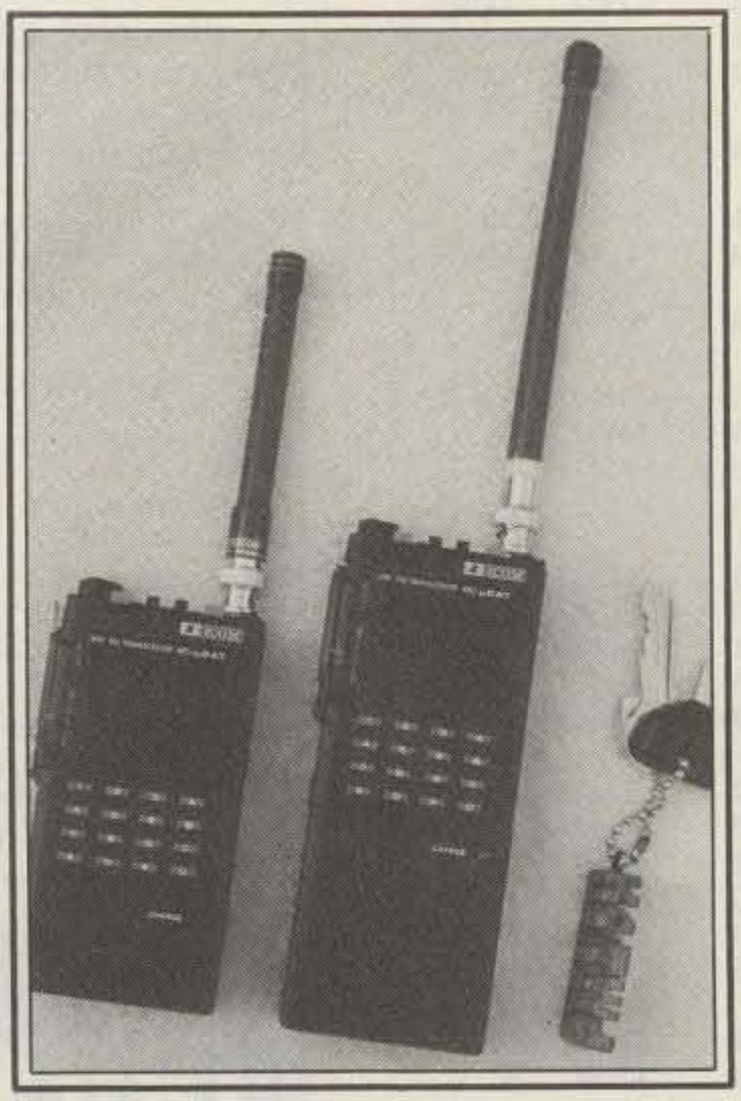

Fig. 1– The two ICOM IC-u2AT hand-held/pocket FM transceivers featured in this review. Left unit is "sized down" with supplied miniduck antenna and optional BP-21 battery pack. Right unit is using supplied BP-22 and optional full-size ducky.

As initially purchased, the u2AT measures 5.6″H × 2.2″W × 1.1″D and weighs 340 grams. Since the talkie's included BP-22 270 ma rechargeable battery pack contributes approximately 2.5 inches of that height, we also purchased ICOM's optional 120 ma BP-21 rechargeable battery packs for reducing the rig's overall height to 4.6 inches. That step makes the u2AT the smallest talkie available today. More details on battery packs later in this review. Operating the Micro-2AT is a cinch. The 10 memories function like 10 tunable VFOs, so you merely select a memory and shift its contents to a desired frequency. Additional programming is equally simple: step to the next memory, press the tuning switches until the desired frequency is displayed, and that's it. When you want to scan the band or add a new frequency, just retune a seldom-used memory.

A Closer Look

Several of the u2AT's special features are not apparent at first glance, so let's take a closer look at the unit. The rig includes a 38 PL/subaudible tone encoder, with a DIP switch tone selector recessed inside the battery connector plate (you slide off the battery to set the switches). The front autopatch tone pad has positive snap action, and tones can be monitored via the speaker while transmitting. Their level also tracks with the rig's volume control, and a keying circuit holds the push-to-talk switch while dialing. A clever battery-saving mode is also included in the u2AT. If no signal is received or switch operation performed for 30 seconds, current demands drop to a mere 6 ma. You could monitor for 8 hours in that state and still have over half of the smallest battery pack's energy available for use.

The u2AT is also interesting in the technical department. Its inner PC boards are supported by a steel frame, for example, while the unit's outer case is high-impact plastic. ICOM reports this design has survived quite a bit of abuse, including being accidentally dropped from a tower. The talkie's block diagram is shown in fig. 3, and its circuitry is straightforward in design. A microprocessor handles tuning functions, including feeding a control voltage to varicaps in the receiver to preset them to a selected range. Numerous bandpass filters are also included to minimize intermod. Prime transmitter stages

*Eastwood Village, No. 1201 So., Rt. 11, Box 499, Birmingham, AL 35210

- Frequency coverage :

MODEL	GUARANTEED RANGE	OPERATIONAL RANGE	
	TRANSCEIVER	RECEIVER	TRANSMITTER
IC-μ2A/AT U.S.A. version	144.000 ~ 147.995	140.000 ~ 163.000	140.000 ~ 149.995
IC-μ2A Australia version	144.000 ~ 147.995	144.000 ~ 147.995	144.000 ~ 147.995
IC-μ2E	144.0000 ~ 145.9875	144.0000 ~ 145.9875	144.0000 ~ 145.9875

Unit : MHz

- Frequency resolution : IC-μ2A/AT 5kHz IC-μ2E 12.5kHz IC-μ2E (Germany, Italy versions) 5kHz
- Antenna impedance : 50Ω unbalanced
- Usable temperature : −10°C ~ +60°C
- Frequency stability : ±15ppm at 0°C ~ +60°C
- Current drain at 8.4V DC :

Receiving	Power saved	Approx.	6mA
	Squelched	Max.	30mA
	At max. audio output	Max.	170mA
Transmitting	High (1.0W)	Max.	600mA
	Low (0.1W)	Max.	300mA

- Dimensions (with BP-22) : 58(61)W x 140(148)H x 29(33)D mm
  Bracketed values include projections.
- Weight : 340g

9-2 TRANSMITTER

- Output power : HIGH 1.0W LOW 0.1W
- Emission mode : 16K0F3E
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ±5kHz
- Spurious emission : More than 60dB below carrier

9-3 RECEIVER

- Receiving system : Double-conversion superheterodyne
- Intermediate frequencies : 1st 16.9MHz 2nd 455kHz
- Modulation acceptance : 16K0F3E
- Sensitivity : Less than 0.25μV (−12dBμ) for 12dB SINAD
- Squelch sensitivity (Threshold) : Less than 0.1μV (−20dBμ)
- Spurious response rejection ratio : More than 60dB
- Audio output power : More than 0.25W at 10% distortion with an 8Ω load

Fig. 2– General specifications of the ICOM IC-u2AT.

such as the RF driver and power amplifier use time-proven transistors found in larger 3 watt talkies. I would guess they'll last indefinitely in the u2AT.

A "Two in One" Unit

A particularly attractive aspect of the u2AT is its ability to be "sized up or down" from its standard form as desired. When used with the supplied BP-22 battery pack, it's a quite thin and compact 1.6 watt output transceiver. Changing to the optional BP-21 makes it a genuine shirt-pocket-size 1.2 watt output unit.

Alternately swapping to the optional BP-24 pack increases the u2AT's overall height to approximately 6.6 inches while boosting its output to 2.6 watts. When you want a super small traveling companion, get two BP-21s; slip one on the talkie and carry one as a spare. When you go into

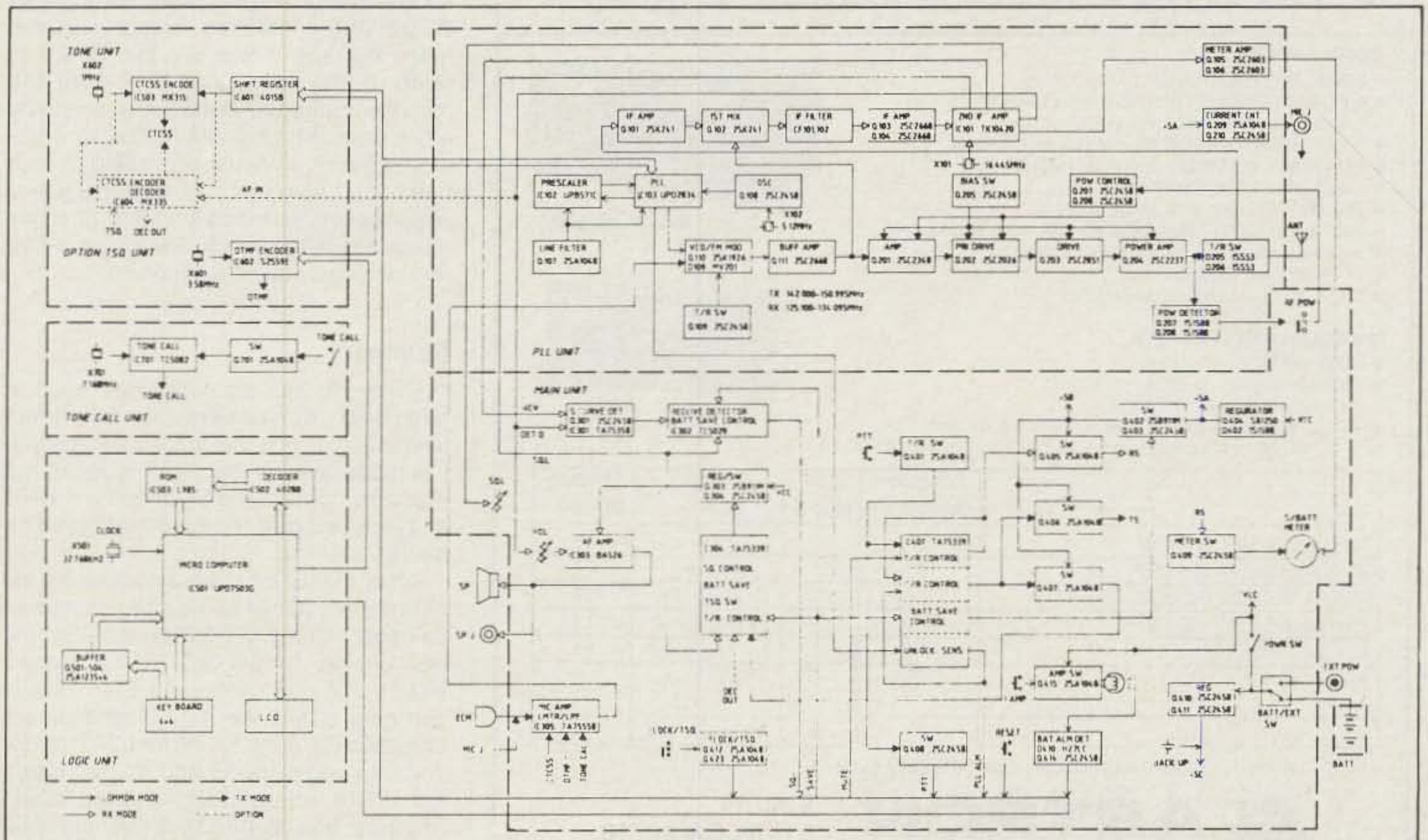

Fig. 3– Block diagram of the ICOM IC-u2AT. Discussion in text.

	Internal Cells (Capacity)	Output Voltage	Charging Period					Charging Current		Height	RF Output Power	*2 Operating Time
			BC-50	BC-25 BC-26 BC-27	BC-16 BC-17 BC-18	IC-CP1 EXT. DC Power Source	*1 BC-35 BC-36	Quick Charge	Normal Charge			
BP-21	NiCd x 6 120mAH	7.2V	1H	15H	N/A	15H	15H	180mA	12mA	32.5mm	1.2W	2H
BP-22	NiCd x 7 270mAH	8.4V	1H	15H	N/A	15H	15H	400mA	27mA	62mm	1.6W	4.5H
BP-23	NiCd x 7 600mAH	8.4V	1H	N/A	15H	15H	15H	800mA	60mA	70.5mm	1.6W	10H
BP-24	NiCd x 9 600mAH	10.8V	1H	N/A	15H	15H	15H	800mA	60mA	85mm	2.6W	8H

*1 The optional AD-10 CHARGER ADAPTER must be used with BC-35 or BC-36. However, quick charges are impossible when the AD-10 is in use.
*2 Stated operation times are approximate and are determined by the following ratio: Transmit (HIGH): Receive: Standby = 1:1:8
N/A: Not Applicable.
All stated specifications are approximate and subject to change without notice or obligation.

Fig. 4– Details on optional IC-u2AT battery pack sizes, power levels, charge, and operating times.

the "boondocks," just slip on a larger pack and/or a bigger antenna. Additional information on optional battery packs is included in fig. 4. Notice in particular their voltage and current ratings, size, and provided RF output.

A simple yet effective means of estimating battery life involves basic math and rig cross comparison. Most popular 3 watt talkies, such as the ICOM O2AT, for example, typically draw 1.0 to 1.2 amperes from their supplied/standard 250 ma battery packs. That translates to a continuous transmit time of 12 to 15 minutes before a fully charged pack is depleted (or 5 timeouts on your local repeater . . . gad!) Likewise, the IC-u2AT draws approximately 520 ma to produce 1.2 watts output from its 120 ma BP-21 battery pack. In "real life" use, however, the rig's low receive current and battery-saving mode of merely 6 ma must be considered. Depending on overall operating style, I thus estimate the BP-21's time between recharges comparable to or slightly longer than most other talkies' standard/supplied packs. Bear in mind that I used the optional BP-21 as an example and then plugged my thoughts into fig. 4's right-hand column. Assuming most popular talkies can operate 2 hours from their supplied pack, the IC-u2AT should double that time when using its supplied BP-22 (the increased output requires more current; however, the BP-22 is rated at 270 rather than [2 × 120] 240 ma). Rechargeable batteries are nothing more than refillable energy tanks, however, so pick a couple according to your needs and always carry a spare. Volkswagen used that theory in lieu of a gas gauge for many years. Swapping a battery pack only takes a second.

Summary

Everyone has his own preference in hand-held transceivers, so look them over and pick one that suits your lifestyle. I personally think the u2AT is ideal, but that's my opinion. It isn't loaded with bells and whistles, but I think it's the biggest little rig you'll find.

All of the ICOM talkie accessories except battery packs and leather cases can be used with the u2AT. That includes the HS-10 and SA/SB VOX/PTT headset, HM-10 speaker mike, and CP-1 mobile charging cable. An AD-10 adapter will convert a BC-35 or BC-36 for u2AT use, or you can add a BC-50 and go first class. For more information, contact ICOM America, Inc., 2380 116th Avenue, N.E., Bellevue, Washington 98004.

HF Equipment	Regular	SALE
IC-735 HF transceiver/SW rcvr/mic †	999.00	**799.95**
PS-55 External power supply	199.00	**179.95**
AT-150 Automatic antenna tuner	445.00	**349.95**
FL-32 500 Hz CW filter	66.50	
EX-243 Electronic keyer unit	56.00	
UT-30 Tone encoder	17.50	

IC-745 9-band xcvr w/.1-30 MHz rcvr	1049.00	**899.95**
PS-35 Internal power supply	199.00	**179.95**
EX-241 Marker unit	22.50	
EX-242 FM unit	44.00	
EX-243 Electronic keyer unit	56.00	
FL-45 500 Hz CW filter (1st IF)	66.50	
FL-54 270 Hz CW filter (1st IF)	53.00	
FL-52A 500 Hz CW filter (2nd IF)	108.00	**99.95**
FL-53A 250 Hz CW filter (2nd IF)	108.00	**99.95**
FL-44A SSB filter (2nd IF)	178.00	**159.95**

IC-751A 9-band xcvr/.1-30 MHz rcvr	1649.00	**1399**
PS-35 Internal power supply	199.00	**179.95**
FL-32 500 Hz CW filter (1st IF)	66.50	
FL-63 250 Hz CW filter (1st IF)	54.50	
FL-52A 500 Hz CW filter (2nd IF)	108.00	**99.95**
FL-53A 250 Hz CW filter (2nd IF)	108.00	**99.95**
FL-33 AM filter	35.25	
FL-70 2.8 kHz wide SSB filter	52.00	
RC-10 External frequency controller	39.25	

Other Accessories:	Regular	SALE
IC-2KL 160-15m solid state amp w/ps	1999.00	**1699**
PS-15 20A external power supply	169.00	**154.95**
PS-30 Systems p/s w/cord, 6-pin plug	299.00	**269.95**
OPC Opt. cord, specify 2, 4 or 6-pin	10.00	
MB Mobile mount, 735/745/751A	24.50	
SP-3 External speaker	61.00	
SP-7 Small external speaker	49.00	
CR-64 High stab. ref. xtal (745/751)	63.00	
PP-1 Speaker/patch	159.25	**149.95**
SM-6 Desk microphone	44.95	
SM-8 Desk mic - two cables, Scan	78.50	
SM-10 Compressor/graph EQ, 8 pin mic	136.25	**124.95**
AT-100 100W 8-band auto. antenna tuner	445.00	**389.95**
AT-500 500W 9-band auto. antenna tuner	559.00	**489.95**
AH-2 8-band tuner w/mount & whip	625.00	**549.95**
AH-2A Antenna tuner system, only	495.00	**429.95**

ICOM

Other Accessories - continued:	Regular	SALE
GC-5 World clock	91.95	**89.95**

6-meter VHF Portable	Regular	SALE
IC-505 3/10W 6m SSB/CW portable	549.00	**489.95**
EX-248 FM unit	55.50	
LC-10 Leather case	39.50	

VHF/UHF base multi-modes	Regular	SALE
IC-551D 80W 6-meter SSB/CW	799.00	**719.95**
EX-106 FM option	140.00	**126.95**
BC-10A Memory back-up	9.50	
IC-271A* 25W 2 meters ... **CLOSEOUT**	859.00	**699.95**
AG-20* Internal preamplifier	64.00	
IC-271H 100W 2m FM/SSB/CW	1099.00	**969.95**
AG-25 Mast mounted preamplifier	95.00	
IC-275A 25W 2m FM/SSB/CW w/ps	1199.00	**1049**
IC-471A* 25W 430-450 **CLOSEOUT**	979.00	**769.95**
AG-1* Mast mounted preamplifier	99.50	
IC-471H* 75W 430-450 ... **CLOSEOUT**	1399.00	**999.95**
AG-35* Mast mounted preamplifier	95.00	

***Preamp $9.95 with 271A/471A/471H Purchase**

Accessories common to 271A/H and 471A/H		
PS-25 Internal power supply for (A)	115.00	**104.95**
PS-35 Internal power supply for (H)	199.00	**179.95**
SM-6 Desk microphone	44.95	
EX-310 Voice synthesizer	46.00	
TS-32 CommSpec encode/decoder	59.95	
UT-15 Encoder/decoder interface	14.00	
UT-15S UT-15S w/TS-32 installed	92.00	

VHF/UHF mobile multi-modes	Regular	SALE
IC-290H 25W 2m SSB/FM, TTP mic	639.00	**569.95**
IC-490A 10W 430-440 **CLOSEOUT**	699.00	**499.95**

VHF/UHF/1.2 GHz FM	Regular	SALE
IC-27A Compact 25W 2m FM w/TTP mic	429.00	**369.95**
IC-27H Compact 45W 2m FM w/TTP mic	459.00	**399.95**
IC-37A Compact 25W 220 FM, TTP mic	499.00	**439.95**
IC-47A Compact 25W 440 FM, TTP mic	549.00	**479.95**
PS-45 Compact 8A power supply	139.00	**129.95**
UT-16/EX-388 Voice synthesizer	34.99	
SP-10 Slim-line external speaker	35.99	
IC-28A 25W 2m FM, TTP mic	459.00	**399.95**
IC-28H 45W 2m FM, TTP mic	489.00	**429.95**
IC-38A 25W 220 FM, TTP mic	489.00	**429.95**
IC-48A 25W 440-450 FM, TTP mic	489.00	**429.95**
HM-14 TTP microphone	55.50	
UT-28 Digital code squelch	37.50	
UT-29 Tone squelch decoder	43.00	
HM-16 Speaker/microphone	34.00	
IC-3200A 25W 2m/440 FM w/TTP	599.00	**529.95**
UT-23 Voice synthesizer	34.99	
AH-32 2m/440 Dual Band antenna	37.00	
AHB-32 Trunk-lip mount	34.00	
Larsen PO-K Roof mount	20.00	
Larsen PO-TLM Trunk-lip mount	20.18	
Larsen PO-MM Magnetic mount	19.63	
RP-3010 440 MHz, 10W FM, xtal cont.	1229.00	**1089**
IC-120 1W 1.2 GHz FM Mobile	579.00	**499.95**
ML-12 1.2 GHz 10W amplifier	379.00	**339.95**
IC-1271A 10W 1.2 GHz SSB/CW Base	1229.00	**1069**
AG-1200 Mast mounted preamplifier	105.00	
PS-25 Internal power supply	115.00	**104.95**
EX-310 Voice synthesizer	46.00	
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BC-35 Drop in desk charger for all batteries	74.50
BC-16U Wall charger for BP7/BP8	20.25
LC-11 Vinyl case for Dlx using BP-3	20.50
LC-14 Vinyl case for Dlx using BP-7/8	20.50
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BP-3 Extra Std. 250 mah/8.4V Nicad Pak	37.50
BP-4 Alkaline battery case	15.25
BP-5 425mah/10.8V Nicad Pak - use BC35	58.50
CA-5 5/8-wave telescoping 2m antenna	18.95
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Well, you bought the new rig, hooked up the antenna, and plugged in the mike or key. You turn it on, tune it up, and sit back for a minute or two. Now what?

What Do You Say After "Hello"?

BY BRADLEY WELLS*, KR7L

CQ CQ CQ DE K7DUM K
K7DUM DE W2LID AR
W2LID DE K7DUM TNX CALL—UR 599 IN TACOMA WASH—NAME JOHN—HW CPY? BK
K7DUM DE W2LID SOLID CPY—NAME ART IN NEW YORK CITY—UR RST 579 HW? BK
W2LID DE K7DUM FB ART—RIG SUPER SIGNAL SNIFFER TO DIPOLE at 25FT—WX CLEAR ES COOL—TEMP 55 DEGS BK
K7DUM DE W2LID FB JOHN—RIG HR HOMEBREW KW—ANT STACKED YAGI AT 100 FT—WX IS COOL ES TEMP 45 DEG BK
W2LID DE K7DUM TNX FB QSO ART—REALLY ENJOYED IT—73 ES CUAGN—DE K7DUM SK
K7DUM DE W2LID TNX QSO—WILL QSL—73 ES CUL—DE W2LID SK

Sound like a familiar conversation? How often have your QSOs been carbon copies of the above with only names and calls changed to protect the guilty? Does your average QSO only last 10 minutes? There is a reason for all this. Most amateurs don't communicate; they talk *at* each other. We have a hobby that should expand our horizons and teach us of other people and places. Yet time and again we mumble the same tired exchanges to each other. One wonders why so many of us even get on the air.

The same problem exists whether you operate phone or CW. The only difference is that the QSO terminates more quickly on phone. Most amateurs seem to have an inability to communicate with each other. In this respect we differ little from those on Citizen's Band. Rather than babble about Smokey and convoys, we prattle on about rigs and weather. The situation becomes ludicrous on 2 meters, where operators 10 miles apart tie up a repeater with detailed descriptions of the weather, ad nauseum.

There is a way out of this situation. Take an active interest in the other person. Ask questions designed to foster conversation. Be somewhat indirect in this approach, however. Ask too many at once and the typical response is "SRI OM HVY QRM 73." Also, avoid turning the QSO into a series of monologues. Remember that PTT, VOX, and QSK were designed to facilitate conversation not speeches.

For a start ask how long the other operator has been an amateur. Your conversation with a new amateur will differ markedly from talking with the guy who has been active for the last 50 years. Perhaps he is involved in contesting, chasing DX, QRP,or a multitude of other specialties. You may find someone who will be only too glad to give you first-hand knowledge in one of these areas.

Have the other operator describe the area where he lives. Is is flat or hilly? Sagebrush or forest? Most people can give good descriptions of where they live and enjoy doing so. Invest in a good road atlas. This can open up many conversations. Amateurs living in small towns take pleasure in your locating them on a map. In addition, many atlases are marked with points of interest. These too can be used as an opener for conversation. During one QSO, for example, a look at the map showed the other amateur's QTH near Carlsbad Caverns. My mention of this lead him to give a narrative description of the Caverns and other lesser known points of interest.

Another area that can be explored is occupations. Don't be content with simple answers. Try to find out exactly what that person does. During one QSO the other amateur mentioned he was an engineer for a plastics firm. "Exactly what do you engineer?" I asked. This lead to an account of the difficulties in designing plastic applicators for tampons and the problems of producing plastic beer-bottle caps. A few questions during another QSO turned up a university professor whose speciality was visual psychology. A pleasant time was spent learning about experiments to test visual response. The variety of occupations is endless and the wealth of information unlimited.

Most amateurs have other hobbies in addition to their radio. Gardening may be the opener for many QSOs. Discovering the other amateur is a hunter or fisherman can lead to an exchange of tall tales or a discussion of the finer points of fly fishing. Interested in energy conservation? Many amateurs have put in wood stoves, insulated their homes, constructed solar panels, and installed other energy-saving devices. First-hand information on a variety of these projects is yours for the asking.

The same lack of conversation occurs working DX stations. Most QSOs sound like a contest exchange with a promise to "QSL via buro." How truly unfortunate, since amateur radio should allow you to be a real armchair explorer. We are supposed to have a unique ability to enhance international goodwill. How much enhancement is there with an exchange of weather reports and 73?

The obvious difficulty with a DX QSO is the language barrier. More often than not, the DX amateur has a good enough grasp of English to carry on a meaningful and interesting QSO. Too many times we assume a limited knowledge of English. The same techniques and ideas apply here as with stateside QSOs. Invest in a good world atlas like those by Rand-McNally or The National Georgraphic Society. Most world maps commonly sold to amateurs are next to useless and only good for wall decoration.

Another trick to enhance your DX QSOs is to invest in "The Radio Amateur's Conversation Guide." It will give you a smattering of ignorance in seven languages. Common phrases used by amateurs are spelled out phonetically. Go easy with this approach. You may discover the true meaning of humility by suddenly being on the wrong end of a high-speed conversation in Japanese.

So back to the rig and warm up your mike and key. Talk to other amateurs with the idea of doing more than an equipment survey or collecting weather reports. These should be the start of your conversation, not its content. You will discover, talking with other amateurs, that they are also interested in you, only they didn't know how to start the conversation.

*5053 37th Ave. SW, Seattle, WA 98126

FM and repeater operation are big favorites among many amateurs. KB1N takes the newcomer through some of the terminology and the basics of this facet of amateur radio.

FM for the New Kid on the Block

BY PETER R. O'DELL*, KB1N

There are a lot of new kids on the block these days, particularly if your block is 220 MHz FM. Since Novice Enhancement became a reality in March, more and more stations have been showing up on the local 220 machines. Last time, I talked about how to get your SSB operation "up to speed." Let's do the same for 220 MHz FM. (This holds true for FM and repeater operation on other bands as well as 220.)

We need to define some of the terms before FM operation will make much sense to newcomers. Much of the operating done using the FM mode involves repeaters. A repeater is simply a station that automatically retransmits signals. It uses two frequencies—an input frequency on which to receive and an output frequency on which to transmit.

Duplex and Simplex

When you work through a repeater with your average hand-held, you are either listening or transmitting, but not both at the same time. This is called **half duplex**. Full duplex is where you can receive and transmit at the same time. You do that every time you talk on the telephone. And the repeater does it all the time.

Because the repeater operates full duplex, it requires special equipment to prevent the transmitter from interfering with the receiver. These devices, usually **duplexers** or **circulators**, are difficult to retune, even if you are moving only a few kHz. For this reason and dozens of others, it is not practical for repeaters to switch frequencies. This makes interference between two repeaters occupying the same frequency a particularly difficult and thorny problem.

Using only one frequency on which to transmit and receive is called **simplex** operation. You take turns with the other station(s) transmitting. With a synthesized rig it is a simple matter to switch frequencies when you are working simplex.

Since there is a limited amount of spectrum available for repeater use and because repeaters cannot switch frequency at the drop of a hat, amateurs have developed band plans that specify which frequencies should be used for what general purposes. Unfortunately, these band plans fall under the general category of "gentlemen's agreements"—that is to say they are voluntary.

FM has numerous advantages over AM-type techniques for local communications. The FM detector circuit operates in such a fashion that a signal only slightly stronger than others on the same frequency "captures" the receiver. In other words, you don't hear the weak signals if there is a strong signal present. AM, on the other hand, produces noticeable and objectionable interference when the strong signal is 100 times greater than the weak one. Also, FM has a sharp drop-off at the fringes. For the most part, then, an FM signal is either "good" or it is not there at all.

Because the repeater is at a fixed site, it is practical to connect a telephone line to it through a device called an **autopatch**. Autopatch is short for **automatic telephone patching network**. The name has nothing to do with making telephone calls from your car, but that is one of the things you can do with an autopatch.

The Good, The Bad, and The Ugly of Repeaters

There are good and bad operating practices on repeaters, as is the case with other modes. Since the signals will probably be good or not there at all, there is little need for much of the procedure found on HF SSB. For instance, there is no need to call CQ on a repeater. If you do, you will be instantly tagged a "newcomer." Should you persist in this practice, you will quickly be labeled a "lid."

All that is necessary is to say something to the effect of "KB1N listening." (Please use your own call sign, though.) If someone wants to talk with you, he will give you a call. Should no one come back to you, wait a few minutes and try again. Repeater users tend to be very mobile, and their operating habits reflect this.

Occasionally, you find some toad making unidentified transmissions. This ranges from "kerchunking" the repeater just to see if you can make it to attempting to talk to other users. With modern, computerized direction-finding equipment and techniques, anyone doing this is asking to have his/her license revoked. If you are not sure how well you are making it into a repeater, just identify your station and ask someone to give you a report.

The FCC only requires that you give your call sign every ten minutes and at the end of your contact. Listening to someone repeat his and the other station's call sign at the beginning and end of each transmission is quite tiring. Anyone persisting in this will soon be labeled a "bore." That sort of thing just isn't needed with repeater operation.

On HF SSB there is justification for using the word "over." This is seldom the case with repeater operation. Because of the quality of the circuit and the squelch tail, it is usually quite obvious when a station stops transmitting. (A squelch tail is the burst of static that is heard at the end of a transmission.) Some repeaters have built-in courtesy tones (beeps or other sound effects) that let the stations know when the other station has stopped transmitting.

Talking too long is another sin that will identify you as a poor operator. FCC rules require that a repeater automatically shut down if a signal is present at the receiver for more than three minutes. This is usually accomplished with a circuit called a **time out timer**. So it is not all that uncommon to hear someone **time out** a repeater. That operator will catch a fair amount of abuse. If he or she is a *repeat offender* (sorry about that), most other operators will start avoiding him or her. The KISS principle applies here (Keep It Short, Simon).

I don't mean to imply that we old timers

*7 Brian Road, South Windsor, CT 06074

are without sin. If you listen to repeaters long enough, you will find some pretty poor operating going on. One of the most idiotic words coined by repeater users is "destinated," which means that he has arrived at his destination. To me "destinated" has always conjured up images of them closing the casket with a microphone cord dangling over the side. It sounds so final.

Take My Tone, PL-ease

One option that is available for most modern FM transceivers, regardless of size or other features, is **Continuous Tone Coded Squelch System**, or **CTCSS** for short. It is sometimes referred to by the Motorola trademark of this circuit, Private Line®, or PL®. In typical amateur use, the amateurs install CTCSS encoders in their transceivers. The repeater has a CTCSS decoder connected to the receiver.

If the decoder does not detect the special tone code on an incoming signal, it does not turn on the transmitter and retransmit the signal. Thus, CTCSS allows closer geographical spacing of repeaters using the same frequencies than would otherwise be possible without objectionable co-channel interference. As the bands become more and more crowded, CTCSS offers some relief. CTCSS also has been used by owners of private repeaters to exclude uninvited operators from using the "machine."

You Are A Guest

You must understand that repeaters are by nature costly beasts to own and operate. Transmitters, receivers, duplexers, hard-line coax, electrical service, telephone lines, and even rent for a spot on the tower all add to the expense of repeater ownership. Usually clubs own and operate repeaters. Some, though, are the property of individuals.

The owner of a repeater, whether an individual or a group, *owns it*. A repeater is simply an amateur radio station. Suppose that your doorbell rings tomorrow morning at about 6 AM. When you answer the door, there stands Joe Ham. Joe announces that he is here to operate your station, pushes past you, and heads for the rig. He fires it up on 15 and starts calling CQ. When no one comes back to his first call, he turns to you and complains that the transmitter isn't powerful enough, the receiver isn't sensitive enough, and your antenna isn't high enough.

Enough is enough, right? Would this make you happy? This sort of thing goes on constantly with repeaters. People who would be shocked at Joe's behavior do just about the same thing with repeaters. They don't bother to ask for permission to operate; many don't even know who owns it. When things go wrong, as they will with any piece of equipment, the Joes (freeloaders is a more accurate name) are the first to complain.

Repeater owners tolerate the freeloaders to various degrees. This is the bottom line: If you are going to dance, you better expect to pay the piper. Most owners welcome travelers through the area. If you are a local or a regular user, you should be contributing somehow.

Some owners have "closed" machines. That means that if you are not invited, they don't want you operating the repeater. Sometimes being invited is simply a matter of paying your dues to the club. In other cases, it is a matter of sharing interests with the other users. CTCSS is often used as a means of enforcing the "closed" aspect of the operation.

Some people react very negatively to closed repeaters. I did when I first became active. Without giving the subject any serious thought, I just reacted very childishly. Then one day I learned the greatest secret of the universe: There ain't no such thing as a free lunch. Somebody has to pay for the cost and upkeep of a repeater. That somebody has a right to decide how *his/her* station (repeater) is going to be used and who is going to use it. Just because I have an SSB station in my house does not mean that you have a right to barge in uninvited and use it. The same holds true for repeaters.

If it is a local club with open membership that owns the repeater, join the club and pay your dues. If it is an individual or special-interest group, find out if you really do share their interests by listening in for a while. If so, contact the owner and ask for permission. If not, move on and find a group that is more to your liking.

Thou Shall

So far I have given you mostly "Thou shalt nots." These "don'ts" will keep you out of trouble as you become familiar with this facet of the hobby. What should you be doing on a repeater?

It really boils down to this: Make new friends and have fun. You do that by talking naturally to your friends like you would face to face. Be courteous. Only do things on the repeater that you would do with your own station and call sign. Keep your transmissions short. Join the club and pay your dues. CQ

The 6 meter amplifier described in this article is the first of four amplifiers to be built by WB2WIK. They will cover 6, 2, 220, and 432 MHz all using a common power supply and be capable of running the legal limit. It's quite a tempting project, as you'll find out.

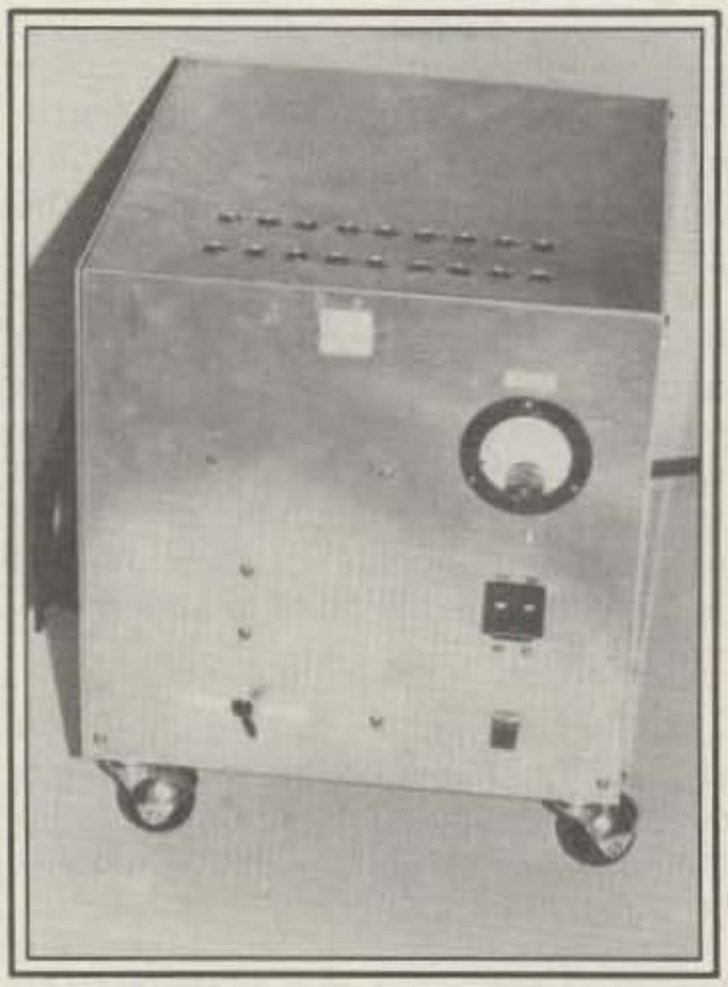
An Easy-To-Build 8877 Legal-Limit Amplifier For Six Meters

BY STEVE KATZ*, WB2WIK

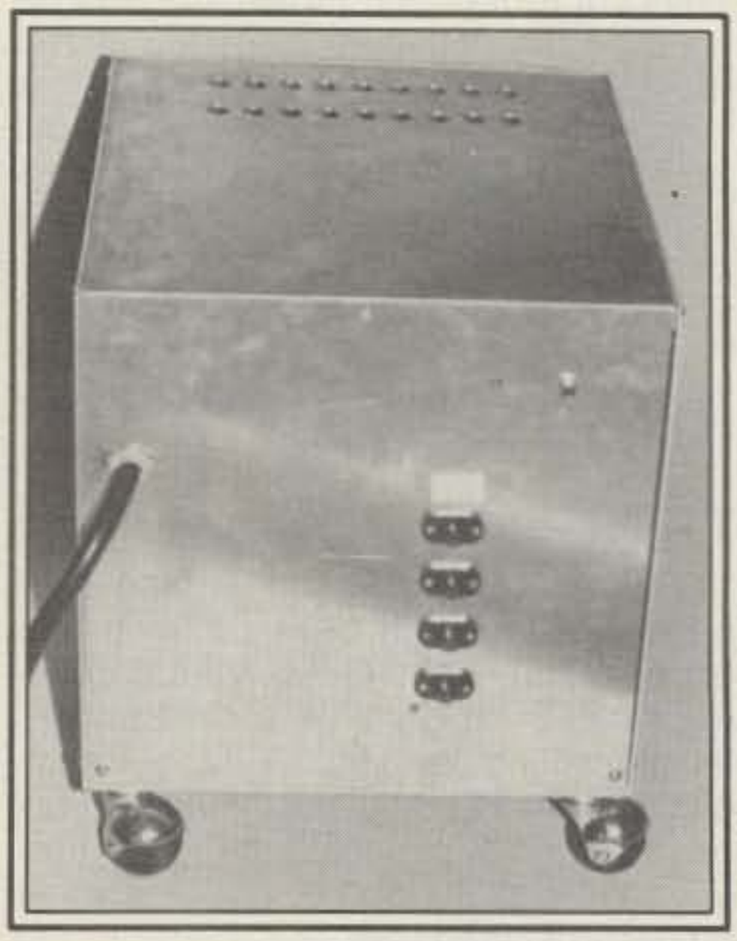
I'm a sucker for an easy project. Designing and assembling the "Block Buster," described in *73* magazine for July 1985, was a cinch. That unit uses a 4-1000A in grid-driven Class AB1 service and runs the legal power limit with only 20 watts drive—just right for the exciter I had on hand at the time, an old Clegg Venus transceiver.

I was called upon in 1986 to build another high-powered 6 meter amplifier, but this time the requirements were quite different. My friend Mike Crawford, WA2VUN, needed an amplifier that would occupy little desk space, so that ruled out the 4-1000A (which is an enormous tube). He also had about 70 watts exciter power available, so a grounded-grid amplifer would be well suited to the available drive level. Hmmm . . . what's small in stature, simple to work with, and runs the legal power limit?

The Eimac 3CX1500A7/8877 triode, of course. I had used 8877 amplifiers in the past but had never built one, so I studied the manufacturer's data sheets and asked a lot of questions of fellow amateurs who I knew had a great deal of experience with the tube. It seemed that although the manufacturer rates the maximum anode potential to be 4000 volts, there were proponents of using much higher voltages (as high as 7000 volts) with the proper precautions. These folks were all running illegal power, however, and I had no great desire to experiment with a $600 tube in an attempt to generate perhaps another 2–3 dB of transmitted signal.



The 8877 plate power supply, front view with all covers intact. This is a real brute affectionately known as "R2D2." The heavy casters allow easy movement around the hamshack. The only meter monitors output voltage, 0–7500 Vdc. The on/off switch is a 25 amp circuit breaker (dual pole) mounted just below the meter.



The plate power supply, rear view. Four Millen high-voltage receptacles, rated 7 kV each, are wired in parallel to accommodate future 8877 RF decks. A single RCA phono receptacle may be seen in the upper right-hand corner for the "B–" return. This is necessary to allow remote measurement of plate (actually cathode) current. The 220 Vac line cord is #12-3 insulated cable.

The Power Supply

My first decision regarding the operating parameters of the new project amplifier was to build an adjustable-voltage plate supply which would allow some modest experimentation. Then I researched the cost of 230 volt, 25 amp variacs (voltage-variable autotransformers) and quickly made my second decision, which was to build instead a dual-voltage plate supply with a tapped high-voltage transformer. What voltages would be ideal? I really didn't know, but before I could think much about it, WA2VUN had ordered a special high-voltage transformer from Peter Dahl Company. This transformer was to have a 4000 volt, center-tapped secondary rated at 1.5 amps and was in transit before I could comment much about its rating. Therefore, we'd make do with the monster when it arrived.

Using a 4000 volt RMS secondary gives one few options about DC output voltage from an unregulated power supply, and surely I was not about to try regulating a 6 kVA source! Using a capacitor-only filter and a full-wave bridge rectifier, the fully-loaded output voltage would be about 5.6 kVdc. I estimated the no-load output voltage to be 10% higher, or 6.2 kV. Using a full-wave center-tap rectifier, these numbers would be halved, or 2.8 kV full-load and 3.1 kV no-load. Using a choke-input filter (God forbid!) and a full-wave bridge, the output would be about 3.6 kVdc full-load, and the no-load voltage could really climb unless the choke was heavily loaded by a *large* bleeder resistor bank. No, this didn't seem a good approach.

I decided to go the full-wave bridge, capacitor-only filter route, but utilize only half the secondary for normal operating. Thus, the output voltage is about 3 kV. Using a big relay, K1, to switch to the full winding allows 6 kVdc output for very high-power work or experimentation. Since the transformer is rated for 1.5 amps, using only half the secondary for most operations doesn't overheat it at all; in fact, there is al-

*153 Rodman Court, Eatontown, NJ 07724

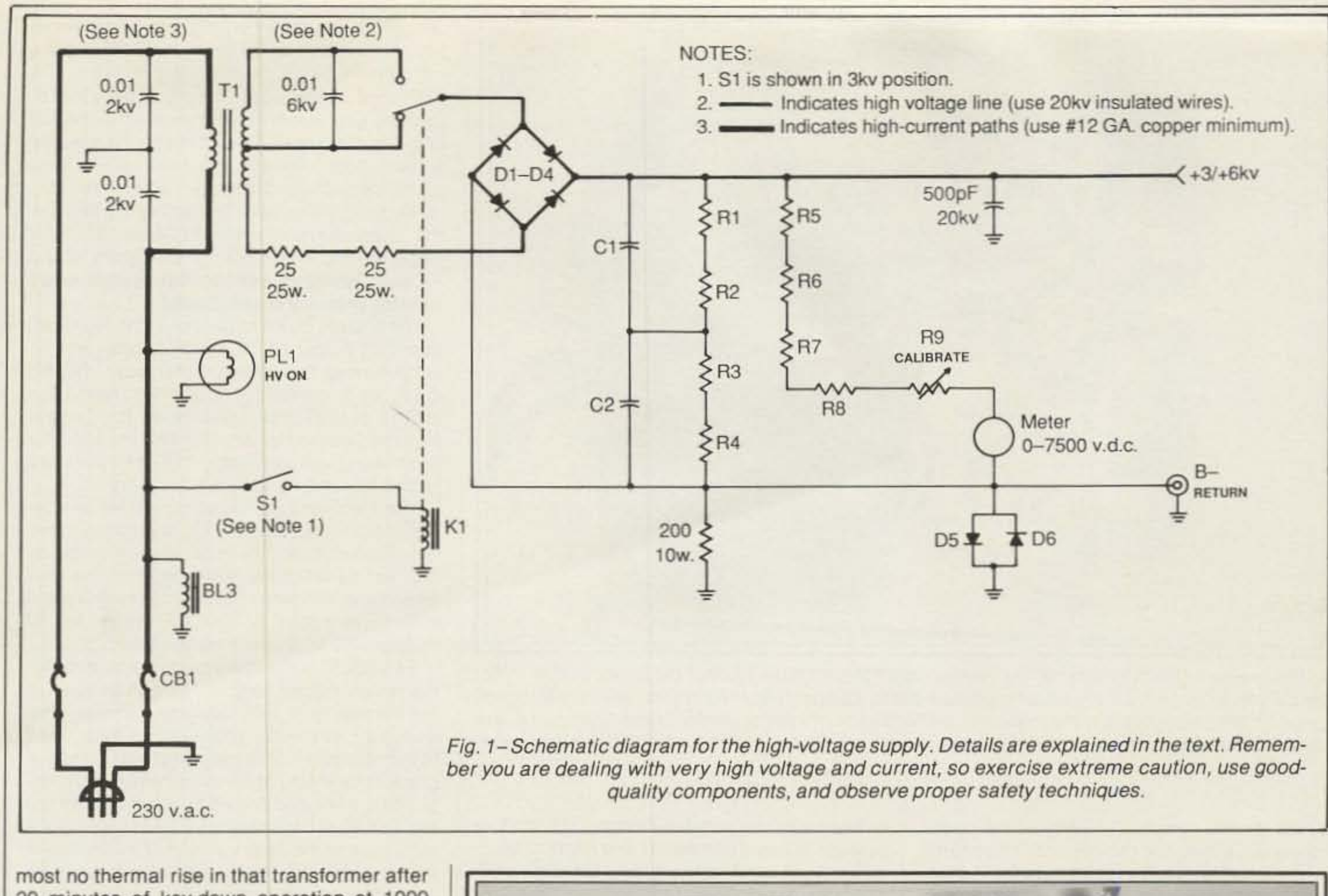


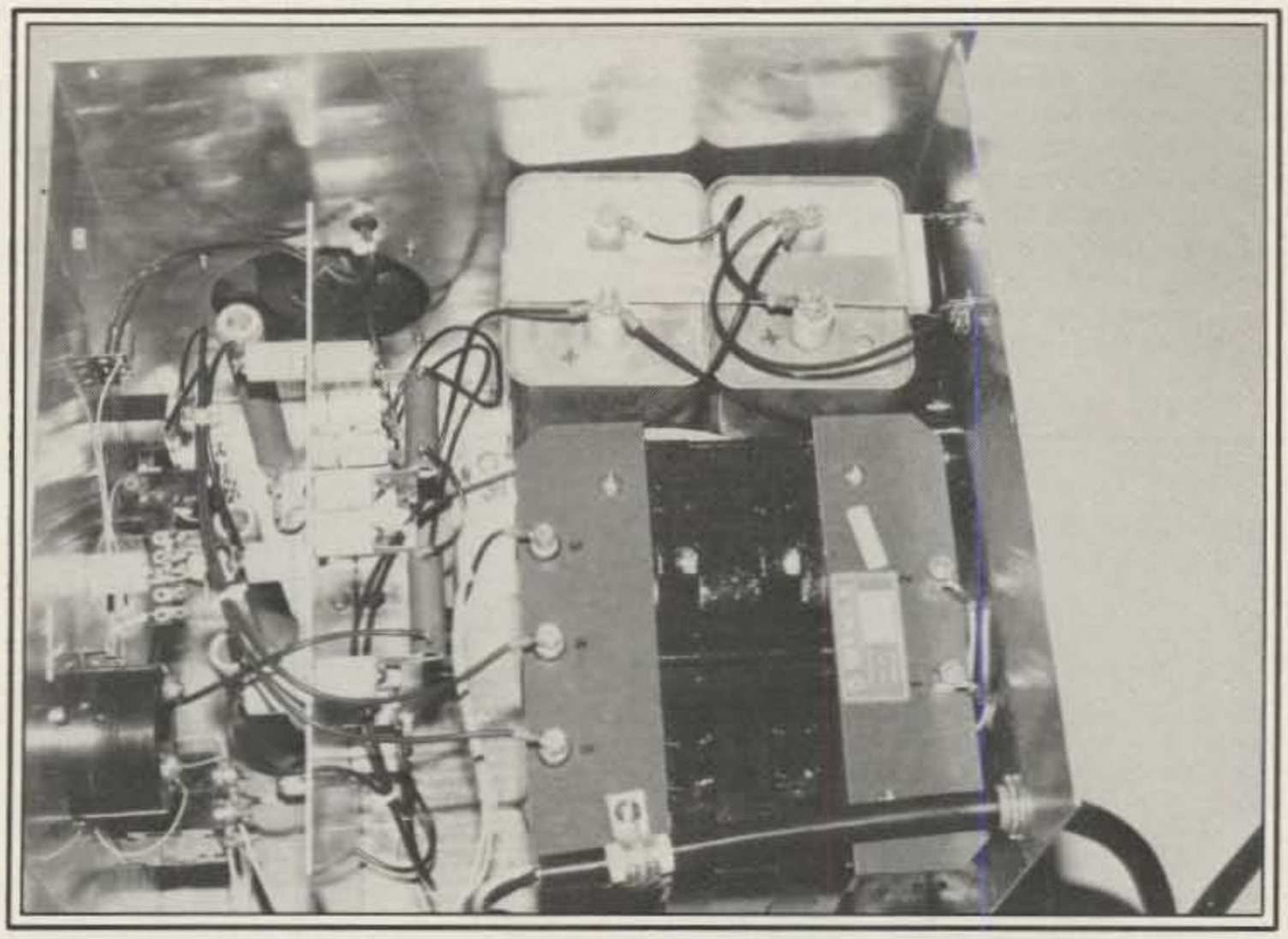
Fig. 1–Schematic diagram for the high-voltage supply. Details are explained in the text. Remember you are dealing with very high voltage and current, so exercise extreme caution, use good-quality components, and observe proper safety techniques.

most no thermal rise in that transformer after 20 minutes of key-down operation at 1000 watts output from the finished amplifier. A more ideal transformer secondary voltage would be 2800 Vrms. With a capacitor filter and full-wave bridge rectifier, this would produce almost exactly 4 kVdc, the recommended maximum Ep for the 8877. But I worked with materials on-hand, and all turned out quite well.

The power supply is nothing more than a big high-voltage source of anode potential for the 8877, so it is really quite simple. The high-voltage full-wave bridge is assembled from four rectifier stacks rated for 10 kV at 2 amps each. Semtech Corporation makes splendid products precisely suited for this job. Other sources can be found, however, and the "K2AW Silicon Alley" units advertised in amateur magazines might suit the purpose. Although the Semtech rectifiers used have a 150 amp surge rating, making them quite self-protecting against inrush current, I used 50 ohms of series resistance (two 25 ohm, 25 watt resistors in series) to limit surge current to 113.12 amps just in case. I'd strongly recommend using this surge-limiting circuit, especially if rectifiers other than the Semtech units are used.

The primary (mains) current is so high that no conventional switch will handle the job. Thus, either a power relay or circuit breaker must be employed to switch the mains. I opted for a good Heinemann breaker similar to those used on Henry Radio amplifiers.

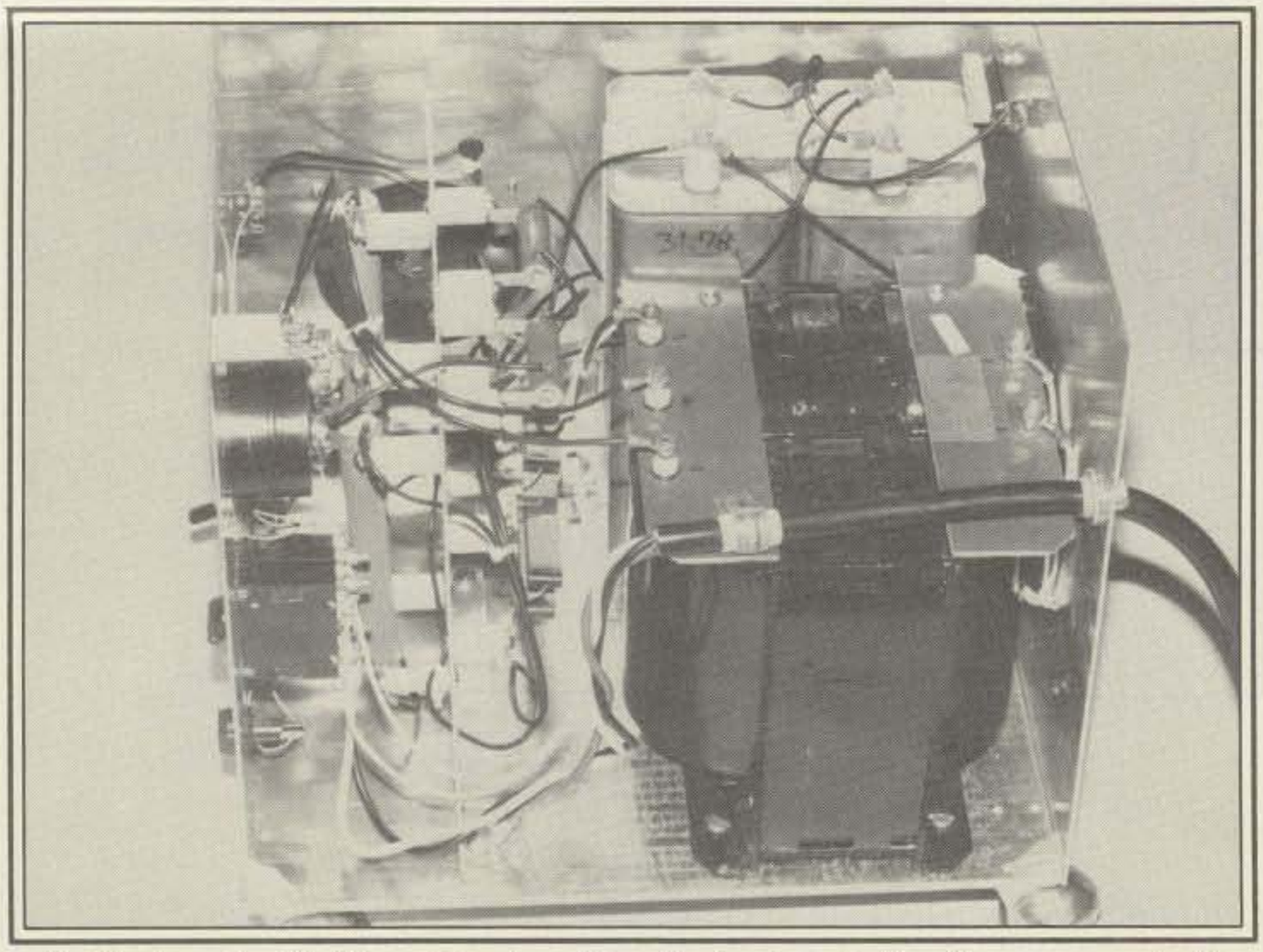
C1 and C2, the high-voltage filter capacitors, were picked up at a flea market (the Dayton Hamvention, I believe) and are ideally suited for the application, providing 26.5 uF of filtering at 9 kVdc. Similar oil-filled "can" capacitors may be obtained from Fair Radio Sales, Lima, Ohio, or one may try a series string of lower-voltage electrolytics—e.g., 12 × 200 uF at 500 volts. **I wouldn't recommend this approach, as it results in far less filtering and requires a more complicated bleeder/balancing arrangement**. Go the oil-filled route; you'll be glad you did.



Top view of the inside of the 8877 plate power supply with two covers removed. Occupying most of the chassis space is the enormous Peter Dahl "Hypersil" high-voltage transformer and the two series-connected 53 uF oil-filled capacitors. To the left, mounted on the front panel and a single aluminum plate spaced a few inches behind the front panel, are all other components. Most high-voltage components are mounted with 1¼ inch ceramic standoff insulators.

R1 through R4 form a bleeder network which also serves to evenly divide the voltage across C1 and C2. These resistors must be of the hollow-core wirewound variety, as they will get quite hot dissipating 180 watts when the plate supply is switched to the "6 kV" position. Bleeder dissipation is only 45 watts in the "3 kV" position. I would not recommend using less bleeder current (i.e., higher bleeder resis-

No-29-30



An inside view of the "right-hand" (as viewed from the front panel) side of the power supply. Near the center, mounted to the vertical aluminum plate, can be seen the high-voltage rectifiers and surge-limiting resistors. On the opposite side of this same plate, closer to the front panel, are mounted the bleeder resistors. All high-voltage wiring is done with 20 kV insulated "anode" wire.

tance), as the dynamic stability of the power supply will suffer and the capacitor discharge time can become too long for safe servicing.

The voltmeter multiplier string consists of R5 through R9, all of which are 1 megohm, 2 watt units, with R9 being adjustable (a potentiometer wired as a rheostat, with one end and the wiper connected together). It is very important that R9 be at the low-voltage end of this string (i.e., next to the meter in the circuit) to avoid insulation breakdown hazard. At least the higher-voltage end of the multiplier string (R5, R6) must be mounted like any high-voltage components, on suitable ceramic standoff insulators to avoid corona. R7 and R8 must be insulated, but can be mounted on smaller standoffs. The maximum potential across R9 is only a few hundred volts, so a standard chassis-mounted "pot" is sufficient, assuming the voltmeter will always maintain some continuity. If the voltmeter were to become an open-circuit, there would be as much as 6000 volts on the potentiometer terminals; for this reason, I'd use a *good*-quality meter which isn't likely to fail. I used a Weston type 301 calibrated "0–7500 Vdc" and having a 1000 ohms/volt sensitivity. If a meter of different sensitivity is used, the values of R5 through R9 **will** require adjustment.

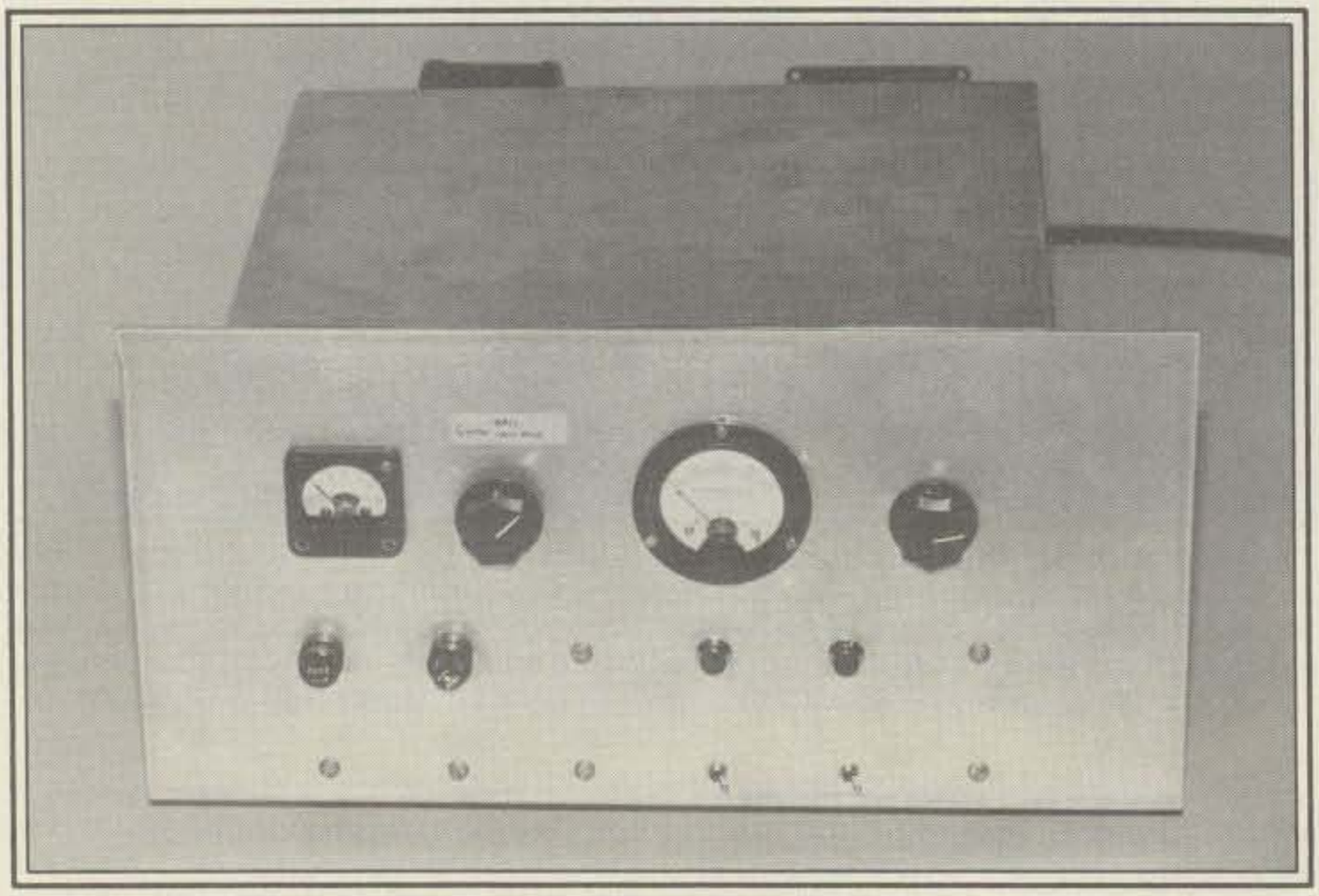
Diodes D5 and D6 are simply in place to protect the grid current meter located in the RF deck. The 200 ohm, 25 watt resistor maintains a low "float" voltage from the power supply/RF deck chassis to the B – supply. The B – is not directly grounded to the chassis, to allow the "plate current" meter to be placed in the negative lead, as shown in the diagram for the RF deck. **I would not recommend using positive-lead metering under any circumstances!**

The 500 pF, 20 kV capacitor at the high-voltage (DC) output of the power supply, and all units having this rating throughout the RF deck, is a ceramic "doorknob" type. Our source of these components for this project was the Dayton Hamvention flea market. The 20 kV rating is not essential, but *don't* use units having less than a 7500 WVdc rating.

The high-voltage output connector is a female Millen unit rated at 7 kV. In my case I used four such connectors in parallel mounted on the rear panel of the power supply; the idea was to use this power supply to provide plate voltage to a total of four RF decks, for 50 through 432 MHz, each using an 8877 triode.

Fan "BL3" is mounted to one vertical wall of the power-supply housing, as can be seen in the photographs, and exhausts warm air generated by the bleeder resistors. A similar sized (4 inch diameter) hole, covered by a protective grate, is located in the vertical wall directly opposite the fan and serves as the intake for the fan's air flow. Directly above the bleeder resistors, several holes are punched in the power supply cabinet's top to allow warm air to be vented by natural convection in the event of a fan failure. This is important if you, like me, choose to build a totally enclosed power supply.

The completed power supply is compact, measuring less than one cubic foot, and weighs just over 100 pounds. To assist in transporting the unit, four hard rubber roller "casters" are mounted to its bottom plate. Since the finished supply resembles a little robot, Mike calls it "R2D2." It is strong enough to stand on, if need be, to reach a beer on a high shelf or whatever.

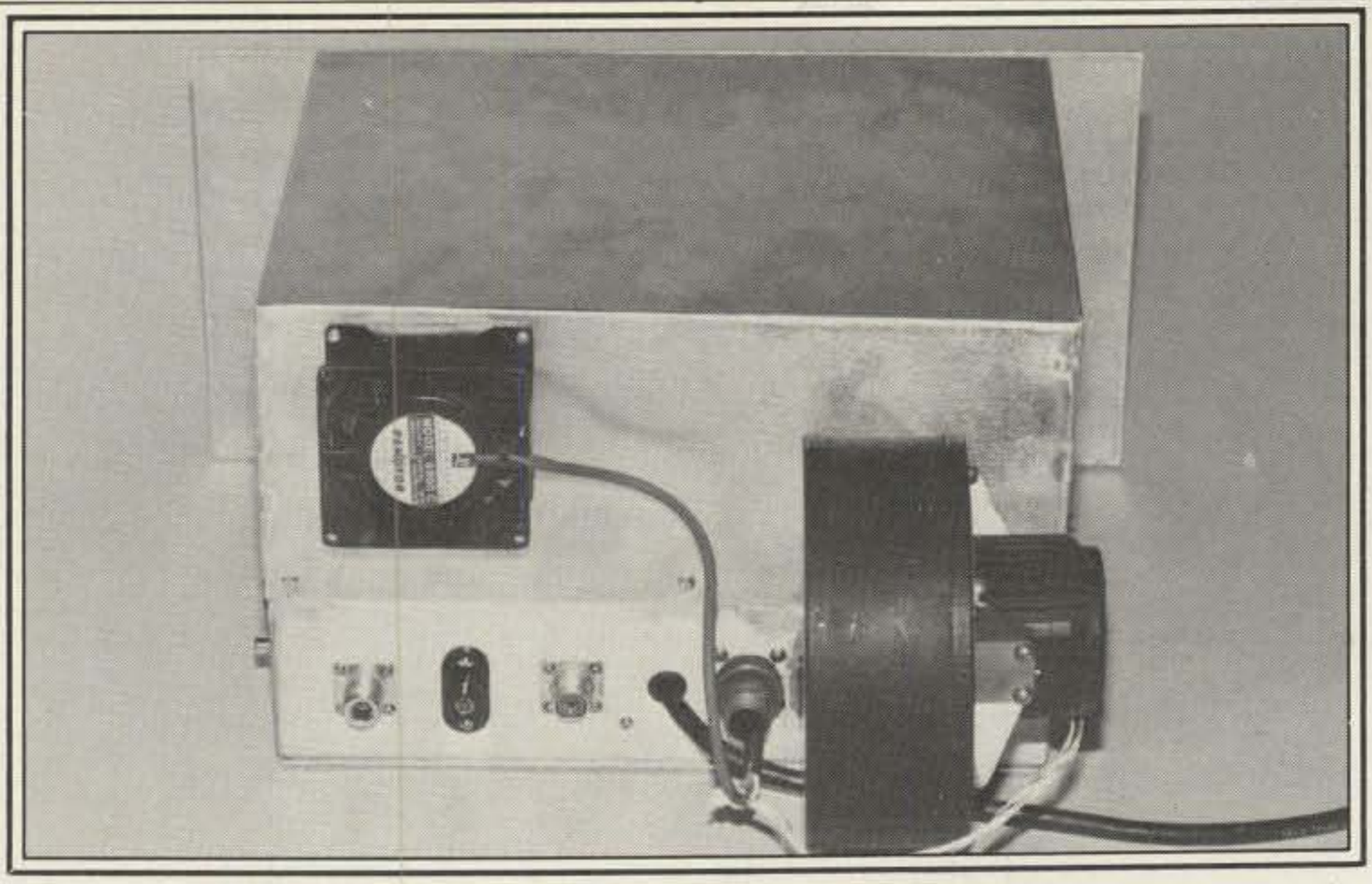


The completed 3CX1500A7/8877 six meter RF deck, front view, with cover. Not very fancy, but it sure works well! The left-hand meter is for grid current (0–100 mAdc) and the right-hand meter measures plate (cathode) current (0–2 Adc). The plate tune and load controls are the only adjustments. The "tune" control is to the left in this view.

The RF Deck

The RF deck was designed to be stacked among other similar decks and therefore needed to be small in stature and have its air intake and exhaust ports to the rear. With these requirements in mind, I used as small a chassis as possible. The chassis height, however, could not be compromised because I wanted to pressurize the underchassis. This meant mounting a blower with its exhaust connected to the rear vertical wall of the chassis, and since most blower exhaust ducts measure 2 inches or more, I used a 3 inch high chassis. If space is unlimited in your particular installation, you may wish to build a far larger RF deck than this one.

To lay out the chassis, I always use rubber cement to bond graph paper to all its outside surfaces. I then use a pencil to write on the paper. I lay out all the bulkier components, arranging them in the most practical manner possible, sketching their outlines, mounting dimensions, etc., on the graph paper. After trying several possible layouts, I try to settle on the one which offers a combination of best possible RF current flow and reasonable sym-

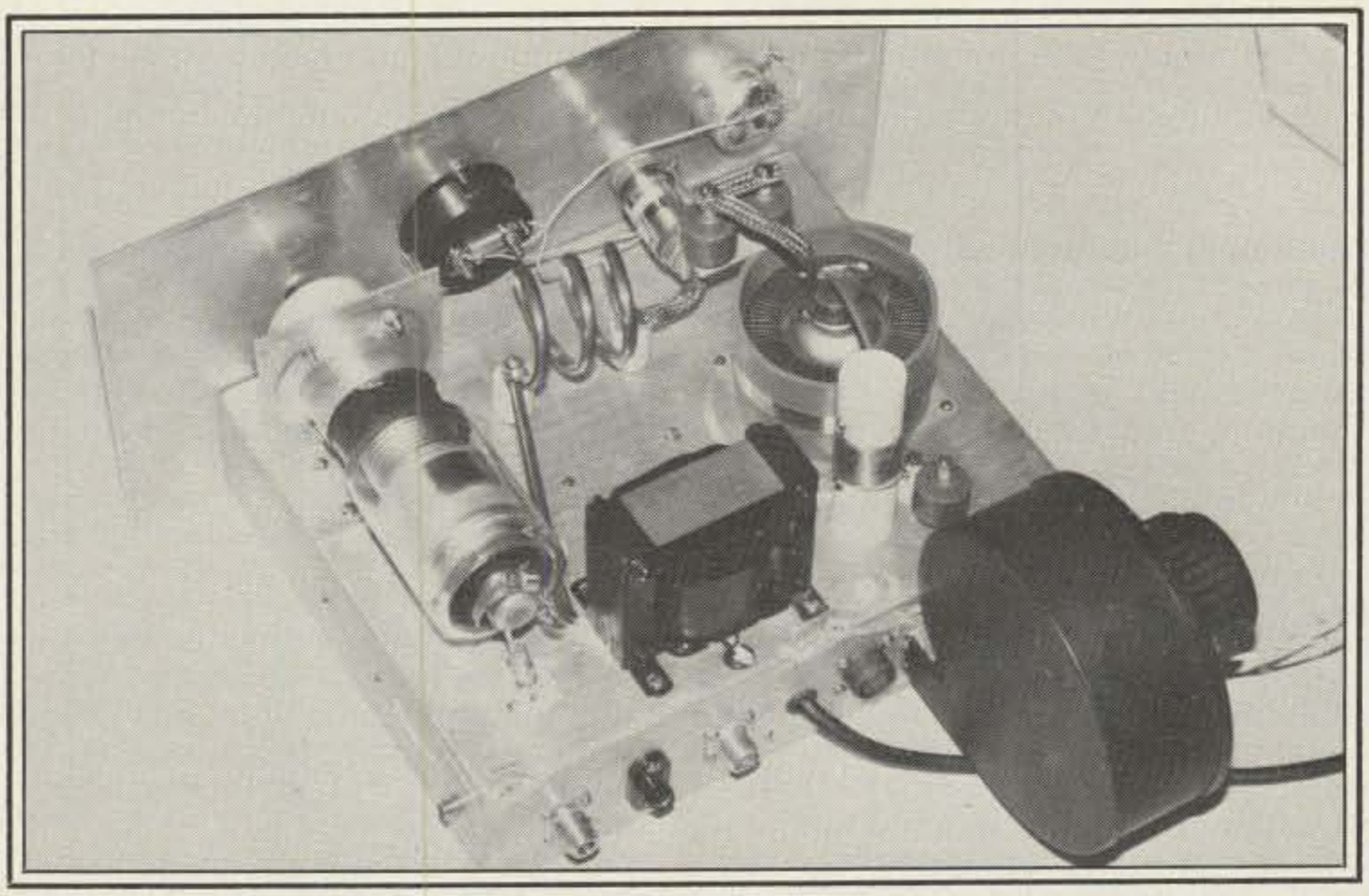


Rear view of the RF deck with cabinet cover installed. There are no holes in the cover, except for the large hole punched to line up with BL2, a Pamotor axial exhaust fan. A screen shield is installed inside the case, over the exhaust hole, to contain 50 MHz RF energy within the cover. BL1 is the large black unit to the lower right. Connectors along the rear apron are, from left to right, output (type N), HV (Millen), input (UHF), AC line cord, and blower motor power.

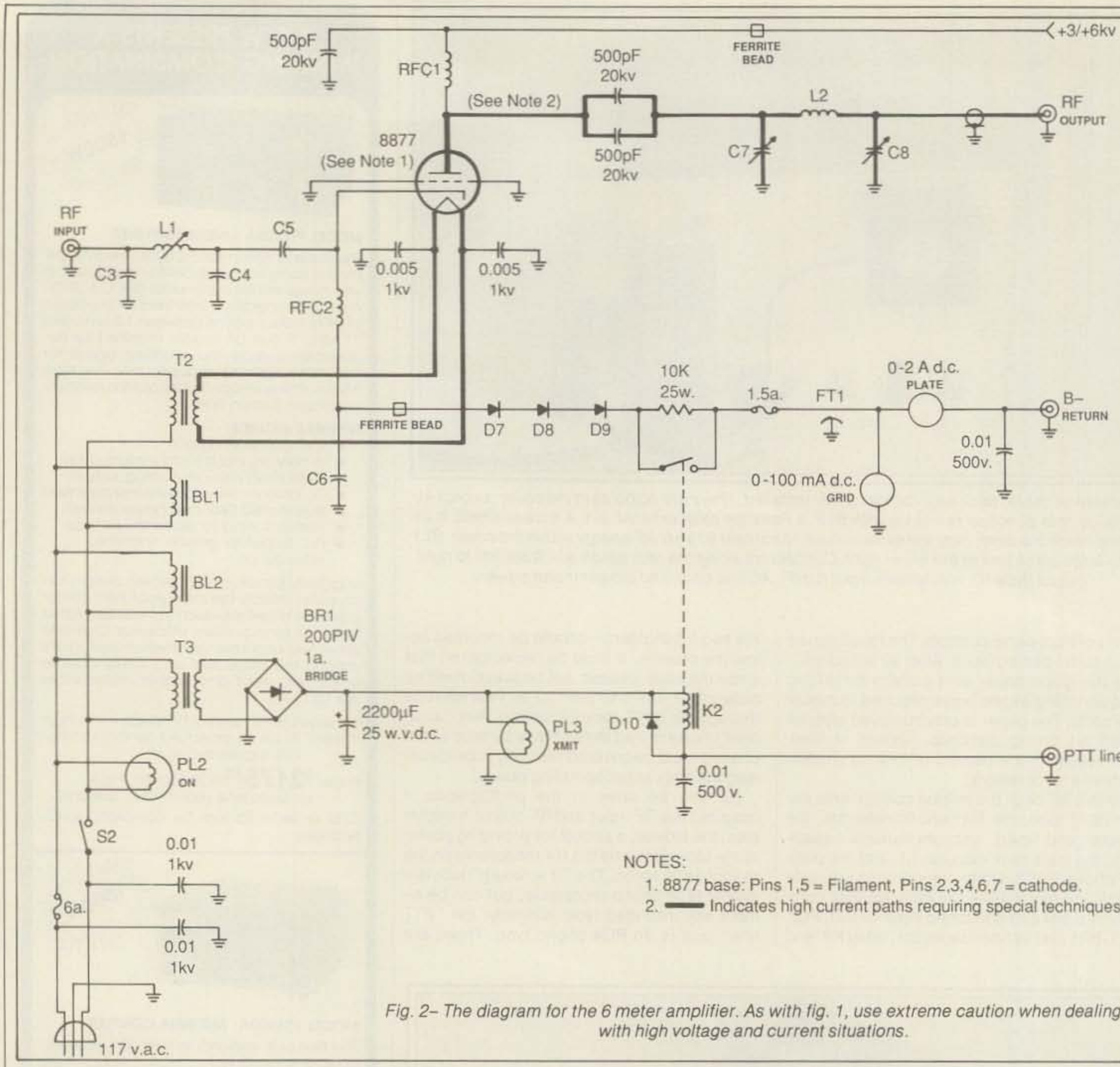
metry of front-panel controls. The result can be seen in the photographs. After all is laid out, I use the graph paper as a pattern for drilling and punching all the holes required to mount the parts. The paper is only removed after all holes are drilled, punched, nibbled, or filed. This results in a professional-looking chassis without a lot of rework.

In this RF deck the largest components are the 8877 tube, the filament transformer, the "plate" and "load" vacuum variable capacitors, the plate tank inductor L1, and the plate RF choke, RFC1. Other components are quite small and many—like the cathode bias components, the cathode tuned input circuit, PL2, PL3, BR1 and its filter capacitor, relay K2, and the two fuseholders—should be mounted below the chassis. It must be remembered that since the underchassis will be pressurized by blower BL1, the only path for air flow must be through the 8877 socket/chimney. Any "accident" holes drilled through any surface of the chassis must be covered securely prior to running the deck at full operating power!

As can be seen in the photographs, I mounted the RF input and RF output receptacles, the blower, a socket for providing power to the blower(s), and the HV receptacle on the rear chassis apron. The "B– return" jack is a simple RCA phono receptacle, but can be almost any insulated type; similarly, the "PTT line" jack is an RCA phono type. These are



Top rear view of the 8877 six meter RF deck. The large cylindrical component to the far left is the output (loading) vacuum capacitor. Filament transformer T2 is near the center, with plate choke RFC1 to its right, just behind the tube. Plate tank inductor L2 is easily seen in this view, and is supported by two large (1¼ inch long) ceramic standoff insulators to the chassis.



NOTES:

1. 8877 base: Pins 1,5 = Filament, Pins 2,3,4,6,7 = cathode.
2. ▬▬ Indicates high current paths requiring special techniques.

Fig. 2– The diagram for the 6 meter amplifier. As with fig. 1, use extreme caution when dealing with high voltage and current situations.

both mounted to one side wall of the chassis. The stud of cathode bias zener diode D9 is also mounted through one side wall, as is the tuning screw assembly of L1, the slug-tuned input inductor. Remember when mounting D9 that neither anode nor cathode can be directly grounded to the chassis; use insulating hardware, usually provided with DO-5 stud devices, before affixing this device.

The 8877 socket is a square ceramic type with built-in provision for grounding the grid ring of the tube. This grid connection is usually four silver-plated beryllium-copper spring "fingers" which face inward, towards the tube, when properly assembled to the socket. In the socket I used, the mounting for these "fingers" was common to the socket mounting holes. Since these provide the only grid connection, they must be securely bonded to the chassis at all four places. Although the tube socket is square, its clearance hole through the chassis can be round. Not having a hole punch large enough, I drilled corner holes in a square pattern slightly smaller than the tube socket's, then used a saw to cut the chassis between the holes. The resultant square hole has slightly rounded corners and allows plenty of space for free air flow through the socket, chimney, and tube anode.

Speaking of chimneys, I didn't use a commercially manufactured one; it seemed too expensive for the simple function served. Instead, I homebrewed a chimney of high-temperature silicon rubber, custom cut from a square sheet of the material. The silicon rubber material is firmly clamped to the tube's largest section of anode with a stainless-steel hose clamp, and seats firmly down over the socket, against the chassis. This serves to direct all the air which flows through the chassis and socket by ducting it through the tube's anode fins. The silicon rubber is cut so that it ends about ½ inch above the uppermost dimension of the tube's anode/fin assembly, leaving plenty of space between the tube and the top of the RF deck case. This is similar to the configuration used by ETO in their amplifiers.

Because we wished to make the unit "stackable," the exhaust air could not be ducted to the cabinet top, as convention usually has it. Instead, we draw the heated air through an exhaust fan mounted to the rear of the RF deck cabinet. This fan must be installed so that it exhausts, rather than pressurizes, the upper RF deck. Otherwise, its air flow will directly oppose that provided by the main squirrel-cage blower. The photographs should make the arrangement clear.

A note regarding cooling the 8877: There are many ways to cool external-anode power tubes, but one common element remains to use as much air flow as possible. I would strongly advise against using an axial fan (like a "muffin fan" or the like) as the main air-flow mechanism for cooling an 8877 or any tube of this power level. Squirrel-cage centrifugal blowers deliver much more air against the back pressure created by the tube, and are the only suitable means for cooling such devices. Yes, blowers make noise, often more than we desire. To alleviate the local noise created by a powerful blower, one can mount the blower at

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BC210XW-M3	*Bearcat* 20 channel scanner	$168.95
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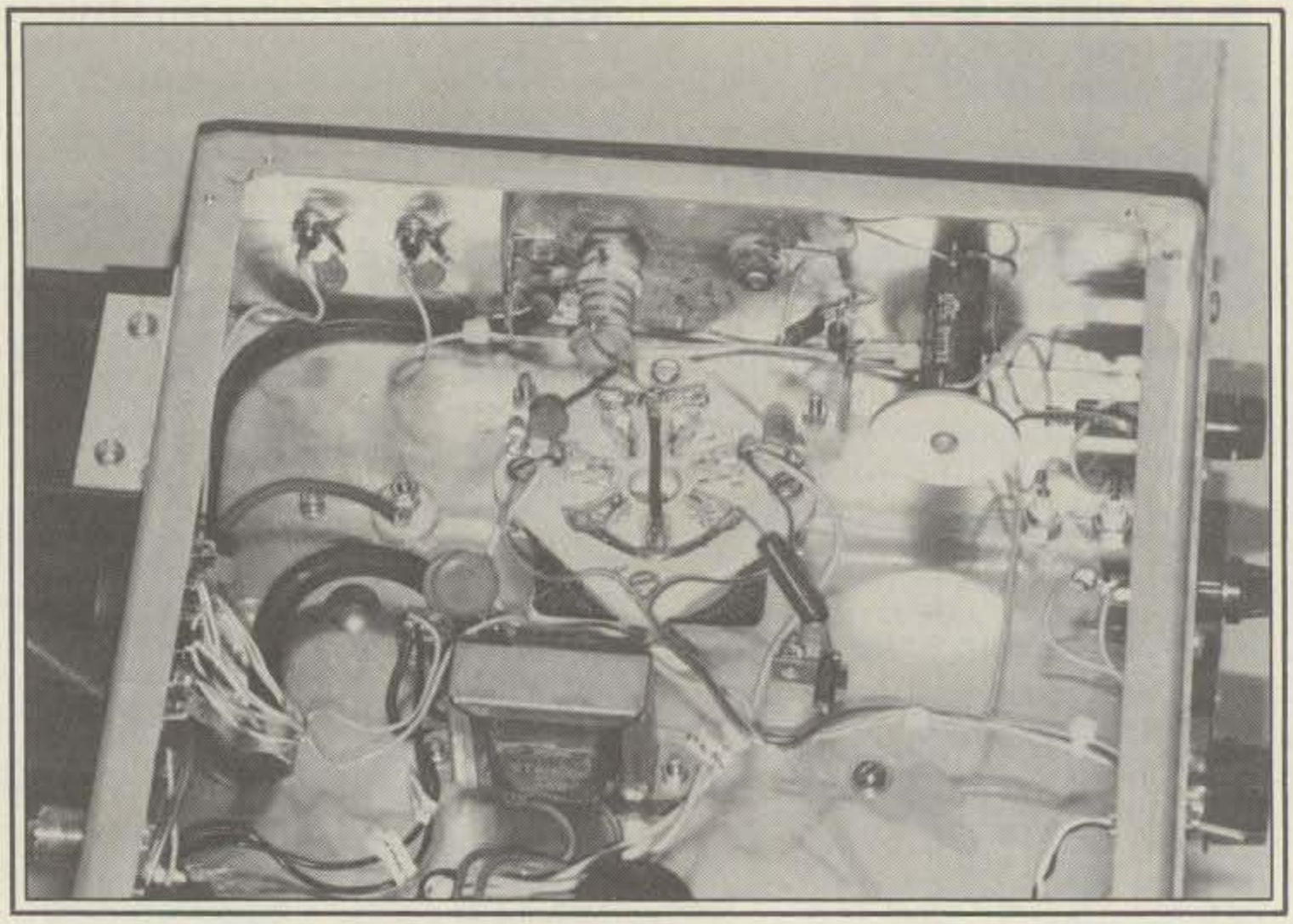
BL2, BL3: Axial exhaust fans, Pamotor or Rotron "muffin."
C1, C2: 53 uF, 4000 volt or 4500 volt oil-filled.
C3, C4: 50 pF, 500 volt silver-mica or NPO ceramic disc.
C5, C6: .0015 uF, 1 kV ceramic disc.
C7: 3–30 pF, 15 kV vacuum variable, ITT-Jennings.
C8: ITT-Jennings UCS300 or equivalent (300 pF max); an air-variable with 1500 volt spacing may be substituted.
CB1: 250 volt, 25 amp dual-pole circuit breaker. Heinemann Electric AM2-A3-A or equivalent.
D1-D4: 10 kV, 2 amp rectifier assemblies. Semtech type SCHS10000 or equivalent.
D5, D6, D10: 200 PIV, 1 amp, type 1N5614 or equivalent.
D7, D8: 200 PIV, 3 amp, type 1N5550 or equivalent. (Note: adjust number of diodes in series to set "idling" plate current.)
D9: 15 volt, 50 watt zener, DO-5 stud mount. Amperex BZY91-C15 or equivalent.
FT1: Feedthrough capacitor, .001 uF, 500 volt.
K1: 120 volt (coil) DPDT, 25 amp, 240 volt contact ratings with contacts wired in parallel. P&B type PRD11AYO or equivalent.
K2: SPST normally open, 2 Adc contact ratings, 12 Vdc coil. Not critical.
L1: 3 t. #20 enamel on ½ inch slug-tuned ceramic form.
L2: 3 t. ¼ inch copper tubing, 1¼ inch ID, spaced as shown in photograph.
PL1, PL2: 117 Vac pilot lamp assembly.
PL3: 12 Vdc pilot lamp assembly.
R1-R4: 50K ohm, 50 watt wirewound resistors.
R5-R8: 1 megohm, 2 watts, 5% carbon or metal-film.
R9: 1 megohm, 2 watt potentiometer wired as rheostat. (Note: R9 must be installed on ground end of R8.)
RFC1: Plate choke: Handwound, 36 t. (about 10 feet) of #20 enamel closewound on 1 inch dia. Teflon form.
RFC2: 8.2 uH, 1.2 Adc rated choke.
S1, S2: SPST, 6 amp/117 Vac rated.
T1: Plate transformer, 240 volt: 4000 volt center-tapped at 1.5 amp ICAS. Peter Dahl custom-made "Hypersil."
T2: 8877 filament transformer, 120 volts: 5 volts at 10.5 amps CCS. **Do not use transformer with higher current rating.**
T3: Filament transformer, 120 volt: 12 volts at 700 mA CCS (not critical).

Miscellaneous:
8877 Socket: Eimac SK2200.
8877 Chimney: Eimac SK2216 (if desired; otherwise, a chimney may be homebrewed per the text.)
Ferrite Beads: Amidon Associates, Palomar Engineers.

Sources for unique components:
Amp Supply Company, 208 Snow Ave., P.O. Box 147, Raleigh, NC 27602.
"Q" Products, 417 Staudaher St., Bozeman, MT 59715.
(Silicon Rubber) ETO, P.O. Box 708, Industrial Park, Canon City, CA 81212.
Semtech, 652 Mitchell Rd., Newbury Park, CA 91320.



RF deck underside showing the 8877 socket, tuned cathode network, relay transformer T3, etc. Note the 8877 socket is mounted well below the chassis to allow free air flow around the socket and through the tube anode fins. The large metal disc towards the upper right-hand corner is made of aluminum and serves to support cathode bias resistor (10K, 25W) with a single long bolt to the chassis side wall.

a remote location and duct the air flow to the underchassis with "dryer hose." **In any case, the more air the better!**

The RF input circuit which tunes the 8877 cathode is located beneath the chassis, with L1 supported to a side wall as mentioned earlier. Keep the leads of C3, C4, and C5 short. Grid-dip L1 to 50 MHz by adjusting its tuning slug. No voltage need be applied during this operation. I didn't know if it was necessary, but I strapped pins 2, 3, 4, 6, and 7 together at the tube socket using heavy copper braid. The RF input to the cathode is fed to one side of the socket, while the DC bias to the cathode is delivered through RFC2, which is soldered to the opposite side of the socket from the RF feedpoint. This may not be necessary, but made for a neat layout. Keep the leads of C6 as short as possible, and hang a ferrite bead on the wire between C6 and D7, close to C6. Use a dab of glue or "Q dope" to hold the ferrite bead in place if necessary.

The cathode line from D7 to the "B– return" is all DC, so layout is not critical. Although the handbooks all use 10 or 12 volt zeners for cathode bias on an 8877, I found this voltage insufficient when operating with 3 kV plate potential; it's even less sufficient when operating with 6 kV! I determined experimentally that a 15 volt zener, boosted to about 16.5 volts by the addition of two series rectifier diodes (D7, D8), allowed the tube to "idle" at about 100 mA with 3 kV plate potential and about 200 mA at 6 kV. This still isn't ideal, but represents a fair compromise. Ideally, I'd short out D7 and D8 in the 3 kV position, and add a few more diodes in series with D7 and D8 for 6 kV operation. You may have to determine the ideal cathode bias voltage experimentally, as this will depend on the gain of the tube in use and the exact plate voltage you provide the tube.

RFC1 is wound on a 1 inch Teflon rod which has one end drilled and tapped so that it can be mounted perpendicular to the chassis with a single ¼"-20 bolt from the underside. Teflon drills and taps work quite well, although it is softer than metal so less tolerant to mistakes. Directly beneath the "bottom" (cold) end of RFC1, a 500 pF "doorknob" capacitor is bolted to the chassis to form the main DC plate line bypass. Don't use any other type of capacitor; only "doorknob" types have low enough inductance to avoid self-resonating below the 6 meter band. A ferrite bead is placed over the HV cable between the "hot" side of the doorknob capacitor and an HV feedthrough insulator which routes the HV to the underchassis. **Use 20 kV "anode" wire or equivalent; 5 kV "test prod wire" is insufficient for this application.**

High voltage is fed to the RF deck through a Millen 7 kV receptacle identical to those used on the power supply. Another "doorknob" capacitor is placed across the HV line at this point to prevent RF from exiting on the HV cable.

The heavy lines shown in the schematic diagram indicate high-current paths (either RF or 60 Hz AC). From the 8877 anode to the RF output receptacle is a high-current RF path, although the current is much higher at the C8 end of L2 than at the tube end. Remember that the pi-net tank circuit shown is an impedance transforming network the input impedance of which is high at the driven end and low at the output end. Similarly, the RF voltage is very high at the driven end and lower at the output end, across C8. The RF currents behave in an opposite manner. **Treat this circuit and all its interconnections with the appropriate precautions warranted by the currents/voltages present.**

I used very heavy silver-plated copper braid to make the connection from the tube anode to the parallel pair of 500 pF "doorknob" capacitors which form the DC block to the plate tank. The "doorknobs" are mounted on a little aluminum bracket which is bolted directly to the "hot" side of C7, an ITT-Jennings vacuum variable capacitor rated 3–30 pF. Another very short piece of similar braid connects the "hot" end of C7 to one end of L2, which is mounted on a pair of 1 inch ceramic standoff insulators as shown in the photographs. A section of ¼

inch copper tubing is used to connect the opposite end of L2 to the "hot" end of C8.

C8, the "output" or "loading" capacitor of the plate tank circuit, needn't be a vacuum unit, but one was handy. A 200–250 pF maximum air-variable capacitor rated at 2 kV would do here, but if one is used, be sure it is a "VHF" type which introduces no parasitic resonances. The advantage of a vacuum unit, even at lower voltages, is its excellent performance in the VHF/UHF region. The "output" end of L2 (where it connects to C8) is the 50 ohm output point, which may be routed to a rear-panel receptacle by a good grade of RG8/U coaxial cable. Because of the temperatures encountered here, I would avoid "foam" type cables, and stick to the military-grade solid polyethylene variety like MIL-C-17 RG8A/U or RG213/U. This cable needn't be longer than 6 inches, so its loss will be insignificant.

The wiring from the 8877 filament transformer to the tube socket must be reasonably short to minimize IR losses in this high-current path. Ideally, use a filament transformer specifically designed for this application; one such unit is available from Peter Dahl Company (El Paso, Texas). If possible, install the tube in its socket and apply filament power; wait a few seconds and measure the AC voltage directly across the socket pins. This should measure 5.0 volts, ± 0.1 volt. Don't use a multimeter, as they are less than 10% accurate for AC measurements. I used an old Ballantine Labs differential voltmeter with 1% accuracy and found the voltage to be 5 volts on the nose with the Dahl transformer. It doesn't matter what the voltage is under no-load conditions. If your particular filament transformer doesn't deliver 5.0 Vac at the tube socket (with the tube installed), use a small variac in the transformer's primary to adjust this. **Operating performance and tube life both hinge heavily on this voltage being correct.**

The filament bypass capacitors, shown as .005 uF/1 kV units on the schematic, should have very short leads. I was undecided whether to connect one side of the filament to the cathode and use filament RF chokes, as is the usual arrangement for VHF amplifiers using the 8877. Fortunately, I never had to experiment with this, because the circuit as shown (cathode has no connection to the heater) worked splendidly on initial try-out. Apparently, 6 meters is close enough to HF so that many HF (rather than VHF) techniques still work here.

The 10K ohm, 25 watt resistor in series with the cathode provides standby bias to cut off the 8877 completely. This resistor is shorted by contacts on K2 during "operate" conditions. Although some tubes generate noise even while cut off, the 8877 does not appear to do so, at least not on 6 meters. Thus, anode voltage needn't be removed during standby. T3, BR1, and the 2200 uF filter capacitor make up a little 12 volt DC power supply whose only function is to provide the coil of K2 with keying potential. I wouldn't recommend an AC relay for this application, as the "PTT line" of many rigs won't key AC very well, especially if the potential is 117 volts!

Initial results with this amplifier have been gratifying. The power-supply construction consumed about one weekend, and the RF deck construction consumed about one full day. All metalwork shown was performed by Mike, WA2VUN, in his welding shop. This was quite nice for me, but a commercially available chassis would work fine for the RF deck. The power supply is so heavy that most commercial chassis would probably buckle under the weight; the base plate for this unit is made from 3/16 inch thick aluminum, with tapped corner braces heliarced in position to hold the side panels. The RF deck chassis is, as stated, homebrew and as such has completely solid corners which were heliarced closed. This isn't really necessary, but providing good underchassis pressurization is.

The amplifier was "fired up" with a used 8877 purchased for a fraction of the price of a new tube. With 3 kV anode voltage, I adjusted the D7-D8 diode string for 100 mA idling plate current. Then, using an ICOM IC-551D exciter (maximum output about 75 watts), two Bird "Thruline" wattmeters, and a Bird 1.2 kW oil-cooled dummy load, I applied drive power while monitoring both input and output levels. Fantastic! The unit delivered 1000 watts RF output with only 40 watts drive, and the input VSWR was nearly 1:1. Increasing the drive to the limit of the IC-551D's ability resulted in more than 1500 watts output as measured on the Bird 43 with a 2500B element. Signs of instability were carefully searched for, but none were found. The plate tuning capacitor C7 tunes very smoothly through resonance, and the plate current shows a mild dip at approximately the maximum output power point. On the model unit, maximum output is achieved with C7 tuned about midway through its range and C8 set at somewhat less than midway. These two adjustments interact slightly, so it is best to repeak each a few times to arrive at a final setting.

One unfortunate note: I was so anxious to try the amplifier with 6 kV applied to the anode that I flipped the switch on the power supply before thinking about which complications could set in. One such complication immediately surfaced with a BANG! The 8877 was, as stated earlier, a "pull" which was removed from service after many years and purchased inexpensively. To some extent one gets what one pays for, and this particular 8877 was very unforgiving about having 6000 volts applied between its anode and grid. Even in "standby" (with cutoff bias applied) the tube made a resounding BANG internally and hasn't been quite the same since. Surprisingly, this particular 8877 still functions, and with 3 kV applied it continues to show considerable gain and output; however, its grid current is much higher than before the "6 kV test," and the tube was obviously further weakened by the experiment.

Using a factory-fresh 8877/3CX1500A7, the amplifier operates well with either 3 kV or 6 kV plate voltage. The idling current is a bit high using 6 kV and the cathode bias network shown, but so much air is being forced through the anode that the heat generated is not destructive. The amplifier has produced many excellent on-the-air reports and represents the first of four amplifiers to be built by the author and intended for WA2VUN's station. The next unit, for 144 MHz, will follow shortly, and hopefully the results of that project will be reported here.

As stated in the title, this is truly an easy-to-build amplifier. While I wouldn't recommend the project for a new 12-year-old Novice, most adults who are reasonably adept with hand tools and have a grasp of RF amplifier circuitry and operation should be able to reproduce my results with little effort. I'll be happy to answer any questions that arise. Good luck and see you on 6.

Novice

a monthly feature by
BILL WELSH, W6DDB

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Getting Started—Part V

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

Antennas

Monoband. It is preferable to erect a separate antenna for each band you operate. Each antenna should be as high as as clear as possible from all surrounding objects. The antennas themselves should be as remote as possible from each other, or at least oriented at right angles to each other to minimize interaction. Don't worry if an antenna leg has to be bent to fit your available space. It can be bent all around in different directions with very little ill effect. However, don't bend the antenna back (180 degrees) on itself at any point.

Directional. The long-range (DX) performance of a good directional antenna such as a Yagi-Uda, delta loop, or quad is much better than the performance of an omnidirectional (nondirectional) antenna such as a vertical. Simply stated, a good directional antenna enables one to work stations that may not even be heard when using an omnidirectional antenna. This article does not cover radio wave propagation factors such as MUF (maximum usable frequency), FOT (frequency of optimum transmission), or fire (transmit and receive) angles since they are detailed in the high-frequency radio wave propagation predictions article that was printed in the March and April 1980 Novice columns. Just understand that the difference between using a directional antenna with a low angle of radiation and using an omnidirectional antenna with a high angle (35 degrees or more) of radiation is roughly the same as the difference between flying or walking across our country. You'll probably reach your objective either way, but you'll be able to do it a lot easier and more often with the directional antenna.

Since they are physically shorter than 40 and 80 meter antennas, Novice 10 and 15 meter antennas are easier to assemble and erect. If you can do so, it is advisable to install a rotatable and highly directional Yagi-Uda or quad antenna for one (or both) of these bands. The 15 meter band is presently much more useful than 10 meters. These antennas are readily available. You can easily work states all around the country, plus countries all over the world, using a directive 15 meter antenna. A simple two-element homemade Yagi-Uda (driven element, plus reflector) provides far better results than you can get from any nondirectional antenna. If you're really stuck for cash, just aim your homebrew beam at the continent you want to work most frequently and leave it there. You could also just aim it across the country for good contacts with your fellow American amateurs. Erect this antenna at least 10 feet above the top of your roof to get good results.

2814 Empire Ave., Burbank, CA 91504

Ten-year-old David Bardfield, KA1PGP, of Brookline, Massachusetts, shares a station with his mother, K1YL, who helped him prepare to pass the FCC exam. David operates code on the 80 meter Novice band.

This is Soon Wha Kim, WH8AAV, the wife of AH8G, and one of their two sons. They live near Pago Pago in American Samoa. (Photo via Rudolf Klos, DK7PE)

Dipoles. It can take a long time to complete the installation of a really good antenna system that provides optimum reception and transmission on the desired bands. Many Novices erect a simple and inexpensive antenna to get on the air while they are completing a much better antenna installation. It has been my experience that the first antenna erected by most Novices is a 40 meter dipole. The 40 meter dipole is a reasonable choice in this situation, since it provides both 40 and 15 meter operation with a reasonably short (66 foot) length. The directivity of a dipole is not as pronounced as it appears to be in the textbooks. A dipole does have maximum reception and transmission capabilities broadside (fore and aft), but it is common to work stations off the ends of a dipole. The dipole antenna has a high fire angle when it is less than one-half wavelength above electrical ground, which can prevent one from being able to contact DX stations. This high angle (about 37 degrees) increases to about 50 degrees when a dipole is positioned about one full wavelength above electrical ground, which is about 40 feet for the 15 meter band. However, a second lobe develops at about 17 degrees when the dipole is raised to the wavelength height, and this lower lobe provides good long-range (DX) opportunities. It is normal for an amateur using a low dipole to think there is something wrong with the receiver when other amateurs are heard working stations not being heard.

Despite its shortcomings, the dipole is still a useful antenna. It is inexpensive and easy to install, and it does let one get on the air with minimum delay. The May through July 1983 Novice columns cover dipole antennas very well. I urge new amateurs to read it. An 80 meter Novice dipole is 125 feet 6 inches long. Since 6 inches of wire should be allowed to make connections at each end of both sections (to the insulators), each half should be cut to 63 feet 9 inches. If possible, it is best to use a half wavelength (or a whole-number multiple thereof) of feedline between your transceiver and antenna, if you want the feedline to radiate RF fed back from the antenna. Select your coax to most nearly match your feedline length requirement and do not coil up extra coax; either drape it loosely or (if necessary) cut it off. Table I provides dimensions for Novice dipoles and their coax feedlines.

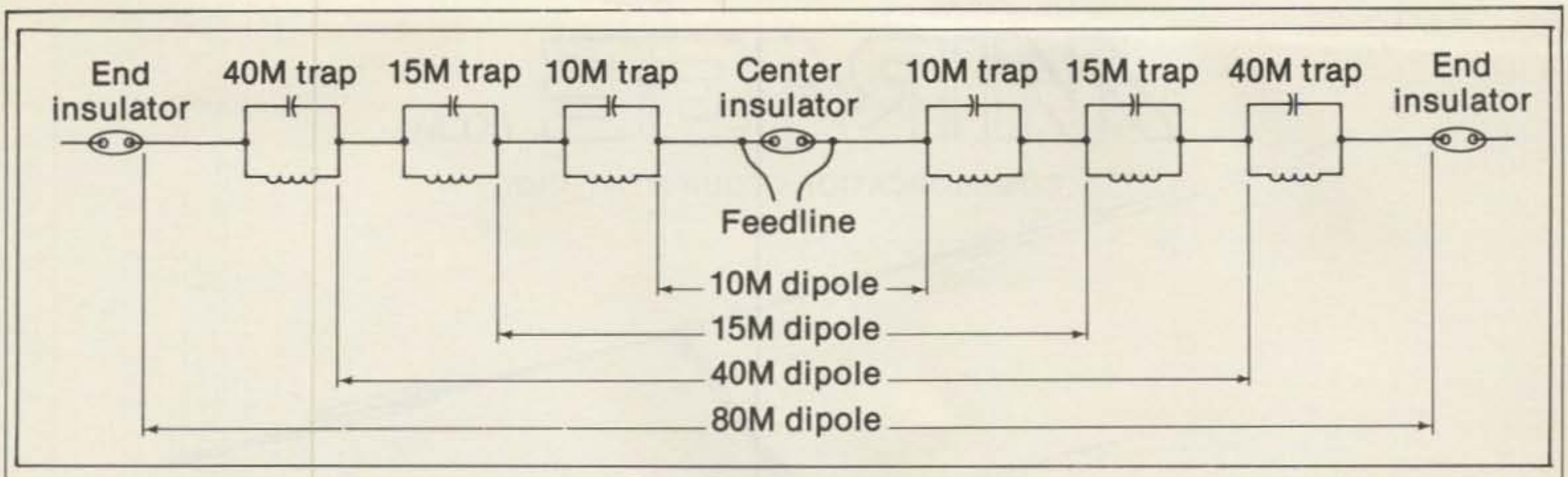


Fig. 1– Trap dipole antenna.

Drooping Dipoles. This antenna is commonly (but erroneously) referred to as an "inverted Vee." Regardless of what it is called, it is popular with amateurs because it just requires one high point of attachment. The center insulator is secured at a high point, and the two end insulators are attached to convenient low points. Simply stated, a dipole works against its mirror image (in the ground), and it is most efficient when the entire antenna is up as high as possible and clear of all surrounding conductive objects. However, if this is the only antenna you can erect immediately, you will find that it performs satisfactorily.

Folded Dipoles. This antenna is a higher impedance version of the standard dipole antenna. It is often made from 300 ohm (TV-type) twinlead with the same twinlead used as the feedline. The dimensions are 1.3 percent shorter than those shown in Table I for regular dipoles. It must be remembered that most transceivers are designed for 50 ohm input/output, and they do not have antenna impedance matching capability. Folded dipoles can be used with 50 ohm transceivers in conjunction with an impedance matching balun. Special low-loss 300 ohm twinlead is available from some suppliers. It is more efficient than standard TV twinlead.

Harmonic/Trap Antennas. Harmonic antennas are more efficient than the extremely short mobile antennas, but they are not as good as individual full-length antennas for each band. If you use a harmonic antenna, you must be extremely careful to minimize the harmonic output from your transmitter because the antenna will accept and will efficiently radiate any harmonic energy it receives. A common harmonic antenna operates on 40, 15, and 10 meters. If you're using such an antenna on 40 meters, any third (15 meters) or fourth (10 meters) harmonic energy would be accepted and radiated. The operation of these antennas is easily understood once you realize that the traps serve to electrically cut off each antenna to a particular length.

Fig. 1 shows a typical 4-band trap dipole antenna. The short innermost segments on each side of the center insulator are resonant at 28.15 MHz, as are the 10 meter traps at the outer ends of these two wire segments. The 10 meter traps serve to electrically cut off the antenna to just the resonant length of the 10 meter dipole. When 15 meter energy is applied, the 10 meter wire segment, the coil of the 10 meter trap, and the 15 meter wire extension resonate to 21.15 MHz. As before, the 15 meter traps electrically cut off the antenna at the overall resonant 15 meter length. The same action occurs on 40 meters; the 10 meter wire segment, 10 meter coil, 15 meter wire segment, 15 meter coil, and 40 meter wire segment combine (on both sides of the center insulator) to form a dipole which is electrically resonant at 7125 kHz. Again, the 40 meter traps electrically cut off the antenna from the remaining wire segments. Eighty meter action is basically the same, except that there is no need for 80 meter traps, since the antenna terminates at the ends of the 80 meter wire segments. The 10 meter wire segment, 10 meter coil, 15 meter wire segment, 15 meter coil, 40 meter wire segment, 40 meter coil, and 80 meter wire segment combine (on both sides of the center insulator) to form a dipole which is electrically resonant at 3725 kHz. Component values (for the traps) and wire segment lengths are detailed in several published articles on trap dipoles.

Novice Band (meters)	80	40	15	10
Center Frequency (kiloHertz)	3725	7125	21150	28150
Wavelength (meters)	80.5	42.1	14.2	10.7
(inches)	3171	1658	558	420
Copper Dipole Length at 95% Velocity Factor (feet and inches)	125'6"	65'7"	22'1"	16'7"
Dipole Length per Quarter Wave Section (feet and inches)[1]	63'9"	33'9"	12'	9'3"
Foam Coax Half Wavelength at 78% Velocity Factor (feet and inches)	103	53'10"	18'2"	13'7"
Regular Coax Half Wavelength at 66% Velocity Factor (feet and inches)	87'2"	45'7"	15'4"	11'6"

[1]This dimension is 1 foot longer than the actual quarter-wave distance to allow 6 inches at each end for attachment to the insulators. The flat (ringing) length is 1 foot shorter than the dimension listed for each antenna.

Table I– Novice dipoles and feedlines.

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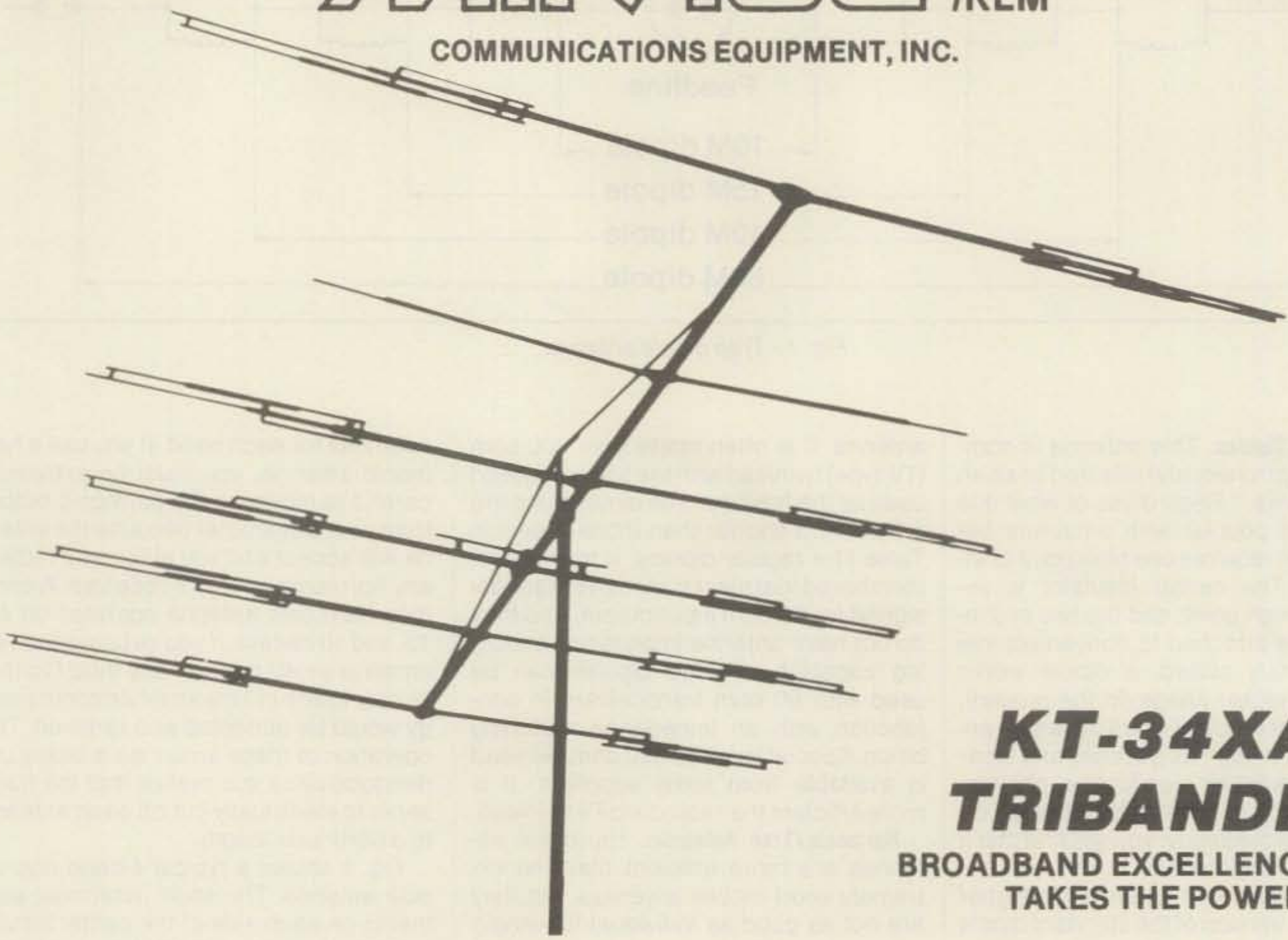

KT-34XA TRIBANDER

BROADBAND EXCELLENCE THAT TAKES THE POWER

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

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

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

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

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

Turn your KT-34A into an XA.
Call your local dealer for price.
W. Scott

MIRAGE /KLM

COMMUNICATIONS EQUIPMENT, INC.

P.O. Box 1000 • Morgan Hill, CA 95037
(408) 779-7363

CIRCLE 26 ON READER SERVICE CARD

Verticals and Ground Planes. Vertical antennas require the least flat-top space of any standard antenna. When radiating dipoles are added to the base of a vertical, the resultant antenna is called a ground plane. Ground-plane antennas are more efficient than verticals, and they provide a low angle of radiation which provides good long-distance (DX) communications. Vertical antennas are very susceptible to automotive ignition interference, and proximity to heavy traffic can make them much less useful than horizontally polarized antennas.

Mobile Whips. It is a waste of time to look for a miracle antenna which will mount on your windowsill and provide efficient operation on *all* Novice bands. No shortened antenna radiates the transmitter's output as efficiently as a full-size antenna. Despite their high costs, mobile antennas are not as efficient as a simple random length of antenna wire located as high and clear as possible, and used in conjunction with an antenna tuner.

Material. The most suitable antenna wire is copperweld, which has a steel center for structural strength and a copper outer coating to provide excellent electrical conductivity. This wire holds its length very well, which is more than can be said for the standard copper wire often used by beginners. A major problem related to using copperweld is that it is usually just available from the best suppliers. Due to its stiffness, it is not advisable to use larger gauges (10, 12, and 14) of copperweld. I have found that 16- and 18-gauge copperweld are satisfactory for use in amateur antennas. It is not good to use multi-stranded copper wire to construct Novice antennas. A major problem related to using this copper wire is that it will stretch as the antenna is subjected to strain, and this lowers the frequency at which the antenna resonates. Soft-drawn copper wire is more prone to stretching than hard-drawn copper wire, but both will stretch in our applications. Another reason not to use multi-stranded wire is that it has a higher inductive characteristic due to the individual strands being wound around the conductor's center. Adding inductance to an antenna increases its electrical length, which means that an antenna constructed from stranded wire will actually resonate below the intended frequency.

Use heavy-duty RF insulators when building antennas, not the lossier power-line insulators. Take care not to kink the antenna wire or to nick it with tools.

One dipole can be used on several bands when it is used in conjunction with the antenna tuning device popularly known as the transmatch. The transmatch changes the electrical length of the existing dipole to make it be resonant at any desired operating frequency. However, the arrangement causes RF energy to be present in one's radio shack, which can result in RF interference to susceptible equipment.

Random-Wire Antennas and Tuners

The simplest first antenna to install is the end-fed random wire used in conjunction with a standing wave ratio (SWR) meter and a random-wire tuner. This combination provides reasonable performance on all Novice bands. The length of a random-wire antenna is not critical, but it should total at least 70 feet (end-to-end) if it is to be used on 80 meters. The random wire does not have a transmission line, and its useful radiating length starts at the antenna tuner's antenna post connection in the radio shack. Since no transmission line is attached to a random-wire antenna, transmission line cost and RF feedline loss are eliminated.

A short piece of coaxial cable (or any other suitable transmission line) and an SWR meter are connected between the transceiver's antenna connection and the antenna tuner's input. The random wire is attached directly to the antenna tuner's output terminal and it is strung outside, wherever it is easy to erect. As is true with any antenna, do not allow any part of the random wire to double back on itself, which means it cannot be erected in two opposite directions. If one part of the random wire is erected east to west, no other part of it can be erected west to east. Also, if the wire is erected to a great height where it leaves the station, it cannot later be run from a high to a low point. The random-wire antenna can provide satisfactory results on several (or all) Novice bands, even when it is a relatively short and scarcely visible (very thin) piece of wire.

It is easy to use a random-wire tuner and an SWR meter to change the electrical (not physical) length of a single wire antenna to have it match the desired operating frequency. Tune the transmitter to provide a low power output at the desired frequency. Set the SWR switch to forward position and adjust the SWR gain control to get a full-scale SWR meter indication. Then, set the SWR switch to reflected position and simply adjust the antenna tuner controls to obtain the minimum possible SWR meter indication. It is usually possible to attain an apparent one-to-one (perfect) ratio. After the antenna tuner has been properly adjusted, transmitter RF output can be increased to the desired level. Neither the SWR reading nor the antenna tuner control settings are altered by increasing RF output power. As optimum antenna tuner control settings are determined for each band, they should be recorded, because they can be used each time one shifts bands in the future. Antenna control settings will vary from season to season, or between wet and dry days, but they will not change very much. The antenna tuner must be connected to a very good RF

ground, or it is possible to lose more power in a poor ground path than is being radiated from the antenna.

As is true with all antennas, the random wire should be erected as high as possible and clear of nearby metallic objects such as rain gutters, rain drain pipes, telephone lines, and electric power lines. If you must erect an antenna close to a metallic (conductive) surface, try to do so at a right angle to minimize undesirable results. Use good RF insulators to support and position the antenna wire, taking care not to make a loop in the antenna as it passes through the eye of each insulator. Solder all antenna connections, including those at end insulators. Failure to solder an antenna connection will result in noise being heard whenever wind or vibration causes the antenna to move. If you want to convince yourself of this noise source, just listen to your receiver while someone else strikes any metal object against your antenna. Do not leave any loose metal-to-metal points in any type of antenna, or you will certainly subject yourself to unnecessary noise whenever the wind blows.

Antennas for 40 and/or 80 meters should be erected where they will be clear (as possible) of metal objects, and not parallel and in close proximity to metallic objects such as buildings and wires. If a directional antenna is erected, the 40/80 meter antenna can be attached to its mast/tower at the center or at one end. If this is done, it is better to attach one end of a dipole (typical) antenna near the high point of the mast/tower and to attach the other end to a convenient (usually lower) point. The resultant sloper works better than the inverted Vee, and its maximum current (center) point is clear of the mast/tower and its associated directional antenna.

Basically, do not use mobile or gimmick antennas in your fixed station installation. Erect as much radiating surface as possible, and get it as high as possible.

Ten Meter Band Advantages

At this point in the 11-year sunspot cycle the 10 meter band has become almost useless for long-range (DX) contacts. However, we have turned the corner and started the climb to the peak of the next sunspot cycle. When that happens, the 10 meter band will improve rapidly. At its peak this band provides worldwide communications with an antenna that is physically small (about 16 feet long), light, and low cost. The small size and light weight of an excellent directive 10 meter antenna (such as a Yagi-Uda or quad) make it possible to install one on an inexpensive push-up (telescoping) TV mast and to rotate it with a heavy-duty TV antenna rotator. A highly effective directional 10 meter antenna can be installed at a small fraction of what it would cost to install a triband (10, 15, 20 meter) equivalent antenna. It is interesting to note that one of these relatively inexpensive 10 meter (only) antennas will function at least as well as the much more expensive triband counterpart on the band to which it is resonant. The performance of marginal equipment is usually much worse on 10 and 15 meters than on the 40 and 80 meter bands. Consequently, good equipment is needed to obtain optimum results on the 10 and 15 meter Novice bands.

This concludes the fifth part of this eight-part article. The sixth part covers baluns, balanced antenna tuners, RF transmission lines, station accessories, and code.

Interference from AC Power

John W. Spence, AC5K, has produced a three-page pamphlet regarding power-line and electrical radio interference. It discusses characteristics of these noise sources and provides tips on isolating problems inside and outside our homes. If you want a copy of the pamphlet, it is available for $2.00 each from John W. Spence, 465 Creekwood Drive, Silsbee, Texas 77656.

HW-8 Handbook

The second edition of *The Hot Water Handbook* is available from Michael Bryce, WB8VGE, 2225 Mayflower N.W., Massillon, Ohio 44646. It provides 31 pages of information on improving and using Heath HW-8 QRP transceivers. If you own an HW-8, you should get a copy of this handbook. It is $5 postpaid to U.S.A. amateurs and $7 to DX amateurs. The Novice column in the May 1981 issue of *CQ* covers low-power (QRP) operation for the benefit of amateurs who are not familiar with this type of operation. A copy of that article will be sent to anyone who requests it and furnishes a self-addressed envelope with double first-class postage (39¢). As always, please use my California address.

Printed Aids

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

A complete set of Technician/General (FCC Element 3) questions and answers is available for $3.00, including shipping costs. They cover every question with a master answer sheet included.

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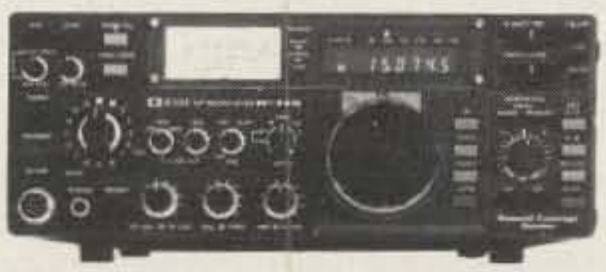

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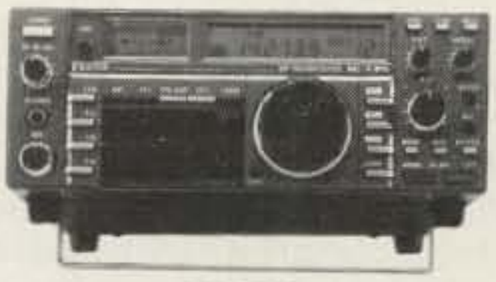

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a monthly feature by
FREDERICK O. MAIA, W5YI

INFO ON AMATEUR RADIO LICENSING:

VECs Take Over Amateur Testing

The FCC released the details of Novice Enhancement on February 10th. For the first time it fell on the VECs to develop and implement the new testing program. Effective January 1, 1987 the amateur radio testing program was completely on its own. The FCC merely retained oversight authority by giving the VECs' guidance on the topics and percentage of questions for each examination. It was up to the VECs to collectively develop and agree on the test questions for the various license classes.

At first the ARRL fought this tooth and nail, filing Petitions for Reconsideration, and when the FCC didn't expeditiously act, filing an eleventh hour appeal in the form of a Request for Stay of the Rules that authorized the VECs to maintain the question pools. They wanted the Commission to be more actively involved and to continue to revise and issue the examination questions. The League was concerned that different volunteer examiner coordinators could have different amateur testing programs and that applicants would search for the easiest test.

This attitude was very confusing to the testing coordinators who were at last fall's VEC Conference held at the FCC in Washington, D.C. VECs representing nearly all (but not all) U.S. amateur testing unanimously agreed that we should and would act together. Every VEC wanted to have a single set of examination questions that every test program would use. We appointed a Committee for Maintenance of the Question Pools that would make the final decision for all of us.

The League did a very poor job of reporting this to their membership. There never was any intention by any VEC *not* to act as one when it came to question pool makeup. That is not the impression that the ARRL publicly presented. This is baffling, since the Atlantic Division Director, Hugh Turnbull, W3ABC, also attended that conference on behalf of the League and clearly knew how the VECs felt. Possibly the concern was that some VECs who were not at the meeting might go astray. Still, the FCC issued a warning Public Notice notifying everyone that the agreements reached at the Conference were binding on all VECs.

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

The FCC denied the League's Request for Stay, and it was up to the VECs to show their stuff! There was much to be done—and not much time in which to do it. The implementation date of Novice Enhancement was March 21st, about a month away! Additional questions covering the new Novice privileges had to be agreed on by the VECs, and the Element 3 Technician-General question pool had to be divided into separate Technician (Element 3A) and General (Element 3B) questions. In the past, this had been done by the FCC's Private Radio Branch, primarily John Johnston, W3BE. Now we had to do it ourselves.

The League started working with other VECs once the FCC denied their "Request for Stay." It became quite apparent that the ARRL Petition for Reconsideration would also be denied. Jim Clary, WB9IHH, the ARRL VEC manager, and Mac McGrath, KZ1A, his assistant, did an excellent job of cooperating with all other VECs in quickly getting the new Novice questions developed and approved and Element 3 separated. Jim and Mac did most of the work and then circulated the information to all other VECs for their input. Nine VECs responded. On February 20th the new Novice questions and Element 3 separation were agreed on. A few changes were made based on suggestions from other VECs.

With Novice Enhancement about three weeks away, all VECs went to work designing their new Novice, Technician, and General class examinations and distributing them to their VE teams. We had over 200 test packages to send out—a very costly expense indeed which had to be paid for out of expense reimbursement (testing fees). New forms had to be devised.

While every VEC uses the same exactly worded questions, every VEC program is somewhat different when it comes to administrative procedures. We try to cut out all of the red tape. Even the test answer format may not be the same. Most VECs—but not all, however—do use a common set of multiple-choice answers. The ARRL and our testing program, the largest two by far, use the same multiple-choice answers. Together we account for about 75% of all U.S. amateur testing opportunities. The ARRL program is about twice as large as W5YI-VEC testing.

We also found out that VECs can work quicker and more efficiently than the bureaucracy! While the FCC adopted new rules providing for written examination credit, two Novice class VEs, and separate Technician and General class tests, they weren't very prompt in getting out a new application Form 610 providing spaces for these changes! The Office of Management and Budget, which oversees government forms, said that the previous (June 1984 and July 1985) Form 610s could be used. These versions are not well suited at all, but we provided our VE teams with a system by which they could be used. The FCC sent us one "draft" copy of the new application form after we had distributed test packages to each of our teams. Even though not a final typeset copy, we hurriedly printed up 5,000 copies and distributed a quantity to each of our teams to use on March 21st—with postage, another $500 expense.

By March 1st we had the needed new program package in the hands of each of our teams. It was very hectic for a while! Thanks to the able assistance of the Datapoint Amateur Radio Club of San Antonio, Texas, who maintains our question pools in its computers, we had everything completed and in the hands of our VEs within a two week period. I hope we don't have to go through so much in such a short period of time again, but we are prepared to if we have to! The show must go on and the VECs need to demonstrate to the FCC that we can get the job done. I think we can even do a better job!

At least one (non-VEC) license preparation publisher contacted us and suggested that we file a petition with the FCC stating that the implementation date of Novice Enhancement was too close. We suspect that this publisher was more concerned with inventory levels of the books in their stock (and in the hands of their dealers) than with the VECs meeting the schedule. Believe me, this was a problem to us, too. As a license material distributor, we had to discard or add supplements to much of our material. The League did the same thing. Only the ARRL and W5YI programs have government authority to be both a VEC and a license preparation material publisher/distributor. Both VEC programs had to demonstrate to the Commission that precautions have been taken so as to preclude a conflict of interest.

This being the first time that the VECs

had to implement a testing program themselves, we certainly did not want to fail the first time out! And we didn't. It did occur to us, however, that smaller VECs might not have the funds nor the organization to gear up as fast as we could. We volunteered our services to get any VEC that needed it operational before the March 21st date.

From The Mailbag

Novice Enhancement and the new Element 3(A) Technician and 3(B) General written examinations have generated a lot of questions. Let's cover the most common!

I passed the previous Element 3 Technician-General examination. Will I have to pass the new General Class 3(B) written examination? No! Any applicant who passed Element 3 before March 21st only has to pass Element 1(B)—the 13 word per minute code test—to upgrade to the General class. Your license or Certificate of Completion will substantiate when you took Element 3. *Always make a copy* of these certificates so you can prove what you have passed and when. Never give your only copy to a VE team! This certificate will become very important to you if you passed Element 3 in February or March, but your Technician license is dated after March 21st! You have two options if you do not have proof that you have passed the old Element 3: (1) Retake the Element 3(B) portion, or (2) contact the VE team (or VEC) to confirm the date you passed Element 3. Both the VE and VEC will have this information in their records. Since this data is kept within the VE/VEC system, do *not* contact the FCC for it. They don't have this information.

What are the new privileges awarded Novice operators? In a sentence, entry-level amateurs can now operate 10 meter HF phone and packet, and simplex and repeaters in the VHF 220 and UHF 1240 MHz bands. There is much more to it than that, of course, but that is the bottom line that most Novices are interested in. CB demonstrated that people want to talk to each other, and Novice Enhancement should cause a big expansion in amateur radio. *Explosion* might be a better word!

It should also help protect our amateur spectrum. Commercial interests long have been eyeing our valuable frequencies. One of the reasons why the FCC has proposed to reduce the 1.25 meter amateur band by 40% is because the "loading" (use) is very light. Even though the Commission says they will lop off the first 2 MHz of the 220-225 MHz ham band, it won't affect the new Novice or repeater communications since this operation starts after 222.1 MHz.

I am interested! How do I get licensed? It is not hard at all. Novice operators must know the Morse code at 5 words per minute and be able to pass a 30 question written examination before two (General class) level volunteer examiners. The 302 written test questions, multiple-choices and answers, are all known and widely available. (W5YI has a *Novice Q&A Manual* available for $4.00 plus $1.25 postage.) You simply study the questions as you would prior to taking a written driver's license test. Before March 21, 1987 the Novice pool contained 200 questions and tests were made up of 20 questions.

Learning the code is equally easy. Get a good code teaching and practice cassette tape course. (Again, W5YI has these available at $9.95 for a 2 cassette course.) You should be ready to pass your Novice test within a couple of weeks. Maybe sooner!

Finding two (it used to be one) volunteer examiners to give you the test may be a little more difficult. Unlike the Technician and higher amateur classes, VEs for the Novice license do not have to be accredited by a VEC. Anyone 18 years or older with a clean amateur radio record holding at least a General class license and not related to the applicant can be a volunteer examiner. There is nothing further they must do except know how to administer the written and code tests and fill out the paperwork (FCC Form 610 application).

There are amateur radio clubs everywhere that would love to have a new member. Many have formal Novice classes to help you become an amateur.

If all else fails, *do some door knocking*. Usually every neighborhood has an easily recognizable amateur tower with a Yagi multi-element antenna on it. Ask the amateur who lives there if he knows where you can take a Novice test or if he can help you. Most will be glad to.

You can even furnish W5YI with the name of a local General class amateur and we will forward the new written Novice test directly to him (along with the appropriate FCC Form 610 application) for administration to you. Amateurs are bound to know other local amateurs who would be glad to act as the second required VE. (Include $1.00 to cover postage/printing.) W5YI will even file the application with the FCC if it is returned to us. We do it all the time. Although a VE would probably prefer to make up his own Morse code test, W5YI has 5 wpm code test tapes available ($3.95 plus $1.00 postage) if they are needed. Again, we will ship them directly to a VE that you specify. We will do everything we can to get you licensed and enjoying the fantastic hobby that is ham radio!

General class and higher amateurs who wish to administer Novice class examinations can purchase a special *Novice Test Kit* from W5YI for $4.95 plus $1.00 postage. Included are all of the instructions, written and code tests, and a supply of the new version Form 610 applications that provide space for two certifying VEs to sign.

How do I learn "ham talk"? What is a "repeater"? I have never thought much about this, but amateurs have a jargon all their own. You won't find it covered in any license preparation material. Voice procedure on the high frquencies is somewhat different from that of VHF repeaters. "Q" signals (not "10 codes") are used on the high frequencies, but not very much on VHF. As a general rule, long-distance amateur communications sound quite different than those on the local VHF/UHF FM repeater.

FM repeaters are the amateur's party line. They are very popular, and new Novices can now operate through repeaters in the 1.25 meter (222.1–223.91 MHz) band. In ham talk, a repeater is simply known as a "machine." It is an automatic retransmitting station that permits amateurs using low-power hand-held or mobile transceivers to obtain a wider communications coverage area by having their weaker signals "repeated" from tall high-gain antennas at higher power levels. While Novices can communicate through 1.25 meter and 23 centimeter (1270 to 1295 MHz) repeaters, they are precluded from establishing or acting as the control operator of an amateur station in repeater operation.

The best way to learn how amateurs talk is to listen. Set your general-coverage receiver to the 20 meter amateur band (14.150-14.350 MHz) to get an idea of what amateurs do on HF. The 2 meter amateur band is a good place to learn VHF operation. The best spot to monitor is between the 145.2 and 145.5 or the 146.61 and 147.39 MHz repeater output segments. Most cities have busy 146.76, 146.82, 146.88, or 146.94 MHz repeaters. Tune in.

I am now a Novice. Do I have to take another test to operate the new voice class? No you don't. Amateurs who were licensed Novices or Technicians on March 20, 1987 automatically get the new privileges allowed by Novice Enhancement without any further testing. This process is known as "grandfathering." It is a good idea, however, to review the new questions so that you are familiar with the new requirements.

Note: We haven't forgotten about our four-part series the History of Communication. Part I appeared in March, and Part II in April. Novice Enhancement caused us to delay Part III and Part IV somewhat. We'll resume it shortly. Meanwhile, keep those cards and letters coming, folks. That is the only way we have of knowing what you are interested in or what confuses you. We have a habit of forgetting what it is like to be a beginner! What may be common knowledge to most amateurs is not to a newcomer. See you next month.

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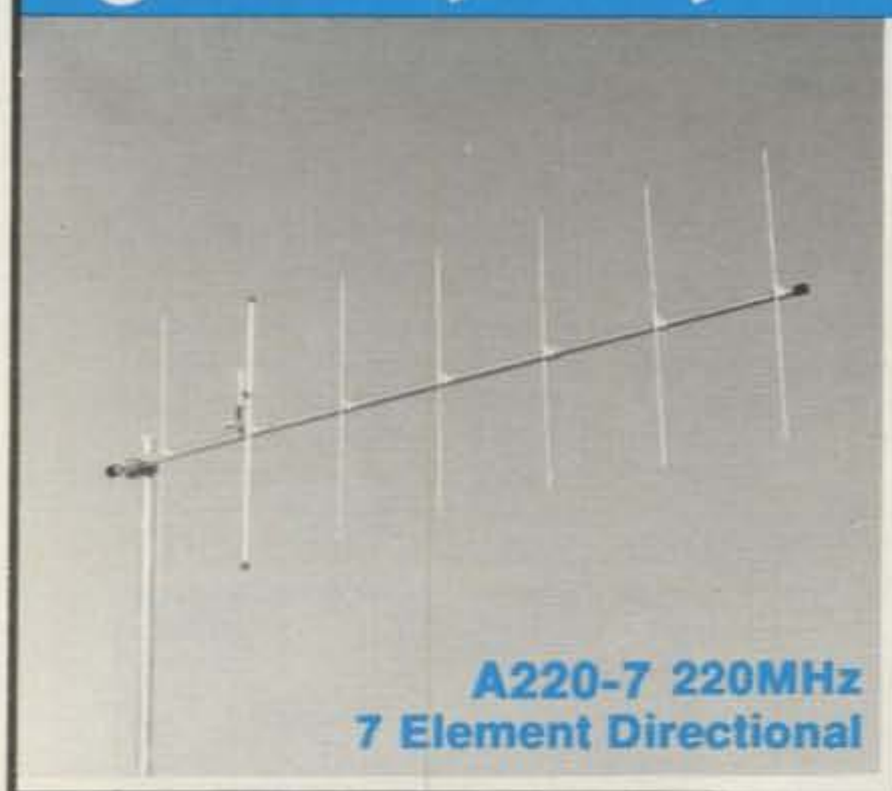

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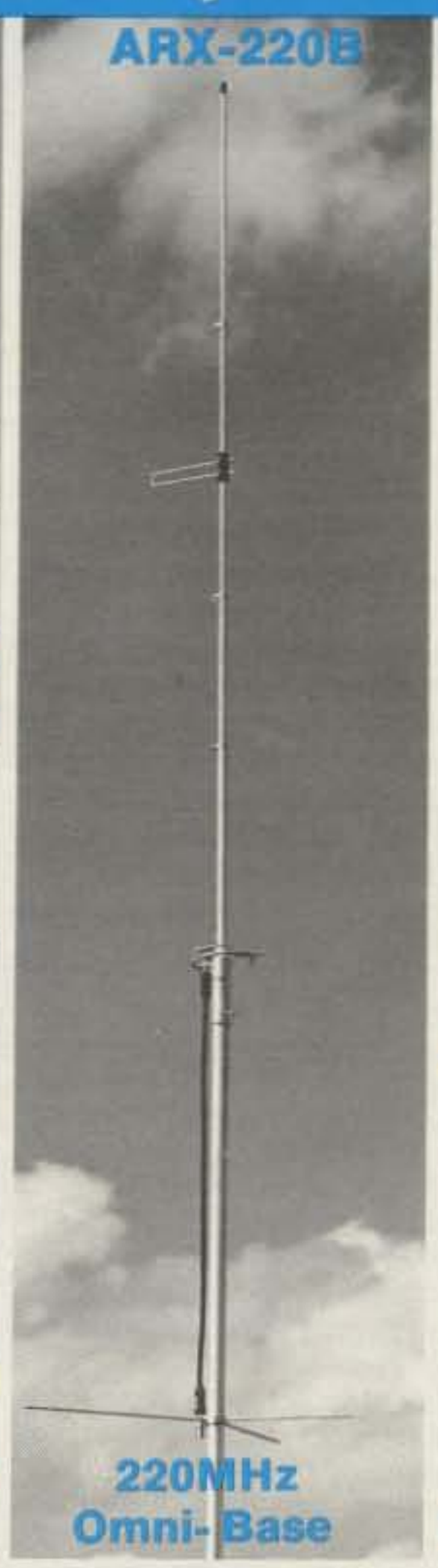

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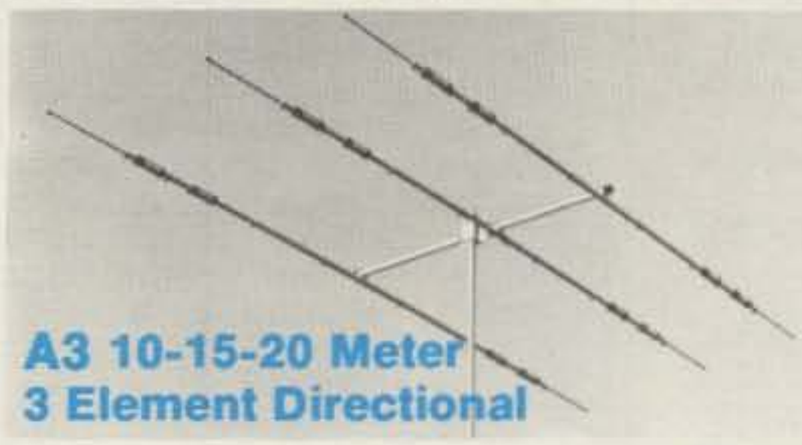
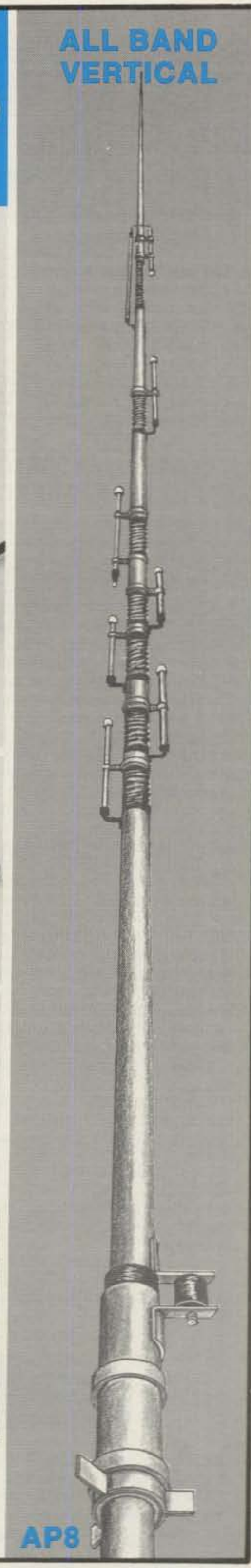
220MHz Portable



A3 10-15-20 Meter
3 Element Directional

A4 10-15-20 Meter
4 Element Directional



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Awards

a monthly feature by
DOROTHY JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for June is:

Charles E. Dillard, N4EED USA-CA All Counties #527, Mixed, 12-11-86

"I first heard of County Hunting during the Dayton Hamvention in 1983. I was on the bus back to my hotel and some of the amateur radio operators were talking about it. One of them told me about the 20 meter net operation.

"The 10 meter band had been my favorite, but with 10 meters dead and DXCC, WAC, WAS, etc., already accomplished, I needed something else to do.

"When I returned home I tuned in to the County Hunters Net at 14.336 and listened. After a while I broke in and found out from Bill, N4AQA, where to get information about county hunting. I received the information just before we were to go on vacation. I had not previously been a mobile operator, but we took the rig with us. On that trip I worked KA6BTU, Cliff, in Sierra, California, and that was the beginning of my quest for the All Counties Award. Some three years later Galen, KB5FU, finished it all for me, the final one being Presidio County, Texas. I have also been on the 'giving' end of a last county exchange, giving WA0LMK, Le Roy, his last one. It is quite a pleasant feeling both ways.

"I was interested in amateur radio during my high school days when Chriswell, W4YCO, got me started. However, I became discouraged and lost interest when I was not able to master the code. Eventually, though, after some 20 years, the interest was revived and I decided to go to the Novice classes at the Birmingham ARC. I got my Novice license in January 1979, my General class in 1981, and my Advanced class in 1982.

"Our vacation trip in 1983 marked the beginning of Jane's life as a 'County Hunting Widow.' But she is very understanding and helpful, putting up with my running around mobile and even joining in the logging chores sometimes. Jane and I have three daughters, Tina, Pamela, and Charlene. We also have two grandchildren, Joshua Bassett and Kimberly Northcutt.

"I am employed by Kimberly Clark as a machine tender on a newsprint machine. We make the paper that is used in printing

333 South Lincoln Ave., Mundelein, IL 60060

Charles "Cooter" Dillard, N4EED, USA-CA #527, at home in his shack.

newspapers. I have worked for Kimberly Clark for 35 years.

"My hobbies, besides amateur radio, include golf, fishing, and camping. I also enjoy collecting knives and caps.

"I want to thank all the net control stations, all the mobile stations, and the many others who helped me to complete All Counties. Special thanks must go to Ken, KB7QO, for over 1000 counties and to Galen, KB5FU, for my last 26 counties. It has been difficult to work them all while employed on shift work these past three years, but it has been well worth the effort. Now I'm on my way to doing it all over again for Second Time Around."

Awards Issued

Donald R. Royster, W4ZMZ, filed his qualifying application and received USA-CA 2000 #695, USA-CA 1500 #780, USA-CA 1000 #954, and USA-CA 500 #2161, Mixed, dated 2-17-87.

Joseph C. Cannon, Sr., KA5RNH, submitted his paperwork and qualified for USA-CA 1500 #781, and USA-CA 1000 #955, All SSB, dated 2-27-87.

Howard E. Guenther, KA8VVE, claimed his endorsement for USA-CA 1000 #952, Mixed, dated 2-10-87.

Roger J. La Mothe, K8MDU, qualified for USA-CA 1000 #953, All SSB Mobiles, and USA-CA 500 #2160, All 75M SSB Mobiles, both dated 2-12-87.

USA-CA 500 certificates went to:

Adolph Kerschbaum, OE5KE, USA-CA 500 #2158, 2-9-87, All CW.

James R. Churchill, K9HDZ, USA-CA 500 #2159, 2-10-87, Mixed.

Roger J. La Mothe, K8MDU, USA-CA 500 #2160, 2-12-87, All 75M SSB Mobiles.

Donald R. Royster, W4ZMZ, USA-CA 500 #2161, 2-17-87, Mixed.

USA-CA Honor Roll

2000		1000		500	
W4ZMZ	695	W4ZMZ	954	OE5KE	2158
		KA5RNH	955	K9HDZ	2159
1500				K8MDU	2160
W4ZMZ	780			W4ZMZ	2161
KA5RNH	781			W8PN	2162
KA8VVE	952				
K8MDU	953				

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

Harold J. Braschwitz, W8PN, USA-CA 500 #2162, 2-18-87, All CW.

Awards Available

EDR 60 Jubilee Award. In 1987 EDR (Experimenterende Danske Radioamatorer) is celebrating its 60th anniversay and is offering the EDR 60 Jubilee Award. For the award you need 60 points, which are earned by working OZ stations in the period January 1, 1987 to December 31, 1987. Count one point for each OZ station worked, except that club stations count 5 points each. All amateur bands and modes are allowed, but repeaters cannot be used. Special endorsements will be given for CW, 2 × SSB, RTTY, one band, a.s.o. The cost is 6 IRCs. Make application by log extract certified by two licensed amateurs and posted no later than January 31, 1988 to Allis Andersen, OZ1ACB, Kagsaavej 34, DK-2730 Herlev, Denmark.

The awards, which will be printed after the deadline date, will be numbered and will be issued in the order in which the applications are received. A list containing calls of club stations is available from the manager (OZ1ACB) for an SAE and one IRC.

Diploma 60th Anniversary of R.E.P. The Portuguese Amateur Radio Club (Rede dos Emissores Portugueses) is marking its 60th anniversary this year, and as part of its commemoration program presents an attractive award with qualification requirements as follows.

1. The award is available to all licensed

amateurs and SWL stations the world over.

2. Issued for confirmed two-way contacts with or having heard from Portuguese stations (CT, CT3, and CU). Contacts must be made betwen January 26, 1987 and December 31, 1987.

3. Bands: all VHF and HF amateur bands.

4. Modes: SSB, CW, Mixed, RTTY, FM. No cross-mode is allowed.

5. The applicant must confirm: European stations EA8, CT3, and EA9—60 points; African stations and American stations—40 points; and Asian stations and Oceania stations—20 points.

6. Each Portuguese station may be contacted only once per band. The same station may be contacted on different bands.

7. Scoring: (a) Contact with a Portuguese station is worth one point. (b) Any contact with Club Station, CT1REP or CT60REP, will count as 5 points.

8. No QSL cards are required, but the following log data must be supplied: date, time, callsign of station worked, frequency, mode. Full name, callsign, and QTH of applicant are also required. Clearly state the endorsement for which you are applying. All applications are to be countersigned as correct by the applicant's National Society (IARU member), which means that the QSL cards of the contacts listed are in possession of the applicant and that the items of the cards are correctly listed.

9. Separate awards will be issued for each mode (CW, SSB, RTTY, Mixed, and FM).

10. Mail application, together with fee of 8 IRCs or $4.00 US, to Diploma 60th Anniversary of REP, P.O. Box 2483, 1112 Lisboa, Codex, Portugal. The award is free of charge to any radio club or amateur radio organization (IARU member).

11. The deadline for mailing applications is December 31, 1989.

Ulan Bator Award. This award is available from the Mongolian Central Radio Club. The award is available to licensed amateurs. Contacts on and after 1 January 1980 are valid. Do not send QSL cards. A list showing full details of the contacts should be certified by the awards manager of a national society. There are no band or mode restrictions. Asian stations need eight QSOs; stations on other continents need QSOs with five different Mongolian stations.

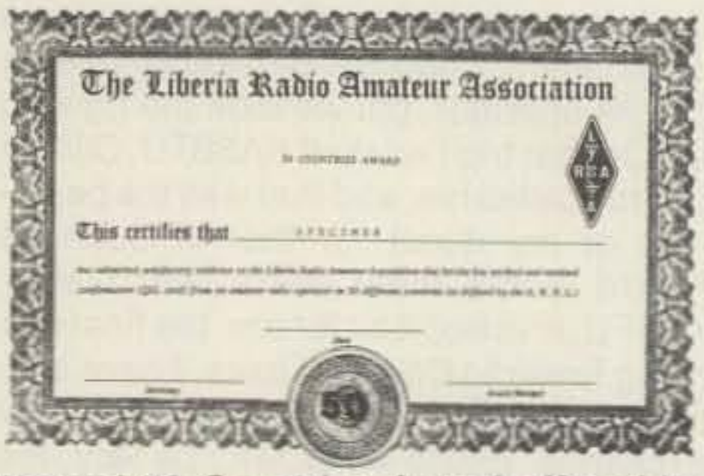
There is no fee for the award; it is free. Send applications to Award Manager, Central Radio Club, P.O. Box 639, Ulan Bator-13, Mongolia.

Ulan Bator Award sponsored by the Central Radio Club of Mongolia.

L.R.A.A. Awards. The Liberia Radio Amateur Association announces the following six awards.

Worked All Liberia Award offered by the Liberia Radio Amateur Association.

Worked All Liberia Award—Submit satisfactory evidence of having conducted two-way communication with at least one other amateur radio station in nine counties of Liberia on at least three different bands since 1 April 1964.

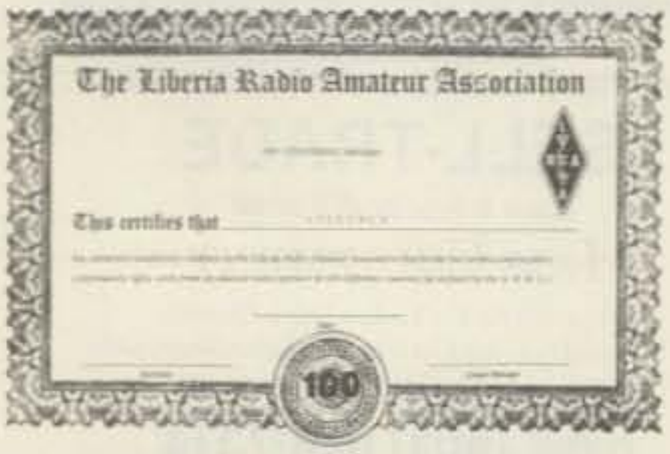


Worked 50 Countries Award offered by the Liberia Radio Amateur Association.

Worked 50 Countries Award—Submit satisfactory evidence of having conducted two-way communication with at least one other amateur radio station in at least 50 different countries since 1 April 1964.

Six Counties Award offered by the Liberia Radio Amateur Association.

Worked 100 Countries Award—Submit satisfactory evidence of having conducted two-way communication with at least one other amateur radio station in at least 100 different countries since 1 April 1964.



Worked 100 Countries Award offered by the Liberia Radio Amateur Association.

Six Counties Award—Submit satisfactory evidence of having conducted two-way communication with at least one other amateur radio station in six counties in Liberia on at least two different bands since 1 April 1964.

West African Countries Award offered by the Liberia Radio Amateur Association.

West African Countries Award—Submit satisfactory evidence of having conducted two-way communication with at least one other amateur radio station in eight West African States and at least five amateur radio stations in Liberia on at least two different bands since January 1, 1962.

Worked ECOWAS Countries Award offered by the Liberia Radio Amateur Assn.

Worked ECOWAS Countries Award—Submit satisfactory evidence of having conducted two-way communication with at least one other amateur radio station in 12 member countries of the Economic Community of West African States, including Liberia, on at least three different bands since May 28, 1975.

The ECOWAS countries are Benin TY, Burkina-Faso XT, Cape Verde D4, Gambia C5, Ghana 9G, Guinea 3X, Guinea Bissau J5, Ivory Coast TU, Liberia EL, Mali TZ, Mauritania 5T, Niger 5U, Nigeria 5N, Senegal 6W, Sierra Leone 9L, and Togo 5V.

Directors GMPR clockwise from left: Buiar, PY5PX; Havro, PY5AVR (50 years of CW); Wes, PY5FB; Didio, PY5BVL; Ed, PU5YPI; and Nei, PY5AKW, President.

General Rules: QSL cards are not needed. Submit a certified list of claimed contacts, signed by an officer of your national society or two General class license holders. The list is to include station worked, date, time, band, mode, and signal reports.

The fee for each award is US $5.00 or 10 IRCs. Send application to Awards Manager, P.O. Box 987, Monrovia, Liberia, West Africa.

Of Interest To Awards Chasers

The accompanying photograph of the directors of GMPR, Grupo Morse Paranaense (State of Paroona's Morse Group), is by courtesy of Ed, PU5YPI. GMPR is one of the largest and most active CW groups in Brazil. For information about group activities and/or membership, write to GMPR, P.O. Box 4143, 82.501 Curitiba PR, Brazil.

73, Dorothy, WB9RCY

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Radio Data Communications and PC-Compatibility!

DS-3200

Now you can have the BEST in a radio data communications terminal and an IBM PC XT-compatible computer with the NEW DS-3200.

Recognizing the chief weakness of previously available computer-based terminals is RFI generation and susceptibility, HAL has designed the fully-shielded DS-3200 for operation in the radio data communications environment. No longer do you have to QRT when that rare DX station's signal dips near the noise level!

The DS-3200 is provided with an extensive RTTY software package which emulates the operation of our MPT3100/DSK3100 combination for message processing and handling. Continuous save to disk of all received text, direct transmission of selected files from disk, and full editing capability are just a few of the features of this "user-friendly" software package. Plus, we have included the latest release of MS-DOS with GW BASIC!

The built-in RS-232C serial port allows the use of the DS-3200 with an external demodulator such as the HAL ST-5000, ST-6000, or ST-8000. Or, add the HAL PCI-2000 for a completely self-contained RTTY/CW terminal and demodulator. Also, with the use of a second RS-232C serial port the DS-3200 can be used with your favorite TNC on Packet!

The DS-3200 with its IBM PC XT-style architecture gives you virtually unlimited flexibility for future expansion. Here is a list of just some of its hardware features: 8088 CPU, 640KB RAM, RS-232C Serial Port, Parallel Printer Port, Clock/Calendar with Battery Back-Up, Two 360KB Floppy Disk Drives OR One 360KB Floppy and One 20MB Hard Disk Drive, HERCULES-compatible Monochrome Graphics Adapter with High-Resolution 12 Inch Monochrome Video Monitor.

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CIRCLE 53 ON READER SERVICE CARD

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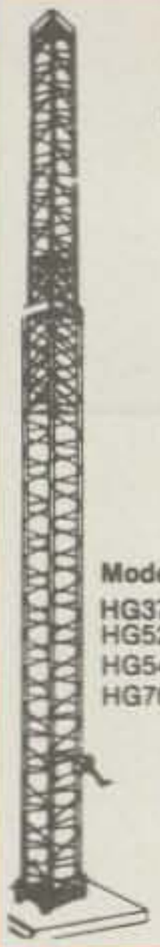

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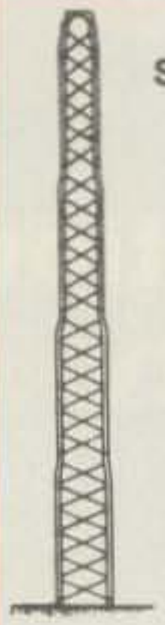
All Models Shipped Factory Direct—Freight Paid*!

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

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

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



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FREIGHT PREPAID

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

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

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

ROHN

Guyed Tower Packages

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

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

	Model 25G	Model 45G	Model 55G
50'	$ 629	$1119	$1489
60'	689	1259	1669
70'	749	1379	1829
80'	909	1539	2019
90'	979	1809	2189
100'	1059	1969	2369
110'	1259	2099	2789
120'	1329	2259	2959

US TOWER CORPORATION

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

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

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

CALL FOR SALE PRICES!

Model	Min. Ht.	Max. Ht.	Ant. load*	Sale price
MA40 mast	21'	40'	10 sq ft	$ 549
MA550 mast	22'	50'	10 sq ft	899
TX438	22'	38'	18 sq ft	829
TX455	22'	55'	18 sq ft	1249
TX472	23'	72'	18 sq ft	2059
HDX555	22'	55'	30 sq ft	1879
HDX572	23'	72'	30 sq ft	3229

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

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

RG-213U

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

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

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$.19/ft $179/1000 ft

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

9086

$.39/ft $379/1000 ft

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

HARDLINE/HELIAX®

Lowest Loss for VHF/UHF!

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

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

Coaxial Cable Loss Characteristics (DB/100 ft)

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

HARDLINE & HELIAX® CONNECTORS

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

COAX CONNECTORS

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

ANTENNA WIRE & ACCESSORIES

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

Van Gorden

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

ALPHA DELTA

DX-A 160-80-40 Sloper	$49

CUSHCRAFT

A3 3-el Tribander	$229
A4 4-el Tribander Beam	$299
A743 & A744, 30/40 mtr KIT for the A3 & A4 ea	$79
R3 20, 15, 10mtr Vertical	$275
AV5 80-10mtr Vertical	$109
D40 40mtr Dipole	$159
40-2CD 2-el 40 mtr Beam	$299
A50-5 5-el 6 mtr Beam	$85
215 WB NEW 15-el 2 mtr Beam	$85
230 WB NEW 30-el 2 mtr Beam	$229
4218 XL 18-el 2 mtr Beam	$105
3219 19-el 2 mtr Beam	$99
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424B 24-el 432MHz Beam	$85
ARX2B 2 mtr Vertical	$39

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

HUSTLER

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

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

Bumper Mounts - Springs - Folding Masts in Stock!

BUTTERNUT ELECTRONICS CO

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

HF2V 80-40m Vertical $129 Delivered
- Full Legal Power
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Accessories:

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

HF6V HF2V

FREE UPS on ACCESSORIES when purchased w/antenna

HF4B "Butterfly" 20-10m Compact Beam $189. Delivered
- Unique Design Reduces Size
- No Lossy Traps
- Turns w/TV Rotor

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

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ROTORS

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

ROTOR CABLE

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

ROHN GUYED TOWER SECTIONS

10 FT. STACKED SECTIONS

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

ALL ACCESSORIES IN STOCK—CALL

ROHN FOLDOVER TOWERS

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

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

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

TOWER/GUY HARDWARE

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

HPTG2100 Guy Cable (2100 lb rating)	$.29/ft
HPTG4000 Guy Cable (4000 lb rating)	$.49/ft
HPTG6700 Guy Cable (6700 lb rating)	$.69/ft
9901LD Cable End (for 2100/4000 cable)	$8.95
9902LD Cable End (for 6700 cable)	$9.95
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Heavy Duty Steel Masts 2 in OD - Galvanized Finish

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

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• 100% Duty Cycle
• 40 Memory Channels
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TS-811A LIST $1049
CALL FOR SPECIAL PRICE

TW-4000A LIST $599
CALL FOR SPECIAL PRICE

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

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

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NEW
TH215AT
2m HT XCVR
TH21BT, TH31AT
TH41AT Also In Stock-
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FT 767 GX HF/VHF/UHF
LIST $1895 CALL FOR SALE PRICE

FT-757GX LIST PRICE $995
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FT2700RH NEW 2M/70cm Dual Band Transceiver Full Duplex-Cross Band Operation LIST $599
CALL FOR PRICE-SAVE $$!

NEW FT290R 2m Portable LIST $579.95
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FT 209/709 RH NEW HIGH Tech HT's 5W Output

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• 5w Output
• 10 memories
• Battery saver
Call For Sale Prices

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

ASTRON POWER SUPPLIES

Heavy Duty- High Quality - Rugged -Reliable

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

Model	*Cont. Amps	ICS Amps	Price
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B215	2M	Yes	2W	150W	$259
B108	2M	Yes	10W	80W	$159
B1016	2M	Yes	10W	160W	$259
B3016	2M	Yes	30W	160W	$229
D1010N	440	No	10W	100W	$319

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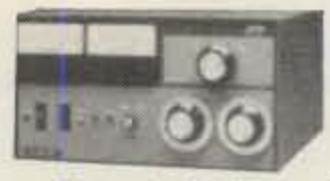

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CIRCLE 14 ON READER SERVICE CARD

VHF

a monthly feature by
STEVE KATZ, WB2WIK

PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

Hot Fun In The Summertime

June brings to mind, at least to a northeasterner like me, happy thoughts of warm weather and the birth of a new growing season—not to mention 6 meter E-skip, the VHF QSO Party, Field Day, new antennas, and other really important stuff. As this is being written in mid-March, it is difficult to think seriously about warm weather, but it probably will come as it always does, bringing with it exciting VHF propagation!

While summer brings beautiful flora and fauna, some of this is not good news to VHFers. The fauna doesn't do us much harm unless it begins eating through our coaxial cables and such; the flora, on the other hand, really can screw up things for those not lucky enough to have antenna systems completely clearing it all—especially the tall trees which fully foliate this time of year.

An interesting paper was published in *IEEE Transactions on Antennas and Propagation*, Volume AP-11, Number 4, in July 1963. Now what did those guys know about VHF way back in the dark ages before ICOM, Kenwood, and Yaesu? Quite a bit, it seems. This particular paper, written by Seymour Krevsky, W2JBI, discusses "VHF Radio Wave Attenuation Through Jungle and Woods." While not many of us have to contend with jungles, the paper makes some interesting points.

The first is that "loss in foliage is essentially the same as that for loss in any medium such as sea water where the field is attenuated exponentially with distance as follows:

Received field: $E = E_0 e^{-d/\delta}$

Skin depth: $\delta = \frac{1}{2\pi}\sqrt{\frac{\lambda}{30s}}$ meters

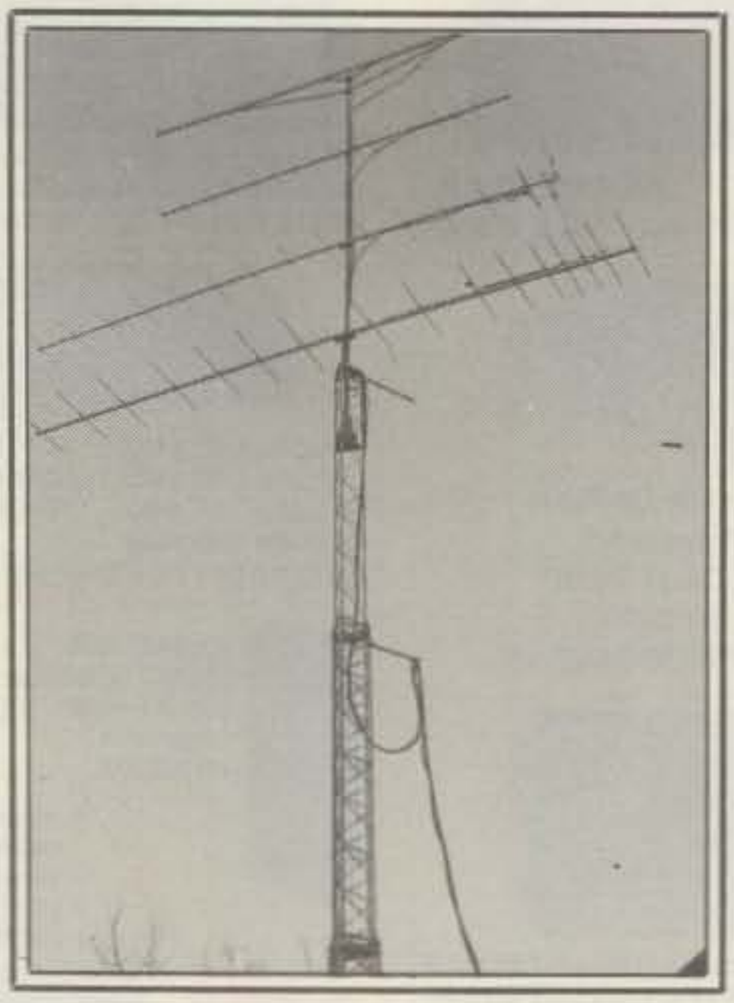
Medium Conductivity: s = Mhos/M

Loss in dB: $a = 20 \log_{10} e^{-d/\delta}$

Note: When $d = \delta$, $a = 8.68$ dB

Our local foliage here in the U.S. is considered to be "Mid-Latitude Woods," with a conductivity of 3×10^{-8} Mhos/meter. By comparison, "Dense Jungle Foliage" has a conductivity of 1×10^{-5} Mhos/meter. As a result, there is a very considerable difference in path loss at any frequency in dense jungle compared with mid-latitude woods. At 100 MHz the difference is a rather staggering 90 dB/0.1 mile! How, then, does one communicate from dense jungle? Beats me!

What brought this data to mind was a talk given by no other than Seymour Krevsky himself at a local radio club meeting. His talk concerned his involvement in communications experiments conducted in the mid-1960s in the jungles of Panama. We don't have any local jungles, and even if we did, my wife wouldn't want to live there because she's deathly afraid of snakes and large insects (in that order). But we do have mid-latitude woods, and many of us have such foliation right in our backyards.



The first tower at the new WB2WIK QTH is a crank-up which allows all antennas to completely clear the trees, but can be "nestled" down at the roof line.

Tall trees come in handy for stringing up 80 meter dipoles, but they can be a real problem when it comes to VHF/UHF work. Aiming through the densest part of a leafy tree, or worse still, a cluster of trees, can turn a usable wintertime path into a useless one. I found this to be the case on 23 cm when working from my "old" home station location in Budd Lake, NJ. Because I was atop an 1100 foot hill and had a relatively unobstructed view in many directions, I thought I surely would be "king of the band" on 1296 MHz. This turned out not to be the case; I did quite well in some directions and very poorly in others. Surprisingly, the "poor" directions were ones where I had a *visual* horizon of several miles. What could have been causing this problem?

Trees! Although I had a visual horizon of several miles, that was only because I could see the distant horizon through the large gaps which existed between the tree trunks. Remember, I'm less than 6 feet tall, so my visual horizon was quite different than that of my antennas, which were nested at about 50 feet above ground. The antennas didn't have the advantage of large gaps between the tree trunks. They were right up there with the dense cluster of tree limbs, branches, and leaves, some of which were less than 20 feet away.

Now, a very tall tower—in my case it would have had to be about 80 or 90 feet—would have allowed the antennas to "see" over the treetops, at least for a few years. But I lived on a one-half acre lot and didn't really want to annoy my neighbors even more than they already were annoyed by my very presence in town, so I steadfastly refused to erect a tall tower. As a result, my 23 cm DXing was very stifled. I could work the Virginia coast (250-plus miles) just about any time, but I found it nearly impossible to work KQ3R, who lived in the hills of northeastern PA (100 miles) and has a truly superior 23 cm station. The entire problem was those darned trees.

I've since moved to the Jersey shore area,

A partial view of the new WB2WIK shack. A lot still wasn't set up, but we're working on it!

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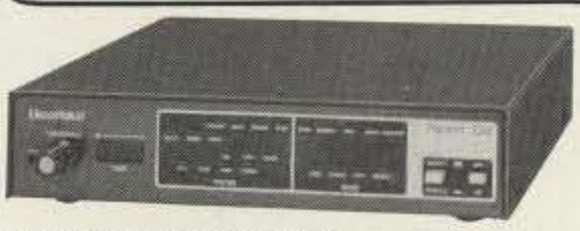

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about 70 miles farther from KQ3R in PA, and have no trouble working Tom with S9 signals on 23 cm. I haven't changed my station a bit. My antenna, however, is now at 66 feet above ground and clearly "looks" over every single tree in the entire new neighborhood. My nearest obstruction is probably a mile or more away. No hilltop, just flat terrain providing no obstacles. If I had known how much difference foliage attenuation could make, I gladly would have annoyed my former neighbors a bit more and erected a taller tower!

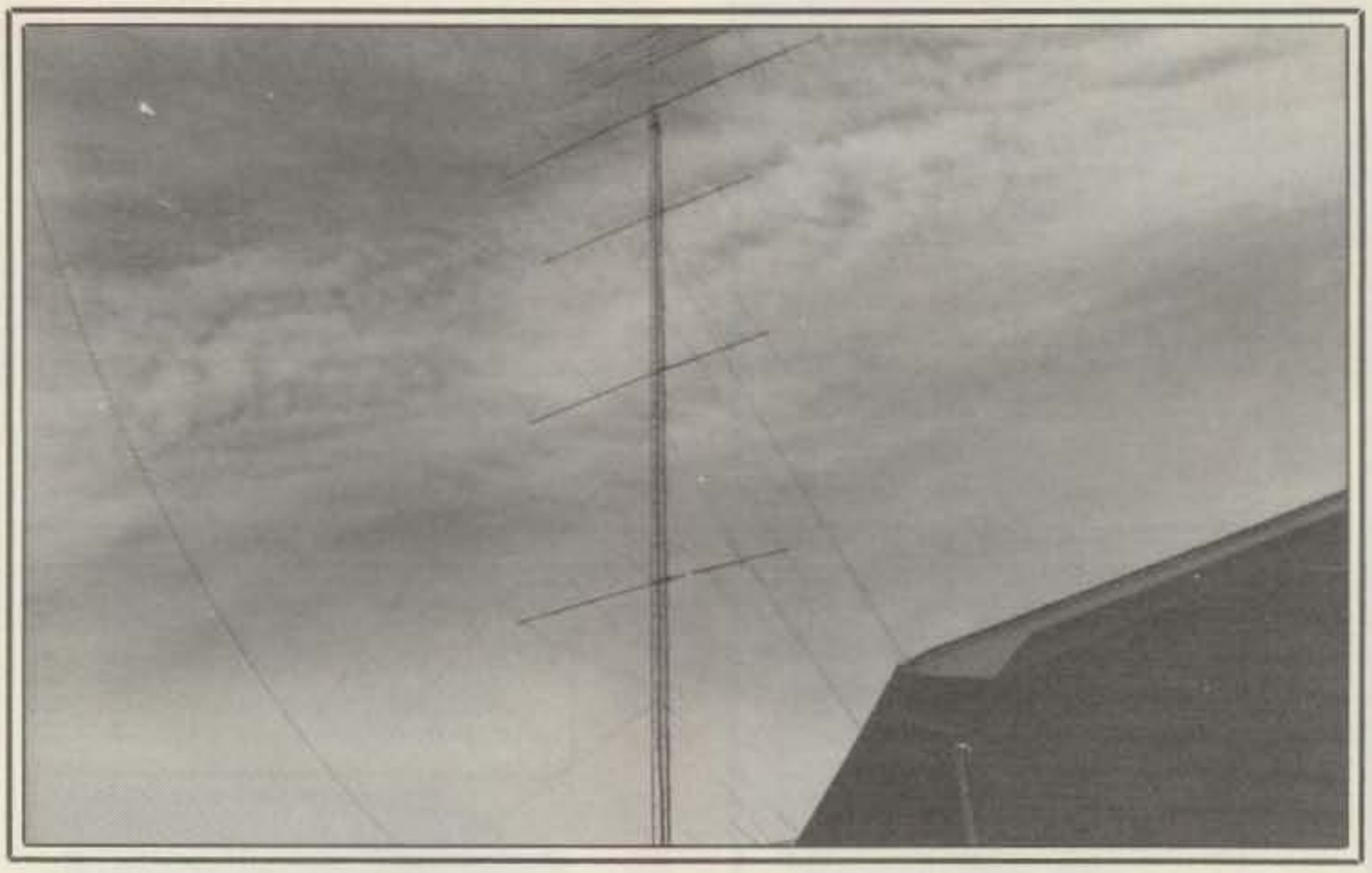
Funny thing, this foliage attenuation. It becomes very severe at higher frequencies, but is almost (not entirely) insignificant in the low to mid-HF spectrum. Added path loss in mid-latitude woods at a frequency of, say, 10 MHz is maybe 1 dB/0.1 mile, compared with nearly 10 dB/0.1 mile at 100 MHz and nearly 50 dB/0.1 mile at 1000 MHz. Most of us probably don't have even 0.1 mile of foliage around our antennas, but you get the point.

What to do? Ideally, we would all live in open fields with no local elevated foliage at all. But then our towers would really stand out and give the neighbors something even more to gripe about. We can install towers tall enough to clear all surrounding woods, but this can be impractical, especially for those living in areas where very tall trees are naturally abundant. We can have nearby trees removed, and sometimes this is a good solution; but lack of natural shade and the detrimental impact on soil erosion in many areas would outweigh the benefits of defoliating, if you'll pardon the expression. How about a crank-up tower! If it can be placed in such a way that the antennas can be elevated above the trees for operating then brought back down below the trees for "storage," this is probably the most ideal situation. A crank-up can also help in negotiating with one's municipality and neighbors. Use the "nested" height for all discussions, pointing out that the tower will "rarely" be used at its fully extended height. I can just hear those zoning variances being granted.

Speaking of zoning, a member of our *CQ* VHF WPX Contest Committee, Ed Parsons, K1TR, recently moved for the second time in two years to avoid a costly battle with the Town of Londonderry, NH. It seems Ed's ex-home town insisted on clinging to its 35 foot structure height limit ordinance, and despite two public hearings and a suit brought against the town, Ed was losing the battle. Therefore, he did the reasonable thing and moved! Way to go, Ed. Ed is now setting up in Windham, NH, where the zoning ordinances are, as he says, "more reasonable." I hope things are going well, Ed, and hope to hear you on the air soon.

Those who wish to enhance their enjoyment of the 6 meter band would do well to order a copy of KA3B's *North American 50 MHz Activity Listing* dated April 1987. I just received my copy, and it's a winner. The new publication is 28 pages long and includes the 50 MHz band plan, and listings of 50 MHz beacons, nets, repeaters, award rules, newsletters, contests, DX operations, QSL information, and 14 pages listing active stations with their grid squares. If *that* doesn't help you work 6 meters more effectively, nothing will! KA3B may be reached by writing to Harry A. Schools, 1606 South Newkirk St., Philadelphia, PA 19145.

Speaking of Harry, he intended to visit Bermuda (VP9) from June 10th through the 15th, which will coincide with the ARRL VHF QSO Party. He intended to have 6 meter gear (only) along, and was looking forward to giving out VP9 and grid FM72 to all those who are lucky enough to work him. I assume his callsign will be KA3B/VP9.



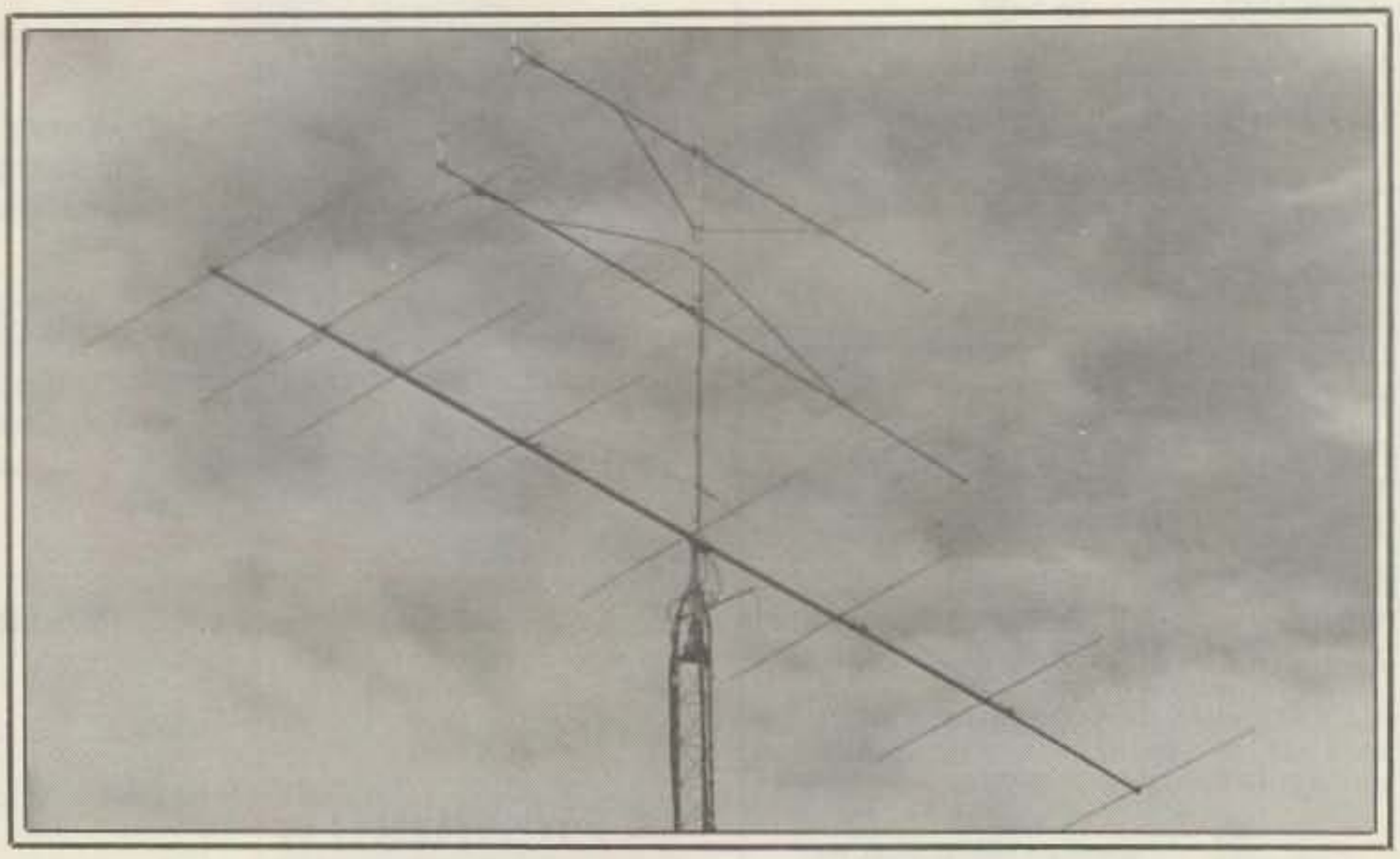
The 100 foot tower at WB2OTK (SC) supports 7 Yagis for VHF/UHF, including a total of 32 elements for 6 meters. Rich was working on rotating the whole system.

Harry also wrote to say that HH7PV should be on 6 meters from Haiti by the time this is printed, and that famed globe-trotter W6JKV was considering a Clipperton Island expedition on 6. Encouraging news in the midst of a sunspot "slump."

Here's a secret: Operate the Third Annual *CQ* World-Wide VHF WPX Contest, and you're likely to work John Lindholm, W1XX, under a very rare and unique callsign. If all goes as John had planned, he will be operating the VHF WPX from the east coast using a callsign that will represent a "new" prefix for everyone he works. I don't want to give away the entire secret, and the operation may not come off as John had planned back in early spring, so get on the bands during the VHF WPX and see what happens!

Rick Phillips, KB3PD, of Newark, DE wrote to tell of his new EME station for 144 MHz. Rick's using 350 watts output from a surplus AM-6154 amplifier and four "Boomer" 3219 antennas. At the time this was witten, KB3PD had successfully completed EME. QSOs with 8 stations in about 35 attempts, with 28 attempts via his setting moon. Rick also expects to be active during meteor showers, as he still needs MS and SD. He says his elevation system is built from a small boat winch picked up for about $20. Good show, Rick.

PC Electronics, Arcadia, CA, has a new 33 cm ATV exciter, the TXA5-33. This ATV transmitter board is crystal-controlled on 910.25 (simplex) or 923.25 (repeater) MHz, or another frequency on special order. The unit requires a 13.8 VDC (nominal) power source at 400 ma peak, and produces about 1.4 watts output on sync tips; it also has provision for a 4.5 MHz audio subcarrier, with PC's FMA5 or XFMA5 accessory. The TXA5-33 sells for $139, and Tom O'Hara, proprietor of PC Electronics, intended to have units available for sale at the Dayton Hamvention, which will have passed



The top 3 antennas at WB2OTK (SC) are 8 elements on 50 MHz, 19 elements on 144 MHz, and 24 elements on 432 MHz.

by the time this is published.

Tom also publishes a listing of Southern California Coordinated 23 cm ATV repeaters, and I was astonished to find 24 such repeaters listed as being on the air. For further information on ATV activity in southern CA or PC Electronics products, contact them at 2522 S. Paxson Lane, Arcadia, CA 91006.

Speaking of 33 cm, the 902 MHz world's record DX as of this writing is 480.8 miles, with the title held by K3SIW/9 near Chicago and W2PGC in western NY. This record was set during the Christmas Eve (1986) tropo session, which provided an excellent path for east-west work to and from the midwestern U.S. Thanks to the *Midwest VHF Report* for this info.

Also in the February 1987 issue of the *Midwest VHF Report* was an outstanding technical construction article, "Using MMIC's in a 902 MHz Transverter," by Don Hilliard, W0PW. The advent of MMIC's (Monolithic Microwave Integrated Circuits) at affordable prices is a boon to amateur VHF/UHF/SHF experimentation, and I imagine we'll be seeing increased use of these devices in commercially built equipment intended for amateurs.

As this is being written in March, I don't yet know the outcome of the FCC's NPRM regarding reallocation of the 220–222 MHz segment of our 135 cm band. If the extension for comments was granted, we should have until the third full week of May to present our arguments in favor of retaining the allocation for the amateur service. If you haven't already mailed your comments in reply to General Docket 87-14 (see this column for May 1987), there may still be time to do so. Get busy!

Mark Allen, KA5YPU, President of the newly-formed Gulf Coast Microwave Society, sent along the club's first newsletter, dated February 20. This is the same group previously discussed in this column as the "South Texas Microwave Society," but they decided to change names after a group from San Antonio advised that they had selected the same name. The goal of the group is to promote usage of the amateur bands above 420 MHz, and they had their first formal meeting on March 2. Interested parties may wish to contact the Society by writing to P.O. Box 7853, Woodlands, TX 77387.

Dennis Rudy, N4NAM/VE3, Markham, Ontario, wrote back in February to say he was very much looking forward to starting up on 6 meters, but concluded his "dedication to ham radio isn't strong enough to warrant climbing the tower in snow and freezing temperatures." Well, Dennis, it should be warm by now, so how about it? Fifty MHz can surely use more Canadian activity. My friend Charlie Rothschild, WB2INB, of Randolph, NJ should be residing in VE3-land by now, in the Kitchener area. Charlie was about to take a new position with Hewlett Packard there, and was in the process of preparing for the move when this was written. Charlie always put out a good signal on 144 and 432 MHz from his NJ-based hilltop station, so maybe we can hope for something from WB2INB/VE3.

Speaking of VE3, I received a letter from Ed Kucbel, VE3KRP, up in Thunder Bay, Ontario. Ever been to Thunder Bay? I have, and expected to see polar bears! Anyway, Ed's active on 144 and 432 MHz using ICOM transceivers (IC271A and IC471A) plus Mirage solid-state power amplifiers to stacked Yagis on each band. He had successfully completed meteor scatter QSOs with K2TXB and K2SMN in NJ during the Perseids shower in 1986 and was looking forward to more meteor work. Thunder Bay is in grid EN58, on the north shore of Lake Superior. Those looking for the grid should give VE3KRP a try. He was working on a dual 4CX250 amp for 2 meters and may have completed it by now. Contact Ed by writing to him at 2048 Victoria Ave. E., Thunder Bay, Ontario P7C 1E3.

Wayne "Hud" Hudson, KT7G, of Seattle, WA and I have been carrying on a heck of a mail correspondence. We've discussed antennas and propagation and lots more over the months, and I'm looking forward to making our first 6 meter QSO. Hud modified his Cushcraft 4218XL "Boomer" for 2 meters by replacing the driven element assembly with a gamma match made from tubing and the center portion of RG8/U, then close spacing the first and second directors to 16 inches (about 0.2 wavelengths). All remaining directors are spaced .308 wavelengths (about 25 inches), for a total of 15 elements (REF-DIP + 13 directors) on the original 4.2 wavelength boom.

Hudson writes, "I'm not boasting, but I consistently work Eugene, OR (300 miles) with 150 watts output and get better reports than several locals with 300–600 watts and stacked beams." He goes on to say, "My front-to-back ratio appears better than with the original Trigon reflector. I put up a piece of 4' × 4' screen for the reflector and didn't see any change other than different feedpoint impedance. The 2 meter 'Hudkit' beam is on a 30 foot push-up mast. When I pull down the beam soon, I'll probably change the first director spacing to .15 wavelengths . . . should get a bit better parasitic excitation . . ." Interesting comments, Hud. I'm still waiting, at this writ-

ing, for photographs of the finished beam. If we can get all the details, maybe a few other readers will make similar modifications and tell about their results.

KT7G had worked 29 states and 70 grids on 50 MHz from June 29, 1986 through January 16, 1987. "Not bad, considering the conditions." I'd say it's pretty spectacular. Anyone wishing further details of the "Hud" special 2 meter 4.2 wavelength Yagi might want to write to him at 404 SW 197th St., Seattle, WA 98166.

Ah, antennas! They really make or break the whole operation, don't they? With this in mind, Rich Whiten, WB2OTK, of Piedmont, SC, had erected some monsters for 50 MHz. Rich uses an 8-element Wilson long-boom Yagi at 100 feet for general-purpose work, but also has four 6-element Yagis installed at about 25'-45'-65'-85' fixed-aimed for really low-angle work. He says the system's aperture is sufficient for random meteor work just about any old time. The 4-bay, 24-element array should have about 16 dBd gain, which makes for one impressive system. Needless to say, Rich also runs a kilowatt and spends more than a little time on 6 meters.

Whiten called me the other night to advise that he's worked out a plan to rotate the 24-element system around the 100 foot tower by side-mounting all the beams on a separate pipe and rotor. This would allow between 180 and 270 degrees rotation, and he was about to start work on the project. Talk about dedication! Is it turning yet, Rich?

Stan Rutherford, W0EUG, of West Des Moines, IA was looking into activating on 6 meters and hoped to have an "older" (Swan 250C, Drake TR-6, or the like) rig on the air shortly. Stan's an old timer who's pretty clever with a pen: "I've got used to my cancer / to no dentures I'm resigned / I can manage without bifocals / but oh, God, I miss my mind!" was the finale of Stan's letter. Come on now, Stan. Anyone wanting to jump on 6 meters can't be all crazy. W0EUG had a couple of beautiful homebrew communications receivers he was looking to sell to make room for 6 meter gear. If there was room, I'd print the photos of these rigs. I don't know if he still has them, but interested parties may write to him at 720 12th St., W. Des Moines, IA 40265. Come join the party on 50 MHz, Stan! This is the best possible time of year for it.

Geoff Brown, GJ4ICD, is an active VHFer from Jersey, Channel Islands, U.K. Those who follow VHF contests might recognize Geoff's call as the winner of our VHF WPX Contest for his category. Brown has been a great help in promoting the *CQ* World-Wide VHF WPX Contest for 1987, and has translated copies of the contest announcement and rules for publication in magazines all over Europe. If Geoff's plan works, there should be enormous activity in Europe for this year's July contest. Americans, get ready for some real competition! We would look rather silly if the European entries turn out in higher numbers than we Americans, so let's get in there next month and give it our all.

WA7TUX of Roy, UT wrote to say that as of this past winter, he was only one confirmation short of 6 meter VUCC. Dale's been using an NCG triband transceiver running 10 watts output to a dipole antenna to work 28 states (including FL, NC, SC, NY, and ME) and 99 grids. By the time this reaches print, Dale should have 50 MHz VUCC clinched. Excellent work, Dale! WA7TUX is one reader who wants to jump right into the competition for a new *CQ* VHF WPX Award. Hopefully, this will all be organized and running very soon.

Ted Goldthorpe, WA4VCC, of Fort Mill, SC wrote to request that newcomers to the meteor-scatter scene please adhere to correct procedures. This will help everyone concerned by expediting QSOs while conditions are peaked. As Ted says, an unfruitful scenario such as this is too often heard during meteor showers:

"Let's say Station A hears completed calls of Station B and immediately goes to S2s in his sequence. However, Station B does not hear completed calls, but now hears lots of S2s; i.e., Station B must continue with calls only. Station A is now hearing lots of completed calls, and can't understand why no S2s. Sorta like a Mexican standoff, and a good waste of valuable meteor burns."

WA4VCC advises, "Follow procedure and give calls with your S2s. Makes for a much more productive meteor contact." I'll second that. But I think there's a lot more to know about m.s. work than can be contained in a few paragraphs. For instance, when making m.s. skeds, by all means stay away from recognized "calling frequencies." It drives me crazy to hear stations trying for m.s. QSOs on 144.200 MHz. Make skeds on odd frequencies which are unlikely to be occupied. What's wrong with 144.062 MHz? We should all be well enough aware of our frequencies to successfully pull off odd-frequency skeds.

Well, that's about it for now. Elsewhere in this issue you'll find the results of the 1986 *CQ* World-Wide VHF WPX Contest and some other interesting reading for VHFers. *Now* is the time to begin planning your operation for the 1987 VHF WPX Contest. It's only next month. See you then.

73, Steve, WB2WIK

World of Ideas

a monthly feature by
DAVE INGRAM, K4TWJ

A LOOK AT THE WORLD AROUND US

Return of the Classic Keys

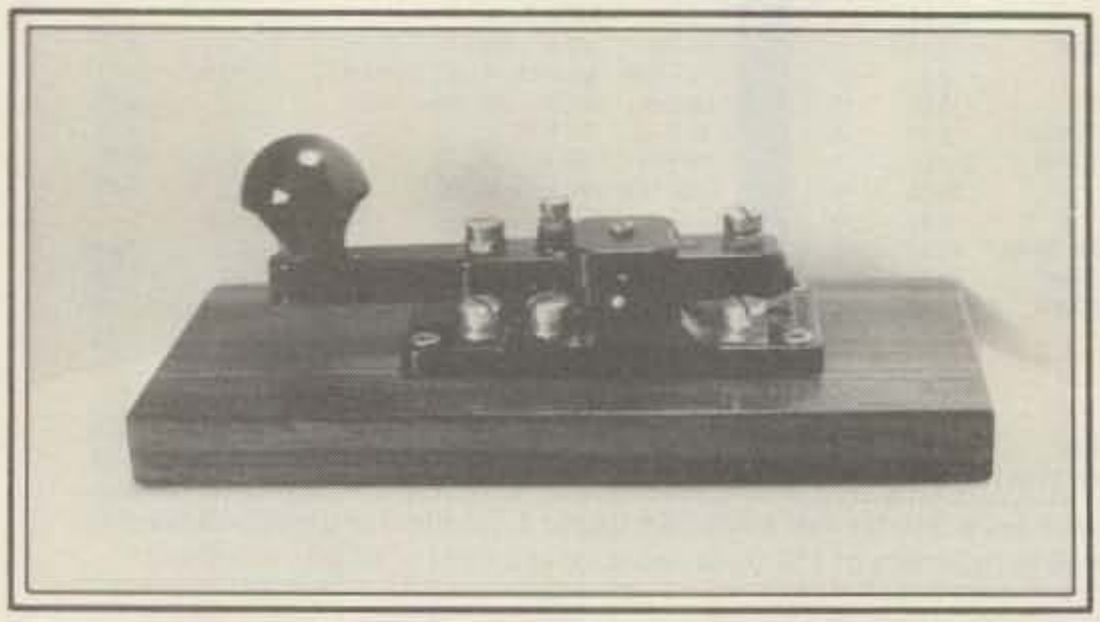


Fig. 1– VE7FOU's main station key. A highly refurbished Army key, it's mounted on a rosewood base.

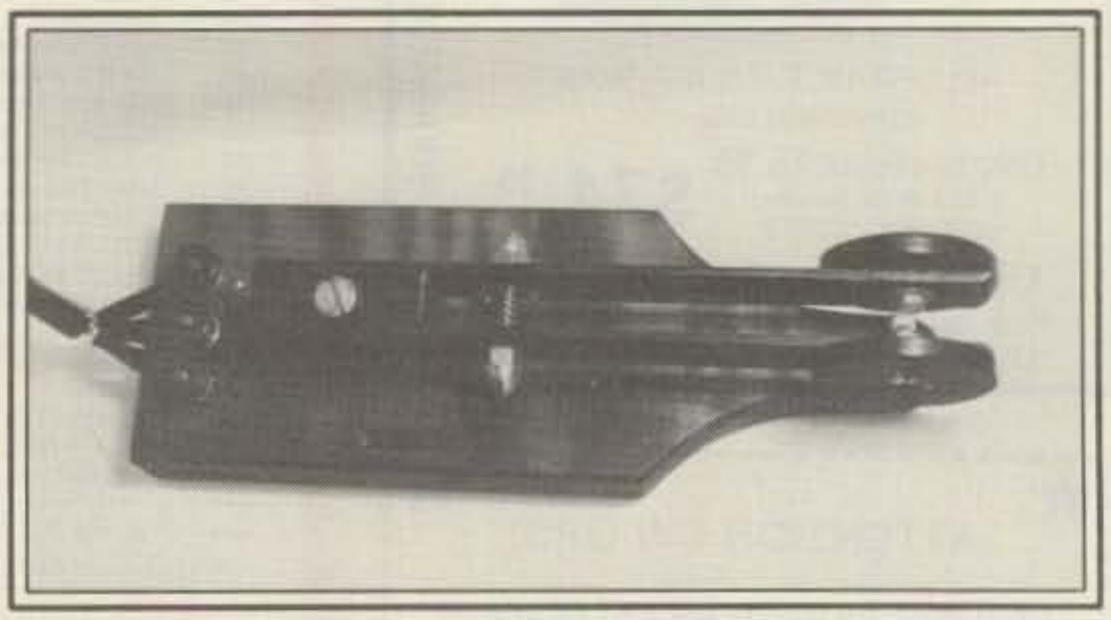


Fig. 2– VE7FOU's homebrewed electronic keyer paddle is a prime example of what one can accomplish with effort and devotion to the CW art.

Your interest and response to our previous columns featuring unique hand keys and classic bugs continue to be absolutely overwhelming. These gems are unbelievably popular items! Letters requesting more views poured in from around the world, so we're proudly "doing it again" this month. Our views this time will highlight the fine art of refurbishing, eye-catching special manufacturing, the classic Continental Morse "clackers" of yesteryear, and a genuine modern classic hand key you can assemble yourself. The photos and tales are quite fascinating, so grab your pocket magnifier, settle back, and enjoy!

Once again our key tour spans the western to eastern reaches of our fair continent. Our kind hosts this time are key collectors Rick Van Krugel, VE7FOU (P.O. Box 7000, Port Hardy, BC Canada V0N 2P0), and Tony Isch, W2GDV (38 Beverly Drive, Belle Mead, NJ 08502). I'll also add a couple of my own key photos and personal comments along the way to share enthusiasm.

Rick is a highly skilled machinist. Tony is a retired bandleader. Both might be considered typical collectors: They're amateurs like you and me, and they're interested in preserving a bit of our golden past. Rick has a nice S-38 and 6L6 QRP rig. I met Tony on 30 meters CW. Both fellows echo the familiar opinions that finding good keys is always challenging and prices vary widely. (I've also found trades far more important than money.) A prime example of the previous statement is reflected in the following true story.

During the last six months I received two letters regarding the same key from opposite sides of the U.S. One amateur had landed his own vertical Vibroplex at a cost of around $400. The other amateur had found a vertical Vibroplex at a flea market and purchased it for less than $10. As you'll recall from last year's keys columns, the vertical bug, or "Wirechief's Key," is a rare and prized classic. During the last six months I also talked with a particular amateur manufacturer considering replicas of the vertical bug. No dates or additional information is available at this time. I'm willing to bet such keys would go like hot cakes. What's your opinion? A good craftsman could make quite a bundle assembling such replicas. A heavy "U"-shaped metal base, plastic upright, "innards" from an old bug—wow!

Eastwood Village No. 1201 So., Rt. 11, Box 499, Birmingham, AL 35210

Fig. 3– VE7FOU's beautifully restored Mac Key. This classic gem was a pure "junker" when Rick found it—no weight, damper, or fingerpieces.

Hold those "homecrafting" ideas in mind a few minutes, and let's take a look at some interestingly crafted keys.

Figure 1

Beginning our jaunt through this unique classic key showcase is VE7FOU's main station key. This British item came from an army tank and is inscribed "KEY.W.T.8AMP No.2 KIII." It is mounted on a highly polished rosewood box filled with a few pounds of lead and epoxy. The wood is used in guitars. Rick's refurbishing efforts are quite apparent. The key looks absolutely immaculate and extremely inviting. Notice use of slot-screws with lock nuts in lieu of traditional knurled knobs.

Figure 2

Rick recently tried his hand at assembling an electronic keyer paddle from scratch with very good results. The item is simple in design but works fine. Flexible metal strips are used for arms. They are spaced and insulated by a center plastic piece. Screws and nuts holding fingerpieces contact center/common

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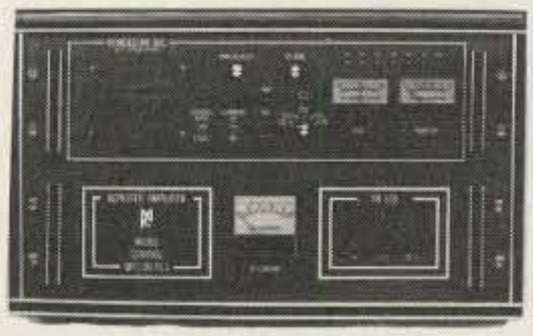

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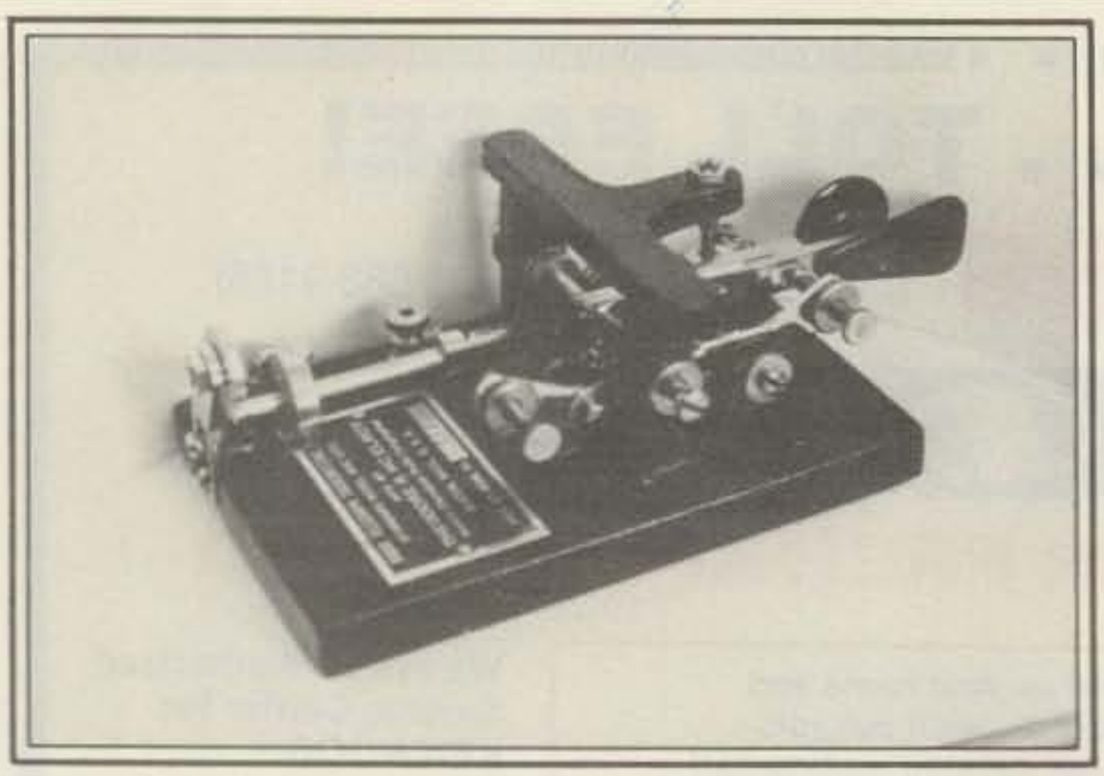

Fig. 4– Side view of the restored Mac Key. Note the cleanliness and perfectly blended workmanship.

ground post. Unit is mounted on scrap guitar/rosewood base that is weighted with lead inserts.

Figure 3

Most key collectors and bug enthusiasts will recognize this item at first glance. It's the classic and ever popular Mac Key (recognized by its familiar T-bar yoke that is convenient for two-finger carrying). This particular Mac Key, however, depicts an ultimate refurbishing achievement. When initially acquired, VE7FOU's Mac Key was in poor/junker shape. He had another Mac Key for "patterning," so a massive cleanup and reconditioning began. But that's not all. Several of the bug's main parts were missing. Rick thus "home manufactured" the bug's spring, dot contactor assembly on pendulum, contact screw, weight, damper wheel and assembly, plus both paddle finger pieces. He sent a color photo of the key with those brass pieces before chrome plating, and his master craftsmanship was unbelievable. As you can see from this photo, the final results look exactly like a brand new Mac Key. The weight may look large, but that is its genuine size.

Figure 4

Side view of VE7FOU's refurbished Mac Key. The dot and dash adjusting screws, weight, and (back) damper were home-fabricated and chrome-plated right before photographing. Rick also included a photo of his "original and good condition" Mac Key for comparison, but the two ("good" and "junker") were identical in appearance.

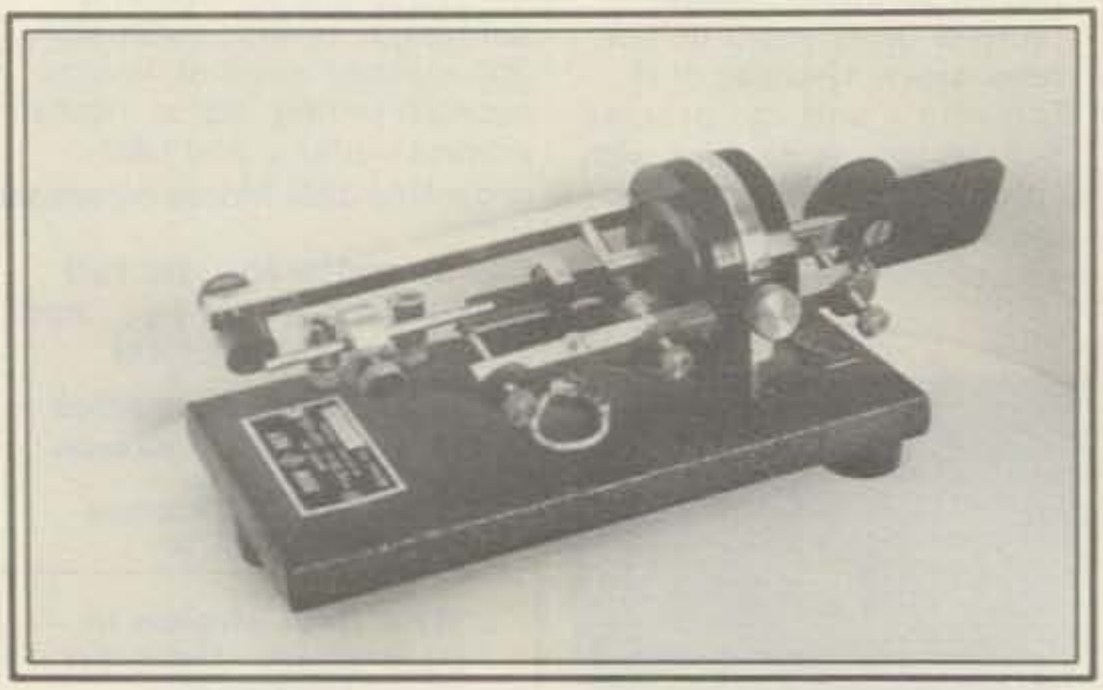

Fig. 5– The Dow Key rotatable bug. Unit can be adjusted for right- or left-hand use, or set horizontally for "straight key" operation. (VE7FOU's collection)

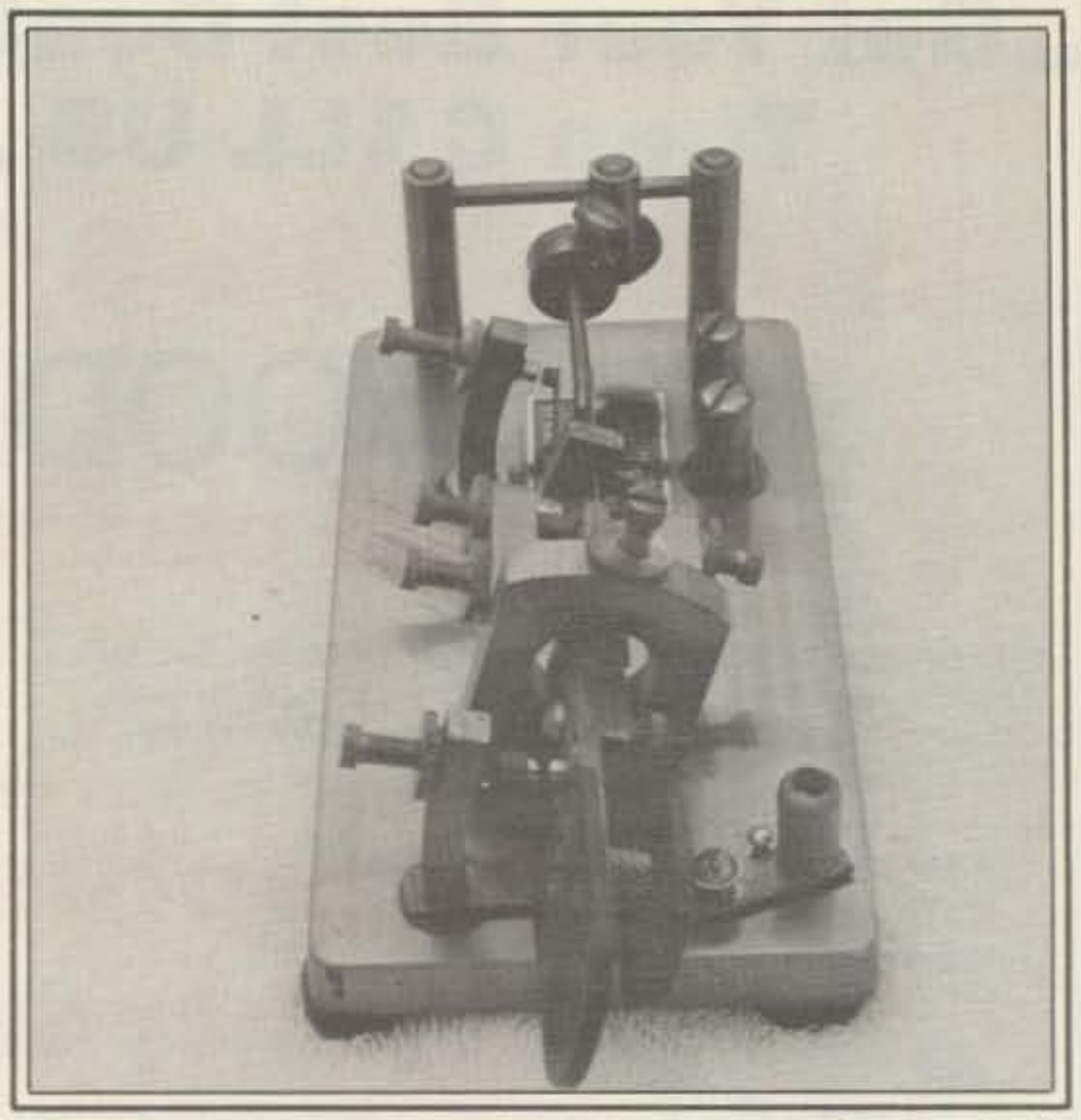

Fig. 6– Dow Key's tilted bug. This item was manufactured with a "lean to the right" for comfortable use. (K4TWJ's collection)

Figure 5

A popular manufacturer of unique-style bugs during the 1940s and 50s was Dow Key of Manitoba, Canada. The model shown here is VE7FOU's refurbished rotary Dow. The bug's full mechanism can be adjusted for any angle to suit one's fist. It can be used left-handed, right-handed, or positioned horizontally and used as a straight key. After rotation a knurled set screw holds the inner mechanism securely. Notice the damper and its chrome support bar also "follow" the inner mechanism's position.

Figure 6

This Dow Key is part of my own collection (K4TWJ). It was used by a professional railroad telegrapher for many years and still works great. Notice it was designed and manufactured with a "built-in" 30-degree tilt for "lazy" right-hand operation. The yoke, dot/dash contacts, etc., are also "bent" to support "tilted use." The key is all brass, extremely attractive, and enjoyable to use on the air. Tilted operation, however, does take a

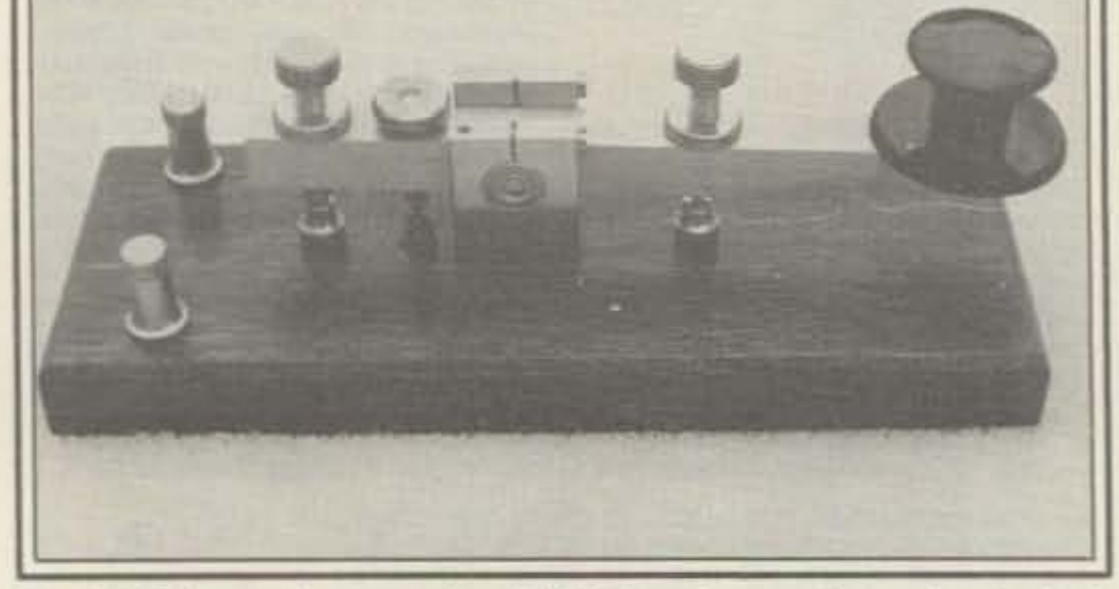

Fig. 7– This precison-crafted KENT key is a modern classic that can be purchased today in kit or assembled form. It is a beauty to see and use. (K4TWJ's collection)

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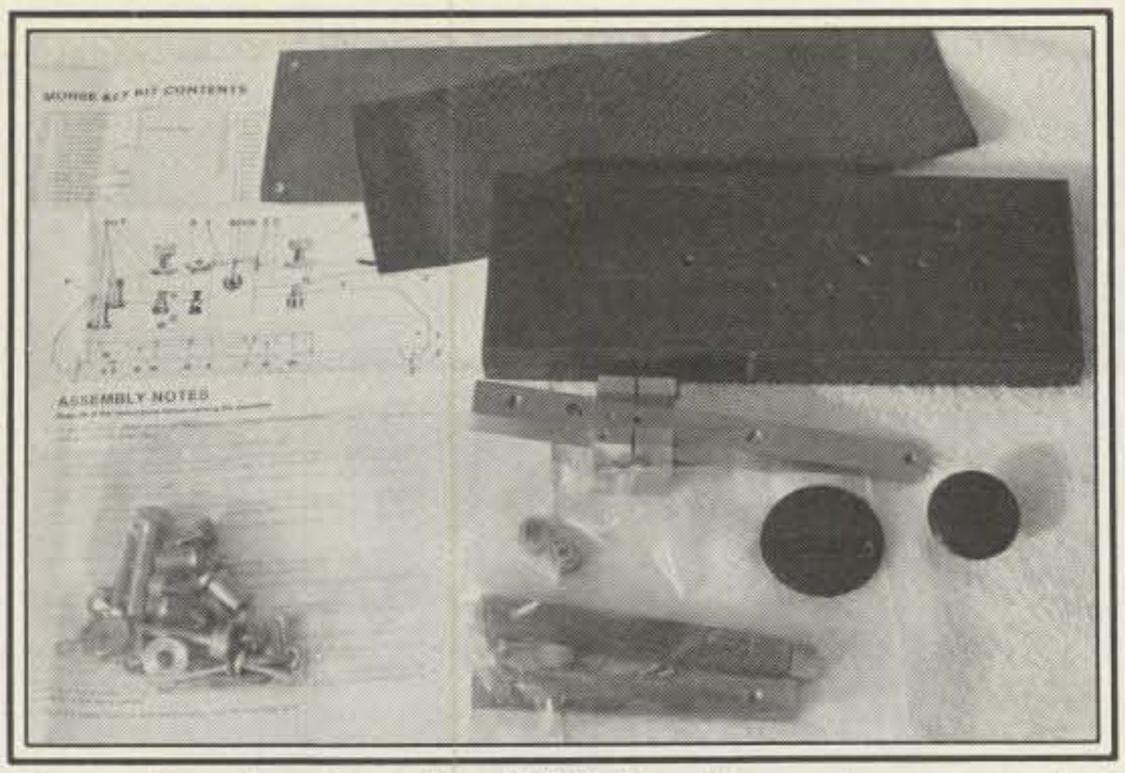

Fig. 8– Here is a view of my KENT key kit exactly as unpacked from its shipping box. Notice all critical parts are preassembled, and all holes are drilled.

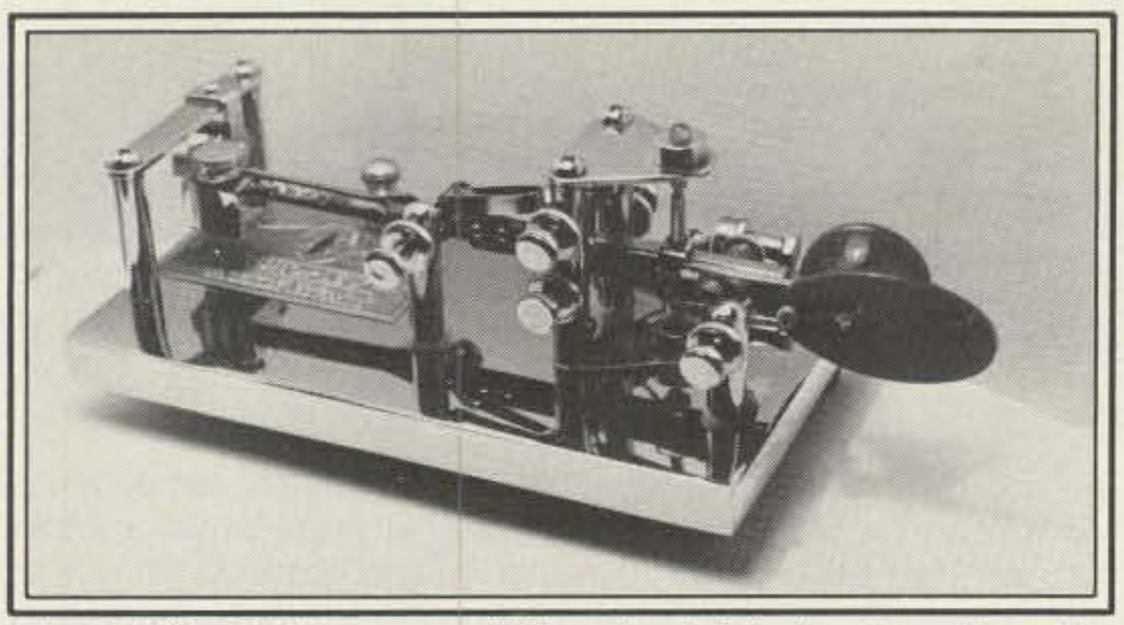

Fig. 9– VE7FOU's restored Vibroplex Lightning Bug. Note flat pendulum, damper bar, yoke top.

few minutes to properly master. I've polished the bug to a lustrous finish using ordinary "Brasso." The fingerpieces were cleaned with a mild soap and then sprayed with clear plastic "Krylon" to produce a brand-new appearance.

Figure 7

A recent addition to my own collection (K4TWJ) is this KENT key produced in England and distributed in the U.S. by Total Electronic Concepts, P.O. Box 400, Lincoln, MA 01773. This is a genuine modern classic that any radio amateur can purchase and enjoy right now. It's quite an attention grabber in the shack or office, and I'll soon be using it mobile also. The KENT key's solid brass mechanism includes ball race bearings and large silver contacts. Every piece of this key, including its fine-threaded adjustment screws, is manufactured to exact tolerance for precise adjustment. It reflects truly beautiful workmanship, and the classic "click-click" sound every amateur loves.

The key's mechanism is mounted on a highly polished and lead-weighted hardwood base. A felt-backed metal bottom lets the key sit flush on a table, or its included feet can raise the key's height to suit your fist. Either way, the "feel" is superb. The key is available (from Total Electronic Concepts) in kit or preassembled form. Check magazine ads or write to T.E.C. directly for pricing and delivery.

Figure 8

Here's a view of my KENT key kit after removal from its shipping box. The main arm, bearing block, and ball race are preassembled and ready for mounting, and all holes (including those

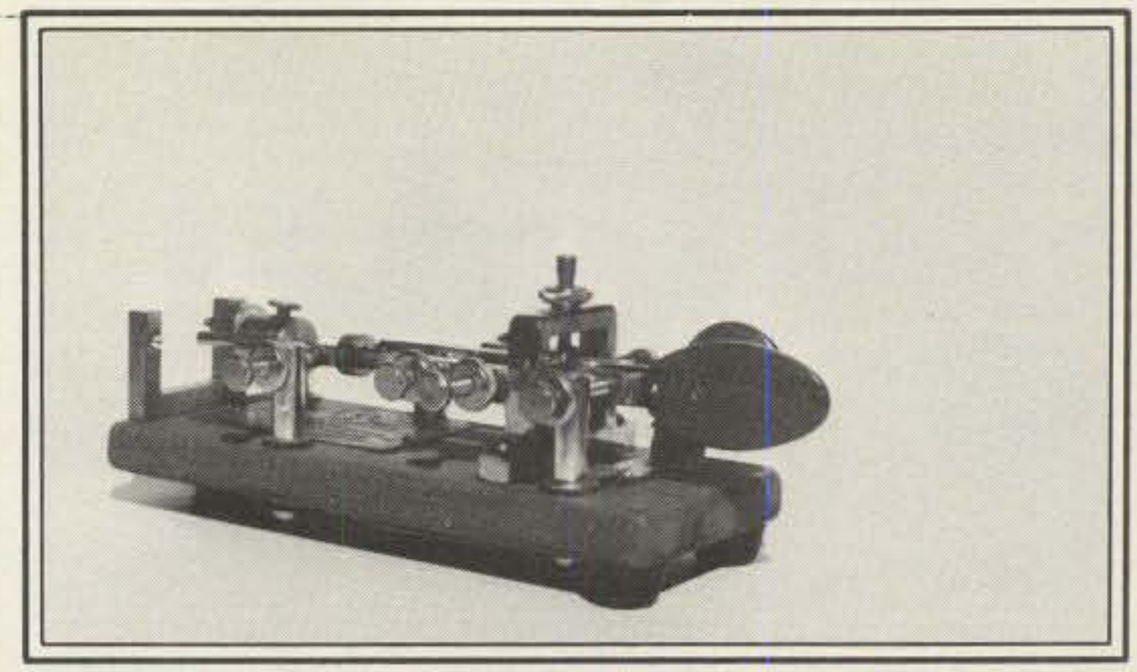

Fig. 10– W2GDV's standard Blue Racer. Note its narrow base, round pendulum, and "U"-shaped damper bar.

in the wood base) are predrilled. I assembled the key in 40 minutes (I'm not mechanically inclined). Figure 8's top three pieces are key base, metal cover, and felt backing. The two black pieces are the key's "Navy Knob," and a handle and a "flat poker chip"-type bottom. Those long metal pieces in the photo's middle bottom are weights that mount in the base. Everything was perfectly "finished." All I did was mount pieces, connect my rig's cable, and enjoy.

Figure 9

Our continuing enjoyment of classic keys indicates many amateurs still don't recognize various Vibroplex models. Thus, the following mini review. A bug's model is determined by its overall design, *not its top nameplate serial number*. Check old magazines and handbook ad sections; copy their information as your guide. Especially note their pendulum, damper, and yoke assembly as they specify model. Figure 9 is VE7FOU's deluxe "Lightning Bug" of rather special style. Notice the flat pendulum, damper bar, and flat yoke with tripod mount. Notice also the yoke's jewel movement. Most unique is the base's tinted top—a promotional variation during the Lightning Bug's heyday. A limited number of green-, red-, blue-, and orange-base bugs were produced.

Figure 10

The ever popular Vibroplex Blue Racer. It is recognized by its small overall size, U-shaped damper bar, and "squared off" yoke. This "Standard" Racer is mounted on a narrow gray base.

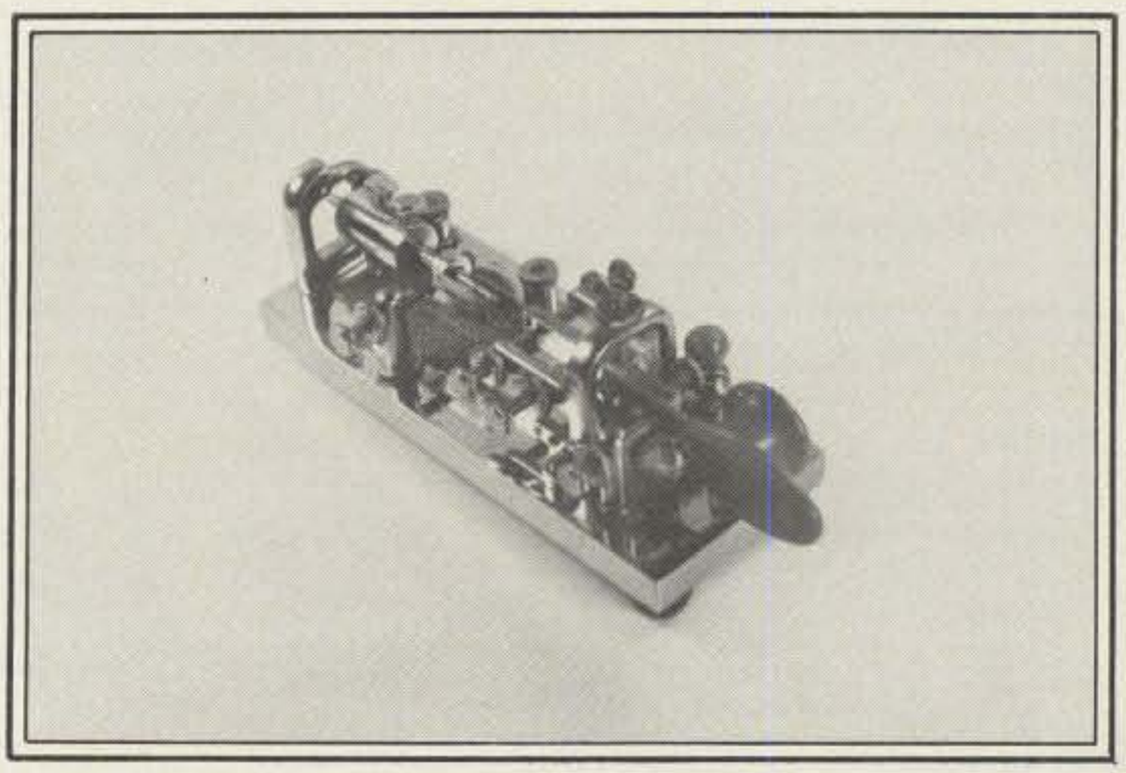

Fig. 11– This deluxe model Blue Racer lacks its traditional "U"-shaped damper bar, but it is still recognized by the narrow base. (W2GDV collection)

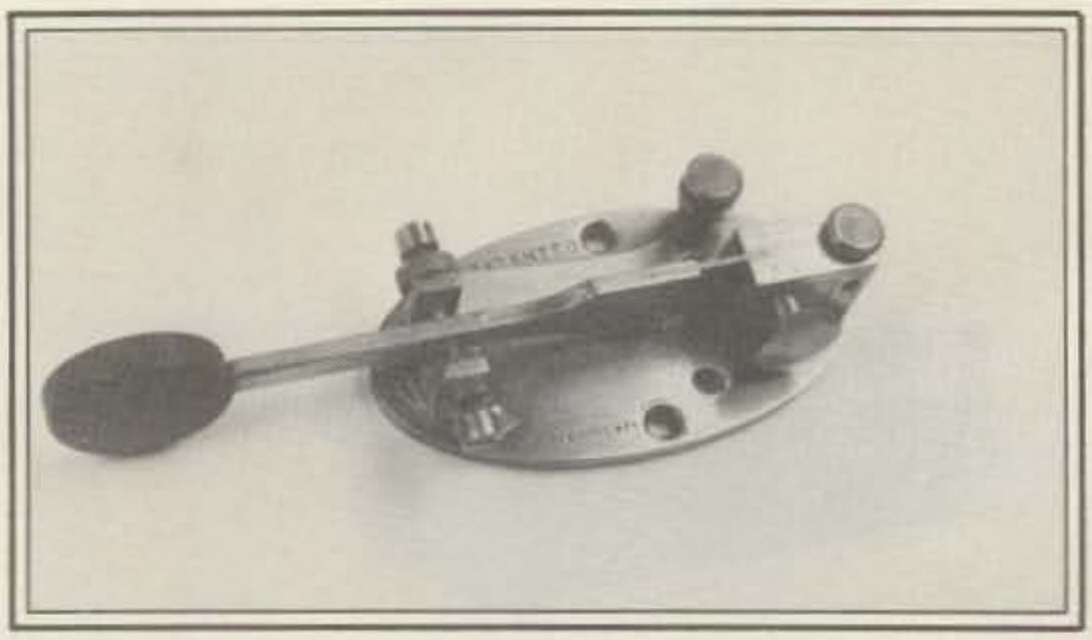

Fig. 12– A genuine Bunnell "Sideswiper." Press the right side and you get a dash. Press the left side and you also get a dash. Confusing? See text. (W2GDV collection)

Figure 11

W2GDV's deluxe model Blue Racer is immediately recognized by its small narrow base. Unusual, however, is inclusion of a miniature-version damper bar and yoke like an "Original" model. My own deluxe Racer includes this same design, so that manufacturing "quirk" must have been rather common in Deluxe models. The bug is also ink-stamped on its bottom as a Blue Racer. The colored base trend didn't follow the Racer, so origin of its "Blue" title continues to be a mystery.

Figure 12

Take a closer look at this key, gang. It is W2GDV's genuine J.M. Bunnell "Sideswiper." It is solid brass, and its oval base measures 2 by 3 inches. A Sideswiper differs from a bug or keyer paddle because moving its arm right or left of center "makes" its single connection for manual dots or dashes. To send a "V," for example, tap the fingerpiece three times on the left and then hold it a "dash length" on the right (or vice-versa; the Sideswiper doesn't care!). You can send a "C" with all right or left side moves, or you can use both right and left side moves. Zow! I wonder how one of these gems would perform mobile. Finding one will definitely be the hard part. They're rare as 1932 Bugatti autos.

Figure 13

Prior to the era of radio, landline telegraph was our country's main communication link. You've seen those telegraph sets "clattering away" in old western movies—the telegraph agent copying Continental Morse while the movie's hero makes/breaks connections from atop a pole in some remote area. W2GDV's Western Union sounder on wood base shown here roars right out of those historic times. Notice the only action this thing does is make "clicks"; the magnets pull the bar down (click) according to received/keyed voltages. After transmitting a message, the agent closed/shorted his key to complete the (telegraph) circuit and allow distant operators to transmit.

Figure 14

A practice key and sounder set from the previously described era, this item is also part of W2GDV's collection. These units only made clicks, not dots and dashes. Consequently, the "all dot" Continental Morse Code was used rather than (amateur radio's) International Morse Code. Maybe that's why we couldn't ever read code during those old Tom Mix movies.

Conclusion

That wraps up our views for this "keys revisited," gang, and

Fig. 13– Roaring out of the old west and Civil War days is this genuine landline telegraph "clatter box." Every letter consisted of only dits. Discussion in text. (W2GDV collection)

we hope you enjoyed the tour. W2GDV's photos, incidentally, were courtesy of John Drum, W4BXI. Will there be yet another sequel? That depends on your interest and "passed along photos" to me. I'll naturally give you credit and return them after magazine publication. Does anyone have a copy of the old Continental/Landline Morse Code and maybe a photo of an unusual old-time "clacker" for inclusion next time? That should prove quite interesting.

Finally, please remember to *include an SASE when writing to VE7FOU, W2GDV, myself, or the other CQ authors*. Our mailbags are quite large. Merely writing brief replies is often a huge operation. Meanwhile enjoy, and we hope to meet you soon on the bands!

73, Dave, K4TWJ

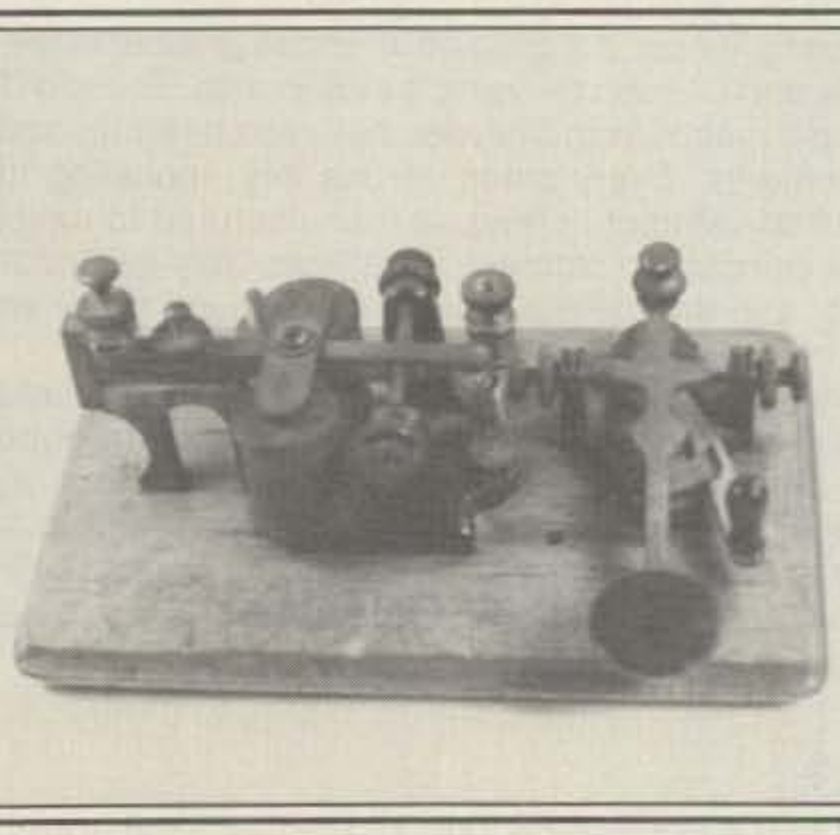

Fig. 14– A Western Union practice set used with landline Morse systems. Click, click-click, click. (W2GDV collection)

CQ Showcase

Larsen AD-2/70 Dual Band Antenna Coupler

Larsen Electronics, Inc. has introduced its new AD-2/70 Dual Band Antenna Coupler, which allows simultaneous operation in both VHF and UHF bands with a common dual band antenna. The AD-2/70 will connect separate VHF and UHF radios with a common dual band antenna, such as a Larsen 2/70 series, or allow separate VHF and UHF antennas to be used with a single port dual band radio. The AD-2/70, designed for operation in amateur 2 meter and 70 cm bands, can be used for commercial VHF and UHF appliations as well. Gross band isolation is suppressed to −50 dB or more, permitting interference-free simultaneous transission or reception. Maximum power rating is 200 watts PEP composite VHF/HF power.

Larsen Electronics, Inc., Vancouver, Washington, and Canadian Larsen Electronics, Ltd., Vancouver, British Columbia, has been sold to a group of Portland investors. The Larsens will continue to be associated with the firm in an advisory role. For more information on the AD-2/70, contact Larsen Electronics, Inc., P.O. Box 1799, Vancouver, WA 98668, or circle number 101 on the reader service card.

Technology Marketing Personal Weather Station

Technology Marketing Incorporated has introduced a weather station for use with the IBM PC, XT, or AT computer and compatibles. Dubbed "PC Weather," this product turns a personal computer into a weather monitoring and weather analysis system. PC Weather comes with its own anemometer and wind vane as-

sembly, two temperature probes, a half-slot PC board, and display software. PC Weather allows users to monitor and display local weather conditions on a personal computer. Typical uses include reporting immediate weather conditions to other hams and monitoring wind conditions for antenna tower protection.

The complete PC Weather system is priced at only $349.95 retail. Features include wind speed, wind direction, barometric pressure, inside and outside temperature, and wind chill factor. Options include a rain gauge and PC Weather Pro, an enhanced software package which provides expanded data display and analysis capabilities. The options are priced at $69.95 each. For more information, contact Technology Marketing Incorporated, 4000 Kruse Way Place, Building 2, Suite 120, Lake Oswego, OR 97035, or circle 103 on the reader service card.

1986 CQ WW DX CW Contest High-Claimed Scores

The following are CW high-claimed scores. These are raw scores only, subject to verification.

Worldwide Single Operator All Band

9Y4VT	8,194,498
PJ2FR	7,028,688
P4OGD	6,991,947
D44BC	6,823,654
FY5YE	5,836,245
PT7BZ	5,242,977
5T5XX	3,933,840
ZB2X	3,796,480
PJ7A	3,729,490
4M4A	2,795,538
DL6FBL	2,600,955
Y24UK	2,459,572
OK3CSC	2,227,884
EH2IA	2,137,959
ZP5XDW	2,014,200
TR8JLD	1,974,548
OK3KAG	1,842,630
HA0MM	1,771,829
YB0ARA	1,664,208
HZ1HZ	1,627,659
G4BUO	1,521,674
OA4ZV	1,447,040
HK1AMW	1,404,004
JI1QPU	1,287,069
VE3IY	1,226,232
OZ7YY	1,219,056
KP4FI	1,218,928
HI0JR	1,188,917
DL4BBO	1,182,564
ZL2SQ	1,164,655
VO1MP	1,133,825
VK9NL	1,124,161
AH6AZ	1,025,759
JF1EQA	1,004,564
ZC4CZ	1,000,160

Single Band

1.8 MHz

HB9AMO	87,204
IO2UIY	82,377
SP3BQD	70,468
DK8NG	69,012
OZ1LO	63,770
IY4FGM	46,565
DF2UU	42,841
KG4XO	39,702
YU3MM	39,329
G3XTT	39,270
YU2TW	34,472
OK3CWQ	33,040
G4VGO	29,280

3.8 MHz

P40R	576,725
EA8RCT	444,551
LZ2KAC	426,525
CT4AT	295,464
YX3A	205,300
G4FAM	142,310
OE3DSA	128,650
HC7SK	113,152
SP5CTY	102,000
HA8KWG	99,544
KG6DX	94,733
HA6NL	94,627
JA5BJC	92,365

7 MHz

I5MPN	496,546
CX8BBH	448,723
4N1C	395,388
LZ1KDP	326,096
G3FXB	320,688
HA9RE	279,500
JA7HMZ	248,520
G4CNY	222,138
FV6NDX	214,760
OH7AA	206,720
EA8BLC	161,694
OH2HE	152,096
N5CT/KH6	136,604
PY1ZFO	135,540
SP2ZFJ	133,998
VE3OZB	131,688
DL2HBX	124,875
JA6BXA	100,266

14 MHz

P40N	1,477,905
YW1A	829,280
CX5AO	828,933
DK3GI	826,917
HK1HHX	772,376
OH8PF	616,864
4N2E	567,536
VO1QU	320,572
4N7N	313,398
JA2HLX	297,000
I1ZEU	281,988
OK2BHV	280,028
SM4GNU	241,808
SP3RBI	232,596
G3RZP	203,118
JA7FTR	195,138
VE3AT	170,280
DJ8FR	153,341
CE4IDY	145,992
ON7WR	144,786

21 MHz

PY5CA	1,102,486
CX7BY	747,604
ZS6BCR	673,068
YW5X	290,996
G6ZY/EA6	280,340
IO3JSS	279,524
ZY7ZZ	254,016
LU1AF/D	240,188
YC8VCE	239,292
G3HCT	205,288
G3LNS	188,622
VK4XA	186,094
FO5JP	170,088
4X6NM	169,302
JA1YYE	166,757
4Z9AAC	165,144
JE1AYU	164,220
4N3E	157,316
DK4JN	128,340

28 MHz

PY2BTR	653,276
YU7QP	312,092
LU4FDM	120,528
LU1DCB	105,225
VK6HD	80,448
VK6SM	74,472
LU5UL	66,990
LU2DGZ	45,429
YC6LD	22,776
YU3ER	16,590
VE3PN	12,390

Multi-Operator Single Transmitter

KP4BZ	7,962,792
VP9AD	7,832,715
HC8A	4,641,780
LZ7A	4,532,352
EA3VY	4,417,268
GJ0AAA	4,257,048
F5IN	4,247,410
OK5R	4,222,434
HG5A	4,100,292
HG7B	3,990,855
OH0AM	3,746,940
HG6N	3,653,562
K5KG/LU	3,628,167
HG9R	3,600,944
YT3M	3,122,560
HS0A	3,117,645
ZY4OD	2,794,350
DF4ZL/5B4	2,628,438
OK1KSO	2,529,360
VP5X	2,366,848
GB4DX	2,130,624
OK2KMI	2,058,680
SP5PBE	2,045,799
HG1S	2,027,733
OH1AF	1,971,441
8P9AG	1,953,830
JA3YBF	1,931,155
XE2NQ	1,866,106
OK1OAZ	1,687,944
YU3AI	1,647,061
HG1Z	1,636,200
F6GOE	1,587,944
IK2BHX	1,565,196
FH/W6KG	1,557,612

Multi-Operator Multi-Transmitter

KP2N	17,827,125
EA9CE	16,597,138
J6DX	14,782,200
VP2MU	10,774,199
XE2SI	5,122,656
PA6DX	4,818,564
YZ1U	3,568,851
DK3BJ	3,272,940
JA2YKA	3,174,688
DL0KF	3,119,649
4U1ITU	2,965,360
JA3YKC	2,458,746

QRP All Band

LZ1BB	865,928
4X6IF	424,928
YU3MJ	355,184
G4ELZ	244,860
OK3CGP	227,539
DL9YX	186,780
G3KDB	155,112
DL8CM	151,341
OH3GD	150,895
DL4FN	126,716
I4KRF	85,760
ZV8WAS	78,720
LZ1DB	69,384
PA2REH	68,412

USA Single Operator All Band

W1KM	3,034,395
K1ZM	2,779,014
K1EA	2,631,084
K5ZD/1	2,469,159
N2LT	2,446,688
K1TO	2,311,680
K1CC	2,259,680
W3BGN	2,209,006
K3WW	2,166,300
W4RX	2,132,104
W9RE	2,113,370
K3TUP	2,104,725
K3LR	2,011,807
N6AR/4	1,991,215
WX4G	1,982,464
AK1A	1,967,471
KC8C/3	1,917,448
N3AD	1,854,855
K6NA	1,684,469
N2MM	1,674,315
NQ4I	1,640,672
W3VT/4	1,616,220
KC1F	1,600,131
K3NA	1,590,246
W0JLC	1,576,539
W2VJN	1,511,619
K4PQL	1,508,040
N4KG	1,498,791
K1XA	1,455,220
K1DG	1,322,558
K2LE	1,313,722
K5MM/7	1,177,686
K8CC	1,115,480

1.8 MHz

W1CF	43,460
K5UR	28,815
N4IN	22,200
K4TEA	18,870
W0ZV	13,330
W2JT	12,474
WB3AVN	10,915
W4BAA	9,802

3.8 MHz

W1FV	195,804
W6RJ	106,600
W8UVZ	35,350
K9DX/6	34,250
WE5P	32,908
W3QM	25,382
K3LZ	25,234
KV8Q	23,680
W9RN	22,572
KB2HZ	22,338

7 MHz

N6QR	336,980
AA4LU	269,800
K0RF	263,296
W6PU	208,611
W8FJ/3	154,014
WA4CTA	141,778
K1ZZ	135,001
K2UU	102,544
K8PO/1	85,878
K5KT/6	85,749
N6VR	80,100

14 MHz

W2YV	575,103
K2VV	534,576
K1RU	468,406
K2RD	394,236
WB8JBM	337,220
N5CR	327,740
W4XJ	324,866
K2WK	306,636
WB9JKI	299,720
N4VZ	298,080
WC4E	294,063
WB8LLD	280,448
W6QHS	243,810
N6GG	221,844
N3RR	172,596
N7TT	156,633
N4MO	147,516

21 MHz

K3RV/4	258,888
K1ZX	238,518
WB4TDH	197,714
K5GO	192,584
N4BP	134,244
K5TSQ	126,120
W5VX	125,114
K4TKM	119,560
K2SG	113,634
K2UR	113,142
K9QVB	76,255
W9YSX	72,653
WB7FDQ	70,380

28 MHz

N6BFM/4	12,120
AC8W	7,600
KB3A	6,644
KD1U/4	4,386
WA6FGV	4,068
NN5E	3,333
NE8T	1,920

Multi-Operator Single Transmitter

N4WW	4,176,612
N5WMU	3,589,872
N3RS	3,434,920
K3KG	3,308,125
K4JPD	2,814,714
K3OO	2,582,118
K4VX/0	2,466,540
N3BB/5	2,177,286
K8AZ	2,048,589
N6AW	1,891,539
W3GG	1,816,479
AI6V	1,793,176
W8JGU	1,789,630
K1RQ	1,698,300
KM1C	1,637,715
K1IU	1,477,840
N1AU	1,460,767

Multi-Operator Multi-Transmitter

W3LPL	7,073,105
NR5M	5,595,030
N4ZC	4,159,050
W3GM	3,885,786
NF2L	3,855,780
KS8S	3,182,645
N6TU	2,818,834

QRP All Band

K1CGJ	167,562
WR4K	150,588
N1AFC	67,983
KH6CP/1	61,650
WB6JMS	58,930
W1SUX	36,330
WB1ESN	28,808

Atlanta ARRL National Convention

JULY 10 -11-12, 1987 ■ ATLANTA, GA
GEORGIA WORLD CONGRESS CENTER

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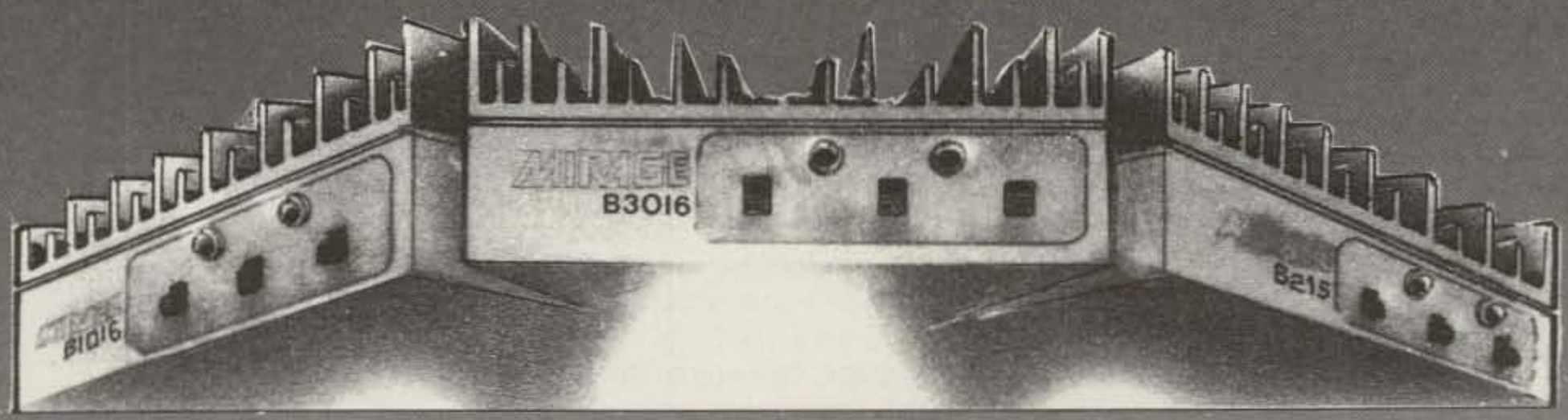

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C106 - 10W in - 60W out
C211 - 2W in - 110W out
C1012 - 10W in - 120W out
C3012 - 30W in - 120W out

6 Meter
A1015 - 10W in - 150W out

440 MHz
D24 - 2W in - 40W out
D1010 - 10W in - 100W out
D3010 - 30W in - 100W out

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CIRCLE 129 ON READER SERVICE CARD

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

I never expected to receive a letter criticizing the fact that some of our Contest Committee members are award winners in our contests. I thought that argument had been put to bed many years ago. In the early days a few organizations had a policy of making members of the committee ineligible for awards in the contest that they were judging. However, that was one of the first things we eliminated.

Who is better qualified to be a judge in a competition than someone who is an active competitor and knows what it is all about from his years of experience? I recall when we organized our first committee in the *CQ* World-Wide Contest and the question was brought up, the immediate response was "Forget it. If I can't participate and be eligible for one of the awards, count me out." Rightfully so, because it reflected on their honesty.

I don't know if our decision set an example for other organizations, but I have not seen that item mentioned again in the multitude of contests I have covered in this column in the past 30 or more years.

This year we were able to send a total of over 20 contest plaques for presentation at the Visalia and Dayton conventions in April. We could have sent a few more if we had received the requests in time. Those who did not make it will be sent directly to the home addresses.

There are a few U.S.A. and world single band spots still available for potential donors for the coming 1987 World-Wide Contest. Inquiries should be sent to me. Information about WPX SSB and CW awards should go to Steve Bolia, N8BJQ. Those for the 160 Contest go to Don McClenon, N4IN.

A final reminder: mailing deadline for logs in last month's WPX CW Contest is July 10th to CQ Magazine, WPX CW Contest, 76 North Broadway, Hicksville, NY 11801.

Another important deadline is for announcements of coming events: June 15th for the September issue and July 15th for the October issue. Using my home address will give you a few added days leeway.

73 for this time, Frank, W1WY

Operation Search Contest

1500Z June 1 to 1459Z June 5

This is a new event sponsored by the Ad Hoc Committee for the advancement of amateur radio in the New York City school system. It is open to all school clubs and individuals in the United States.

School clubs can operate the following modes: CW, SSB, RTTY, SSTV, VHF, and Packet radio.

Exchange: RS(T), school, club, state, city, and if ARRL affiliated.

Scoring: One point, non-club to school club. Two points for clubs contacted in own city; 3 points in own state; 4 points if in another state within own ARRL division; 5 points if outside own division.

Multiplier: Two points for each ARRL affiliated club contacted.

Final Score: Total QSO points plus ARRL points made on each mode.

Awards: Certificates to the school club with the highest score in each mode. A special certificate to the non-school operator with the highest composite score.

Logs: Must include all information from items listed above and duplicate contact deleted. Operators' and Club Trustees' and non-school operators' signatures are required on all logs.

All entries must be received by July 1st. They go to: A.C.A.A.R.R. N.Y.S.S. Contest, *c/o* Martin Smith, KA2NRR, 1021 East 81st Street, Brooklyn, NY 11238.

(It would seem to me that for a first-time event, especially where non-experienced operators are involved, the rules, scoring, and many modes used are much too complicated. I suggest you request a more detailed copy from the Public Relations Officer, Jeffrey Feigenbaum, KA2KSW, 1842 East 33rd Street, Brooklyn, NY 11234.—ed)

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

*	May	30	ARCI QRP CW Sprint
*	**May**	**30-31**	**CQ WW WPX CW Contest**
	June	1-5	Operation Search Contest
*	June	6	YLRL Novice/Tech. Day
	June	6-7	RSGB National Field Day
*	June	6-8	PVRC On The Air Reunion
	June	13-14	So. America CW Contest
	June	13-14	All Asian Phone Contest
	June	13-15	ARRL VHF QSO Party
	June	20-21	SMIRK (6 M) QSO Party
	June	20-21	NINE Land QSO Party
	June	27-28	ARRL Field Day
	July	1	Canada Day Contest
	July	4	Clinton Riverboat Day
	July	4-5	Venezuelan SSB Contest
	July	10-11	Kansas VHF/UHF Sprint
	July	11-12	IARU World Championship
	July	**18-19**	**CQ WW WPX VHF Contest**
	July	25-26	Venezuelan CW Contest
	July	25-27	MARAC County Hunters CW
	Aug.	1	YLRL YL-OM SSB Sprint
	Aug.	1-2	New York State QSO Party
	Aug.	1-3	TWO Meter QSO Party
	Aug.	22-23	All Asian CW Contest
	Sept.	5 & 6	Nat'l CW & SSB Champion
	Sept.	9-11	YLRL "Howdy Days"
	Sept.	19-20	Scandinavian CW Contest
	Sept.	26-27	Scandinavian SSB Contest
	Sept.	**26-27**	**CQ WW DX RTTY Contest**
	Oct.	10-11	Pennsylvania QSO Party

* *Covered last month.*

RSGB National Field Day

1500 to 1500Z Sat.–Sun., June 6–7

Activity for this CW-only Field Day is not confined to Great Britain. You will also hear some portable activity out of Germany and Switzerland.

Although overseas stations are not directly eligible, they are invited to participate and submit a report of the stations worked.

A certificate will be awarded to the overseas station in each continent that shows the most contacts. Send your logs to: RSGB HF Contest Committee, P.O. Box 73, Lichfield, Staffs., WS13 6UJ England.

ARRL VHF Contest

1800–0300Z Sat.–Mon., June 13–15

Action will be found on the 50, 144, 220, and 420 MHz bands, and even higher up in the spectrum.

The scoring varies with the different bands used, and there are certain requirements and restrictions in the rules. Working WAS on 6 meters is a possibility. Complete rules will be found in the May issue of *QST*.

I strongly recommend that you write to ARRL Headquarters for official forms. Include an SASE with your request to: ARRL VHF Contest, 225 Main St., Newington, CT 06111.

South American CW Contest

1500Z Sat. to 1500Z Sun., June 13–14

Sponsored by *Electronica Popular* magazine of Brazil, and supervised by the Grupo Argentino de CW of Buenos Aires, this is an annual affair the second weekend of June.

It's still a CW contest only, but the format and scoring have been changed. Now you can work stations in other continents as well as South Americans. Use all 6 bands, 1.8 through 28 MHz.

Classes: Single operator both single and all band, multi-operator, single transmitter, all band only and SWL.

Exchange: RST plus a QSO number starting with 001.

Points: Contacts with stations in own country zero points but okay for multiplier credit. Other countries but same continent, 2 points. Countries in other continents, 4 points. Contacts with South American stations, 8 points. (For stations outside of S.A.)

Multiplier: Different countries (DXCC list) plus the different South American prefixes worked on each band.

Final Score: Total QSO points times the sum total multipliers from each band.

Awards: Certificates to the three top-scoring stations in each country in each class.

Use a separate log sheet for each band and a summary sheet showing the scoring and other essential information. Include an SAE and one IRC for a copy of results.

Logs must be received no later than August 31st and go to: WWSA Contest Committee, P.O. Box 18003, 20772 Rio de Janeiro, RJ, Brasil.

All Asian DX Contest

Phone: June 13–14 C.W.: Aug. 22–23
0000Z Sat. to 2400Z Sun.

This is the 28th year of this activity sponsored by the JARL. The exchange is between Asian countries and the rest of the world.

Classifications: Single operator, both single and all band. Multi-operator, both single and multi-transmitter, all band only (one signal per band only).

Club stations are classified as multi-operator and each operator will give his age in the exchange.

Exchange: For OM's—RS(T) plus age of operator. For YL's—RS(T) and 00.

Scoring: 3 points for contacts on 160; 2 points for contacts on 80; 1 point on all other bands. (KA contacts do not count.)

Multiplier: For Asians the multiplier is determined by the number of different countries worked on each band (DXCC list). For non-Asians it is determined by the number of different Asian prefixes worked on each band (*CQ* WPX list).

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

Keep in mind that non-Asians use Asian prefixes as their multiplier, not countries.

Note: JD1 stations on Ogasawara (Bonin and Volcano) are in Asia, and JD1 stations on Minamitori Shima (Marcus) are in Oceania.

Awards: Certificates to the top scorers, both phone and CW, in each country and each U.S. call area. In each class, both single band and all band, up to the fifth rank, depending on the number of returns. Medals to the all-band continental leaders, both single and multi-operator.

Logs: Keep all times in GMT. Use a separate column for the country or prefix multiplier, and fill in only the first time it is worked. Use a separate log for each band. Include a summary sheet showing the scoring and other information, and a signed declaration that all rules and regulations have been observed.

There is a strict disqualification clause for taking credit for duplicate contacts in excess of 2% of the total on each band, as well as other infractions.

Logs must be received no later than Sept. 30th for the Phone section, and Nov. 30th for the CW section. They go to: JARL Contest Committee, P.O. Box 377, Tokyo Central, Japan.

Asian Country List: A4; A5; A6; A7; A9; AP; BV; BY; CR9; EP; HL/HM; HS; HZ/7Z; JA-JR; JD1; JT; JY; OD; S2, TA; UA/UK/UV/UW9-0; UD6; UK6C, D, K; UF6/UK6F, O, Q, V; UG/UK6G; UH8/UK8H; UI8/UK8A, G, I, L, O, T, Z; UJ8/UK8J, R; UL7/UK7; UM8/UK8M, N; VS6; VS9M/8Q; VU; VU (Andaman & Nicobar); VU (Laccadive); XU; XV/3W; XW; XZ; YA; YI; YK; ZC4/5B4; IS (Spratly); 4S; 4W; 4X/4Z; 70 (S. Yemen); 70 (Kamaran); 8Z4; 9K; 9M2; 9N; 9V; (Abu Ail).

1986 All Asian CW Contest
North American Results

U.S.A.

1.9 MHz

N6TR/7	**1,218**
W0ZV	**561**
W7QID	72
W2FCR	**3**

3.5 MHz

W6RJ	**10,890**
W7RX	**5,984**
W5FO	**1,560**
K7CW/5	700

7 MHz

N6AW	**43,492**
W6KP	39,900
K0OST	**56**
W5NR	**8**

14 MHz

N6VI	**20,215**
NI6W	5,502
WF5E	**1,876**
WA6FGV	1,512
W6SZN	828
W100	**567**
K1TO	140
KA7FEF	**108**
KW2J	**81**
AA6EE	30
W1END	9

21 MHz

N6ND	**400**

All Band

K6NA	**182,416**
W6TMD	127,351
KY7M	**37,734**
K5MM/7	32,849
WN4KKN	**28,710**
K7LXC	16,206
W6UQF	12,675
WX4G	10,366
K6EID	9,108
W7KJJ	8,479
K1ZM	**6,102**
W3GM	**5,487**
W6ISQ	4,095
W7YF	3,042
WG6H	1,836
W6HAL	1,767
K6BWX	1,363
N3BNA	72
KG9N	**16**

Multi-Opr.

K3EST/6	**285,978**
N6VR	203,814
NR5M	**135,228**

Alaska

All Band

WL7E	**924**

Canada

14 MHz

VE7FJE	**6,355**
VE1ASJ	825
VE2AEJ	1

All Band

VE2LJ	**20**

Costa Rica

7 MHz

TE0X	**340**

14 MHz

TI2CCC	**1,225**

Panama

7 MHz

HP1AC	**209**

Hawaii

7 MHz

KH6IJ	**99**

Hawaii

14 MHz

AH6EK	**3,040**

**Certificate winners in boldface.*

SMIRK (6 Meter) QSO Party

0000Z Sat. to 2400Z Sun., June 20–21

This is the 12th annual QSO party sponsored by the Six Meter International Radio Klub (SMIRK). The party is open to all, members and non-members, but it seems to be geared for membership participation.

Cross-band contacts are not permitted and competition is for single-operator only. Operation, of course, is confined to the 6 meter band.

Exchange: SMIRK number and grid square.

Scoring: Two points for each SMIRK contact; 1 point with non-members. Multiply total QSO points by number of different grid squares worked.

Awards: Certificates for winning scores in each ARRL section, foreign state, province, prefecture, United Kingdom shire/county/region, and country.

The new official log forms must be used. A large SASE to KA0NNO will get you detailed information and the new log forms.

Mailing deadline for entries is July 6th to: Lisa Lowell, KA0NNO, P.O. Box 547, Hugo, CO 80821.

The Six Meter Invitational Net (SIN) also has something going on May 30–31, 1400Z to 2400Z. Exchange call, SIN no., and grid squares. SIN contacts count 3 points; with non-members 2 points. Multiply your total QSO points by the number of grid squares worked for your final score. Certificates will be issued. Send your log no later than July 1st to: Lisa Lowell, KA0NNO, P.O. Box 547, Hugo, CO 80821.

NINE Land C.W. Contest

1700Z Sat. to 1700Z Sun., June 20–21

This is the fifth annual contest organized by the Joliet ARS in which there is no limit to whom you can work; however, contact with NINE Land stations (Ill., Ind., and Wisc.) have double QSO point value. Only one contact per band with the same station permitted.

Classes: Single and multi-operator, one transmitter.

Exchange: Consecutive QSO numbers beginning with 001, and state, VE province, or DX country.

Scoring: Contacts with NINE Land stations count 2 points; with all other stations 1 point.

Multiplier: Number of states, VE prov-

Contest Hall of Fame

An earlier issue of *CQ* announced the founding of the Contest Hall of Fame, with Hazzard "Buzz" Reeves, K2GL, as the first amateur elected to receive this ultimate honor for the radio contester. Nominations were solicited for future consideration.

In determining eligibility, the Contest Hall of Fame Committee uses a yardstick similar to that which governs the DX Hall of Fame—namely, that nominees should have made extraordinary and unselfish contributions to the sport of contesting, often at great personal sacrifice of time and resources. They must be amateurs who have given much to the enjoyment of the sport by others over a long period of time. Examples of activities which meet these criteria include the engineering, maintenance, and operating of leading-edge contest stations; the planning and support of contest expeditions (DXpeditions coinciding with major DX contests); and the conception, development, and administration of major contests.

When the call for nominations to the Contest Hall of Fame was issued, the response was immediate and almost unanimous for one great amateur who has given of himself to the contest world for half a century. It is *our* honor to announce the election to the Contest Hall of Fame of a man who can truly be called a "legend in his own time"—**Katashi Nose, KH6IJ**.

Nowhere in contest-land can there be an amateur who hasn't logged Mr. K in a sweepstakes or major DX contest. The KH6 multiplier is guaranteed, coming from a well-engineered and maintained contest station on not a remote mountaintop, but on a 5,000 square foot city lot. This man is an inspiration to each of us who operates from an urban environment.

Katashi Nose was first licensed in 1932 as K6CGK while he was a junior at Honolulu's McKinley High School. In those early days Hawaii was considered part of the 6th call area and there was no KH6 prefix. His first rig used a 201A tube and was powered by a 45 volt battery. He called and answered CQ's for the better part of 6 months without an answer, until he suddenly made consecutive contacts with W6AM, W6CUH, and W6ENV. Nose had stumbled across the ARRL DX Contest, and he never forgot the thrill.

Left to right are Katashi Nose, KH6IJ, and his XYL, Matsuyo. Katashi is the second amateur elected to the prestigious Contest Hall of Fame. To be eligible for consideration for the Contest Hall of Fame, an amateur must have made extraordinary contributions to the enjoyment of radio contesting by others.

In 1934 Nose entered his own station in the ARRL DX Contest for the first time and finished 12th in Hawaii on CW. In 1935 he moved up to third place, and over the next five years he became the man to beat, making the top score for Hawaii in four of those years. In 1935 he entered Sweepstakes for the first time and was top score for his section on CW.

Prior to World War II, the contest we know today as the *CQ* World-Wide DX Contest was sponsored by *CQ*'s predecessor publication, *Radio Magazine*, and was introduced in 1939 as the Radio World-Wide DX Contest. Unfortunately, there was only one contest before amateur radio was silenced for the duration of World War II, but the first CW winner of that first world-wide DX contest was Katashi Nose, K6CGK, using a Vee beam and a four-section 8JK (see page 51 of the June 1940 issue of *Radio Magazine*). In that depression period economics dictated that Katashi homebrew his equipment with whatever was available, and he made his own capacitors using tinfoil from cigarette packages and waxed paper. His variable condensers he fashioned from refrigerator ice trays.

Nose has consistently been a "giver," not a taker, to amateur radio. He is the author of 30 technical articles in major amateur radio magazines, including contest-related articles on subjects such as loading a tower on 160 meters, constructing homebrew rotating towers, and making lightweight beams. He served as the president of the Honolulu Amateur Radio Club for several terms, was a charter member of the WARC-79 Advisory Committee, served on the ARRL Contest Advisory Committee representing all the 6th call area for two terms, and was advisor to the University of Hawaii Amateur Radio Club.

In the mid-1950s Nose was selected by the Shell Foundation as one of the 100 most outstanding high school teachers in the U.S. Later he moved up to the University of Hawaii as a Professor of Electrical Engineering. He is now retired.

No story about Katashi Nose is complete without mention of his loyal and devoted wife, Matsuyo, without whose help and encouragement this marvelous record would not have been possible. Katashi and Matsuyo Nose, KH6IJ, Mr. and Mrs. Contest Hall of Fame.

—John Attaway, K4IIF

Contest Hall of Fame

Hazzard "Buzz" Reeves, K2GL
September 20, 1986

Katashi Nose, KH6IJ
April 4, 1987

Ivan Belvis, KP4FI, can always be found as an active participant in our World-Wide Contest. He also manages to win his share of awards.

inces, and DX countries worked (counted once only). There is a bonus multiplier of 1 for each 20 NINE Land stations worked.

Final Score: Total QSO points from all bands times the number of states, provinces, DX countries, and bonus points worked.

Frequencies: 1805 and 60 kHz up from lower edge of 10 through 80 meters (no 30 meters). Novice: 25 kHz up from low edge of their bands.

Awards: Certificates to high scorers in each class in each state, VE province, and DX country. Plaques to high scorer in NINE Land and outside NINE Land.

Dupe sheets are required for entries with over 200 contacts, and a summary sheet showing the scoring, etc. Include a large SASE for a copy of the results.

Mailing deadline is July 20th to: John Fixari, NM9X, Rt. #1 140 H3, Lockport, IL 60441.

ARRL Field Day

1800–2100Z Sat.–Sun., June 27–28

Without a doubt this activity generates more stateside participation in manpower than any other amateur radio activity. It is mostly a club-organized activity, and requires that the coordinator be knowledgeable about what is required.

Entries are separated into many classes. Rules and requirements are quite extensive and will be found in the May issue of *QST*. It is advisable that you read them thoroughly.

Official log forms are a must. Direct your request with a large SASE to the ARRL, ARRL Field Day, 225 Main St., Newington, CT 06111.

Canada Day Contest

0000 to 2400Z Wednesday, July 1

Sponsored by the Canadian Amateur Radio Federation, this contest is open to all amateurs. Everyone works everyone on both sides of the border. Rules have been restructured to quote, "make for a better contest."

Classes: Single operator—All Band, CW, SSB, and both modes. Single band, CW/SSB. Multi-operator—Single transmitter and multi-transmitter, all band only.

Exchange: Name, RS(T), QSO no., province, territory, state, or country. Multi-

multi stations use separate QSO no. for each band.

Scoring: 10 points for each Canadian contact, 4 points for contacts with stations outside of Canada, and 20 points can be claimed for working each official station using the VCA or TCA suffix.

Multiplier: Each Canadian province/territory worked on each band and mode.

Frequencies: 1825/75, 3525/3775, 7075/70/155, 14025/150, 21025/250, 28025/500, 50040/125 kHz.

Awards: Certificates to winning stations in each class, in each province/territory, DX country, and each US call area. Trophies for top scorers, all band, CW, SSB, and both modes. Single band 14 and 7 MHz. And multi-single and multi-multi stations.

Include a summary sheet with your entry showing the scoring, etc., and the usual signed declaration that all rules and regulations have been observed.

Mailing deadline is July 30th to: CARF Contest, Att: John Clarke, VE1CCM, 16 Keefe Ave., Sydney, Nova Scotia, B1R 2C7 Canada.

Clinton ARC Special Event

The Clinton, Iowa Amateur Radio Club will operate a special event station, W0CS, on Saturday July 4th to commemorate the celebration of the Clinton Riverboat Days.

Activity will be found on: CW—3720, 7120, 21120, 28120. SSB—3875, 7275, 14275, 21375, 28400. Two Meter FM—146.460. SSB—144.210.

Send your QSL's and an SASE to: Darryl Petersen, KD0PY, RR #1, Box 84, Bryant, IA 52727 for your special certificate.

Venezuelan Contest

SSB: July 4–5 C.W.: July 25–26
0000Z Saturday to 2400Z Sunday

This is the 26th yearly contest celebrating Venezuela's independence. It's a world-wide type contest; therefore, do not confine your activity to working YV's only. Use all six bands, 10 through 160 meters. There are four classes: Single operator, single and all band, and multi-operator single and multi-transmitter.

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

Points: Contacts between stations in different countries, 2 points. Between stations in the same country zero (0), but permitted for multiplier credit.

Multiplier: One for each YV call area, each U.S. call area, and each country (including own) worked on each band.

Final Score: Total QSO points from all bands multiplied by the sum of the multiplier from each band.

Awards: A plaque to the highest scorer in each class. Medals to the highest scoring single operator in each continent and the Bolivarian countries (Bolivia, Colombia, Ecuador, Panama, Peru).

SSB Contest: Certificates to stations in the Americas working 15 YV stations and 10 different countries; European and African stations working 10 YV's and 10 countries; and Asia and Oceania stations working 5 YV's and 10 countries.

CW Contest: Certificates to all stations working 5 YV stations and 10 different countries.

Indicate each new multiplier in a separate column only the first time it is worked. Use a separate log sheet for each band, and a summary sheet showing the scoring, your name and address in Block Letters, and the usual signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

Mailing deadline is September 15th for SSB entries and October 15th for CW.

They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Caracas 1010-A Venezuela.

1986 CQ WW DX SSB Contest High-Claimed Scores

The following are SSB high-claimed scores. These are raw scores only, subject to verification.

USA
Single Operator All Band

K2TR	3,133,071
W3BGN	2,850,228
K1ZM	2,772,020
K5ZD/1	2,738,148
W9RE	2,580,600
K1DG	2,546,527
K1CC	2,543,671
N2FB/3	2,496,620
WX4G	2,376,192
K1EA	2,331,924
K4ISV	2,325,000
N2LT	2,301,120
K6NA	2,253,951
N2RM	2,105,780
N2MM	2,073,220
AI7B	2,029,494
KM3T	1,880,529
K0UK	1,810,104
W3XU	1,753,884
W0JLC	1,724,754
WS4Q/5	1,641,024
WZ4F	1,436,351
KE9A/4	1,334,838
KA5W	1,227,919
NN7L	1,227,519
W7RM	1,227,198
W6MKB	1,221,380
W6GO	1,125,396
K1IU	1,091,872

Single Band
28 MHz

K4JRB	179,530
KE5FI	147,876
K7QQ	103,716
WC4E	99,081
KE7C	94,032
K1UO	75,936
WB7FDQ	72,625
N4MM	47,040
W3KHQ	44,184
KQ1V	18,126

21 MHz

K3RV/4	945,791
N2IC/0	637,515
W1ZM	442,668
W8UA	437,900
W4NL	415,740
N4VZ	359,700
WA2QNW	334,560
N6BFM/4	324,819
K3VW	290,178
K4UTE	274,240
W1QK	190,820
N3II	190,704
K7GEX	188,846
K1EFI	155,820

14 MHz

K2EK	807,910
KE7V	609,385
K2HFX	556,584
K3ZJ/4	550,858
N7TT	547,500
W6QHS	510,510
WB9HAD	466,754
K2WK	374,327
N4MO	350,217
KV4P	317,840
W8TWA	311,353
K5TSQ	264,099
WA7GVM	243,846
K2QF	182,372
K1KJT	169,680
K2IBW	166,223

7 MHz

W7FP	205,806
K0RF	148,629
KM6B	135,432
N0EKK	85,734
KV0Q	84,930
AD8C	43,329
KS9O	39,105
K4MZW	21,056
N9BUS	18,788
W2HZ	17,404

3.5 MHz

K7SS	217,648
W6RJ	105,716
KR1G	52,548
K1MEM	45,125
W9RN	41,040
NO2I	37,022
W8UVZ	30,000
KQ3V	21,696

1.8 MHz

K5UR	19,044
W4DR	11,648
AB1A	8,320
W2FCR	7,425
N1ACH	5,200

Multi-Operator
Single Transmitter

K3TUP	5,865,768
KX4S	4,335,969
N2ME	3,973,546
N3RS	3,929,396
N4WW	3,623,833
N4ZC	3,587,985
K4VX/0	3,490,576
W5WMU	3,239,474
KS9K	3,236,114
N4RJ	2,771,400
K1YR	2,750,368
WB2ULI	2,655,537
W8CZN	2,509,501
K1RQ	2,436,902
KU2C	2,349,027
NB1H	2,165,792
KC7U	2,149,780
K3WW	2,063,936
N3BB/5	2,034,894
N8CXX	2,005,602

Multi-Transmitter

N5AU	11,190,868
N2AA	10,695,094
W3LPL	7,552,953
N6RO	6,916,580
NR5M	6,237,080
AD8P	6,087,552
K1NG	3,323,802
W3GM	2,402,887
W6XJ	1,517,120
K3II	1,153,152
N1AU	956,736

World
Single Operator All Band

8R1X	8,940,450
P40A	8,172,930
PJ2FR	6,925,920
VK9NS	4,773,131
VE6OU/3	4,509,274
V31CV	4,155,242
TA2BK	3,973,710
WR6R/KH6	3,937,192
ZF2FL	3,736,635
CE3FIP	3,643,269
W3MA/VP9	3,472,816
KQ2M/VP2V	3,338,700
K4YT/4D9	3,086,770
DL6FBL/VP9	3,084,208
EA9AM	3,046,290
YT3M	2,898,336
EA8ACH	2,889,409
N3JT/HK0	2,756,520
TR8JLD	2,725,002
ZS3BI	2,708,528
DJ4PT	2,537,766
VS6DO	2,458,932
YB0ARA	2,421,045
I5MXX	2,368,330
VE3XN	2,336,180
OH6JW	2,327,236
ZS3HL	2,309,710
OK3CSC	2,122,515
JA1XAF	2,102,895
IV3PRK	2,026,634
JA0JHA	1,861,098
T2ARY	1,831,886
4M4A	1,831,467
VK2KL	1,819,566
CX9CO	1,731,184
DL8PC	1,603,992

Single Band
28 MHz

ZY5IW	728,280
LU2E	526,588
4M7A	505,230
LU6FEC	461,955
HC5EA	379,850
CX2AAL	342,054
YV6PM	320,705
EA8VV	319,278
ZS6P	317,835
3G3Z	304,080
VK6HD	279,063
JH1AJT	269,940
L4H	252,639

21 MHz

ZZ5EG	2,184,570
V22A	1,789,470
ZP5JCY	1,707,888
9Y4AT	1,106,145
VO1SA	1,024,155
CE6EZ	1,008,484
LU3MDO	946,974
CE4FXY	885,354
4N3E	759,437
CS8NH	755,988
5Z4DU	723,940
I4LEC	596,025
4N4C	547,755
JR1CBC	529,740
YU1DX	515,520
YC0EJG	509,888

14 MHz

OH8PF	1,259,503
VE3CDX	1,088,468
OH8SR	1,027,368
YW1A	1,002,592
PY5EG	899,085
IO6FLD	832,590
DL8NU	802,102
VO1QF	797,210
DF0AT	668,834
JH8JWF	653,184
SM4GNU	652,188
SK0UX	598,476
VE2PJ	584,898
LU4MEE	573,300
XF5L	526,008
OH2WI	509,102

7 MHz

ZY5EG	476,856
I4VEQ	425,799
JA8IXM	316,382
OH3UU	303,800
JA5BJC	298,384
HK1HHX	244,500
YV6BTF	230,724
LU5UL	214,228
LX0RL	206,763
SM5AQD	197,694
JA2BAY	163,170

3.8 MHz

NP4A	343,170
LX9BV	185,280
PA2TMS	151,065
IO3MAU	137,907
OH7UE	120,980
GW4VEQ	117,710
HA4KYN	109,368
SM2EKM	93,575
OZ4MD	89,870
SP6IAE	82,705

1.8 MHz

LZ2CJ	89,244
VE3BMV	54,478
KH6CC	45,828
DL1YD	36,864
YU2TW	22,302
SP3BQD	21,056
J48CS	20,106
CT4AT	17,350
OK1DXS	15,677

Multi-Operator
Single Transmitter

KP4BZ	10,596,868
CV1D	9,734,271
I5NPH	9,368,892
LZ7A	7,872,326
Y34K	7,075,832
HG5A	6,633,882
HC8DX	6,564,480
VE3BVD	6,131,169
HG6N	6,123,610
F6BEE	6,072,130
HG9R	5,962,537
UQ1GWW	5,785,911
HG7B	5,395,550
LU2FDR	4,348,252
AI6V/KH6	3,731,134
N4SF/VP9	3,680,532
C31LDL	3,619,928
YT2R	3,526,152
YE0X	3,455,412
CE6OS	3,245,216

Multi-Transmitter

PJ1B	25,546,738
JY7Z	14,388,986
VP2MU	13,179,697
KH6XX	12,577,140
VP2MW	9,152,552
P36P	7,101,080
JA2YKA	6,292,141
LA7Q	5,516,680
VE7ZZZ	5,442,267
JA1YWX	4,823,255
4N1C	4,626,090
JA3YKC	4,212,440

QRPp
All Band

WP4G	678,056
VE1CBF	551,057
K3WS	291,846
4X6IF	263,313
N1AFC	235,125
YO2AQB	113,826
KZ5Q	71,604
W6YVK	65,312
OH5NHI	63,020
HK7IMB	49,088

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DX

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JOHN A. ATTAWAY, K4IIF

NEWS OF COMMUNICATION AROUND THE WORLD

"Toil, says the proverb, is the sire of fame."—Euripides (484–406 B.C.)

The *CQ* DX Awards Advisory Committee is pleased to announce the election of Mr. Kan Mizoguchi, JA1BK, to the DX Hall of Fame. The official presentation of the Hall of Fame plaque was made to Mr. Mizoguchi on April 4 at the 1987 International DX Convention in Visalia, California.

Kan Mizoguchi has been an outstanding voice for amateur radio, particularly DX, in Asia and the Pacific for many, many years, and it is fitting that he is the first Asian amateur elected to the DX Hall of Fame.

Kan is known not only for his DXpeditions to rare countries, but also for his activity in introducing new modes, such as RTTY, and new bands, such as 160 and 6 meters, into the countries where his DXpeditions took place. In at least four operations from China, he spent many hours in cooperation with Chinese amateurs regarding contest operations, satellite communications, RTTY, and split-frequency operation on both CW and SSB. His efforts results in China's first participation in the *CQ* World-Wide DX Contest in 1985. He has also been prominent in the public relations aspect of DXing and published the first DX handbook in Japan.

DXpeditions to which JA1BK has made important contributions include XU1AA during the 1971 *CQ* World-Wide DX Contest; 3D2DB and N6DX/NH8 with N6DX in April 1980; 3D2MK and T2AAE in October 1980; VS5TX in November 1980; 9M6MO/MA in November 1980; FW0BK in September 1981; CR9BH with Martti Laine in January and February 1982; CR9BK in February and again in August 1982; BY1BK in November 1982; BY4SK, BY8AA, and BY1PK in March 1984; and BT1BK during the *CQ* contest in October 1985. His Fiji, American Samoa, Wallis Island, Tuvalu, Sabah, and Brunei operations were the first DXpeditions from those countries to include 160 meters. RTTY operation was conducted for the first time from Brunei, Sabah, and Wallis Island.

Kan has made DX presentations at major conventions in Dayton, Fresno, and Visalia on five separate occasions. His subjects included XU1AA, Okino Torishima, BY1PK, and other interesting DX countries. He was the first Japanese amateur to make a presentation at Dayton.

P.O. Box 205, Winter Haven, FL 33882

Kan Mizoguchi, JA1BK, is the first Asian DXer elected to the DX Hall of Fame. Election to the DX Hall of Fame is the highest honor for a DXer and is only conferred on those who have made major contributions to the advancement of DXing. Hall of Fame members include great DXpedtion operators and planners, leading QSL Managers, DX writers, and others who have given fully of themselves and their time to DX. (Photo courtesy JA1KSO)

As an operator, JA1BK was the first Japanese amateur to make the DXCC Honor Roll, and he has worked all continents on both the 1.9 MHz and the 50 MHz bands. His Japan to Europe contact on 50 MHz was a record.

Activities at JA1BK are not limited to DX. Mizoguchi was a Director of JARL, the Japan Amateur Radio League, for four terms and a founding director of IARU, Region III. In this capacity, his contributions have been invaluable in promoting understanding between DXers and the amateurs of third-world countries. He is an honorary member of both the Northern California DX Club and the Southern California DX Club and was nominated for the DX Hall of Fame by Mr. Nob Ito, JA1KSO.

Congratulations to Kan Mizoguchi, JA1BK, DX Hall of Fame!

More Information Sources For The Active DXer

In *CQ* for December 1986, page 90, we listed a number of worthwhile publications which are useful to DXers looking for those last zones, countries, and prefixes. At that time we did not have full particulars on *The DX Bulletin* edited by Chod Harris, VP2ML. However, we now have information on that very excellent source.

The DX Bulletin is published 50 times per year at 816 Fourth Street, Suite 1001, Santa Rosa, CA 95404, and can be re-

THE DX HALL OF FAME

Gus. M. Browning, W4BPD
Nov. 1, 1967

John H. Cummings, W2CTN
March 23, 1968

Stewart S. Perry, W1BB
Aug. 16, 1968

Richard C. Spenceley, KV4AA
March 1, 1969

Danny Weil, VP2VB
Sept. 15, 1969

H. Dale Strieter, W4DQS
May 23, 1970

Stuart Meyer, W2GHK
Oct. 31, 1970

Martin Laine, OH2BH
Jan. 22, 1972

Ted Thorpe, ZL2AWJ, and
Chuck Swain, K7LMU
Aug. 6, 1972

C.J. (Joe) Hiller, W4OPM
March 30, 1973

Ernst Krenkel, RAEM
April 14, 1974

Frank Anzalone, W1WY
June 19, 1976

Lloyd Colvin, W6KG, and
Iris Colvin, W6QL
Nov. 12, 1976

Geoff Watts, Editor and Publisher
June 11, 1977

Don C. Wallace, W6AM
Sept. 23, 1978

Joe Arcure, Jr., W3HNK
Dec. 1, 1979

Hugh Cassidy, WA6AUD
April 26, 1980

Eric A. Sjolund, SM0AGD
April 21, 1981

Franz Langner, DJ9ZB
May 9, 1982

Dr. Sanford E. Hutson, K5YY
Jan. 22, 1983

Rodney H. Newkirk, W9BRD
Feb. 25, 1984

Ronald W. Wright, ZL1AMO
April 20, 1985

Herb Becker, W6QD
April 20, 1985

Jim Smith, P29JS/VK9NS
April 26, 1986

Kan Mizoguchi, JA1BK
April 4, 1987

The WPX Program

Mixed

1265	I2QEA	1268	KA8MVJ
1266	KC7EM	1269	W9IL
1267	WA8SXM	1270	DK6NP

SSB

1871	IK0EIM	1875	WA4WIN
1872	JL1XTP	1876	YC6LD
1873	IV3LNQ	1877	DK6NP
1874	Y44XD	1878	N4OM

CW

2424	JJ1CZR	2428	K5IS
2425	I2UNF	2429	JH8LIZ
2426	AD8W	2430	IK3GER
2427	SM0KCR		

VPX

251	I0ZUT

Endorsements

Mixed: 450 I2QEA, W9IL, DL6NP. 500 I2QEA, W9IL, JA7RPC, DK6NP. 550 I2QEA, W9IL, JA7RPC, DL6NP. 600 I2QEA, W9IL, JA7RPC, DK6NP. 650 I2QEA, W9IL, DK6NP. 700 I2QEA, DK6NP. 750 I2QEA, DK6NP. 800 I2QEA, DK6NP. 850 K9BQL, DK6NP. 900 DK6NP. 950 DK6NP. 1000 DK6NP. 1050 DK6NP. 1100 DK6NP. 1150 DK6NP. 1200 DK6NP. 1250 DK6NP. 1300 DK6NP. 1350 DK6NP. 1400 DK6NP. 1450 DK6NP. 1500 DK6NP. 2450 W4BQY.

S.S.B.: 350 N4OM, DK6NP. 400 N4OM, DK6NP. 450 IK2AEQ, N4OM, DK6NP. 500 IT9KZW, N4OM, DK6NP. 550 IT9KZW, N4OMN, DK6NP. 600 IT9KZW, N4OM, DK6NP, EA3AAY. 650 IT9KZW, W4WKQ, N4OM, DK6NP. 700 IT9KZW, N4OM, DK6NP. 750 IT9KZW, K9BQL, DK6NP. 800 IT9KZW, KC9DS, DK6NP. 850 IT9KZW, DK5WQ, DK6NP, AC3T. 900 IT9KZW, DK6NP. 950 IT9KZW, DK6NP. 1000 IT9KZW, DK6NP. 1050 KC8YM, K5RPC, IT9KZW. 1100 KC8YM, IT9KZW, K5RPC. 1150 KC8YM, IT9KZW. 1200 KC8YM, IT9KZW. 1300 F2VX. 1350 F2VX. 1400 F2VX, NJ0C. 1450 F2VX. 1500 F2VX. 1550 F2VX, WF4V. 1600 F2VX, WF4V. 1650 F2VX, WF4V. 1950 W4BQY.

C.W.: 350 JJ1CZR, I2UNF, SM0KCR, IK3GER. 400 I2UNF, SM0KCR, IK3GER. 450 I2UNF, SM0KCR. 500 SM0KCR. 700 DL1HBT, K4MF. 750 DL1HBT. 1850 N2AC. 1900 W4BQY. 1950 G2GM. 2150 N6JV.

10 Meters: AD8W, DK5WQ
15 Meters: YC6LD
20 Meters: JJ1CZR, SM0KCR, DK5WQ
40 Meters: AD8W, N4OM
80 Meters: Y44XD, AC3T
160 Meters: DL1AM, JA0SU

Asia: W9WPM, JJ1CZR, JH7MSQ, YC6LD, DL9JI
Africa: CT4UW, DL9JI
No. America: NK2W
So. America: W9PWM
Europe: IK0EIM, SM0KCR, Y44XD, JA0SU, DL9JI, K4MF
Oceania: W9WPM, JH7MSQ

Award of Excellence Plaque: VK9NS with 160 Meter bar
VPX Award of Excellence Plaque: DE0 DXM with 160 Meter bar
Award of Excellence Plaque Holders: W4BQY, I0JX, WA1JMP, K0JN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM.

Award of Excellence Plaque Holders with 160 Meter Endorsement: SM0DJZ, DK5AD, W3ARK, LA7JO, W4VQ, K6JG, W4CRW, N4MM, SM0AJU, KF20, K5UR, OK1MP, N5TV, W8CNL, W1JR, W6OUL, W4BQY, W5UR, N4NO, W8RSW, N4KE, I2UIY, W8ILC, W1BUS, NN4Q, G4BUE, LU37L/W4, I4EAT, VE7WJ, W9NUF, N4NX, VK9NS, DE0DXM.

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

Steve Olausson, SM5DAC, is an active participant in the CQ SSB DX Award Program. Steve recently received the 200 country sticker for his certificate. (Photo via N4UF)

ceived via either first- or second-class mail. Regularly published information includes DXpedition news, propagation information, QSL Manager listings, and a calendar of special events and activities from rare countries. In addition, special reports are issued from time to time on topics such as new countries and unusual events.

Another interesting publication added to our list is the *Heard Island DX Association Newsletter* published by Jim Smith, VK9NS. Jim writes an authoritative running commentary on activity from rare DX locations and rare band countries. For information on membership in the HIDXA, write to Jim at P.O. Box 90, Norfolk Island, 2899 South Pacific, via Australia.

For Spanish-speaking DXers, the *Lynx DX Bulletin,* sponsored by the Lynx DX Group in Spain, contains much useful information. For subscription instructions write to the Lynx DX Group, Apartado Postal 351, 26080 Logrono (La Rioja), Spain.

Peter I Island

The great Norwegian DXpedition to Peter I Island early this year prompted much interest in this little-known island which has always been there, but only recently became a DX country. The following article, written and published in *QRZ DX* by Bob Winn, W5KNE, provides an interesting and enlightening history of the island. Thanks, Bob, for permission to use it.

"Peter I is an uninhabited island located in the Bellingshausen Sea about 240 miles off the coast of Antarctica. The Island was first sighted in 1821 by the Russian explorer Thaddeus von Bellingshausen, who was in command of the Russian sloops *Vostok* and *Mirny*.

"When first sighting Peter I Island, the Bellingshausen expedition thought they had found a large land mass, possibly a continent, but as they drew nearer it became obvious that they had found an island. They were unable to approach nearer than 14 miles because of solid ice. Bellingshausen noted ice-capped rock cliffs rising several thousand feet from the sea. He named it Peter I Island after the great Russian Czar.

"Peter I is a glacier-capped volcanic island whose highest point is a dome about 5750 feet in elevation. It has been described as completely covered in ice and snow with bare rock showing only where the cliffs are too steep for snow.

"It was in 1929, more than a 100 years later, before the first confirmed landing was made on the island. A Norwegian expedition from the research vessel *Norwegia* went ashore on February 1, 1929 and claimed the island for Norway. It was placed under Norwegian sovereignity in 1931 and became a dependency in 1933.

"During the intervening years, numerous vessels have sighted Peter I Island, but few landings have been attempted because of the extensive ice pack. It had been reported by one writer that Norway maintained a cache of emergency supplies at Sandefjord Bay on the island, but a landing party from the Argentine ice breaker *General San Martin* in 1971 could find no trace of any supplies.

The WAZ Program

10 Meter Phone

313	N7RT

15 Meter Phone

241	N7RT	242	JH7VEP

20 Meter Phone

595	JA1IFP	599	I2EOW
596	JH6QPD	600	VU2CVP
597	N7RT	601	WD4RCO
598	K7SP	602	IK0EPS/W4

20 Meter CW

255	N7RT	257	OZ4OC
256	VE7AHA	258	K3QIA

40 Meter CW

61	JA3CSZ	62	VE7AHA

All Band WAZ
SSB

3076	JA6GRX	3083	AK4H
3077	KC7EM	3084	JA1QWT
3078	XE1FFW	3085	G4UNH
3079	K7SP	3086	EA4GT
3080	GM3CSM	3087	DK0ZR
3081	I2UYT	3088	CT4IS
3082	I2HLZ		

Phone/CW

6052	JR3IIR	6061	F6CLH
6053	JA6GRX	6062	HB9BIO
6054	JH6QPD	6063	SM5MEL
6055	CT1YH	6064	K6SIK
6056	K7SP	6065	HB9BMU
6057	K7SP (CW)	6066	SP3BYZ
6058	EA5AR	6067	DF3CB
6059	W7DP	6068	IK7CJV
6060	JH2RMU		

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

5 Band WAZ

Standings as of March 1, 1987

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

132. W3GG
133. DL8AN
134. G3GIQ
135. LA9GV
136. OZ7YY

The top 13 contenders for 5 Band WAZ are:

1. JA1BWA, 199
2. JA3EWU, 199
3. N4WW, 199
4. K5YRA, 199
5. W8UVZ, 199
6. JA0CWZ, 199
7. JA3CWZ, 199
8. K9CEB, 199
9. DJ9ZB, 199
10. SP6JCY, 199
11. W2YY, 198
12. K7UR, 198
13. K9GX, 198

404 Stations have met the 150 Zone level.

"Most DXers are aware that the Antarctic Treaty of 1959 set the Antarctic region aside for peaceful purposes with no signatories to make territorial claims. This is the reason why Antarctica is only a single country for amateur radio award purposes even though the region is divided into pie-shaped territories. However, the DXCC country status of Peter I Island is not affected by the Antarctic Treaty, presumably because the island became a dependency of Norway in 1933, 26 years before the treaty was signed."

Attention Shortwave Listeners

The highest award for prefix hunters is now available to shortwave listeners. *CQ*'s WPX Award of Excellence has been expanded to include a VPX (Verified Prefixes) Award of Excellence for SWLs in the VPX Program, and the first plaque has been awarded to Peter Kuhfus, DEØDXM, of Wiesbaden-Dotzheim, West Germany.

Peter Kuhfus has been active in the VPX Program since May 1973 when he received VPX certificate #54. In the intervening years he has qualified for all band and continental endorsements with a verified prefix level of 1000.

The requirements for the VPX Award of Excellence are 1000 prefixes mixed mode, 600 prefixes SSB, 600 prefixes CW, all 6 continental endorsements, and the 5 band endorsements for 80 through 10 meters. A special 160 meter endorsement bar is also available.

Applications should be submitted to WPX Award Manager Norm Koch, K6ZDL, P.O. Box 1351, Torrance, CA 90505.

Here and There

Andaman Islands: The Indian DX Group used their own suffixes with the VU4 prefix. For example, QSL VU4APR via VU2APR.

Belgium—160 Meters: Belgian amateurs are now authorized to use the band segment 1830–1850 kHz CW and SSB with up to 10 watts output.

Carolina DX Association: Congratulations to Scott Douglas, K2SD, on his selection as new editor of the *Carolina DX Association Bulletin,* succeeding Murph Ratteree, W4WMQ. Club officers for 1987 are Gary Dixon, K4MQG, President; Skip Richardson, WA4UUP, Vice President; Bill Jennings, W4UNP, Secretary/Treasurer; and Roger Burt, N4ZC (ex-KP4AOO), Net Manager.

Cayman Islands: Joe, WA6VNR, and wife, WB6MME, will operate ZF2AH from June 26 to July 14 mostly on CW. QSL to WA6VNR.

Cocos (Keeling) Islands—VK9YW/VK9YS: The February DXpedition by Bob, W5KNE, Editor of *QRZ DX* and Jim Smith, VK9NS, DX Hall of Fame, yielded about 18,700 contacts during the 2 weeks of operation. Most were to Japan and Europe

50th Anniversary WAZ Award

The following stations met all the requirements for the 50th Anniversary WAZ Award (1986).

1. N4JF
2. W8AH
3. K2TQC
4. LZ1HA
5. K9RHY
6. WØMLY
7. DJ9ZB
8. AB9Ø
9. K8JRK
10. JA2BL
11. JI1QPU
12. JA8DNZ
13. KQ9W
14. YB5QZ
15. IK8DYD
16. WD9GQV
17. W9NUF
18. W9DWQ
19. VK9NS
20. JH1IED
21. I:9BWQ
22. WA2TMP
23. VE1NG
24. N4VZ
25. JA8CAQ
26. WA7BPI
27. K3FN
28. W2FXA
29. W7ULC
30. K3AJ
31. OH3TQ
32. OK1RD
33. KR9O
34. CT1FL
35. NS7Z
36. P-29JS
37. JA8KSD
38. JA6AD
39. K4MQG
40. F6DKV
41. DL3RK
42. KE9U
43. WB2ABD
44. DL7AA
45. VE7AHA
46. DL1PM
47. JA5PUL
48. G3MIR
49. JA6AV
50. ON4FU
51. JA3FYC

5 Band WAZ #58

Dr. Robert Eshleman, W4DR, hardly gave the *CQ* 5 Band WAZ Award a thought until he worked JTØGM on 80 meters. Then he thumbed through his cards and found that 160 of the 200 were already in hand. Zone 40 on 20 meters was the last card that filled out the hand.

Bob was first licensed as W4QCW in 1950. He now holds the Extra class license and everyone in the family is licensed. XYL Rosie is N4CFL with 260 DXCC counters to her credit. Son Curtis is WA4CSE, and son Lee is WA4CSG.

Bob is a full-time member of the School of Dentistry at the Virginia Commonwealth University at Richmond. His speciality is Fixed Prosthodontics. Forty-seven years olds, he holds DXCC for both mixed and phone, has the #1 5BDXCC Award, and also holds 5BWAS, 160 DXCC, and 160 WAS. He uses CW and SSB about equally.

A member of the Central Virginia Contest Club, Bob has antennas all over the property, having a half-wave dipole for 160 up at 110 feet; a delta-loop and sloping dipoles for 80; a 3-element Yagi at 120 feet for 40; a 5-element Yagi at 120 feet for 20; a 5-element Yagi at 130 feet for 15; and a 5-element Yagi at 75 feet for 10 meters. Just in case they might be needed, there are also three beverage antennas used primarily for receiving on 160 and 80.

Equipment includes a Drake R4C and T4XC to an Alpha 76, and a TS820 with a Henry 2K.

Bob is a past chairman of the ARRL DX Advisory Committee. He is usually found working the *CQ* and ARRL DX Tests, and while he does not use DX nets, he is not against them. The hardest part of 5B WAZ was to get Zone 23 on 80 meters, but the JTØGM sparked the effort to gather the handful still needed. An assist and a telephone call from W9ZR alerted W4DR to the JT station coming in at sunrise on the long path.

Bob has not done all the DXing from just the home turf. In 1954 he was on Navassa with the first post-WW II effort, this the KC4AB operation. A bit of quick calculation will show that Bob was 17 years old at the time. He was on Navassa again in 1969 with the K4IA/KC4 effort.

First licensed at 14, on a Navassa DXpedition at 17, Dr. Bob Eshleman, W4DR, is shown here with a 100% amateur family. Bob has gained 5B WAZ #58, Zone 40 on 20 being the last one. In addition to KC4AB on Navassa in 1954, W4DR operated EA9EJ in Spanish Sahara in 1967 and VP5JEX in Turk and Caicos in 1982. Shown here with XYL Rosie, N4CFL, are sons Curtis, WA4CSE, on the left and Lee, WA4CSG, on the right. Bob is a past chairman of the DX Advisory Committee.

In 1967 Bob was in Spanish Sahara signing EA9EJ. This was a rare one all the way up to the time it was deleted. In 1982 he and the XYL celebrated their 25th wedding anniversary with a trip to operate VP5JEX, Rosie's first chance at operating from a DX location.

All of this is impressive and again lends credence to the feeling that 5B WAZ is probably one of the more difficult, if not the most difficult, award to attain, and it is one that the top DXers really work to attain. All that explains why so many of the top DXers are found in the short list of those who have gained 5B WAZ, and Bob Eshleman, W4DR, certainly stands there with the best.

The WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with CQ master prefix list. Scores are based on the current prefix total regardless of an operator's all-time count. Honor Roll must be up-dated annually by addition to, or to confirm present total. If no up-date, file will be placed into "inactive" until next up-date. Lifetime Honor Roll fee $2.00 (U.S.) for each mode, with no fees required for up-dates.

MIXED

3131	YU2AA	1895	YU1AB	1407	KL7AF	1123	3A2LF	855	K9BQL
2865	F9RM	1863	I2PJA	1401	N6JM	1117	KC8CC	853	K7CU
2853	K2VV	1841	W1NG	1395	SM6DHU	1114	N8BJQ	853	AB9O
2750	W2NC	1836	I8YRK	1391	IS0LYN	1100	AC2J	848	W9JBR
2572	K6JG	1833	WA8YTM	1347	I2UIY	1074	VK9NS	840	I2EAY
2502	K6XP	1786	W9NUF	1322	NN4Q	1067	I1WXY	821	KX1A
2501	VE3XN	1786	EA2IA	1312	LA7JO	1060	WD9IIC	820	W2XQ
2366	W9DWQ	1736	W0SFU	1308	W6OUL	1043	YU2TY	800	I2TZK
2345	W4BQY	1671	PY4OD	1305	DK5AD	1038	YU2CBK	759	OE1KJW
2297	YU2TW	1665	IN3ANE	1293	SM0AJU	1028	PY1DFF	745	VE6VW
2224	N4NO	1662	YT7DX	1291	YU7AJD	1025	WD4RAF	715	KL7VZ
2218	N4MM	1661	K9BG	1283	K2POF	1018	DF6EX	708	G4SDJ
2118	N6JV	1600	N5TV	1266	YU2CQ	1012	AI8S	695	W5ASP
2103	YU7BCD	1562	PY1APS	1263	I1POR	995	KC2RS	679	K6UXO
2072	I2PHN	1537	N6AW	1249	W7CB	986	NE6I	678	W4WKQ
2069	N6CW	1512	K7NN	1247	W5PWG	980	N2CIC	668	N3KR
2056	YU7BPQ	1490	CT1LN	1234	SV1PL	943	I0AOF	652	G4OBK
2040	N9AF	1481	I2MQP	1227	WB8ZRL	914	EA1CIM	650	JO1BMV
2006	K0BLT	1470	K8LJG	1219	K2OLG	901	W0JIE	633	Y44UI
1940	N2AC	1433	SM3EVR	1215	G4FAM	900	I1EEW	620	YU1PJ
1924	K5UR	1420	EA9IE	1153	N2AIF	883	WI4K	602	W9IAL
1898	PA0SNG	1414	IT9QDS	1141	N4IB				

SSB

2789	F9RM	1638	K5UR	1201	I8KCI	981	K8LJG	752	K9BQL
2538	I0ZV	1638	CT4NH	1151	KL7AF	965	IK5ACO	744	K8ZZU
2410	K2VV	1614	WF4V	1112	KK0L	964	WB6GFJ	716	IT9ONV
2273	K6JG	1599	I8YZP	1108	CT4UW	939	WA2FKF	710	N2AIF
2271	ZL3NS	1470	WA4QMQ	1095	K5RPC	936	W3GXK	702	I3ZSX
2210	K6XP	1466	I2MQP	1088	KC8CC	935	XE1XF	699	I2KKL
2209	K2POA	1451	VE1YX	1088	W4UW	930	N4IB	698	G4KHF
2109	I0AMU	1431	I4CSP	1085	PY4OD	928	I8WYD	698	KC2FC
2082	CT1UA	1416	CT1FL	1079	N2AC	898	N2CIC	692	YB3CEV
2053	I2PHN	1413	CT1LN	1071	NN4Q	888	I5AFC	686	W6YMH
1993	N4MM	1399	W1NG	1067	SM6DHU	885	AG2K	666	LA1XDA
1942	W0YDB	1384	NJ0C	1052	EA8AKN	871	EA4KK	662	CT1AHU
1904	I4ZSQ	1341	W9NUF	1048	I2UIY	857	I1EEW	661	VO1AW
1859	I2PJA	1312	W3ARK	1048	PP2ZDD	853	AB9O	659	I4UFH
1832	I3ZKD	1300	N5TV	1047	EA3AQC	845	I2EOW	654	NE6I
1765	I6ZJC	1293	AC2J	1037	KC4OV	818	IN3AHO	653	KX1A
1749	W4BQY	1286	EA2IA	1035	WB8ZRL	816	ON6IT	652	CP8HD
1724	YU7BCD	1283	XE1OX	1030	F6BVB	813	WN5MBS	642	OE5BGL
1693	N4NO	1264	G4CHP	1020	SM0AJU	808	KK5P	635	KE6KT
1667	I8YRK	1234	LA7JO	1016	CX9CO	798	K3IXD	607	YB3CDL
1661	PA0SNG	1218	W2NC	997	CT1BY	788	W6OUL	606	WA8YTM
1642	W9DWQ	1204	KC8YM	984	W0ULU	758	WB6SRK	605	VK9NS

CW

2511	W2NC	1569	YU7SF	1167	W1NG	899	I2UIY	693	NE6I
2315	K2VV	1551	LZ1XL	1164	IT9VDQ	889	F6HKD	669	ZS6BCR
2110	WA2HZR	1526	N4MM	1098	K2POF	854	KN7K	667	W2XQ
2097	N6JV	1525	K5UR	1026	K8LJG	847	W9PWM	663	LA7JO
1973	N6CW	1502	VO1AW	1015	SM6DHU	827	VE1ACK	659	KA1CLV
1951	K6JG	1428	PY4OD	1000	I7PXV	823	G4FAM	655	K6UXO
1924	N4NO	1415	EA2IA	993	KL7AF	823	LA9XG	654	W0JIE
1912	ON4QX	1378	W9NUF	979	W1WAI	818	AI6Z	647	WB8ZRL
1880	K6XP	1357	N4YB	973	DJ1YH	800	JH1VRQ	644	JA2GCW
1878	W9DWQ	1306	I1YRL	940	SM0AJU	799	SM5DAC	635	W4RHZ
1848	W4BQY	1300	N5TV	936	N2AIF	777	EA5QR	634	OZ5UR
1836	W3ARK	1289	JE1JKL	922	OH3TQ	767	TI4BGA	625	W6YMH
1820	G2GM	1261	I2DMK	906	W6OUL	724	VE4AEX	621	CT1LN
1805	VE7CNE	1246	JA1KRU	904	NN4Q	711	I2EAY	603	I8YRK
1779	OZ5EV	1228	KA7T	904	YU2CQ	705	OE1KJW	602	VK9NS
1751	N2AC	1178	WA8YTM	901	AK2H	700	N4IB	600	G3VQO
1672	YU7BCD								

due to poor propagation to North and South America. QSL VK9YW to W5KNE and VK9YS to VK9NS.

Colvins: Best wishes to Iris Colvin, W6QL, for a speedy recovery from surgery for a broken hip incurred during their Indian Ocean DXpedition.

European DX Foundation: EUDXF was a major contributor to the Peter I Island DXpedition and provides a transceiver with second VFO for 5A0A. Joining declarations to Erich Wagner, DL1LD, Flurweg 23, D-4444 Bad Bentheim 1, Federal Republic of Germany.

Franz Josef Land: This rare DX country now has three active stations—UA1OT, UV1OO, and RZ1RWA.

Gough Island: ZD9CK is scheduled to be active until October.

Gibraltar: ZB40 commemorated the

Here is the J52UAC club station in Guinea-Bissau, which is sponsored by the International DX Association (INDEXA). The club has over 50 members, 12 of whom have amateur radio licenses. (Photo via W4WMQ)

40th anniversary of amateur radio in Gibraltar.

"Heard Island Odyssey": This is an excellent book by Kirsti Jenkins-Smith, VK9YL/VK0YL, wife of DX Hall of Famer Jim Smith, VK9NS. Copies may be ordered from Ron Pretekin, 6741 Oakland Drive, Dayton, OH 45415-1520.

Howland Island (KH1): Gary, K6JAJ, will be on Howland Island this summer with K6RXK to commemorate the Amelia Earhardt crash.

International DX Association: INDEXA is providing varying levels of support for 3C1MB (second amp), a Solomon Islands club station (books and keys), FT8WA (complete Drake station), 5A0A, the Peter I Island DXpedition, 1S1CK, FH4EC, FK0AT, and 20,000 QSL cards have been shipped to 20 DX stations. New members

CQ DX Awards Program

SSB

1523	YC6LD	1524	YB0PR

CW

691	KE3A

SSB Endorsements

310	K6WR/316	275	K2JF/291
310	K9LKA/315	275	KS0Z/280
300	CT1UA/304	275	WB6OKK/278
300	KC8EU/300	250	PY2DBU/273
300	WB6GFJ/300	28 MHz	WB6OKK
275	W6MFC/295	3.5/7 MHz	WB6OKK
275	W4UW/292		

CW Endorsements

275	W0HZ/290	1.8 MHz	OK1MP
275	K2OWE/281	3.5/7 MHz	DJ1TH
150	KE3A/151		

Total number of active countries is 316. The basic award fee for subscribers to CQ is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an s.a.s.e. is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for air-mail reply. Please make all checks payable to the awards manager.

are needed. Write P.O. Box 373, Richardson, TX 75083.

Japan—80 Meters: The top of the 80 meter band has been expanded by the JA government to allow operation in the segment 3791–3805 kHz.

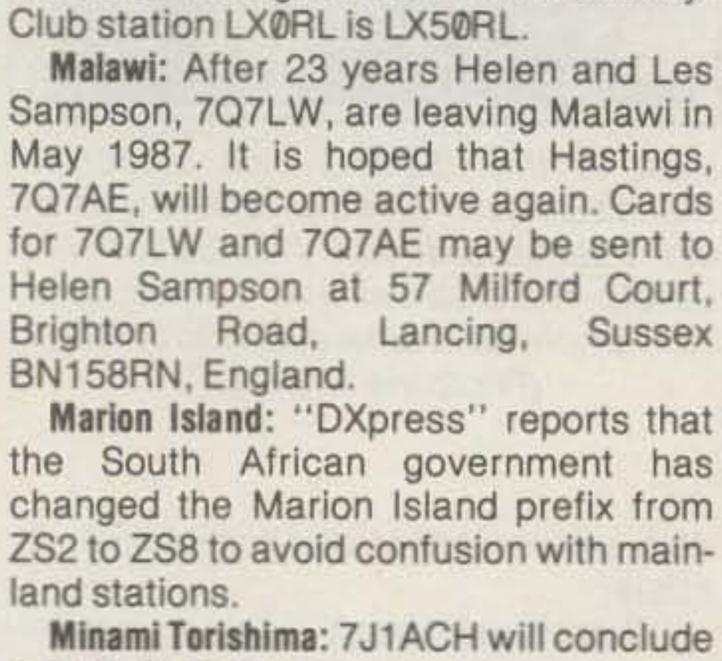
LZ/50: During 1987, Luxembourg stations are appending /50 to their callsigns in celebration of the 50th anniversary of the Luxembourg Amateur Radio Society. Club station LX0RL is LX50RL.

Malawi: After 23 years Helen and Les Sampson, 7Q7LW, are leaving Malawi in May 1987. It is hoped that Hastings, 7Q7AE, will become active again. Cards for 7Q7LW and 7Q7AE may be sent to Helen Sampson at 57 Milford Court, Brighton Road, Lancing, Sussex BN158RN, England.

Marion Island: "DXpress" reports that the South African government has changed the Marion Island prefix from ZS2 to ZS8 to avoid confusion with mainland stations.

Minami Torishima: 7J1ACH will conclude activity in June.

NCDXC: 1987 officers for the Northern California DX Club are Lou Beaudet, K6TMB, President; Ted Algren, KA6W, Vice President; Ron Panton, W6VG, Secretary; and Jim Knochenhauer, K6ITL, Treasurer. Congratulations to Jim Maxwell, W6CF, on a great job as Editor of *The DXer*.



Left to right are Jean Claude, FT8ZA, Guy, FT8XD, and Jean Michel, FT8WA. These operators were sponsored by INDEXA. (Photo via W4WMQ)

Palmyra Island: W0RLX, one of the XF4DX group, is reported to be planning a DXpedition to Palmyra in September.

Peter Island DXpedition—3Y1EE and 3Y2GV: This well-planned and well-executed DXpedition, which made over 20,000 contacts, incurred substantial costs in landing and setting up on this almost inaccessible Antarctic island. Contributions will be greatly appreciated and should be sent to Peter I Island DXpedition 87, c/o Erling J. Wiig, LA6VM, Jacob Fayes V. 6, N-0287 Oslo 2, Norway.

Zaire: Tom Gregory, N4NW, has the callsign 9Q5NW in Zaire.

The 160 Meter WAZ Award

The following stations have met the requirements for the 160 Meter WAZ Award.

Award No.	Call	Date Received	Zones
1.	K1MM	11/21/86	30
2.	K1MEM	11/24/86	31
3.	N4PN	11/25/86	34
4.	W3AP	11/28/86	33
5.	N4SF	12/6/86	30
6.	K4UEE	12/8/86	32
7.	PA3BFM	12/22/86	32
8.	OH1XX	1/3/87	33
9.	K4PI	1/5/87	30
10.	JA1GTF	1/5/87	37
11.	K5RU	1/23/87	39
12.	W0CD	2/14/87	30
13.	W9ZR	2/25/87	30

For complete rules and an application blank for the 160 Meter WAZ Award, send a business-size, self-addressed, stamped envelope to WAZ Award Manager Leo Haijsman, W4KA, 1044 Southeast 43rd Street, Cape Coral, FL 33904.

Jack Reed, VE3GMT, visited and operated BY1PK in China last October. He worked a number of UA and W6 stations. Jack has been one of the most prominent Canadian DXers for many years. He regularly puts out a super signal from his Toronto QTH. (Photo via VE3IPR)

Southern California DX Club: SCDXC officers for 1987 are Red Stillman, W6AE, President; Edgar Brown, N6OU, Vice President; Hugh Allen, W6MFC, Secretary; and Albert Almeida, N6JZ, Treasurer. Don Minkoff, NK6A, is Bulletin Editor.

Revilla Gigedo: The XF4DX crew made approximately 15,000 contacts, 60% CW and 40% SSB. Some 600 lucky DXers worked them on 160 meters.

Svalbard (Spitzbergen): SP5EXA plans a repeat DXpedition from Spitzbergen this summer.

Virginia Century Club: VCC 1987 officers include Frances T. Sledge, N4CRU, President; Haywood N. Perry, W4DHZ, Vice President; and Grover Brewer, Jr., W4FPW, Secretary/Treasurer.

Western Washington DX Club: Officers for 1987 are Bill Peck, N7FSW, President; Joe Gregory, W7QN, Vice President; Jack Wichels, W7YF, Secretary; and Mike Sedgwick, WA7BPI, Treasurer.

73, John, K4IIF

QSL Information

A22BW to DK3KD
C6AEQ to KA2QLF
CX8XY (South Shetlands) to CX2CS
D68QL to YASME Foundation, Box 2025, Castro Valley, CA 94546
H44AF to N6NDH
HR6A to WB5VZL
HV1CN to I2ZCE
J73D to W2OB
JA2NQG/JD1 to JH1LKH
JT2BT to Box 639, Ulan Bator, Mongolia
K2SS/VP2V to WA6AHF
K6JAJ/KH8 to Gary Haugen, 3744 Jurupa Ave., Riverside, CA 92506
KC4USV to KF4UU
KD7P/KC4 to KA7MLT
KH6AC to WK6T
KK7K/DU7 to N2AU
KL7LF/KH3 to KL7VZ
OD5QS to WA4VDE
P29RT to W6FAH
P48GD to N2MM
PJ1JP to WA6PKN
T58DX to I2JSB
TK5UC to F6AOI
TU4CG to F2BS
VK8DS & VK8GC to VK9NS
V31DX to N5DD
V31JQ to WB8YUC
VQ9QM to W4QM
XE2VKR to NN7A
XF4DX to K9AJ
ZF2JR to N6RJ
ZF2KD to N5TP
ZK1XY to W0RLX
ZS3Z (Namibia) to ZS6BCR
ZY1CRP to PY1AJV
ZY8SA & ZY8SB (St. Peter & Paul Rocks) to PY1BVY, Box 1502, 24000 Niteroi, Brazil
3Y1EE & 3Y1GV to LA6VM
5A8A (Libya) to SP6BZ
5B4LP to F6FNU
5L2SI & 5L2RL to DJ6SI
5T5NU to F6FNU
5V7WD to WB4LFM
5W1FZ to ZL1CAD
7D8DP to W8MPW
8P6AY to K1COW
8P6DX to VE3ICR
8P6CW to VE3CPU
8P6RF to VE3DLL
8P9HG to VE5RA
8Q7QL to YASME Foundation, Box 2025, Castro Valley, CA 94546
9Q5NW to Box 368, Stockbridge, GA 30281

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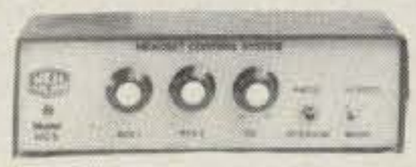

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Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Although there are signs that a new solar cycle may have already begun, solar activity continues to remain at a very low level.

The Royal Observatory of Belgium reports a monthly mean sunspot number of 4.0 for February 1987. The sun was completely spotless on 16 days, and the highest number of spots recorded on any single day was only 19. This monthly mean value results in a provisional 13-month running smoothed sunspot number, upon which the solar cycle is based, of 14 centered on August 1986. Solar activity has remained at this level for the past five monthly readings.

The 10.7 cm solar flux level for February was 71.5, according to daily observations made at the Algonquin Radio Observatory at Ottawa, Canada.

Official 1986 Sunspot Numbers

The Royal Observatory of Belgium, the world's official keeper of solar data, reports the following final official monthly mean sunspot numbers for 1986:

Jan.—2.5	July—18.1
Feb.—23.2	Aug.—7.4
Mar.—15.1	Sep.—3.8
Apr.—18.5	Oct.—35.4
May—13.7	Nov.—15.2
June—1.1	Dec.—6.8

The yearly mean was 13.4, which makes 1986 the year of lowest solar activity in sunspot cycle 21. There were 129 days during 1986 when the sun's surface was completely spotless. The highest number of spots recorded was on October 24 with a count of 76. The count exceeded 30 on only 44 days during the year.

Based on the official 1986 monthly mean values, Table I shows the latest available smoothed sunspot numbers. Values shown after June 1986 are provisional.

If solar activity is on the increase, as many experts believe, then this will verify that the new cycle, number 22, began during March 1986. If the cycle remains stalled at the present level of 14, or should drop lower in the next few months, the experts will have to reevaluate the starting date of Cycle 22.

June Sunspot Number

What level of solar activity can we expect for June 1987? According to the National Geophysical Data Center at Boulder, Colorado, there is a 90% chance that solar activity this June will fall between 20 and 52, with 36 as the most likely level. The Royal Observatory of Belgium forecasts a level between 22 and 36, with 28 most probable. Using a more or less classical method for predicting solar activity, the Editor of this column is calling for a level of 22. All three forecasts, however, are in agreement that solar activity this June will be higher than the level of 14 observed during June 1986.

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for June 1987

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 9, 19, 26	**A**	**A**	**B**	**C**
High Normal: 4, 8, 14, 20, 22, 25, 27-28	**A**	**B**	**C**	**C-D**
Low Normal: 1, 3, 5-7, 10, 13, 15, 18, 21, 24, 29-30	**A-B**	**B-C**	**C-D**	**D-E**
Below Normal: 2, 11-12, 16-17, 23	**B-C**	**C-D**	**D-E**	**E**
Disturbed: None	**C-E**	**D-E**	**E**	**E**

Where expected signal quality is: **A—Excellent opening, exceptionally strong, steady signals greater than S9.**

B—Good opening, moderately strong signals varying between S6 and S9, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from Propagation Charts appearing on the following pages.

2. With the *propagation index*, use the above table to find the expected signal quality associated with the band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good-to-fair (B-C) on the 1st, fair-to-poor (C-D) on the 2nd, good-to-fair again (B-C) on the 3rd, good (B) on the 4th, etc.

Computer Propagation Bulletin Board

Since March the NOAA Space Environmental Services Center (SESC) in Boulder, Colorado had in operation a microcomputer public bulletin board system (PBBS). In operating the bulletin board, SESC is experimenting with a new and popular technique for delivering SESC text products. Currently, a daily summary and forecast of solar and geophysical activity and a daily HF propagation summary and forecast (with updates every six hours) are being offered on the bulletin board. In the future, information about other NOAA space environmental services and samples of a variety of SESC products will be posted on the bulletin board.

The bulletin board is in operation 24 hours each day. Modem-equipped PCs can access the system by calling (303) 497-5000. Either 300 or 1200 baud can be used. Protocal is the standard 8-bit data word with 1 stop bit and no parity.

There is no charge for the data that can be obtained from the SESC bulletin board, but the telephone call is not toll free.

June Propagation

Compared to last June, expect an improvement in propagation conditions on the HF bands this year.

Twenty meters looks like it will continue to be the best band for DX propagation conditions during June. It should open shortly after sunrise and remain open for several hours in almost all directions. When conditions are Low Normal or better, look for good openings to Europe, Central and South America, the South Pacific, Australasia, and the Far East before noon-time absorption sets in and weakens DX signals. A second, and usually stronger, peak is expected during the afternoon and early evening hours when good conditions should be possible towards Europe, Africa, Central and South America, and the Middle East. Later in the evening, and until midnight, expect good openings to South America, Antarctica, the South Pacific, Australasia, and the Far East.

Not much DX is expected on *15* meters until after noon, although some openings should be possible towards Central and South America. After noon the band

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1984	60	56	53	50	48	47	44	40	34	29	25	22
1985	21	20	19	18	18	18	17	17	17	17	17	15
1986	14	13	13	14	14	14	14	14				

Table I– The latest available smoothed sunspot numbers based on the official 1986 monthly mean values.

11307 Clara Street, Silver Spring, MD 20902

HOW TO USE THE DX PROPAGATION CHARTS

1. Use Chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4 and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9 and 0 areas; the Western USA Chart in the 6 and 7 areas, and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (15 through 80 Meters) for a particular DX region, as shown in the left hand column of the Charts. A ** indicates the best time to listen for 10 meter openings; * best times 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 Propagation 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. Time shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M., 13 is 1 P.M., etc. Appropriate *daylight* time is used, *not* GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitter 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, a half-wave 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.

June 15–August 15, 1987
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Central Europe & North Africa	13-18 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	19-21 (1) 21-22 (2) 22-00 (3) 00-01 (2) 01-02 (1)	21-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Northern Europe & European USSR	*Nil*	06-07 (1) 07-09 (2) 09-15 (1) 15-18 (2) 18-19 (3) 19-22 (2) 22-00 (1)	20-21 (1) 21-23 (2) 23-00 (1)	21-23 (1)
Eastern Mediterranean & Middle East	11-13 (1) 16-17 (1)	08-09 (1) 13-15 (1) 15-18 (2) 18-19 (2) 19-20 (3) 20-22 (2) 22-23 (3) 23-00 (2) 00-06 (1) 06-08 (2)	20-22 (1) 22-00 (2) 00-01 (1)	22-00 (1)
Western Africa	11-14 (1) 14-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	20-22 (1) 22-01 (2) 01-02 (1)	21-01 (1)
Eastern & Central Africa	11-16 (1)	16-18 (1) 18-20 (2) 20-22 (1)	22-00 (1)	22-00 (1)
Southern Africa	11-13 (1)	01-03 (1) 05-07 (1) 15-16 (1) 16-18 (2) 18-19 (1)	20-21 (1) 21-01 (2) 01-02 (1)	22-01 (1) 23-01 (1)*
Central & South Asia	*Nil*	08-11 (1) 20-23 (1)	05-07 (1) 20-22 (1)	*Nil*
Southeast Asia	*Nil*	07-10 (1) 19-23 (1)	*Nil*	*Nil*
Far East	*Nil*	07-08 (1) 08-10 (2) 10-12 (1) 20-23 (1)	04-06 (1)	*Nil*
South Pacific & New Zealand	19-22 (1)	19-21 (1) 21-02 (2) 02-07 (1) 07-10 (2) 10-12 (1)	02-03 (1) 03-06 (2) 06-07 (1)	03-06 (1) 03-05 (1)*
Australasia	19-22 (1)	06-08 (1) 08-09 (2) 09-12 (1) 17-19 (1) 21-23 (1) 23-01 (2) 01-04 (1)	03-04 (1) 04-06 (2) 06-07 (1)	03-06 (1)
Caribbean, Central America & Northern Countries of South America	15-17 (1)** 09-12 (1) 12-15 (2) 15-17 (3) 17-18 (4) 18-20 (2) 20-21 (1)	06-07 (1) 07-08 (2) 08-10 (4) 10-12 (3) 12-16 (2) 16-18 (3) 18-21 (4) 21-23 (3) 23-00 (2) 00-02 (1)	20-22 (1) 22-23 (2) 23-03 (3) 03-05 (2) 05-07 (1)	22-00 (1) 00-04 (2) 04-06 (1) 02-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-17 (1)** 09-12 (1) 12-15 (2) 15-17 (3) 17-18 (4) 18-19 (2) 19-20 (1)	06-08 (1) 08-09 (2) 09-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-23 (3) 23-01 (2) 01-04 (1)	21-23 (1) 23-03 (2) 03-06 (1)	00-05 (1) 01-04 (1)*
McMurdo Sound, Antarctica	*Nil*	20-22 (1) 22-00 (2) 00-02 (1)	00-03 (1) 03-06 (2) 06-07 (1)	03-06 (1)

*Indicates best time for 160 Meter opening.
**Indicates best time for 10 Meter opening.

Time Zones: CDT & MDT
(24-Hour Time)
CENTRAL USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	13-17 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-17 (2) 17-19 (3) 19-20 (2) 20-22 (1)	20-22 (1) 22-00 (2) 00-02 (1)	21-00 (1)
Northern Europe & European USSR	*Nil*	06-07 (1) 07-09 (2) 09-14 (1) 14-17 (2) 17-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)	21-23 (1)
Eastern Mediterranean & Middle East	*Nil*	07-09 (1) 14-16 (1) 16-18 (2) 18-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)	*Nil*
Western Africa	14-16 (1)	06-08 (1) 13-15 (1) 15-17 (2) 17-18 (3) 18-19 (2) 19-21 (1)	20-00 (1)	21-23 (1)
Eastern & Central Africa	*Nil*	16-18 (1) 18-20 (2) 20-22 (1)	20-23 (1)	*Nil*
Southern Africa	10-12 (1)	05-07 (1) 14-15 (1) 15-17 (2) 17-18 (1) 22-00 (1)	21-23 (1) 23-00 (2) 00-01 (1)	22-00 (1)
Central & South Asia	*Nil*	09-11 (1) 18-20 (1) 20-22 (2) 22-00 (1)	05-07 (1) 19-21 (1)	*Nil*
Southeast Asia	19-21 (1)	08-10 (1) 20-21 (1) 21-23 (2) 23-00 (1)	05-07 (1)	*Nil*
Far East	20-22 (1)	07-08 (1) 08-11 (2) 11-21 (1) 21-23 (2) 23-01 (1)	04-07 (1)	04-06 (1)
South Pacific & New Zealand	15-19 (1) 19-21 (2) 21-22 (1)	17-19 (1) 19-22 (2) 22-00 (3) 00-03 (2) 03-07 (1) 07-10 (2) 10-14 (1)	01-03 (1) 03-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	01-04 (1) 04-05 (2) 05-06 (1) 03-05 (1)*
Australasia	16-18 (1) 20-22 (1)	06-07 (1) 07-09 (2) 09-11 (1) 15-17 (1) 20-22 (1) 22-00 (3) 00-02 (2) 02-04 (1)	01-03 (1) 03-06 (2) 06-07 (1)	03-06 (1)
Caribbean, Central America & Northern Countries of South America	15-18 (1)** 09-13 (1) 13-15 (2) 15-17 (3) 17-18 (4) 18-19 (2) 19-20 (1)	06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-16 (2) 16-18 (3) 18-20 (4) 20-22 (3) 22-00 (2) 00-02 (1)	20-22 (1) 22-23 (2) 23-03 (3) 03-05 (2) 05-06 (1)	22-00 (1) 00-04 (2) 04-05 (1) 00-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	14-17 (1)** 09-12 (1) 12-14 (2) 14-16 (3) 16-17 (4) 17-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-23 (2) 23-02 (1)	21-23 (1) 23-03 (2) 03-05 (1)	22-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	*Nil*	18-21 (1) 21-23 (2) 23-01 (1)	22-04 (1) 04-06 (2) 06-07 (1)	04-06 (1)

Time Zone: PDT (24-Hour Time)
WESTERN USA TO:

	15 Meters	20 Meters	40 Meters	80 Meters
Western & Southern Europe & North Africa	*Nil*	06-07 (1) 07-08 (2) 08-14 (1) 14-18 (2) 18-20 (1) 22-00 (1)	20-23 (1)	*Nil*
Central & Northern Europe & European USSR	*Nil*	06-07 (1) 07-09 (2) 09-14 (1) 14-17 (2) 17-19 (1) 21-23 (1)	20-22 (1)	*Nil*
Eastern Mediterranean & Middle East	*Nil*	06-08 (1) 14-16 (1) 19-20 (1) 20-22 (2) 22-23 (1)	20-22 (1)	*Nil*
Western Africa	10-14 (1)	07-09 (1) 14-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	20-23 (1)	*Nil*
Eastern & Central Africa	*Nil*	14-16 (1) 16-18 (2) 18-19 (1) 06-08 (1)	*Nil*	*Nil*
Southern Africa	*Nil*	06-08 (1) 13-16 (1) 22-00 (1)	20-21 (1) 21-22 (2) 22-23 (1)	20-22 (1)
Central & South Asia	*Nil*	07-08 (1) 08-10 (2) 10-11 (1) 18-20 (1) 20-22 (2) 22-23 (1)	05-07 (1) 18-20 (1)	*Nil*
Southeast Asia	15-17 (1) 20-23 (1)	07-09 (1) 09-11 (2) 11-12 (1) 21-23 (1) 23-01 (2) 01-03 (1)	03-05 (1) 05-06 (2) 06-07 (1)	04-06 (1)
Far East	14-16 (1) 20-23 (1)	07-10 (2) 10-13 (1) 21-23 (1) 23-00 (2) 00-02 (3) 02-04 (2) 04-07 (1)	02-03 (1) 03-04 (2) 04-05 (3) 05-06 (2) 06-07 (1)	03-06 (1)
South Pacific & New Zealand	13-15 (1) 15-17 (2) 17-20 (3) 20-21 (2) 21-22 (1)	02-07 (1) 07-10 (2) 10-16 (1) 16-18 (2) 18-19 (3) 19-22 (4) 22-00 (3) 00-02 (2)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1)	00-02 (1) 02-06 (2) 06-07 (1) 02-05 (1)*

Australasia	15-18 (1) 18-21 (2) 21-22 (1)	19-21 (1) 21-22 (2) 22-00 (3) 00-02 (2) 02-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-16 (1)	00-01 (1) 01-04 (2) 04-06 (3) 06-07 (2) 07-08 (1)	02-05 (1) 05-06 (2) 06-07 (1) 04-06 (1)*
Caribbean, Central America & Northern Countries of South America	15-18 (1)** 10-13 (1) 13-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-07 (1) 07-10 (3) 10-15 (2) 15-18 (3) 18-21 (4) 21-22 (3) 22-23 (2) 23-02 (1)	19-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-06 (1)	20-21 (1) 21-03 (2) 03-05 (1) 23-04 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	12-16 (1)** 10-12 (1) 12-13 (2) 13-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	05-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-18 (3) 18-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	20-21 (1) 21-23 (2) 23-01 (1) 01-03 (2) 03-04 (1)	22-03 (1) 00-02 (1)*
McMurdo Sound, Antarctica	16-18 (1)	17-20 (1) 20-23 (2) 23-01 (1) 07-09 (1)	21-23 (1) 02-03 (1) 03-06 (2) 06-07 (1)	04-06 (1)

should open occasionally from the eastern half of the country towards Africa and Central and South America, and from the western half towards South Pacific, Australasia, the Far East, and Central and South America. Best time to check for these DX openings is during the late afternoon hours, particularly when conditions are expected to be High Normal or better.

Few DX openings are expected on *10* meters, but a number should be possible to the Caribbean and Central America via sporadic-*E* propagation. Longer openings into South America, and possibly to southern Africa and the South Pacific, may also be possible during the late afternoon hours, particularly when conditions are High Normal or better.

Longer hours of daylight and seasonally higher levels of static should reduce considerably the chances for DX openings on 40, 80, and 160 meters. Some fairly good openings, however, are forecast to several areas of the world for 40 meters during the hours of darkness and the sunset and sunrise periods. Similar openings, but usually with weaker signals, should often be possible on 80 meters during the hours of darkness. An occasional DX opening may also be possible on 160 meters during the nighttime hours.

Plenty of good short-skip openings are expected on the HF bands during the month. For distances less than 250 miles try 80 meters during the day and 160 meters at night. For openings between 250 and 750 miles, 40 meters should be best during the day and 80 meters at night. For openings beyond 750 miles, 20 meters should be optimum during the day and 40 meters at night. Frequent short-skip, sporadic-*E* type openings are also expected on 10 and 15 meters over distances between approximately 600 and 1300 miles. Fifteen meters should occasionally open over longer distances during the late afternoon.

This month's *CQ* Propagation Charts contain DX predictions for the period June 15 through August 15, 1987. Short-Skip Charts for June, for openings between 50 and 2300 miles and from Hawaii and Alaska, appeared in last month's column.

VHF Ionospheric Openings

A sharp increase can be expected in sporadic-*E* short-skip propagation during June and the summer months. Fairly frequent 6 meter openings should be possible over a range of 1000 to 1400 miles. During periods of intense and widespread ionization, two-hop 6 meter openings up to distances of about 2300 miles may also be possible.

An occasional sporadic-*E* opening on 2 meters can occur, particularly when sporadic-*E* ionization is very intense, over distances between approximately 1200 and 1400 miles.

While sporadic-*E* ionization can occur at any time, and hence its name, it is more likely to take place between 10 AM and 2 PM and again between 6 and 10 PM local daylight time.

Not much meteor-type propagation expected during June, but some might occur during a minor meteor shower which is expected to take place between June 8 and 10.

Check the Last Minute Forecast at the beginning of this column for those days during June that are expected to be Below Normal or Disturbed on the HF bands. These are the days on which auroral and perhaps other types of ionospheric propagation are most likely to occur on the VHF bands.

73, George, W3ASK

Announcing (from page 6)

• The following hamfests, etc, are slated for June:

June 6, **Independent Repeater Assn. Hamfest,** National Guard Armory, Byron Center, MI. Call 616-455-3915.

June 6, **Central Ontario Amateur Radio Fleamarket,** Bingeman Park, Kitchener, Ontario, Canada. Contact Guelph ARC, P.O. Box 1305, Guelph, Ontario N1H 6N9, Canada or call Ray Jennings, VE3CZE, 519-822-8342.

June 6–7, **Apple City Radio Club Hamfest,** Rocky Reach Dam, north of Wenatchee, WA. Contact Merton Hiatt, Apple City Radio Club, 1002 No. Surry Rd., Wenatchee, WA 98801.

June 6–7, **North Area Repeater Assn. Swapfest and Exposition,** Minnesota State Fairgrounds, St. Paul, MN. Contact Amateur Fair, P.O. Box 857, Hopkins, MN 55343 (612-566-4000).

June 6–7, **Northern Colorado ARC Superfest,** Larimer County Fairgrounds, Loveland, CO. Contact Duff McRoberts, NFØU, 1308 Ellen Place, Loveland, CO 80537 (303-669-3708). Wheelchair accessible.

June 7, **Goodyear Hamfest,** Wingfoot Lake Park near Akron, OH. Contact Don W. Rodgers, WA8SXJ, 161 Hawkins Ave., Akron, OH 44313 (216-864-3665).

June 7, **Ham-O-Rama '87,** Erlanger, Kentucky Lions Park. Contact WA4WNF, c/o NKARC, P.O. Box 281, Florence, KY 41042 (606-371-2255).

June 7, **Humboldt ARC Hamfest,** Humboldt, TN. Contact Ed Holmes, W4IGW, 501 N. 18th Ave., Humboldt, TN 38343 (901-784-3490).

June 7, **Starved Rock Radio Club Hamfest,** Bureau County Fairgrounds, Princeton, IL. Contact Ken Stasiak, WB9ZFO, Box 134, Lostant, IL 61334 (815-368-3284).

June 7, **Manassas, Virginia Hamfest,** Prince William County Fairgrounds, Manassas, VA. Contact Ole Virginia Hams ARC, P.O. Box 1255, Manassas, VA 22110, or call John Gunsett, KI4VP, 703-361-5255.

June 7, **Chelsea Swap and Shop,** Chelsea Fairgrounds, Chelsea, MI. Contact Robert Schantz, 416 Wilkinson St., Chelsea, MI 48118 (313-475-1795).

June 7, **Breeze Shooters Hamfest,** White Swan Amusement Park, near Greater Pittsburgh Int. Airport. Contact Bud Faulhaber, N3DOS, 1059 Balmoral Dr., Pittsburgh, Pa 15237 (412-366-5097).

June 10–13, **Antique Radio Club of America National Convention,** Sheraton Hotel and Exhibition Center, New Carrollton, MD. Contact ARCA, Box 684, Bryn Mawr, PA 19010.

June 13, **Gilfer SWL Fest/Fleamarket,** Gilfer Shortwave, Park Ridge, NJ. Call 201-391-7887.

June 14, **Six Meter Club of Chicago Hamfest,** Santa Fe Park, Willow Springs, IL. Contact Mike Corbett, K9ENZ, 606 South Fenton Ave., Romeoville, IL 60441.

June 14, **Monroe County Radio Comm. Assn. Swap and Shop,** Monroe, MI. Contact Elaine Wessel, KA8RNK, P.O. Box 237, Monroe, MI 48161 (313-279-1571).

June 14, **Hall of Science ARC Hamfest,** NY Hall of Science parking lot, Flushing Meadow Park, Queens, NY. Contact Steve Greenbaum, WB2KDG, 718-898-5599 (evenings).

June 19–21, **Central Alberta Radio League Picnic and Hamfest,** Red Deer, Alberta, Canada. Contact VE6BLD.

June 20, **Raritan Valley Radio Club Hamfest,** Columbia Park, Dunellen, NJ. Contact Dave, KA2TSM, 201-763-4849 (8 a.m. to 5 p.m.).

June 20, **Western Slope Amateur Radio and Computer Swapfest,** National Guard Armory, Grand Junction, CO. Contact Les Scott, NVØF, 2105 Yellowstone Rd., Grand Junction, CO 81503 (SASE) (303-242-5296).

June 20–21, **Mission Trail Net Roundup,** Visalia, CA. Contact Lyle Storey, K6JQY, 26062 Road 132, Visalia, CA 93277.

June 21, **Frederick ARC Hamfest,** Frederick, Maryland Fairgrounds. Contact Clyde C. Wachter, Jr., WB3KQV, 7317 Ridge Rd., Frederick, MD 21701.

June 21, **Satellite ARC Father's Day Swapfest,** Union Oil Co. New Love Picnic Ground south of Santa Maria, CA. Contact Santa Maria Swapfest, P.O. Box 5117, Vandenberg AFB, CA 93437.

June 21, **Lake County (IN) ARC Dad's Day Hamfest,** Lake County Fairgrounds, Crown Point, IN. Contact Ken Brown, WD9HYF, 918 Chippewa Dr., Crown Point, IN 46307.

Antennas & Accessories

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

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

More on the G5RV

This time columnist W8FX returns to the popular G5RV antenna with some interesting comments on recent developments by none other than the antenna's inventor, Louis Varney, G5RV. Don't miss this month's CQ exclusive!
—K2EEK

Last month we turned to a discussion of radio propagation, revisiting and updating the propagation coverage contained in the April 1984 and November 1985 columns. We reviewed some propagation basics, and also focused on new trends in the computer determination of propagation and grayline parameters with a look at the updated Super DX EDGE™, a high-tech version of Xantek's original Commodore 64 software package.

Just two months ago in the column we cleaned out the mailbag, so to speak, but we find that the letters are coming in as fast as ever. Therefore, this month we'll again devote much of the column to a review of some of the letters received. This time we have two most interesting letters which contain current information on the G5RV antenna design by the antenna's inventor, Louis Varney. Following our mailbag review we'll examine some new software of interest to readers and take a look at some good sources of hamshack reading material. Let's begin this month's discussions by turning to the G5RV.

G5RV Communique

Bill Wiseman, KM1E, dropped us a line concerning his friendship and correspondence with Louis Varney, G5RV, and attached a letter he had received from Louis. Taken together the two letters are rather lengthy, but in view of the considerable reader interest in this popular multiband HF antenna, reprinting the letters here is worthwhile and instructive. Writes KM1E:

"I am a longtime subscriber to *CQ* and have read with much interest your monthly feature on antennas, which is, in my opinion, one of the highlights of *CQ*'s editorial content *(Thanks, Bill!—ed.)*. I am also a longtime friend of G5RV. In fact, we both lived in the same town in England pre-World War II. In a sense, you might say Louis was my 'Elmer' because it was he who first got me interested in ham radio. We have both moved around the world a lot since then, but have kept in contact over the years.

"Earlier this year [1986], I paid him a visit at his summer QTH in England and told him about the substantive discussions of his antenna design which have been presented in several of your monthly articles. He was most interested in them, so after returning to the U. S. I sent him copies for his review. His comments are contained in a recent letter, a copy of which I enclose. As you can see from the text, Louis indicates you are free to make whatever use of his comments you may wish for your monthly feature. I hope you and your readers may find them to be of interest, and I am sure that should you have any specific questions you might want to put to him, Louis would be happy to respond."

Bill, we certainly appreciate your forwarding G5RV's letter. In that it contains some of the most current thinking on the G5RV from the inventor himself, it's appropriate to reprint most of his letter here. Writing to friend KM1E, Louis states:

"Thank you very much for sending me the W8FX monthly articles in *CQ*, which I read with interest. As you rightly say, it is surprising that there still appears to be some misconceptions about the functioning of the G5RV antenna, despite the many write-ups (apart from my own explanatory articles) that have been written and published all over the world.

"Particularly, I cannot understand why many amateurs persist in using a balun when they are feeding the antenna with 50 or 80 ohm coax. They don't seem to realize that only on 14 MHz does the matching section present a good match to 80 ohm coax for the full-size version, and on 28 MHz for the half-size G5RV, and that on all other bands the base of this [antenna system] presents a complex reactive load, which, as you know, a balun does not like! Whether they choose to use a 1:1 or a 4:1 balun makes no difference.

"The use of a suitable type of ASTU [antenna tuner] is essential with the G5RV antenna in order to satisfy the reactive load presented at the station end of the feeder system—whatever type of feeder is used. The anxiety about the possible unequal currents at the junction of the coax feeder and the matching section is quite unnecessary. I did some tests a few years ago to prove that provided the antenna is at a reasonable height above ground and [it is] symmetrical, and that the matching section descends reasonably vertically for at least 25 feet, the two currents are virtually equal.

"On the question of optimum feeder lengths, the only important thing is to ensure that the whole *system* (antenna plus matching section, plus whatever length of twinlead, openwire line, or coax is convenient to use from the base of the matching section to the ASTU) does *not* resonate so as to present an odd one-eighth wavelength to the transmatch. Because if it does, it will present a reactive condition which is impossible to satisfy either with a parallel or a series tuned circuit. Such a condition will result in the inability to obtain a 1:1 (or very near) VSWR at the transmitter output.

"Fortunately, this condition is only likely to occur on one of the HF bands. The simple remedy is to cut off or add on a few feet of the main feeder so as to avoid such a resonance. The only cases I know of where amateurs have experienced problems with the G5RV antenna have been due to the above condition or to the fact that they have departed from the basic design dimensions.

"Incidentally, under the heading 'Back to the Zepp' [Antennas & Accessories column, *CQ*, May 1986, p. 71], I do not agree with N4BLJ's statement that 'pattern plots are predictable . . .' In my experience, no type of antenna erected in a typical garden in close proximity to a house—with its electric wiring, plumbing, and other metal structures, wire fences, garden shed, tin roofs, etc.—produces the classic, theoretical polar diagram as seen in the textbooks. [The possible exception might be] well-designed and adjusted multi-element beam antennas, which concentrate the radiated energy in a fairly narrow forward beam with good front-to-back ratios and insignificant sidelobes."

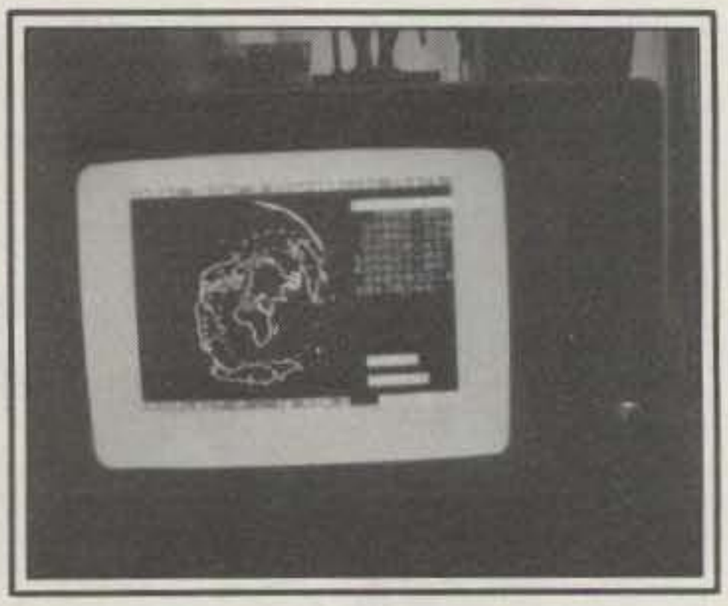
Louis enclosed some results of his tests on feeder current equality when using coax feeder *without* using a balun. The excellent current balance he reports on 3.5, 7, 14, and 28 MHz supports his comments about the lack of need for a balun with this type antenna. We thank both Bill and Louis for their timely and interesting comments on an increasingly popular antenna with readers of this column, and we solicit reader comments on the G5RV for our continuing forum.

Software Topix

Timex-Sinclair-Spectrum Notes. We have found, from the many letters received, that the Timex-Sinclair family of computers is still popular with *CQ* readers, despite the fact that these computers have generally evolved into "orphans" in the highly competitive computer marketplace.

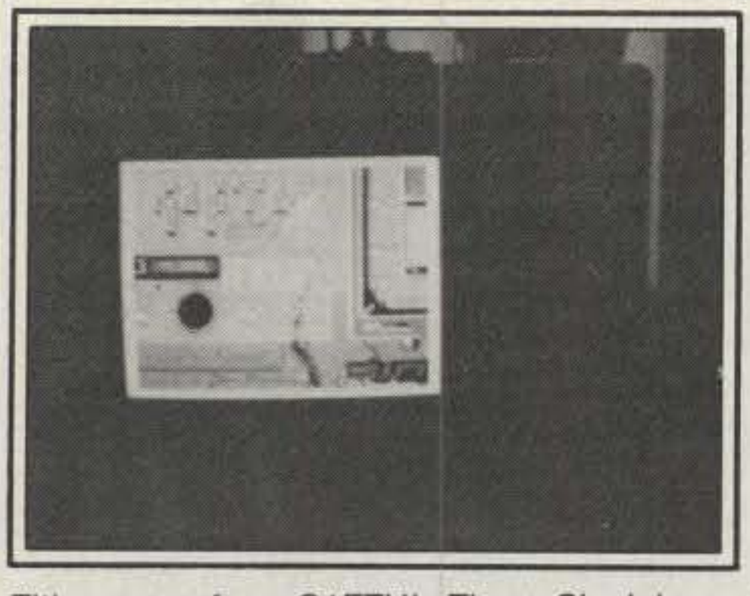
Bob Howard, W6DLI, is known to us as a dyed-in-the-wool believer in this computer family, especially in terms of hamshack applications. Writes Bob, in response to our writeup and photos in the June and October 86 issues:

"By the time your columns were printed, Sinclair in England had sold rights to the Sinclair name and Spectrum line of computers to arch-rival AMSTRAD. They did not acquire Sinclair Research, Ltd., or the rights for Eastern



Another Timex-Sinclair capability: OSCAR 9 "footprint" on globe, from GM4IHJ, via SARUG. (Photo courtesy WA6DLI)

317 Poplar Drive, Millbrook, AL 36054



Title screen from G1FTU's Timex-Sinclair no-interface RTTY transmit/receive program. (Photo courtesy WA6DLI)

WeatherFax satellite photo showing weather conditions over Italy, from Dieter Oslender in Germany. (Photo courtesy WA6DLI)

Europe or North America, which Timex seems to have acquired as part of what debt was owed to them as the production arm for Sinclair.

"A fallout of all this was apparently an order for the Timex TC2068 (designed for Europe) by Poland. [This was a buy] for use in schools, of 800,000 computers and 200,000 disk drives, and perhaps [there was] a similar deal with the Czechs. The TC2068, in a USA standard, may invade Mexico, so some might make it across the border [to the U.S.]. This will at least place the Timex Sinclair Spectrum in the three million class that IBM is advertising!

"The 8/32-bit computer, the QL, is up in the air in England, but the American version is being sold by a network of dealers supplied by A+ Computers of Keene, NH, which acquired the stocks of Sinclair USA when they retreated. The QL has the 68008 chip in the family of Motorola chips used in the Macintosh, Atari 520/1040, and Amiga, which have 16/32-bit 68000 chips (the IBM is an 8/16-bit 8088 chip computer in the PC and XT models). For hams with an inclination to put [a computer] together, a 'kit' QL is available for $139 plus $7 shipping from A+ Computers, 69-B Island Street, Keene, NH 03431. It is an assembled circuit board that just needs to be put back in the case with the microdrives and keyboard. User groups can get an even better deal on a group purchase of 25.

"With the publication of my comments in *CQ*, I heard from Sweden and Germany, in addition to the USA, concerning interest in the Sinclair, Timex, and Spectrum computers. For Europeans, the British ham group is SARUG, the Sinclair Amateur Radio User Group. Information can be obtained from Paul Newman, G4IMP, 3 Red House Lane, Leiston, Suffolk IP16 4JZ, UK. Membership in the UK is 5 pounds (British) plus 5 SASEs; elsewhere, it is 8 pounds, payment to P. Newman [at the above address]."

As a postscript, Bob added that "...[Timex-Sinclair] computers are used by dedicated SWL satellite trackers who keep tabs on military and weather satellites. I heard from Dieter Oslender in Germany, who receives WeatherFax, etc., on an RGB monitor; I am enclosing some TS2068/Spectrum pictures as photographed from my RGB monitor, as received from SARUG and Dieter."

Thanks for the update, Bob, and I hope that this information isn't outdated by the time it reaches print. We're pleased to print here some of the interesting photos you sent along. Hopefully, the Polaroids will reproduce well in glorious black and white!

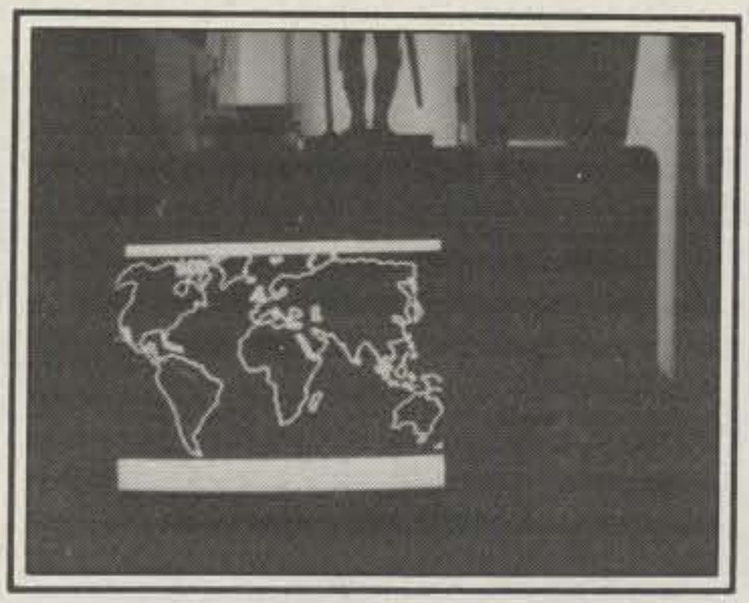
MORSCODE Tutor. Duane Stilwell wrote about his program, MORSCODE Tutor, which he wrote for the IBM-PC/XT/AT and compatibles, and which he markets through his firm, Cyber-ware Corp. Writes Duane:

"After reading several of your articles in *CQ*, I see that you cover a wide variety of subjects, including software as well as antenna design and instructional material. Here is a computer program we hope you will take some time to try out, and if you find it useful we would appreciate mention in your monthly feature. We think that the program has merit as a training aid.

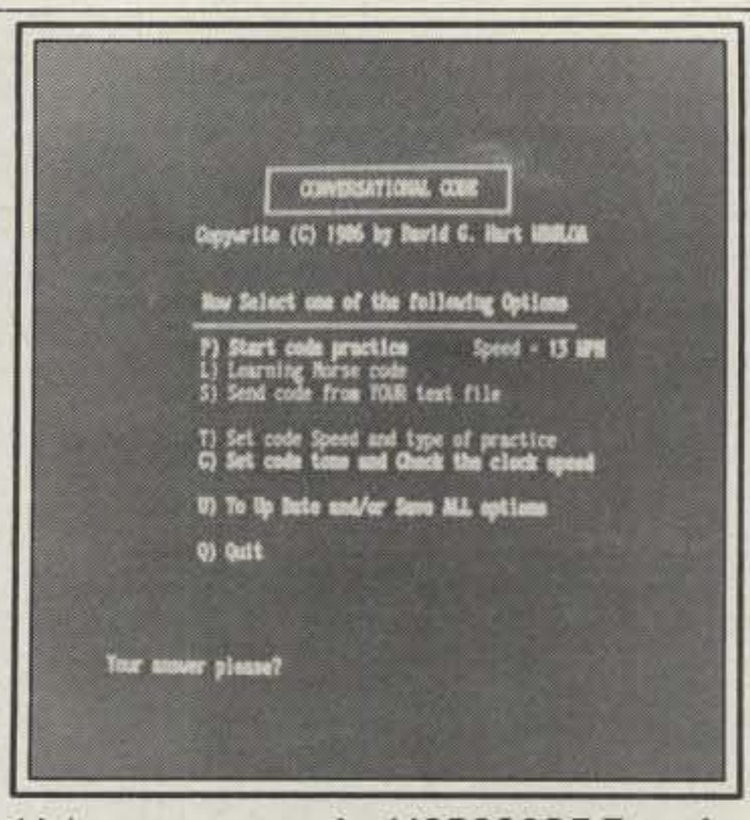
"MORSCODE Tutor, by Dave Hart, WBØLOA, is intended for use by everyone from beginners studying for the Novice license to Advanced-level operators wishing to improve speed and accuracy. As you will see, it's sophisticated and, we feel, reasonably priced at $29.95 including postage and handling."

We found the menu driven program to be a very competent one, one which has a number of useful features that indeed make it appropriate for various skill level use. Some of the features include user-selectable speed of from 3 to 99 wpm; generation of random (but logical) typical conversations in actual examination format, as well as typical QSOs; ability to send characters, words, or conversational code from a built-in dictionary; capability of sending code from your own text files; and several other features. The operating manual is on the disk and may be viewed on screen or printed out.

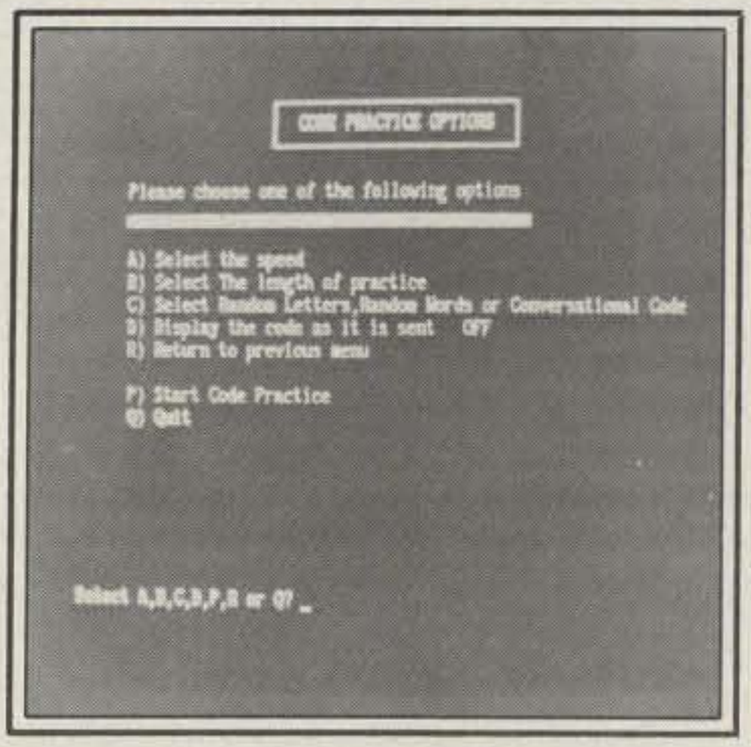
For more details, contact Duane Stilwell at Cyber-ware Corp., 4411 Bee Ridge Rd. S.251, Sarasota, FL 33583.



German "SAT-BAHN" Spectrum computer program showing OSCAR 10 going from Baja, California to Brazil (at about 2000 GMT on 27 September 1986). (Photo courtesy WA6DLI)



Main menu screen for MORSCODE Tutor for the IBM-PC/XT/AT and compatibles. See text for a description of the program. (W8FX photo)

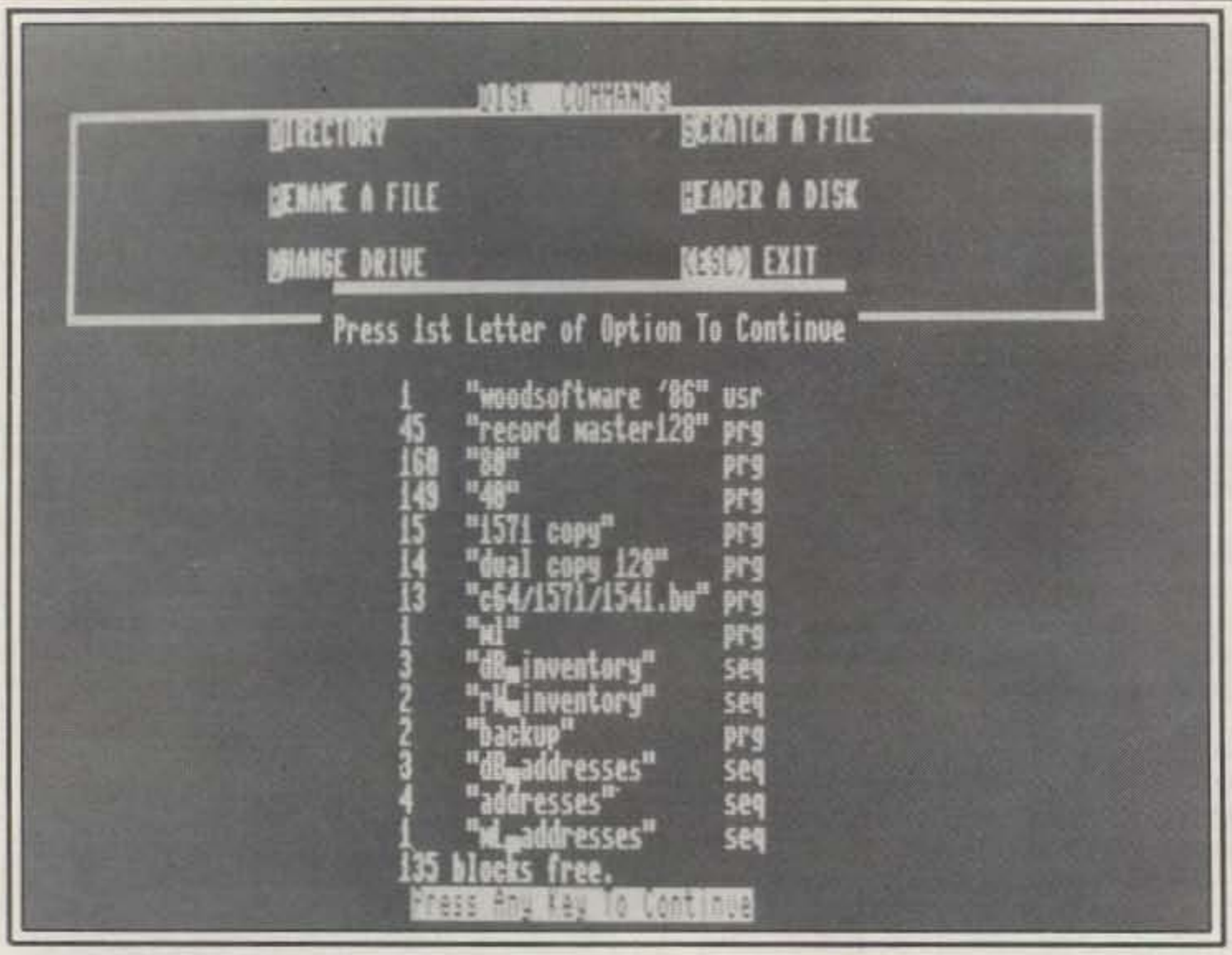


Shown here is one of the menu selections screens from MORSCODE Tutor, by David G. Hart, WBØLOA. Program features "typical QSO conversations" with user-selected levels from 3 to 99 wpm. (W8FX photo)

Record Master 128. It's a pleasure to highlight a fairly new program for the Commodore 128, one which we use ourselves to maintain various hamshack databases. This is Record Master 128 by WOODSoftware, a powerful, sophisticated package that is a functional workalike to the popular Commodore 64 packages FlexFile™ and PractiFile™.

For several years we have used the similar programs FlexFile and PractiFile in various hamshack and general-purpose database applications. We found that these two programs provided excellent data management power, but at the same time were extremely easy to use, even when devising complex record formats, search options, and sort functions. The programs are menu-driven and self-prompting, so the user is walked through even complex database setups. Frankly, most of the other Commodore databases we had tried were insufficiently powerful for serious use, while the few that were sufficiently powerful were too difficult to conveniently use, or required the learning of a database command language.

For over two years we have maintained a list of antenna manufacturers and dealers, as well as a listing of amateur radio software sources, using PractiFile on the Commodore 64. About



The Disk Commands screen on the Record Master 128 program by WOODSoftware. The program disk's directory is shown in this photo. (W8FX photo)

Title screen from The Big Blue Reader, an unusual disk and file format conversion program offered by S.O.G.W.A.P. Software. Program is designed to allow interchange of data between Commodore and IBM computers. (W8FX photo)

the only criticism of the database in meeting our needs is really directed at the computer itself, which limits the display screen to 40 columns, and to the Commodore 1541 disk drive, which is slow even in handling the random files which PractiFile produces. Because of these limitations, we had considered redoing the database using an IBM-PC compatible database program, but didn't want to go to the trouble of doing so. Then we saw an ad for Record Master 128.

The program's author, Donald G. Woods, was kind enough to send us a review copy, and we're enthusiastic about the program's performance. In particular, it can directly read any files produced by the Commodore 64 versions of FlexFile and PractiFile, and it also offers several powerful enhancements not included in the original 64 programs, while retaining the easy-to-learn features, including the screen prompting.

Some of the features offered by Record Master 128 include compatibility with both 40- and 80-column display screens; support of the FAST mode in 80 columns; up to 79 characters per field, 254 characters per record, 40 fields per record, and 10,000 records per database; and output to printer, screen, or disk. The program also sorts files alphabetically or numerically, with sorting on multiple keys; offers a data select feature using over nine conditionals; creates wordprocessor files; and includes a data transport (export and import) feature, mailing label generator, batch entry of data, and report writer with a calculation feature.

The $49.95 program works with one or two disk drives, a dual drive, or a hard disk drive, and will output to the printer either in true ASCII or Commodore-specific PETSCII format. The firm has a liberal update policy: returning the warranty card with $10 entitles the user to free updates for two years. The program is marketed for WOODSoftware by Mid-Kansas Computers, 204 W. 6th, Newton, KS 67114. A Commodore Amiga version is also available.

Incidentally, ham and computer club secretaries and treasurers should particularly like this program due to its ability to organize large quantities of information, maintain membership lists, and efficiently print mailing labels and membership reports, with little technical knowledge of databases being required.

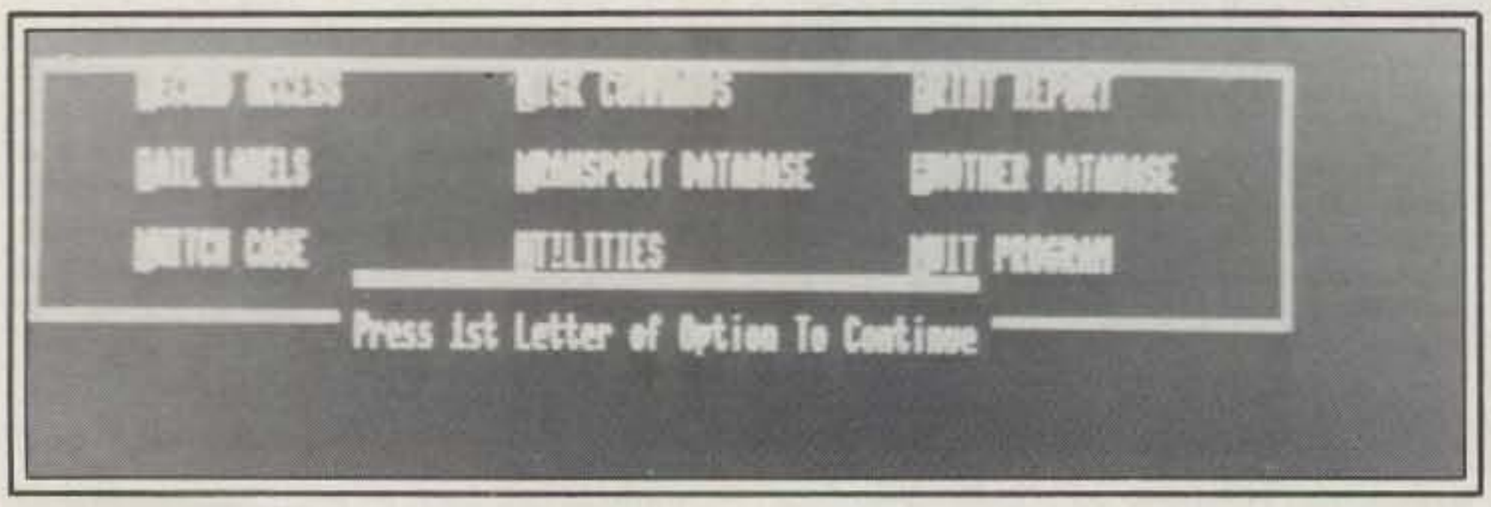
The Big Blue Reader. We're equally enthusiastic about another Commodore 128 software product that we think will find much application in hamshacks; this is The Big Blue Reader. It's a program that bridges the gap, in several respects, between Commodore and IBM-PC computers, allowing disk and file interchange between the two radically different computer systems. It effectively gives the Commodore 128 user the ability to read from and write to MS-DOS files.

This new program from S.O.G.W.A.P. Software is made to order for the individual who, like myself, has productively been using a Commodore computer for several years, but recently added an MS-DOS (IBM-compatible) computer to the hamshack. Transporting wordprocessor and database files between the two computers is now possible with this program, allowing you to transport letter and other document files, computer-based logbooks, contest logs and records, equipment warranty and insurance files, and the like, maintained on a Commodore, to the IBM-based machine (or vice versa). This capability is a godsend to many, since it can eliminate tedious retyping and general annoyance.

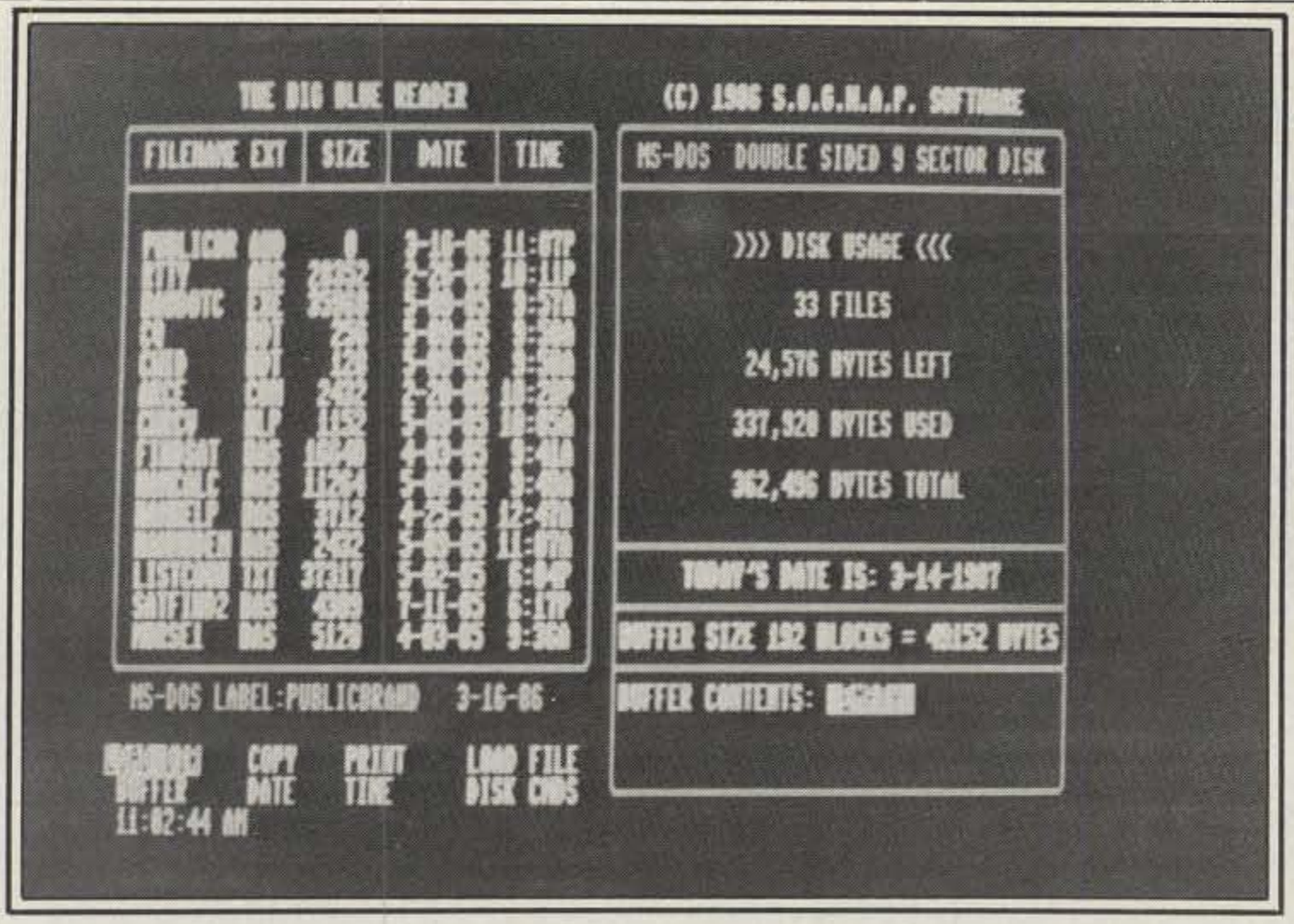
The Big Blue Reader is designed to copy standard MS-DOS format disk files to and from standard Commodore disk files; MS-DOS versions 1.0 through 3.1 disk formats (SSDD/DSDD, eight- and nine-sectors) are supported. The program reads and writes to single- or double-sided disks with the Commodore 1571 disk drive. Optional translation of Commodore ASCII (PETSCII) to and from standard ASCII is provided.

Either Commodore or MS-DOS ASCII files may be viewed on the screen or sent to a printer for hardcopy. ASCII files are transferred from MS-DOS to Commodore format at 12,000 bytes per minute, while Commodore files are translated to MS-DOS format at a respectable 20,000 bytes per minute.

Two additional utility programs are provided in the package. The first is Big Blue Back-Up, which backs up a complete MS-DOS disk to an-



We've found Record Master 128 to be an excellent Commodore 128 database—easy to use but powerful, and compatible with the popular Commodore 64 file management programs, PractiFile and FlexFile. Shown here is the program's second menu screen. (Photo by W8FX)



Shown here is the main display screen of The Big Blue Reader, described in this month's column. The directory of an MS-DOS disk is displayed on the left-hand side of the screen. (W8FX photo)

other MS-DOS disk, also using the Commodore 1571 disk drive. The backed-up copy will be exactly like the original disk, whether single- or double-sided, and eight- or nine-sectors. A second module is Big Blue Format, which formats a standard, nine-sector MS-DOS disk on the 1571 disk drive. Like other program operations, this process is fast, taking about one minute.

After working with the program for awhile, I found that it works as advertised, and is a boon to the individual who would like to transport files from his Commodore to an MS-DOS machine, or who would like to bring home office work created on an IBM-PC or compatible, using the files on a Commodore. Too, anyone who "upgrades" his hamshack to include an IBM-PC compatible and has lots of data and wordprocessing files in Commodore format will likely find good uses for this software. The program really works!

You should be aware, however, that while The Big Blue Reader can work some wonders, it doesn't perform miracles. There are some limitations. The program doesn't allow you to actually *run* MS-DOS programs; these are designed to run on a completely different microprocessor, usually the 8088 or 80286, while the Commodore 128 uses the 6582 microprocessor.

Also, the program will not do complete file conversions between all programs. The Reader program works primarily with ASCII and PETASCII files; Commodore SEQUENTIAL (SEQ) files are handled best, while PROGRAM (PRG) files may not transfer successfully. Too, some wordprocessors and other programs use unique embedded formatting commands to format text output which are not compatible with other wordprocessors or programs.

According to a company representative we contacted, for the program to function and allow the transfer of files and text, The Big Blue Reader mut be used with a C-128 and at least one 1571 disk drive. A second disk drive may be used, but it need not be a 1571; a 1541 or compatible will do. So far they have not found any IBM-generated software with which the program will not work. And by the time this appears in *CQ*, a CP/M version of the program should be available.

Fig. 1 shows the program's Main Menu, as it displays the directory information on a standard Commodore format disk. Fig. 2 shows directory information on an MS-DOS disk. The panel at the bottom left of the screen is used to select among the program's major functions using the cursor controls on the computer's keyboard.

The Big Blue Reader is priced at $29.95 and is available from S.O.G.W.A.P. Software, Inc., 611 Boccaccio Avenue, Venice, CA 90291.

Note from The Source. Commodore users of the popular telecommunications service, The Source Information Network, will be happy to know that a Special Interest Group (SIG) has been established to support Commodore 64, 128, and Amiga users. Called ICUGSIG, short for the Independent Computer Users Group, the new service provides over 100 keyword searchable software programs, many of them free for the asking; bulletin boards; and more than a dozen computer conference areas. ICUGSIG helps Commodore and Amiga users find quick answers to their computing questions, search out bargains in new and used equipment, share concerns and interest about industry developments, and enjoy sharing their computing enthusiasm with other computer users. This SIG is one of the largest provided on The Source, and it includes extensive sub-groups. Each sub-group has its own software library, member directory, conferences, and bulletin boards.

Information on The Source can be had by writing to Source Telecommunications Corporation, 1616 Anderson Road, McLean, VA

```
THE BIG BLUE READER                    (C) 1986 S.O.G.W.A.P. SOFTWARE

 FILE NAME          TYP   BLOCKS        COMMODORE SINGLE SIDED DISK

HOW TO USE          PRG     42              >>> DISK USAGE <<<
HOW TO PART 2       PRG     36
CBM                 USR      1            33 PROGRAM FILES
DOS SHELL           PRG     68             0 SEQUENTIAL FILES
C-64 WEDGE          PRG      1             1 OTHER FILES
VIC-20 WEDGE        PRG      4            34 TOTAL FILES
DOS 5.1             PRG      4
SD.BACKUP.C16       PRG      7           281 BLOCKS FREE
SD.BACKUP.+4        PRG      7           382 BLOCKS USED
SD.BACKUP.C64       PRG     13           663 BLOCKS TOTAL
SD.COPY.C64         PRG      8        71,374 BYTES FREE ON DISK
UNI-COPY            PRG     14
PRINT.+4.UTIL       PRG      8        TODAY'S DATE IS: 6-14-1986
PRINT.C16.UTIL      PRG      8
                                     BUFFER SIZE 192 BLOCKS = 49152 BYTES
DISK NAME:1571 TEST / DEMO  ID:DS 2A
                                     BUFFER CONTENTS:  EMPTY
LOAD DIR     COPY     PRINT     LOAD FILE
 BUFFER      DATE     TIME      DISK CMDS
 12:02:33 PM
```

Fig. 1– The Big Blue Reader main menu w/CBM format disk directory. Di rectory information for a standard Commodore format disk is shown here as displayed in the main menu. Panel at bottom left-hand corner of the screen is used to select among the program's main functions.

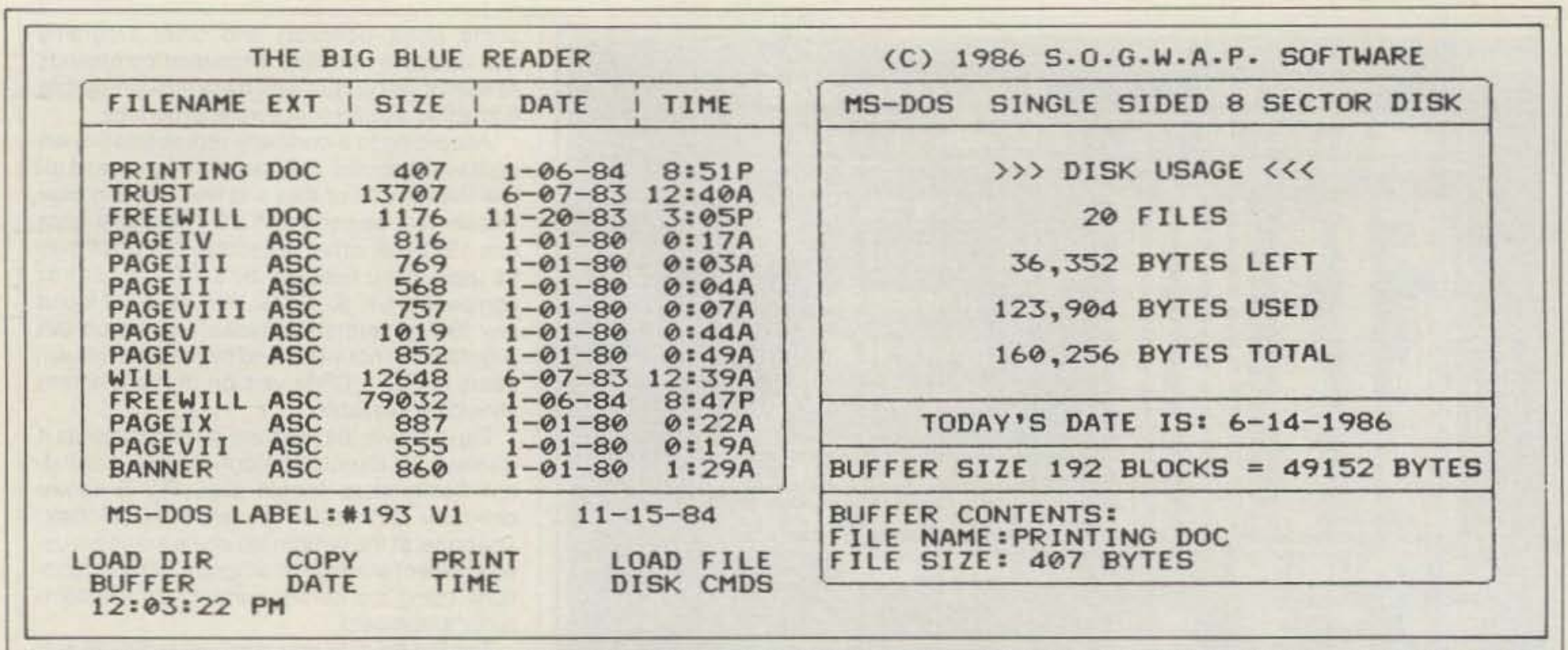


Fig. 2–The Big Blue Reader main menu w/MS-DOS format disk directory. Directory information for a standard MS-DOS format disk is here displayed in the main menu. Panel at bottom left is used to control the program's various functions.

22102. A toll-free number is available: 800-336-3366.

Good Reading

New Encomm Catalog. Donna Irby at Encomm, Inc., sent me a copy of their new catalog, knowing that my "specialty" is antennas and accessories, including computer equipment. Several of the products they distribute caught my eye.

One is the Diamond 25–1300 MHz continuous-coverage D-130 Discone antenna, an ultra-wideband antenna that covers amateur radio, air traffic control, and various utility frequencies in the specified range. Although Discones are primarily considered to be receiving antennas, the D-130 can be used for transmitting in some of the frequency ranges covered by the antenna. The D-130 is a 67 inch long, 2.2 pound stainless steel antenna that allows transmission on most amateur VHF and UHF bands (6 m, 2 m, 70 cm, 33 cm, and 23 cm). Up to 200 watts may be used on these "transmittable" frequency bands.

Encomm also distributes the popular Kenpro KR-5400A/5600A Computer Control Interfaces for automatic satellite antenna pointing via computers such as the Commodore 64. While the KR-5400A provides the electromechanical interface to the rotor motors, the actual hardware interface to the computer is provided by the KR-001, which consists of Analog-to-Digital (A/D) converters for the elevation and azimuth channels. It also provides the drive signal for driving the motors in the desired direction.

The KR-001 plugs into the C-64's cartridge port and operates with tracking software written by N4HY and AMSAT, available from the AMSAT Software Exchange. Kenpro and Encomm provide the software needed to point the antenna from data entered in the program in real time; information regarding automatic tracking routines is available from Kenpro and Encomm for those who wish to write their own tracking software. For those who own computers other than the Commodore 64, but which have a standard RS-232 Serial Interface, the KR-010 converter is available.

For more information or a catalog, write to Encomm, Inc., 1506 Capital, Plano, TX 75054.

Radio Database International. This book should be of special interest to our SWL readers, as well as amateurs who might think that it's time to rediscover what's going on between the ham bands in terms of international broadcasting. The 1987 edition of this popular quick-access entertainment guide to the more than 1,100 frequencies on which news, music, sports, and information are broadcast is now available. Authored by Lawrence Magne, it has been called the closest thing to *TV Guide* for the shortwave spectrum, as its format makes identifying particular stations quite easy.

The 350-page book lists mediumwave and shortwave stations by country and frequency, and it also provides the language, power, and antenna directivity at specific times of the day. It contains a wealth of information on international broadcasting, including the entire broadcasting spectrum arranged in a single volume; a cross-index of major stations listed alphabetically by country; more than a dozen articles for the newcomer and seasoned listener; and a buyer's guide to dozens of portable and tabletop "world-band" radios, with prices and comparative ratings. A special feature of the book is the graphic WORLDSCAN listings, which make it easy to tell which stations can be heard at which time, and in what language.

The book is available from International Broadcasting Services, Ltd., P.O. Box 300, Penn's Park, PA 18943, for $12.95 plus $1.95 shipping and handling. It is also available from the ARRL.

Wrapping It Up

That's all Alan will let me write this month, gang. We've covered a lot of ground, though, with some letters of interest, particularly with information from the venerable Louis Varney, G5RV, whose antenna bears his callsign; a look at some useful computer software for Commodore and IBM computers; and a peek at some instructional reading matter.

Next month we plan to return to our examination of propagation with a close look at Band-Aid, an exciting propagation aid for the IBM-PC user. See you then.

73, Karl, W8FX

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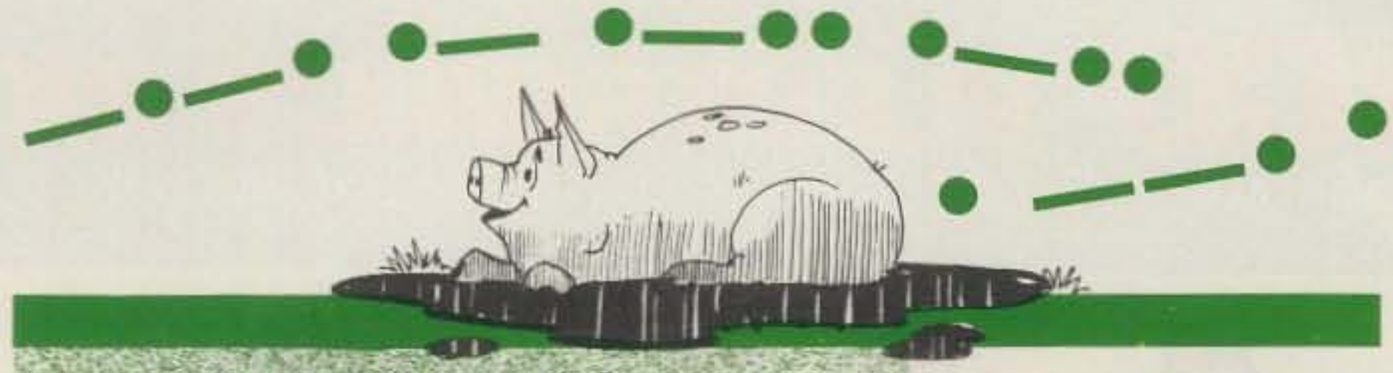

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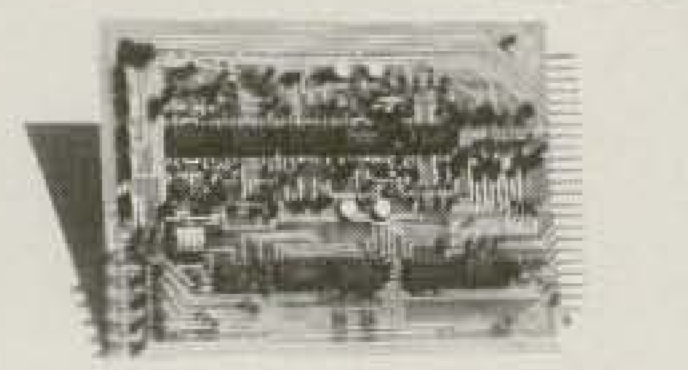

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