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Amateur Radio

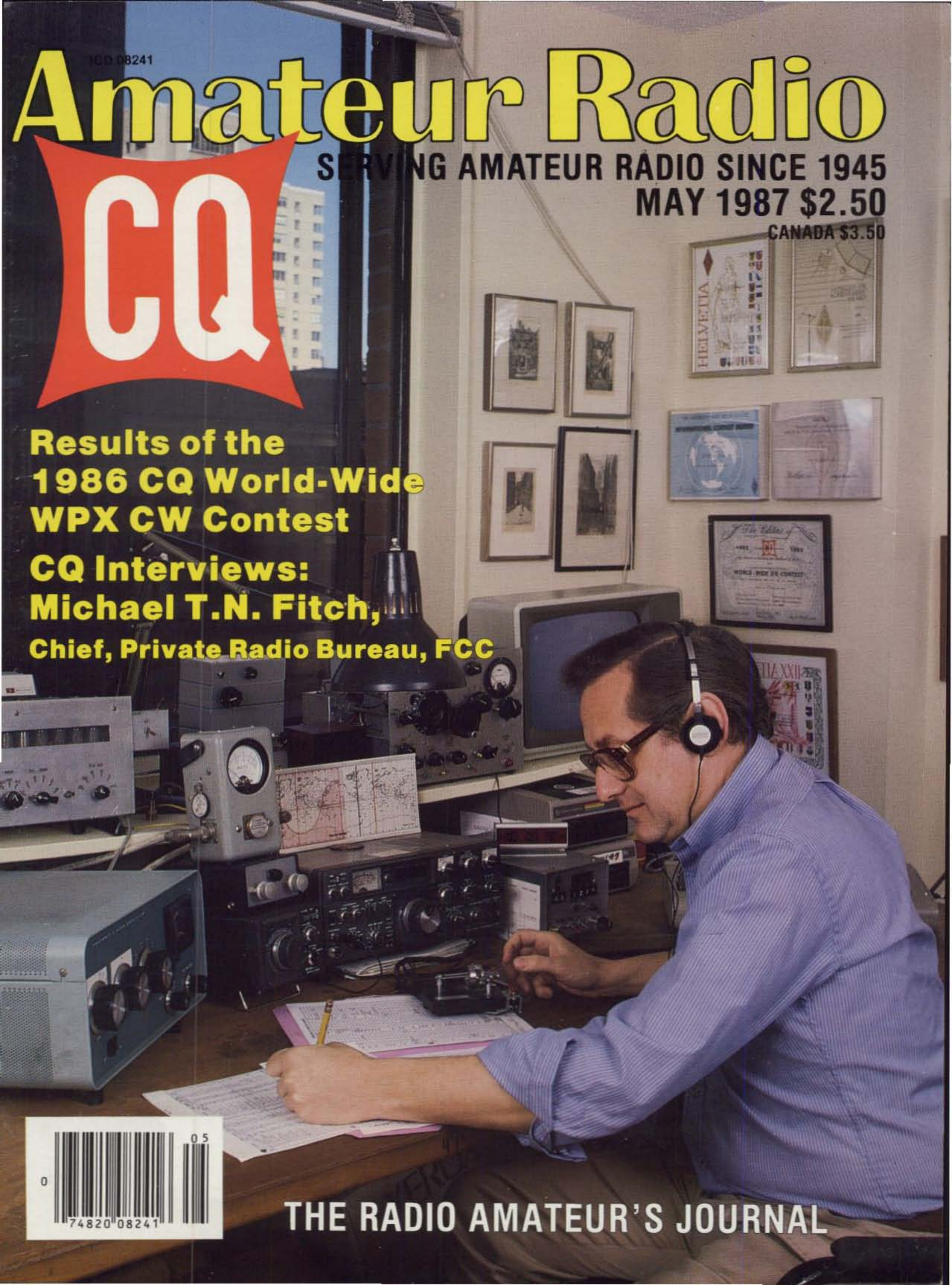
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CQ

**Results of the
1986 CQ World-Wide
WPX CW Contest
CQ Interviews:
Michael T.N. Fitch,
Chief, Private Radio Bureau, FCC**



THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in Amateur radio

First Again!

TW-4100A 2 m/70 cm FM Dual Bander

A Kenwood original just got better! Kenwood was the first to develop a 2 m/70 cm mobile radio in a single, compact package. Since then, other companies have imitated the concept, but still have not done it the "Kenwood way." The all-new TW-4100A is more compact, more powerful, and packed with more features than ever before! With many new features and accessories, and backed by Kenwood's experience, the all-new Kenwood Dual Bander is light years ahead of the rest!

- **Selectable full duplex cross band ("telephone style") operation.** Remote base or cross band repeater function possible (a control operator is needed for remote or repeater operation*).
- **45 watts on 2 m. 35 watts on 70 cm.** 5 watts (adjustable) low.
- **Frequency coverage: 142-149 MHz (allows operation on certain MARS and CAP frequencies) and 440-449.995 MHz.**



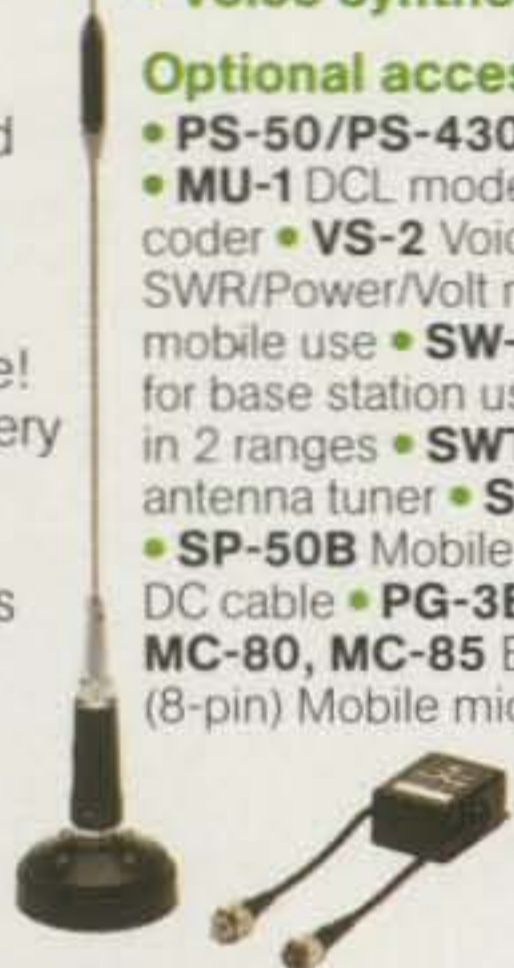
- **New compact size!** Only 5.9" W x 1.97" H x 7.87" D and weighs less than 4 pounds!
- **Proven high performance Kenwood GaAs FET front end receiver.**
- **Easy to operate!** Only 3 knobs and 8 keys on the front panel.
- **Separate antenna ports for VHF and UHF.** Minimizes loss and increases reliability and performance!
- **10 memory channels.** Lithium battery backs up memory. Store frequency, offset, subtone. Two channels store the transmit and receive frequencies independently for odd split or cross band operation.
- **Front panel-selectable CTCSS tone (when optional TU-7 is installed.)**

- **Non-volatile operating system.** Even after memory back up cell dies, all operating features remain intact! No re-programming or "board-swapping" necessary!
- **Programmable band scan and memory scan with memory channel lock-out.**
- **Large, illuminated LCD display and main knob.** For excellent visibility in direct sunlight or darkness.
- **Selectable frequency step for quick and easy QSY.**
- **Voice synthesizer VS-2 option.**

Optional accessories:

- PS-50/PS-430 DC power supplies
- MU-1 DCL modem unit
- TU-7 CTCSS encoder
- VS-2 Voice synthesizer
- SW-100B SWR/Power/Volt meter 140-450 MHz for mobile use
- SW-200B SWR/Power meter for base station use 140-450 MHz. 0-200 W in 2 ranges
- SWT-1/SWT-2 2 m and 70 cm antenna tuner
- SP-40 Compact speaker
- SP-50B Mobile speaker
- PG-2N Extra DC cable
- PG-3B DC noise filter
- MC-60A, MC-80, MC-85 Base station mics.
- MC-55 (8-pin) Mobile microphone
- MA-4000

Dual band mobile antenna with duplexer (mount not included) • MB-11 Extra mobile mount



- **Digital Channel Link (DCL) option.**

*Please check FCC regulations on repeater operation.
Minor modification necessary for repeater operation.
Specifications and prices subject to change without notice or obligation.
Complete service manuals are available for all Trio-Kenwood transceivers and most accessories.

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Compton, California 90220

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HF to Microwaves!

TS-670

40, 15, 10, and
6-meter all mode
"Quad Bander"

- Keyboard selection of frequency, as well as "traditional" VFO
- 80 memory channels store frequency, band, mode data
- All-mode squelch, noise blanker, RF attenuator
- Optional general coverage unit, voice synthesizer, FM unit, IF filters



TR-50

1.2 GHz FM transceiver

**The perfect portable
for microwave
mountain-topping!**

- 1 watt output
- LCD frequency readout with S & RF power meter
- 5 memory channels

- Odd split on memory channel 5
- Includes: Battery set, charger, external power cable, 16-key DTMF hand microphone, sleeve antenna with adjustable mount, shoulder strap.



TM-221A/421A

The compact FM mobile transceivers

- TM-221A: 2 m, 45 W, with expanded receiver coverage (138-174 MHz). Modifiable for MARS or CAP operation. (MARS or CAP permit required.)
- TM-421A: 70 cm, 35 W. The first compact 35 watt 70 cm transceiver!
- Built-in front panel-selectable CTCSS encoder. Decode optional.
- Famous high performance Kenwood GaAs FET front end.
- 14 full-function memory channels, 2 channels for odd split operation.
- 16-key DTMF mic., mic. hook, mounting bracket, and DC cable included.
- Remote control telephone-style handset option (model RC-10).



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

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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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The Radio Amateur's Journal



ON THE COVER: Tony Japha, N2UN, top NY single operator for 40 meters in the 1986 CQ WPX CW Contest shows us how it's done from downtown New York City. That's quite an accomplishment. Photo by Larry Mulvehill, WB2ZPI.

MAY 1987

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Zero Bias

AN EDITORIAL

This month we are proud to present an exclusive interview with Michael T.N. Fitch, Chief, Private Radio Bureau, FCC. Mr. Fitch raises some very interesting points with regard to our "purpose" and most especially our success rate in selling amateur radio to newcomers. While this interview was compiled shortly before Novice Enhancement was enacted, the fact that we now have Novice Enhancement doesn't lessen the need for a very active sales job on our part.

At the first few hamfests of the 1987 season, Novice Enhancement continues to be the hot topic of conversation. Just about everyone is enthusiastic about it. In the beginning of March, *CQ* made a specific mailing to all licensed Novices letting them know all the particulars and the start-up date (which coincided with the Charlotte Hamfest). The amateur press covered the material generally in the April issues, which typically arrived at the reader's homes toward the end of the preceding month (March). So, the word is out. Now what?

A few of the guys who run amateur radio classes who were at the Orlando Hamfest (early March) said that their enrollment had risen just on the news of Novice Enhancement. Presumably, more families are going as groups now that there are phone privileges as a very active incentive. I noticed that at both the Miami and the Orlando Hamfests more people were bringing their children. I had a bitter comment in last month's editorial about the fact that we brought about 50 copies of the Archie amateur radio comic book to Miami and ran out early in the show. There were no other copies available at that show. Well, at Orlando, the situation improved somewhat. Gordon West of Gordon West Radio School brought copies, and this time we brought 100 copies. We both ran out of them. The same situation occurred in Charlotte. I guess that I'm trying to shame some folks into bringing the books to shows instead of storing them for posterity. All you have

to see is the avid face of a youngster going through the pages to see that the comic books do have an immediate positive impact. No, it's not the total answer, but it's a very big step in the right direction.

By the time most of you read this, Novice Enhancement will be a fact, an established fact. Right now we can only guess as to the increase in activity. What the im-



Everyone knows what a rubber-duckie is, but Chip Margelli, K7JA, of Yaesu, jumps the evolutionary scale in creating a 40 meter rubber-condor (no, it's not in their catalog) for Yaesu's HF packset. Here Chip passes inconspicuously past the CQ booth at Charlotte.

impact on 10 meters and 220 MHz will be is really up to the number of licensed amateurs ready to jump onboard. In some areas, repeater coordinators will have to take their job a bit more seriously and start coordinating lest we have repeaters all over the place. Putting everything on PL may be somebody's idea of a solution, but it's a very bad idea that will come back to haunt him.

We at *CQ* helped to celebrate the coming of Novice Enhancement at the Charlotte Hamfest. We had a banner proclaiming Happy Novice Enhancement (3/21/87) at the *CQ* booth. It was nice of the folks at Charlotte to have a hamfest on the same day. The Charlotte show itself was pretty busy and they had a great fleamarket. As with the Miami and Orlando Hamfests earlier in the year, people are coming out this year in greater numbers than last year. Maybe the word is getting out that you can really have some fun at these things. It is a wonderful way to see and touch all the latest in amateur radio gear. It's also a great place to pick up parts, components, and hardware for construction projects for those who like to roll their own.

Now that we have a super story to tell about amateur radio and what a Novice license can mean, I'd like to see more clubs taking booths at these hamfests just to sign up students for classes and to answer questions from prospective amateurs. There are people who come to hamfests just out of curiosity or those who have a limited knowledge about communications both of whom could become amateurs with just a little bit of encouragement and direction. We all know that it's a little more involved than telling them to buy this book and tape or that book and tape and go home and memorize.

It's also a good time for those with operating experience to get on 10 and 220 MHz and give the newcomers some pointers on operating. Make a few contacts with Novices and Technicians and show them the ropes. In operating phone we generally imitate what we hear, both the good and the bad. It's much easier and beneficial to start off learning good habits. Some of these folks will be scared and mike-shy, but a little bit of encouragement will go a long way. Just think back to the first few phone contacts you made, and most importantly, the few amateurs who helped you through the rough spots. I'll bet you can still remember their calls and names after all these years.

While it is a fact that a lot of us are getting on in years and the median age is indeed rising, there is a positive side to that situation. The wealth of experience, technique, and simple down-to-earth "how-to" has presumably grown, too. It's time for some of us to pass that along. Call it paying dues, paying rent, or paying anything for the free ride we've all enjoyed for many years. In the long run, nothing is free.

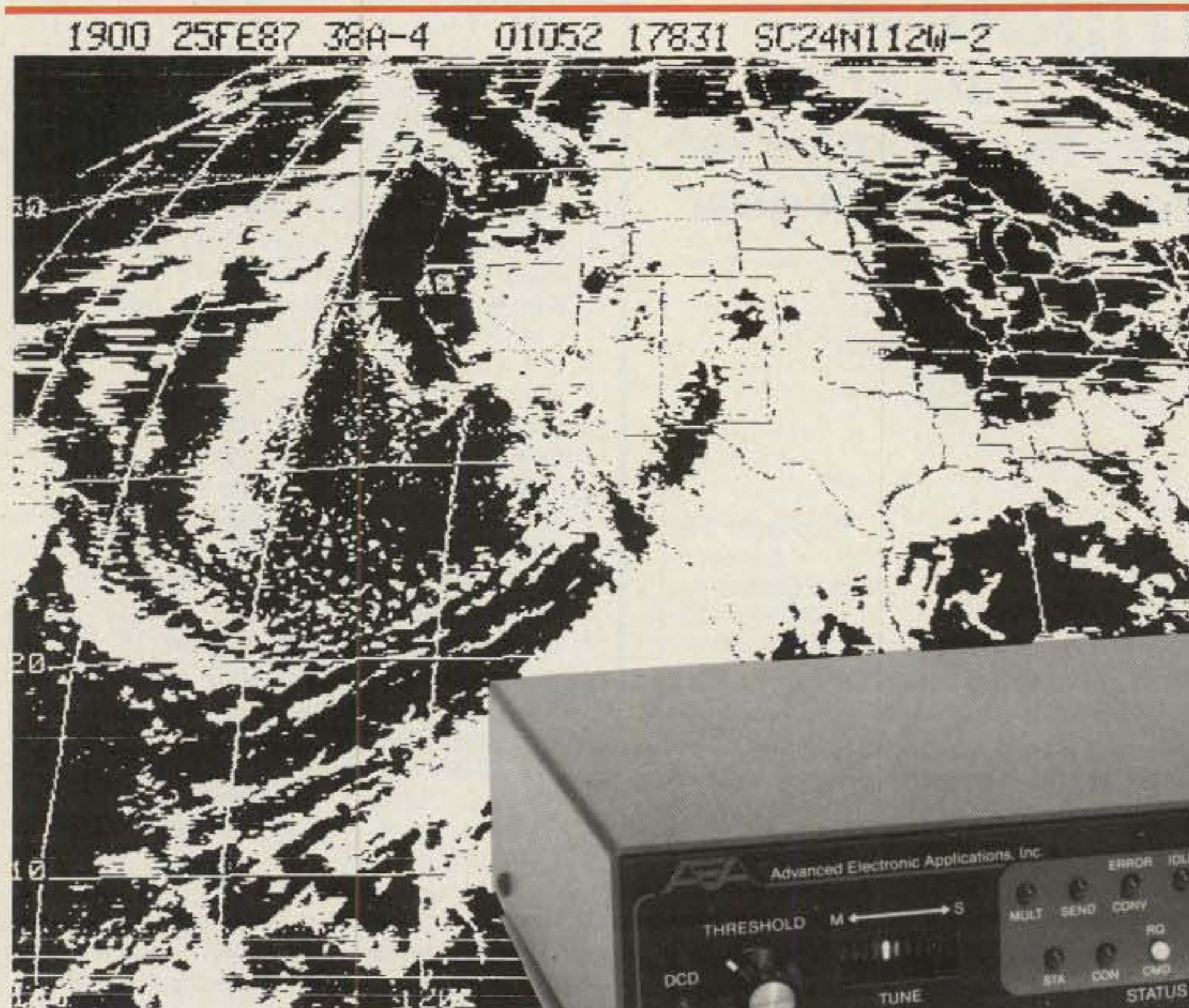
73, Alan, K2EEK



The "Happy Novice Enhancement" banner announces the start of a new era in amateur radio at the Charlotte Hamfest.

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



\$319⁹⁵
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.



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(206) 775-7373

Say You Saw It In CQ

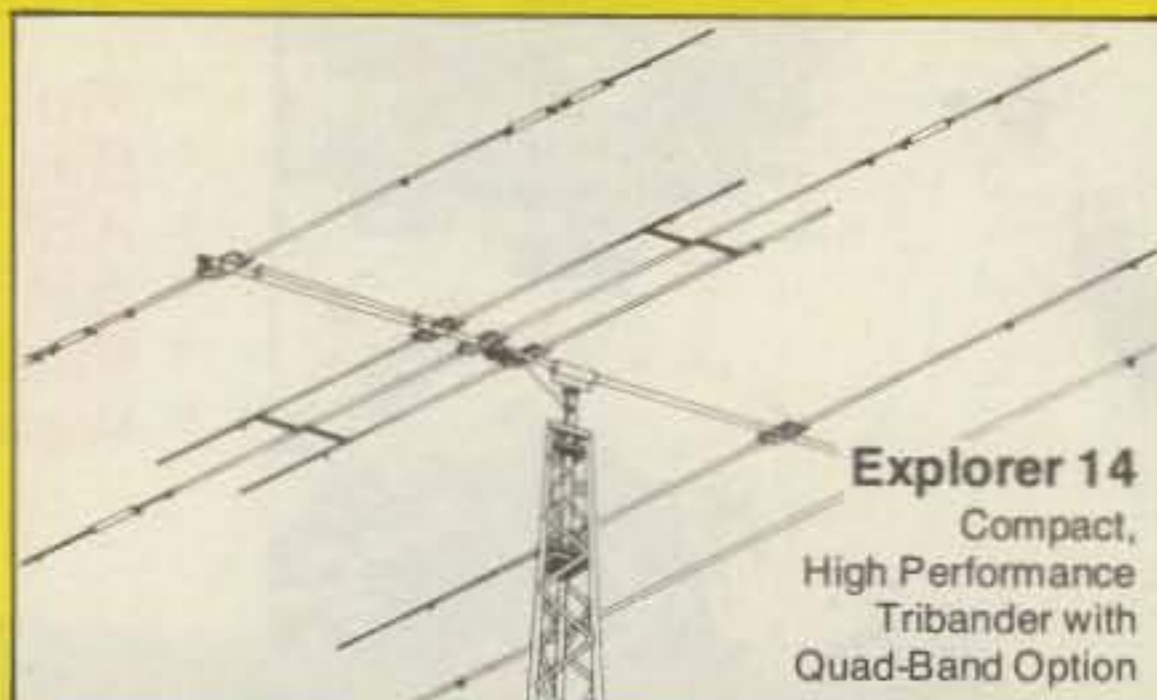
hy-gain®

Broadband Tribanders

State of the art antennas to maximize the performance of your ham gear.

Explorer 14

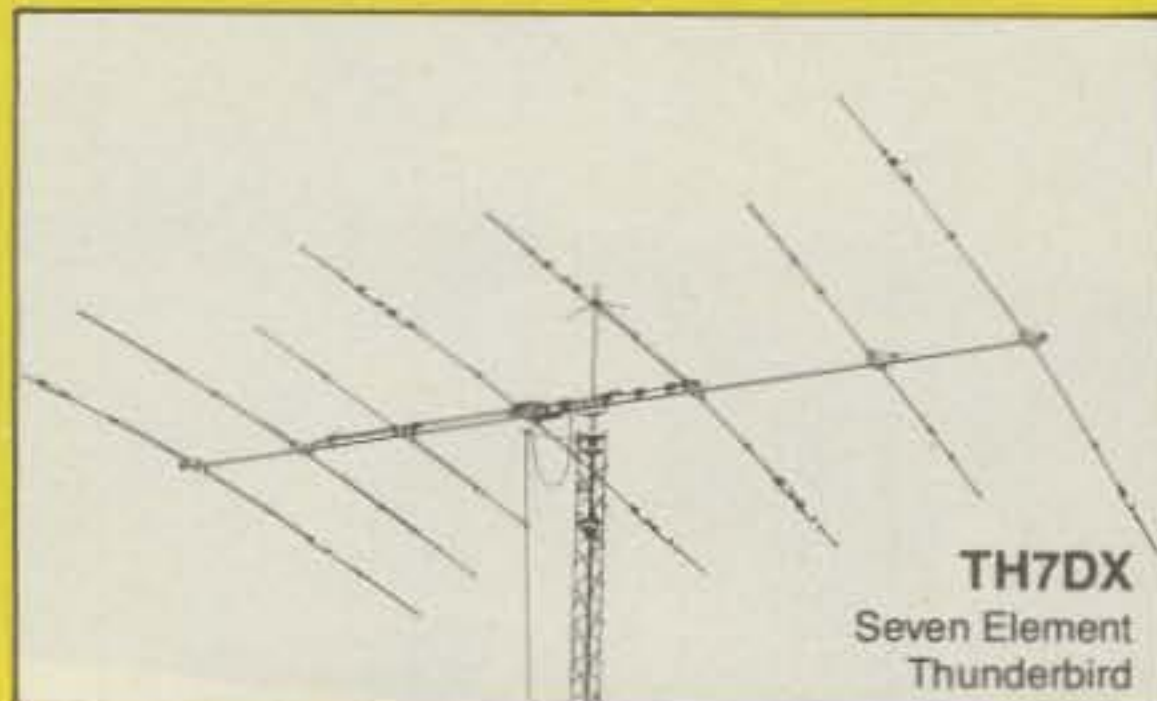
Unique PARA-SLEEVE design (patent pending) achieves exceptional broadband performance in this compact antenna. Forward gain and front-to-back ratio outperforms other antennas of the same size. Surface area is 7.5 sq. ft. (.69 m²). With a 14 ft. (4.3 m) boom the turning radius is only 17 ft. (5.3 m). The ideal choice where space is limited. Great for roof mounts or small towers. Optional kit for 30 or 40 meters.



Explorer 14
Compact,
High Performance
Tribander with
Quad-Band Option

Five Element Thunderbird TH5Mk2

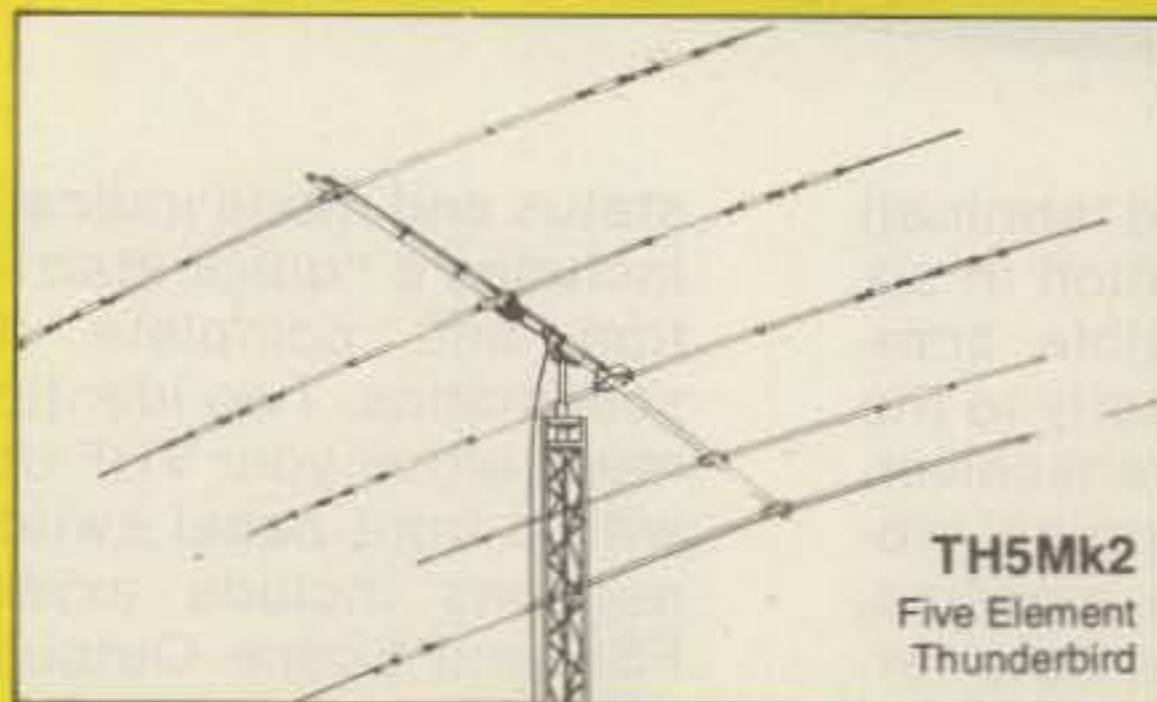
Broadbanding is achieved with our unique dual driven element system. Five elements on the 19 foot boom (5.8 m), with four active elements on each of the three bands. A rugged antenna with 7.4 sq. ft. (.68 m²) of surface area. Turning radius is a manageable 18.4 ft. (5.6 m).



TH7DX
Seven Element
Thunderbird

Seven Element Thunderbird TH7DX

Successor to the legendary TH6DXX. Five active elements on 10 meters and four elements on both 15-20 meters. The TH7DX represents the ultimate in high-performance arrays whether you're comparing other large tribanders or stacked monobanders. Surface area of 9.4 sq. ft. (.87 m²), a 24 ft. (7.3 m) boom and a turning radius of 20 ft. (6.1 m). Conversion kits for TH6DXX available.



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Five Element
Thunderbird

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- Separate Hy-Q traps for each frequency. Factory assembled and individually resonated to insure uniform performance.
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- Unique broadband beta match assures efficient energy transfer and places the entire antenna structure at dc ground.
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Announcing:

• **Louisville, Kentucky**—The Louisville ARTS will operate the "Run for the Roses" under the call W4CN from 2400 to 0500 May 1 and 1300 to 1700 on May 2. For a certificate send a QSL and an SASE via ARTS Club W4CN, P.O. Box 7391, Louisville, KY 40207. (No. 10 envelope for folded or 9" x 12" for unfolded (39¢ postage). Suggested frequencies 21.125 Novice, 21.325-14.250 SSB.

• **W2ODV Special Event**—The Bayonne, NJ OEM ARC will operate W2ODV on May 2 and 3 from 1400-2100Z to commemorate the first two-way police radio system. Suggested frequencies: 3.870, 7.270, 14.270, 146.520, 144.830/145.430, W2ODV/R, and 222.680/224.280, W2KB/R. For certificate send QSL and large SASE (39¢) to W2ODV, Bayonne OEM ARC, 16th St. Firehouse, Bayonne, NJ 07002.

• **Evening With The Pros**—The North American Teleconference Radio Network will present an Evening with the Pros on Friday night May 8th (8 pm Central Time). Sharing the microphone will be Roy Neal, K6DUE, "Frosty" Oden, N6ENV, and Bill Pasternak, WA6ITF. The program will deal with the "Art of Selling Amateur Radio" from the printed page to the space age. For more information, write to: North American Teleconference Radio Network, Midway Amateur Radio Club, Timothy Loewenstein (Net Manager), P.O. Box 1231, Kearney, NE 68848-1231.

• **W3GFS from Laurel, MD**—The Laurel ARC will operate W3GFS from 1400Z until 2000Z May 9 to celebrate the fourth annual Main Street festival in Laurel, MD. Frequencies: lower 25 kHz of 40 and 20 meter General bands; 8" x 11" certificates for SASE. QSL to LARC, P.O. Box 1436, Laurel, MD 20707.

• **W2DOR From Lakehurst, NJ**—The Jersey Shore ARS will operate W2DOR in Lakehurst, NJ from the Lakehurst Naval Air Station, from 1700 UTC May 9th to 1800 UTC May 10th, in honor of the 50th anniversary of the crash of the Hindenburg. Frequencies will be around 3875, 7275, 14375, 21425, 28525 kHz phone and 3706 kHz CW. A certificate will be available to US stations for \$1 and to DX stations for 3 IRC's. QSL to J.S.A.R.S., P.O. Box 295, Toms River, NJ 08754.

• **W7VPA Special Event**—The Tri-City ARC will operate W7VPA on May 14-16 from Pasco, Washington in conjunction with Products Industrial Exposition '87. Daily operation from 1800-0200 UTC will be on 20 and 80 meter General phone bands. For certificate send QSL and SASE to: TCARC, P.O. Box 73, Richland, WA 99352.

• **KT4A Operation**—The Maryland Apple Dumping Radio Amateur Society will activate a DXpedition-style operation as KT4A, Tangier Island, May 15-18. CW 7 and 37 kHz above the lower band edges; SSB 3937, 7237, 14237, and 21237 kHz; FM 146.55 MHz and local repeaters. Tangier Island is in the Chesapeake Bay, Accomack County, Virginia. For special QSL card, QSL to K3KMO, Box 60, Damascus, MD 20872 (SASE appreciated).

• **W4ODR Armed Forces Day 1987**—In recognition of the 38th Annual Armed Forces Day Celebration, W4ODR located northside aboard Naval Air Station Memphis, Millington, Tennessee, will be operated for the 5th consecutive year by sailors and Marines on Saturday, 16 May,

(continued on p. 86)



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Deal yourself a winning hand in modern technology with ICOM's new micro-size 2-meter FM transceiver. The IC- μ 2AT combines maximum performance, reliability and easy operation in a thin-styled handheld that's perfectly suited for today's active lifestyles.

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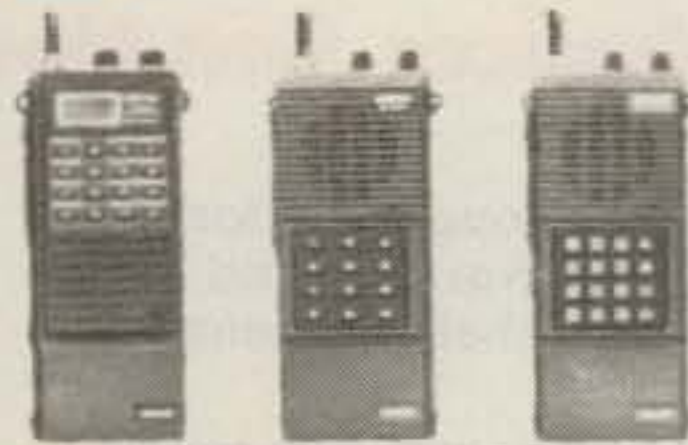
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CQ Interviews:

Michael T. N. Fitch

Chief, Private Radio Bureau, FCC

BY THEODORE J. COHEN*, N4XX

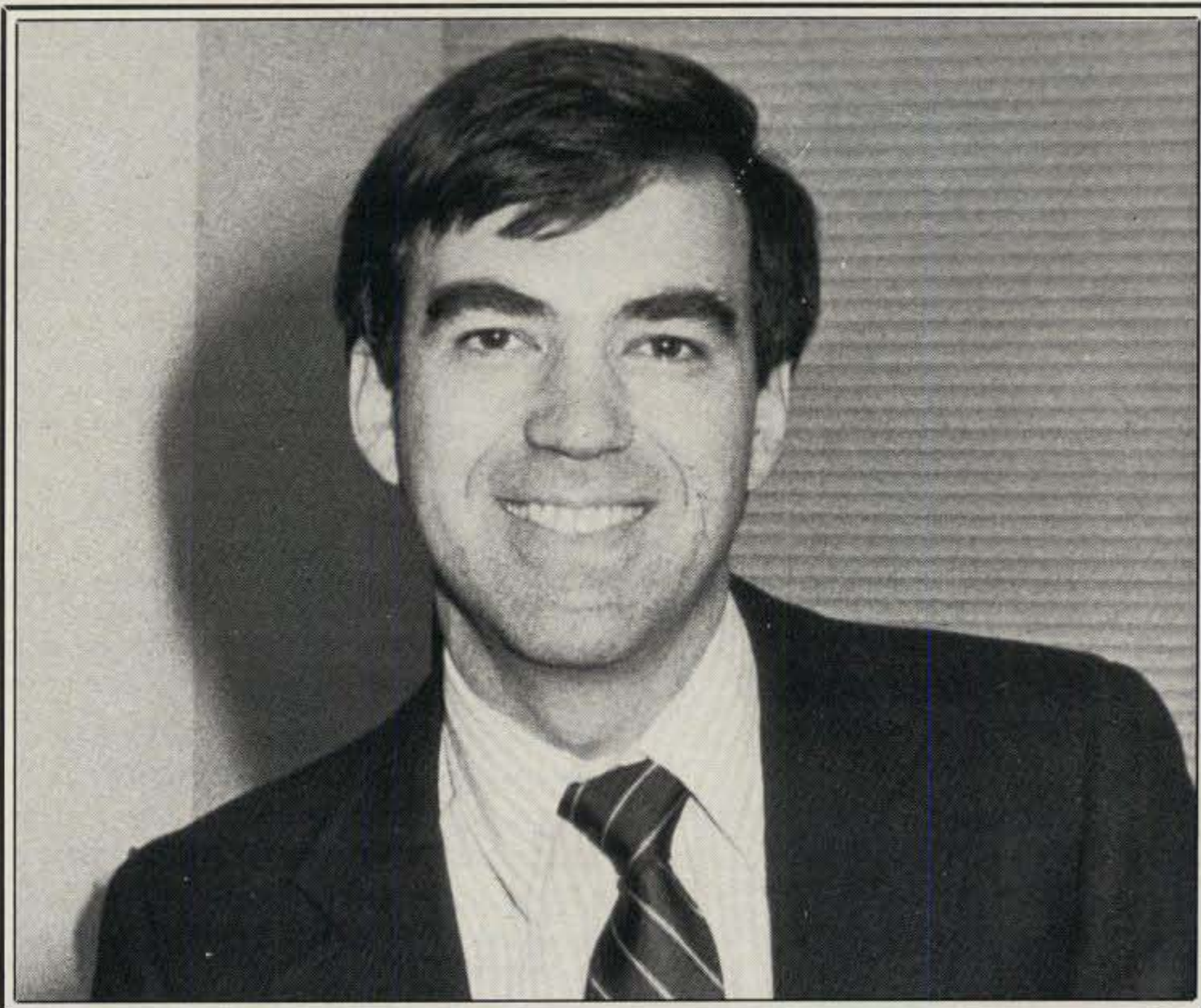
Michael (Mike) T.N. Fitch was named Chief of the Private Radio Bureau (PRB) in November 1986. A native of Glenwood Springs, Colorado, he received a Bachelor of Science Degree in Electrical Engineering from Purdue University in 1967. Three years later he received a Juris Doctor Degree from Columbia University. At that time he joined the Federal Communications Commission's Mass Media Bureau, and from 1971 to 1976 served as a trial attorney in that bureau's Enforcement Division. In 1976 Mike was appointed Deputy Chief of the Compliance Division of the Private Radio Bureau.

In 1979 Mike was selected as a Presidential Exchange Executive with the Westinghouse Electric Corporation. In this position he served as a consultant to Westinghouse on the Federal regulatory process and industry-government relations. He also represented Westinghouse in Europe and the Orient.

Since his return to the Commission, Mike has held a number of positions in the PRB, including Chief, Rules Division (1979); Chief, Land Mobile and Microwave Division (1982); and Deputy Chief (1983). Today, as Chief of the Private Radio Bureau, he administers a number of radio services, including the Amateur Service.

Mike lives in the District of Columbia, and has a twelve-year-old daughter, Christine. In his spare time he enjoys reading, music, and a rousing game of volleyball.

Given that Mike is one of the most influential people in Washington when it comes to the administration of the Amateur Service, we thought our readers would enjoy getting to know him better. With this in mind, it is with great pleasure that CQ now presents an exclusive interview with Mr. Michael T.N. Fitch, Chief, Private Radio Bureau, FCC.



Michael T. N. Fitch, Chief Private Radio Bureau, FCC.

CQ: It's been quite a while since we last spoke with the Chief of the Private Radio Bureau (PRB), Mike. But with you having been appointed to the post late last November, this seems like a good time to introduce you to our readers and to look in on the Bureau's activities. How about first giving us an overview of your organization and the functions of the major elements?

Fitch: Briefly, the Private Radio Bureau administers the private land mobile, microwave, aviation, marine, and amateur radio services. These radio services have more than 2.5 million licensees, and they basically encompass

all non-broadcast and non-common carrier use of radio. The Bureau has a staff of 200 people, 140 doing licensing in Gettysburg, PA, and 60 doing rulemaking and compliance in Washington, DC.

CQ: What parts of your Bureau are responsible for the administration of the Amateur Service? Could you tell us a little about their activities and the people in charge?

Fitch: The Bureau is comprised of three divisions: Licensing, Land Mobile and Microwave, and Special Services. Amateur policy is the responsibility of the Personal Radio Branch of the Special Services Division. The Chief of Special Services is Ray Kowalski. His Deputy Chief is Roger Madden, and the Branch Chief is John Johnston, W3BE. Another amateur, Ralph Haller, N4RH, is Deputy Chief of the Bureau.

CQ: It's no secret that funding problems have cut into the activities of many government agencies. What is the current funding situation

vis-a-vis the Commission, in general, and your bureau, in particular? And how is it affecting your activities and your allocation of the Bureau's resources this year?

Fitch: Ted, the Bureau, like the rest of the FCC, has been reduced in size significantly over the past several years. We have kept up with the increasing workload by streamlining and automating our processes, and by relying on the high quality and dedication of our staff. For the next year, our resources should remain about the same, so I do not see any major problems in keeping up with the workload.

"I very much expect 'unregulation' to continue."

CQ: The policies of the Commission during the Reagan Administration can be characterized as fostering an atmosphere of "unregulation" within the telecommunications community. Do you see this process continuing, and if so, what forms will it take? And how could "unreg-

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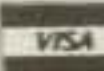

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ulation" affect the amateur community over the next two years?

Fitch: I very much expect "unregulation" to continue. In my view, it has contributed significantly to the dynamicism of telecommunications in the country, and that has been of great benefit to the public. I am a committed unregulator myself, and the Bureau will be striving to

"I am a committed unregulator, and the Bureau will be striving to identify additional areas where we need not impose federal regulations or where we can turn over functions to private organizations."

identify additional areas where we need not impose federal regulations or where we can turn over functions to private organizations. Privatization has worked very well, so far, in the area of amateur examinations, and we are looking at whether special call signs for amateur licensees could be administered privately.

CQ: But how far do you think the Commission can go in "unregulating" amateur activities before it destroys the framework required for a viable service to exist?

Fitch: I don't see any danger of unregulation "destroying the framework" of the Amateur Service. We unregulate to make a service more useful to its members. As we undo traditional, detailed regulation, the framework of

"I don't see any danger of unregulation 'destroying the framework' of the Amateur Service."

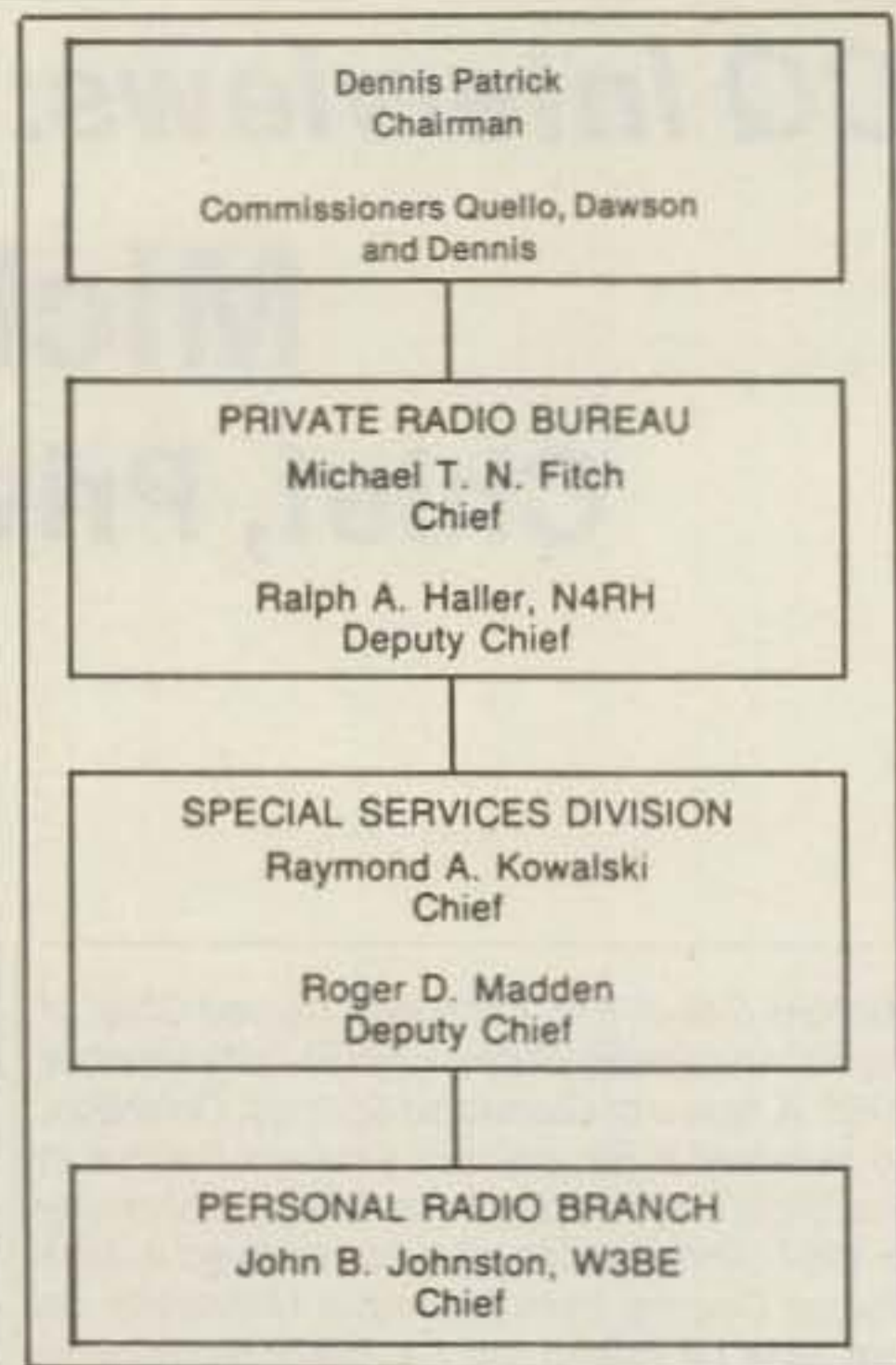
the service will be strengthened, not weakened. Moreover, where amateurs have expressed strong positions on specific proposed changes, their views have been given a great deal of consideration by the Commission. So very little unregulation has been done over the objection of the amateur community.

CQ: How successful is the Volunteer Examination Program?

Fitch: We believe that the Volunteer Examination Program is extremely successful, Ted. It has resulted in a much greater frequency and number of locations for examinations. Widespread opportunities to take examinations make it easier for people interested in amateur radio to become licensees or to upgrade. That, in turn, provides new energy for, and participation in, the service. It has also allowed for more productive application of those Commission resources that were previously devoted to examination administration.

"We believe that the Volunteer Examination Program is extremely successful."

CQ: Do you believe that volunteer examiners have maintained the integrity of the licensing activity and that applicants are uniformly ex-



The FCC organizational chart as it relates to the Amateur Radio Service.

amined, regardless of where they take their exam?

Fitch: The Volunteer Examination Program is at least as sound as the prior [Commission-administered] program.

CQ: But haven't there been instances where cheating was uncovered in this program?

Fitch: In any large endeavor there are likely to be isolated instances of impropriety, and we have been given information alleging misconduct relating to some examinations. But these are few in number, and we are following up with appropriate action. It would be inappropriate to discuss any specific cases at this time. Amateurs are, for the most part, very reliable, Ted, and I am comfortable relying on their strong sense of integrity, except where shown otherwise.

CQ: Mike, what changes does the PRB anticipate making that would make the Volunteer Examination Program more effective?

Fitch: I can't list any specific changes at this time, but we continue to "fine tune" the Volunteer Examination Program as we gain experience with it. Every year we meet with the VECs and discuss possible improvements, and they now have some projects active as a result of last summer's meeting. For example, the VECs have formed a committee to take over the task of maintaining the examination question pools, as mandated last summer by the Commission in PR Docket 85-196.

CQ: What is the current status of the Volunteer Monitoring Program, and how effective has it been?

Fitch: The Volunteer Monitoring Program operates in conjunction with our Field Operations Bureau (FOB). As far as I know, it has worked very well, and the FOB has obtained some very useful information for amateur volunteers.

CQ: Mike, Commissioner Mimi Dawson has voiced support for putting more teeth in Sec-

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"There are advantages and disadvantages to making the 'Good Amateur Practice' rule more specific."

tion 97.78, "Good Amateur Practice." The reason for this, apparently, is that with stronger regulations in this area, FCC monitors and members of the Amateur Auxiliary—that is, our volunteer monitors—would find it easier to go after those amateurs who use obscene and indecent speech on the air. How do you feel about this?

Fitch: That's a difficult question, Ted. There are advantages and disadvantages to making the "Good Amateur Practice" rule more specific. As currently framed, it is something of a "catch-all" above and beyond the specific requirements of the other rules. That leaves us with a great deal of flexibility in applying it to specific situations that often cannot be anticipated. It also makes it difficult to "prove" a violation of the rule. On the other hand, if the rule is made very specific, it becomes no different than other specific rules, and it would not add an additional basis for resolution on unanticipated situations. In either case, Section 97.78 is unlikely to affect obscene or indecent speech issues since that is the subject of Section 97.119 of the Rules. The difficulty of enforcement in this area is the elusiveness of a definition for "obscene and indecent" speech, which the courts have grappled with for many years. We do pursue cases in this area, but we proceed cautiously because of First Amendment issues. Specifically, we try to select only cases about which there could be no reasonable disagreement. Naturally, this is a more cautious approach than many amateurs prefer.

"We have no POLICY objection to special call signs; our elimination of this program was simply a RESOURCES issue."

CQ: Probably nothing arouses stronger feelings among amateurs than the subject of special call signs. The PRB's policy, of course, is to refrain from issuing them. However, the American Radio Relay League (ARRL) is currently studying the matter, with the intent being to develop a Special Callsign Program under which it, working with the Commission's approval, would issue special call signs to amateurs. Could you bring us up to date on this issue, and tell us how you feel about such a program?

Fitch: We have opened an inquiry into privatizing a special call sign program through the issuance of PRB-3. Comments by the amateur community in response to PRB-3 will help us to determine how to proceed on this question, and I hope that many of your readers will give us their views. We have no *policy* objection to special call signs; our elimination of this program was simply a *resources* issue. If someone else can provide the resources to run such a program, I hope that we can delegate that responsibility to them.

CQ: Do you intend to take the initiative on rule-making as it pertains to the Amateur Service?

Or will you let amateurs themselves drive the rulemaking process?

Fitch: Ted, we'll continue to look for ways to simplify and deregulate the Amateur Rules. I hope that we will receive suggestions on how to proceed with this effort from amateur licensees. In addition, as always, much of the rule-making activity will be responsive to petitions filed by amateur licensees.

"I would like to hear from more amateurs on the current state of their service and on where they think it should be headed."

CQ: What are amateurs writing to the PRB about these days? That is, what are the service's major concerns as perceived by operators in the field?

Fitch: We receive letters on all sorts of topics. The two areas we hear the most about, however, are lapsed call signs and licenses, and the conduct of a few notorious licensees whose operations are particularly offensive to others. I would like to hear from more amateurs on the current state of their service and on where they think it should be headed.

CQ: What do you consider to be the most serious problem facing the Amateur Service today?

Fitch: The most serious issue I see is to ensure that there is a valid sense of purpose for the

"The most serious issue [facing amateurs] is to ensure that there is a valid sense of purpose for the Amateur Service."

Amateur Service. Is it a hobby service? Is it an emergency aid service? Is it a radio, or electronics, or computer experimentation service? I'm not sure that the answer is clear, either to its members or to those of us who administer the service. That ambiguity leads to some of the most contentious issues addressed by amateur licensees, many of whom have very different ideas about the purpose of the service. It also makes the Amateur Service vulnerable to attack by other groups who have a cohesive, well-defined purpose, and who desire more spectrum with which to fulfill it. Obviously, amateur licensees can try to clarify and unify the purposes of their service.

CQ: One problem that continually plagues amateurs is radio-frequency interference (RFI) to electronic home entertainment equipment. More often than not, the problem is with the consumer's equipment, not with the amateur's transmitter. The Commission already has "enabling" legislation under which to address such "interference," but so far it has done little but to encourage the electronics industry to clean up its act. How successful has this effort been?


Fitch: Manufacturers, either independently or through the Electronic Industry Association (EIA), are aware of RFI problems. The EIA is in the process of developing a series of guidelines to make equipment less susceptible to radio energy. As long as these voluntary efforts continue, I believe you will see improvements.

Furthermore, in an area that changes as fast as does consumer electronics, I would be reluctant to have the government set regulations for equipment immunity. The industry is in a far better position to keep its voluntary standard current.

CQ: Mike, how serious is the problem of deliberate interference by one amateur with the on-the-air activities of another amateur? Have instances of deliberate interference increased in number lately, or does the amateur community have this problem under control?

Fitch: This is a complex question to answer. As we discussed earlier regarding the matter of good amateur practices, issues such as deliberate interference are not clear-cut. For example, a net may feel it has a "right" to the use of a frequency because it has met there every day for 20 years. Before the net convenes, however, let's say that a legitimate conversation is in progress. Come net time, the net members may consider it a case of deliberate interference if the amateurs who were there first do not change frequency. This type of interference simply requires cooperation to resolve. In other instances, deliberate interference cases have been resolved through enforcement actions. In general, I believe instances of deliberate interference are rare; those which do occur attract our attention. It's similar to hearing about a plane crash; the thousands of safe flights that are flown each year simply aren't a news item. From the information I have, most amateur traffic does not receive intentional interference.

CQ: Once again, land mobile interests are pressuring both the Commission and the Interdepartment Radio Advisory Committee (IRAC)



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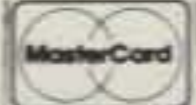
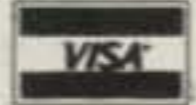
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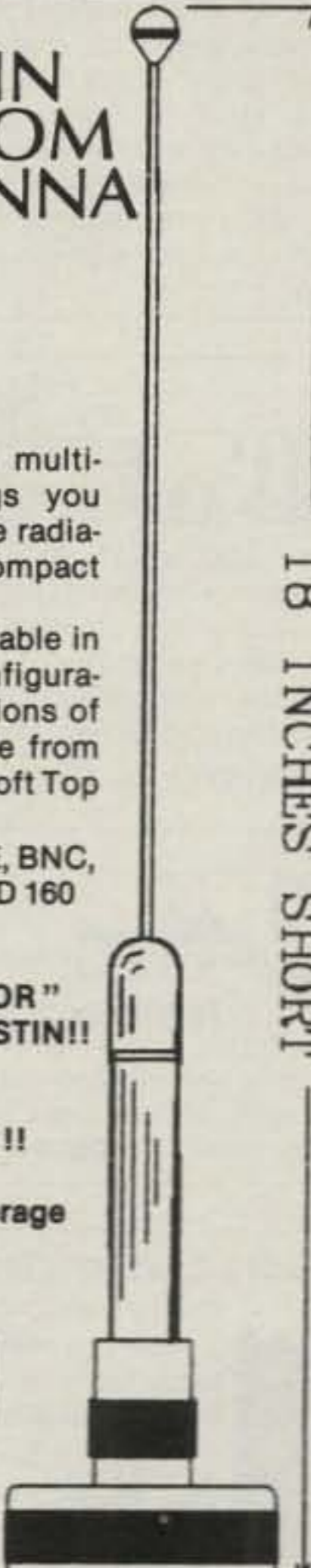
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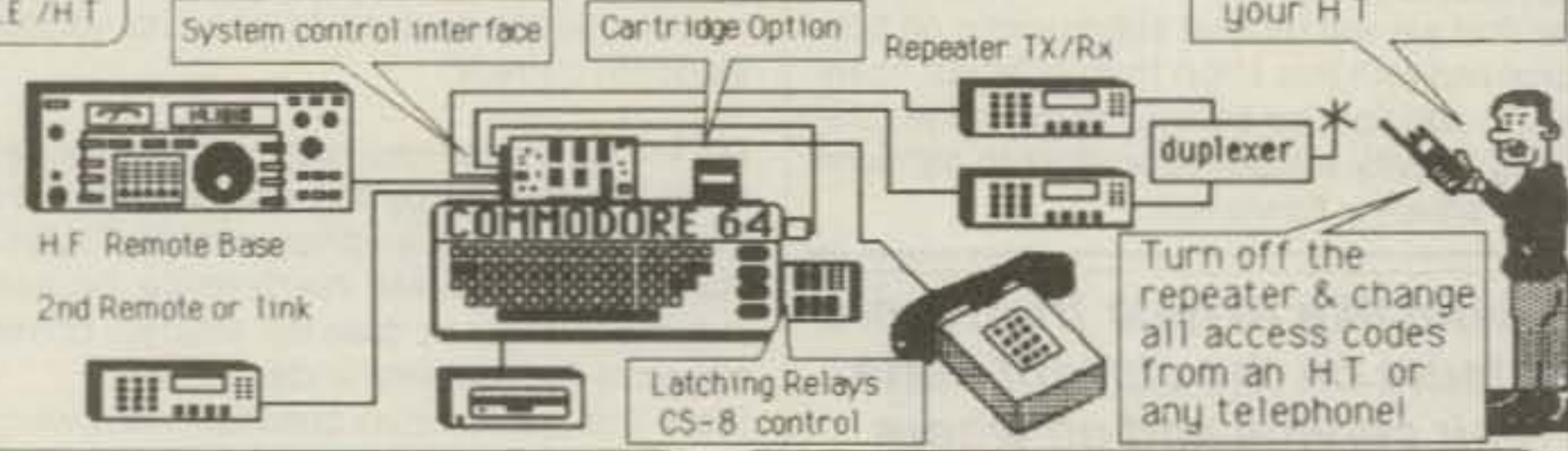


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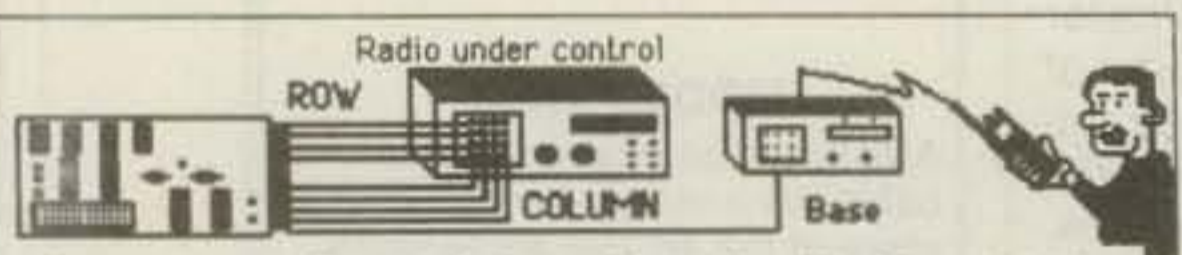
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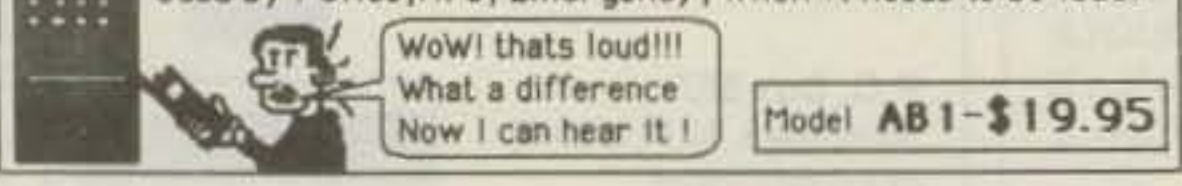
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to allocate parts of the 220 MHz band to their service. However, allocations in this band were to have been the subject of discussions within the FCC and the IRAC, and were specifically to have been part of their long-range planning activities. What gives here?
Fitch: This issue is the subject of a rulemaking in the Office of Engineering and Technology. Because this is an open rulemaking, I will comment only briefly. This is a band that has long been looked at for a variety of possible uses, including the current amateur uses. Whatever the final outcome, we should move quickly to resolve the matter instead of allowing it to continue in limbo.

CQ: What other amateur bands do you see threatened by outside interests?
Fitch: At this time, the only band under active consideration is the 220-225 MHz band.

CQ: What are the strengths you see in the Amateur Service, Mike?
Fitch: The diversity of talent, resources, and expertise in the amateur community, along with its discipline and dedication to public service, are its strengths. Ideally, the service should be an exciting, accessible way for a person to get involved in telecommunications, and as our society moves more and more into the Information Age, that opportunity should attract many of our citizens. The Amateur Service is a wonderful, informal way for newcomers in telecommunications to contribute their enthusiasm and new ideas and for "old hands" to impact their wisdom and experience for the betterment of everyone.

CQ: And what do you consider the service's weaknesses?
Fitch: To stay healthy, any organization needs change and growth. I don't think the Amateur

"I don't think the Amateur Service has been as successful as it could be in 'selling' non-participants on all that it has to offer."

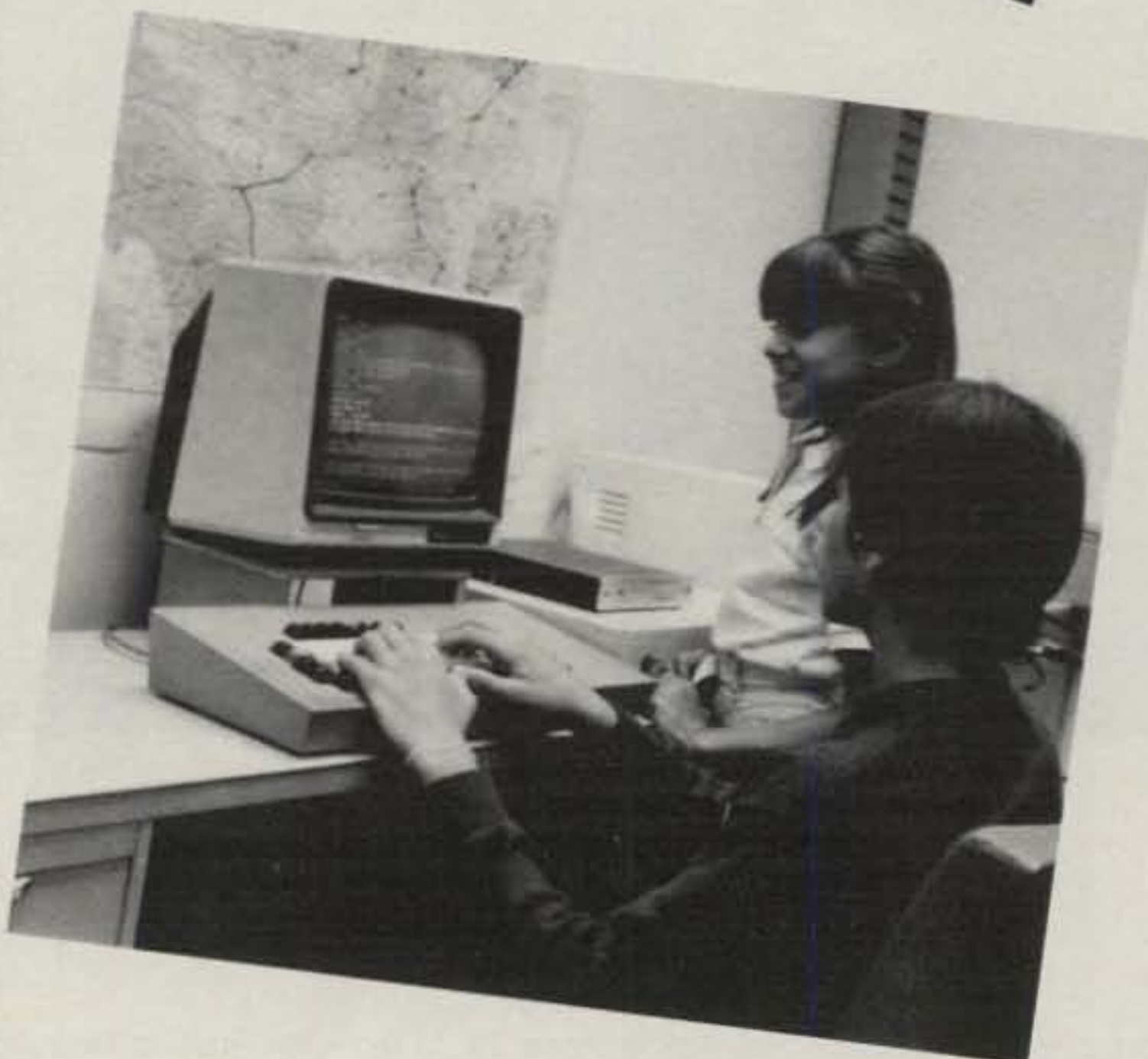
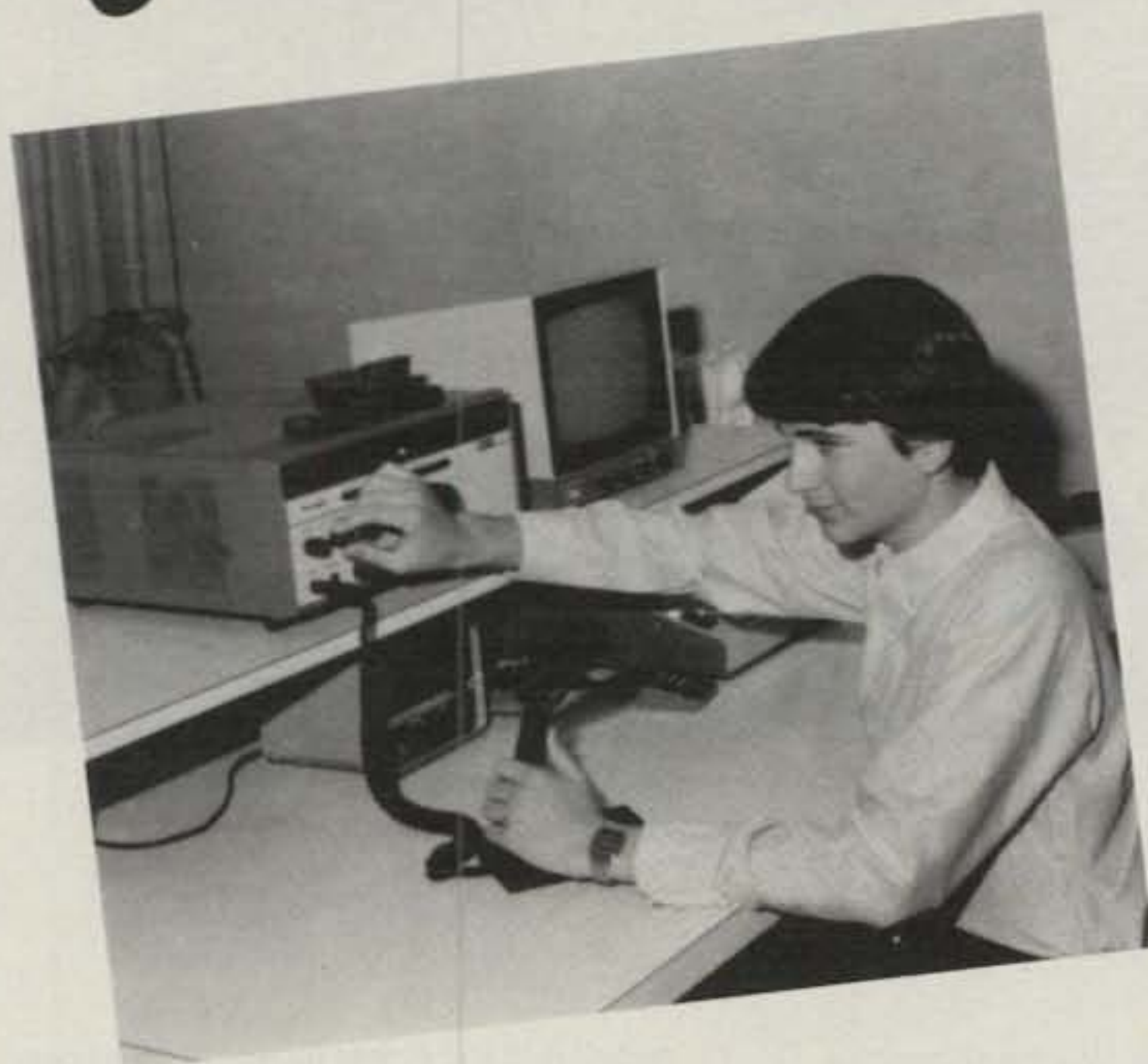
Service has been as successful as it could be in "selling" non-participants on all that it has to offer. As a result, its growth and progress may be less than optimal. I hope that every amateur will make a commitment to the service to reach out for capable non-participants and to try to involve them in amateur radio.

CQ: Mike, how, in general, do you personally feel about amateurs?
Fitch: My experiences with amateurs have been very positive. I admire their dedication and enthusiasm. My only concern, however, is that some amateurs tend to lose their perspective when it comes to the overall responsibilities of the Commission. The Amateur Service is only one of many services we administer, and amateurs need to remember that their issues compete with many others for attention. I would urge amateurs to resolve their problems as best they can among themselves before coming to the Commission.

CQ: Mike, thanks for taking the time to talk with us.
Fitch: I've enjoyed it, Ted, and I look forward to hearing from your readers on the many issues facing the Amateur Service today.

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Reef: A chain or range of rocks or ridge of sand lying at or near the surface of the water.



DXpedition To Market Reef, OH0MD/OJ0 – Part I

BY DAVE HEIL*, K8MN/OJ0

I suppose the idea started during those 20 meter skeds between Don, K8MFO, and Martti, OH2BH. Don had been intrigued with the idea of a trip to Market Reef with an emphasis on the lower three bands, especially 160 meters. Wayne, W6EUF, had taken part in the OJ0AM operation in July 1981 and was anxious to make another trip. After considerable organizational work on the part of OH2BH, the trip began to take shape.

Market Reef (Market Fyr) is a tiny dot of rock at 60 degrees, 18 minutes, 10 seconds north and 19 degrees, 8 minutes, 3 seconds east on most maps and charts and is nonexistent on others. The reef is roughly 2½ hours west of the westernmost island of Aland by small boat. It sits astride the Finnish-Swedish border and is of importance for its computerized remotely controlled weather station and because its lighthouse warns freighters plying the nearby shipping lanes of the dangerous rocks which abound in the area.

The lighthouse was erected in 1885 by the Russians, who then ruled Finland. Early records are quite difficult to come by and are writ-

ten in the Russian language. Wooden barracks were constructed on the reef for the workmen who were to build the light. They began to lay its foundation from rock quarried on the site. A tremendous storm swept away the barracks and the portion of the foundation which had been completed. Three men were lost to the angry sea. After this disaster, plans were revised and stone for the new foundation was quarried and cut to proper size in the Helsinki area and ferried to Market ready to be set into place. The work crews slept aboard a ship anchored nearby and ferried to and from the construction site daily. Work was completed in a year.

During ensuing years two additional buildings were added and connected to the lighthouse by an elevated catwalk some 15 feet in the air. Access to the catwalk is via a series of iron rungs set in the wall of the furthest building or by a steel ladder at the lighthouse end. The middle building is the power generation site for the complex and houses three aged and unreliable diesel generators.

The Finnish Coast Guard, through efforts by Lars Nikko, OH0RJ, was kind enough to airlift a new diesel generator in by helicopter and permit us to use it for our operation. Market Reef Power Unlimited (OH0RJ) was like working from commercial mains.

In addition to the Coast Guard landing permit and permission for entry to the lighthouse, licenses were obtained from the Finnish PTT for the other two Americans who would make the trip and for our friends from Ceuta, Jaun, EA9IE, and his wife, Pilar, EA9AM. My own permission for operation from Market arrived just three days before our departure date. The visitors began to filter into Finland on various dates toward the end of June. Wayne, W6EUF, headed for the OH0W operating site on Brando Island in the Aland group for some operating time, and Don managed to get in 10 or 12 hours from that location as well just before we left for the reef.

The SRAL amateur radio summer camp took place in the city of Pori on Finland's west coast the weekend before we headed for Market. We congregated there to make final plans for the trip, see some old friends, and make some new. The summer camp is a combination Field Day and hamfest and is one of two big amateur radio events held in Finland each year. Pori's Hotel Rantasipi was the center of daylight activity. Don conducted a CW pile-up copying contest, and he, Wayne, and I were honored to take part in the DX forum with Baldur, DJ6SI, and Juan, EA9IE. Saturday evening featured a banquet and dancing. I'm only sorry that I missed the Friday evening fes-

*c/o CQ Magazine

Market Reef stands out from the Baltic Sea as a 300 foot tall statue of stone. There is no vegetation on the rock. A breakwater points to the north trying to stem waves frequently washing the lighthouse. The country is just as wide as an 80 meter dipole.

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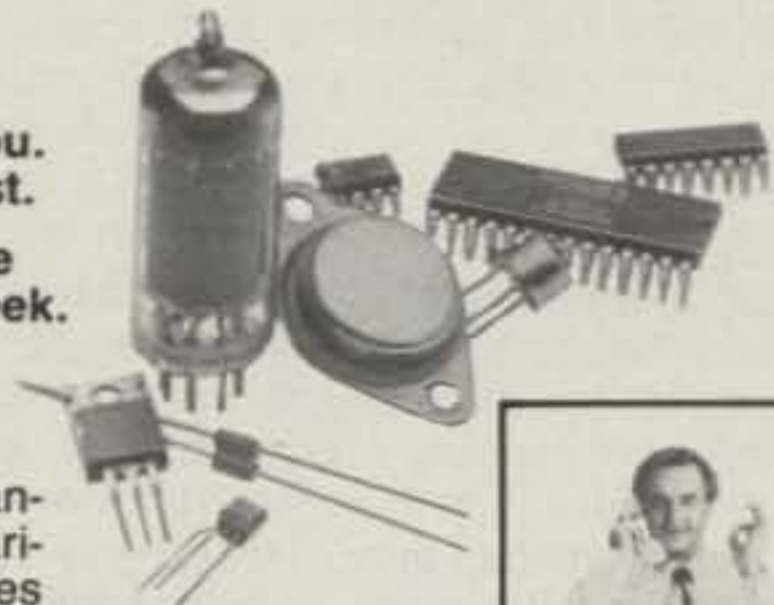
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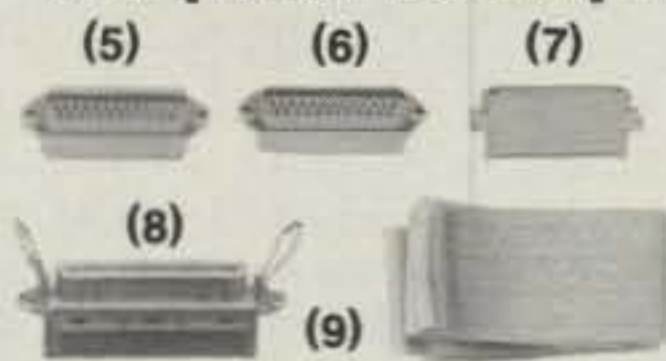


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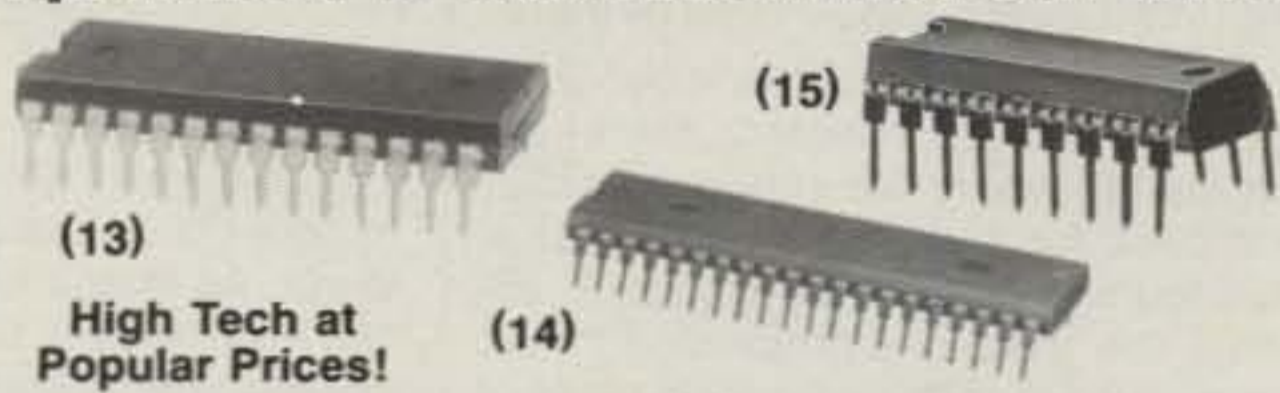
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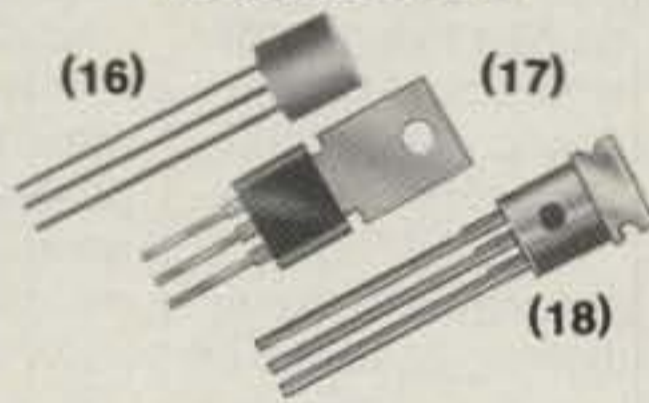
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tivities. I understand that SRAL president Axel, OH5NW, consumed his entire wine glass, including stem. I'd like to see ARRL President W4RA top that!

Saturday evening after the banquet the real camaraderie began. Leif, OH2BAQ, took me out to the camping village adjoining the hotel area. I'm only sorry I can't remember the names of the three gentlemen who shared their canned froglegs and shots of Finnish Koskenkorva (schnapps) with me. OH6PJ from Vaasa introduced me to the Finnish version of crepes suzette prepared over an open fire. People laughed, sang, drank, and danced their way through the short Finnish summer night.

I returned to Helsinki on Sunday to load my car for the next morning's trip. I picked up Wayne, Juan, and Pilar from Martti's home early on the morning of July 7. Martti and his family had spent the night at their country home, and we met Martti on the highway and convoyed the rest of the way to Turku. Once there, we wound our way through this beautiful city to the Viking Line ferry terminal for the trip to Aland's capital, Mariehamn. Don and Vilho Flink, OH2BAZ (OH0BA), would meet us there.

The two cars were loaded onto the big Viking Line ferry, and we went topside to one of the ship's cafeterias where we ran into Baldur, DJ6SI, destined for a short holiday in Mariehamn. We found a table large enough to accommodate the group and proceeded to talk away a good portion of the trip over glasses of cold Finnish beer. The always-hungry Martti suggested we move to the ship's dining room for some lunch. Baldur introduced us to an excellent German white wine to accompany our meal. After lunch the group assembled on the deck for a look around. We caught sight of another Viking Line ship heading for Stockholm and, like ours, plying slowly through the waters of the archipelago. We stood aft on the uppermost deck looking over the hordes of sunbathers taking advantage of the pleasant July weather on the ship's fantail. We took turns snapping photos of one another and took great delight in the sight of each small tree-covered island we passed. It seemed a posh way to go on a DXpedition.

Arriving in the quaint little city of Mariehamn, we checked into our hotel and enjoyed a late afternoon nap. Don and Vilho would arrive late that night via the government ferry. The rest of us grabbed a bite of dinner at a small grill and drove to the OH0AA shack to attend a regularly scheduled meeting of the Aland Radio Club. The club members cut short their normal meeting and took us for coffee at a local snack bar. OH0NC and XYL OH0YL entertained us in their home afterward.

Mariehamn's center for nightlife is the Hotel Archipelag. We decided to sample its hospitality. Martti, Wayne, Juan, and Pilar decided to spend some time chatting in the lounge. Feeling a bit more adventurous, I chose the disco. I crawled back to the hotel at about 3 a.m. to find that Don and Ville had arrived about midnight. Martti must have known how late I was out, as I got a wakeup call from the hotel operator at six, a full hour before anyone else arose. I'm still planning my opportunity for revenge.

Vilho Flink, as far as I can tell, lacks confidence in only one area—his ability to speak English. Martti asked Vilho how he and Don had gotten along during their stay at OH0, and Flink replied that his arms were tired from speaking so much English.

After breakfast we drove to the home of Kee, OH0NA, to get the provisions loaded and



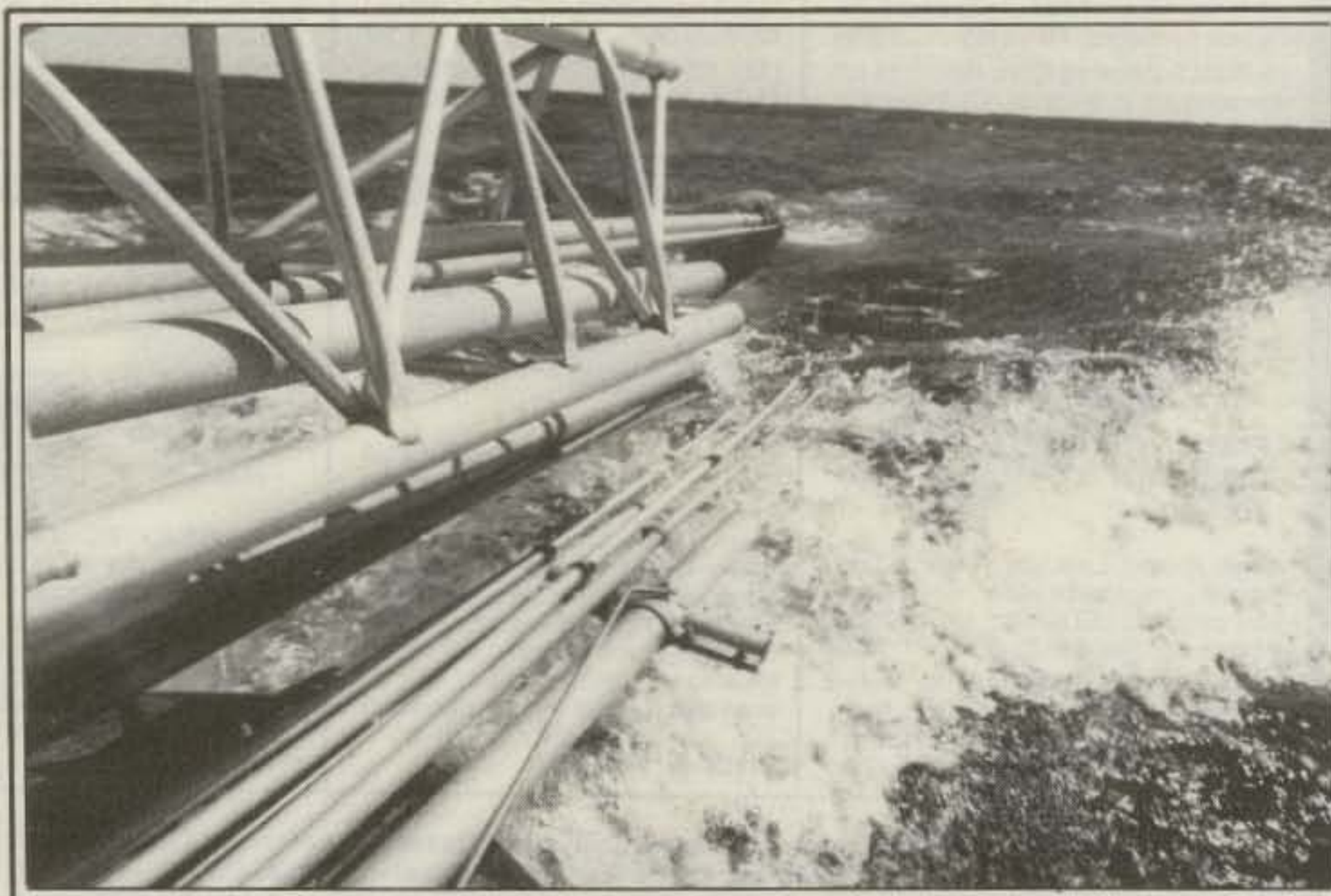
The OH0MD/OJ0 crew, from left to right: OH2BAZ, K8MFO, OH0RJ, OH0NA, OH2BH, W6EUF, and K8MN.

to take the 2-element 40 meter beam off the tower. As things turned out, we would never use it on the reef. Some time later we drove to Eckero, our jumping-off point for the trip. It took some doing, but after a lot of hard work we got the boat loaded and chugged out of the boathouse at about noon local time on July 8 with nine passengers, a tower, two Yagis, several rigs and amps, and all of the food and drinks (except water) we'd need for our week's stay. Kee's son Mikael took the wheel while Kee sat perched precariously on the roof of the tiny cabin. Seas were a bit rough and the little boat yawed widely. Kee, his hair flying in the breeze, hung on with one hand, smoking cigarettes, swigging Coca-Cola, and charting our course through rocks often barely beneath the surface.

Nearly midway on our 2 hour and 20 minute trip the lighthouse and adjoining buildings of

Market came into view as white specks on the horizon. As we cleared the nearby islands, the seas became more turbulent and, while queasiness was not the rule, there were a couple of faces which were of a different hue than at departure. We had expected that due to the seas we might not be able to land on Market, and that Kee might have to swim to the reef and bring out a longboat to ferry the cargo ashore. Jaun and Pilar, who had come along just to be able to see Market, were invaluable in helping to offload the equipment. They spent the next several hours exploring every inch of the island. Juan was very excited about writing an article for publication in one of the Spanish amateur radio magazines. He and Pilar accompanied Mikael back to Aland in the late afternoon. The rest of us were now quite isolated on Market.

Now the laborious process of stowing equip-



A 30 foot boat carried cargo, 10 people, and loads of aluminum including a 40 meter beam.



A top-band vertical with guy wires is easily supported by helium balloons like this one, but when it's stormy, they surely come down in search of a place sheltered from the winds.

We set about getting the CW station set up. Later this station would continue to be referred to as the "CW station," though it would see service on both modes. Our plan called for getting one station fully operational while the rest of the team worked to put up the tower and assembled the equipment for the second station. We went on the air at 1435Z July 8 with K8MFO at the key. Our first QSO was with JA1BLC, closely followed by our first U.S. contact, W8QWI.

Through the ingenuity of Kee, a block and tackle fixed to the top of the lighthouse was used to bring up the 50 foot aluminum tower and 203BA. If this reads as if it was an easy task, don't be misled. We had a lot of trouble mounting the beam. The wooden ladder used to support the tower in a horizontal position began to splinter and fall apart and the gusty winds made it necessary to have someone at the ends of several lines to stay the tower as the others hoisted it into a vertical position. Fortunately we had plenty of daylight for the task, as our operation began only two weeks after the summer solstice. Our "night" was a few hours of twilight. It was this which would make our operation on 160, 80, and 40 a real challenge.

The CW station used a TH3 tribander mounted atop a reinforced concrete structure which jutted 15 or 20 feet above the roof of the generator building. A quarter-wave vertical was erected on the rocks using a Karjala beer bottle as a base insulator (Don gamely drank the beer in furtherance of our effort). An 80 meter inverted-vee was hoisted to the top of an-

other mast near the CW position. Since Don, Vilho, and I are 160 meter fans, a huge helium tank and several large balloons were hauled along on the trip. Vilho and Don inflated one of the balloons and attached 100 meters of polypropylene cord, spiral wrapped with very fine wire. Another light cord was attached as a tether and the balloon was sent aloft. The big blue balloon looked great as it floated above the little island. We'd soon find out if it worked.

After both stations were up and running, we settled into the tedium of operating. I'm sure that anyone who's been on an expedition of this type will tell you that not every moment is thrilling. One gets a kick out of working some exotic country, exchanging reports with a buddy back home, or seeing a very high QSO rate during a peak opening, but a lot of DXpeditioning is being tired, cold, uncomfortable, or bored when not operating. Oh sure, we had quite a few of life's amenities and were even able to operate two kilowatt stations on the same band simultaneously. The stuff that stories like this are made of is people—not rates, equipment, or antennas. Those of you who worked us know how high the rates were, and you know we had equipment and antennas that worked.

Don Karvonen is an iron man, plain and simple. Don's a CW man who can sit at a rig for hours and hours. He loves operating 160 and 80 digging through the static crashes for weak ones. We teased that he's the only member of the team to sleep in his boots for a week so as not to miss an opening. While we were friends back in Ohio I often had the disappoint-

ment and provision and of setting up our sleeping quarters in the musty-smelling lighthouse began. The lighthouse basement held three concrete water tanks which were filled by the runoff of rain water from the roof. Kee warned us not to take water from the far tank as it contained "Chernobyl water." We giggled at this unit until we found that he wasn't joking.

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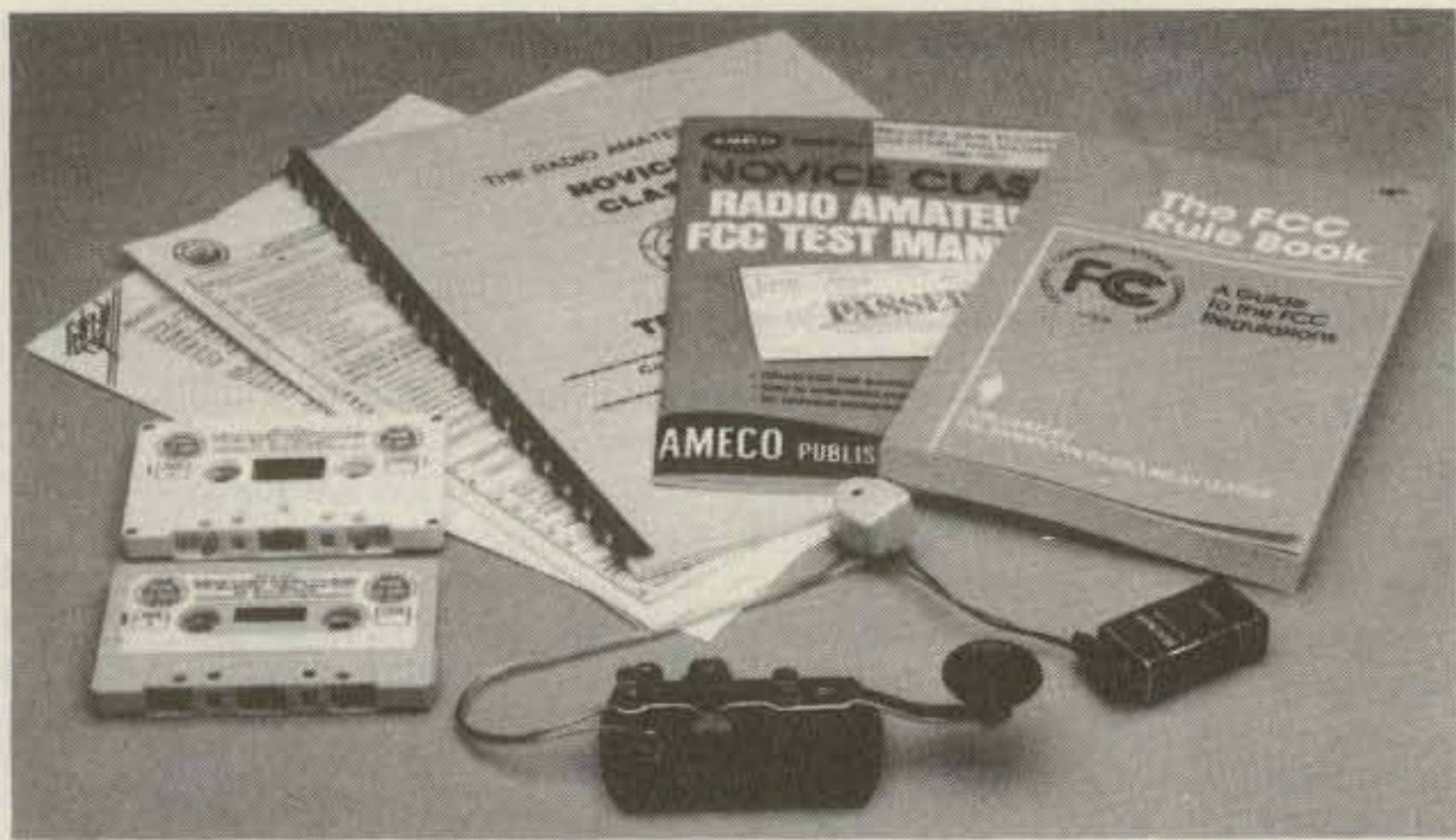
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ment to hear weak DX signals on top band come back "K8M?", call them again and hear them "K8MFO" rather than "K8MN." About the only times we'd see each other were over a drink at one of the Dayton Hamvention's DX hospitality suites. This time we'd have a chance to share the top band operation from the same shack.

One thing we didn't lack on Market was food. It wasn't fancy, but it was filling and warm. Kee (Karl-Erik Eriksson) was, in addition to being the former lighthouse keeper on Market, the expert on the history of the place, a first-class sailor, and our chef. He kept us on a regular feeding and coffee break schedule for the duration. Kee knew nothing of amateur radio until OH2BH and friends first invaded his reef in 1970. He became interested in ham radio and taught himself the code and theory. After he got his license, he got on the air and taught himself English. OJØMA hit the airwaves with NCDXF donated gear.

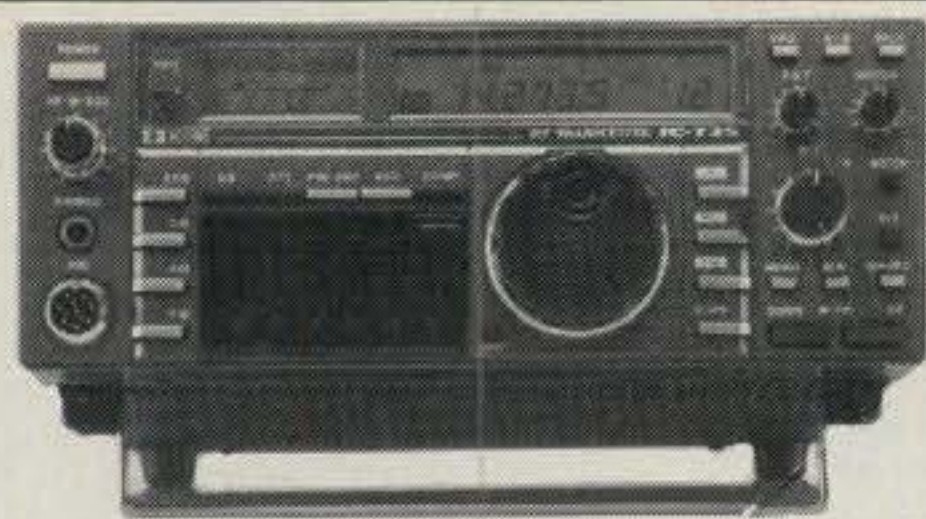
Lars Nikko was a breath of fresh air. His sense of humor and abilities as a conversationalist kept us entertained throughout our stay. Although he is originally from Vaasa in OH6-land, he has lived on Aland for many years, working for Finnish Broadcasting there. In addition to keeping Market Reef Power Unlimited at 220 volts, 50 Hz, he aided Kee in keeping our stomachs full. Lars was content to keep in touch with his friends on Aland and the mainland on 80 meters during most of the week, but we finally coaxed him into a 20 meter SSB stint the last day of the operation.

If you could choose one man to take on a DXpedition, you'd have to search high and low to find anyone more suitable than Vilho Flink. Flink is a former rally driver who now owns several taxis in Helsinki. He's an expert antenna man and dedicated operator. Vilho is a natural left-hander who has taught himself to send with the left hand while simultaneously logging with the right. His dedication to the cause included changing the position of the 40 meter sloper several times each day to favor band openings. As the weather would bring down our top-band balloon, Flink would come up with a new idea for keeping us on 160. He had Market fairly well covered with copper radial wires for various verticals for several bands.

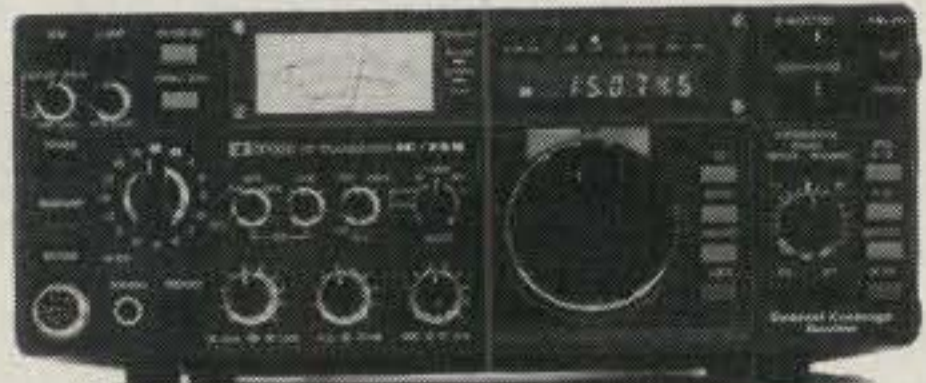
Wayne Gingerich of Long Beach, California was the only American member of the group who had been on Market Reef before. Wayne favors SSB and put in some long hours manning the SSB station during 20 meter U.S. openings. Despite limited fresh water and opportunities for bathing and shaving, Wayne always managed to look as if he was ready for an afternoon of golf at the country club. While most of us spent our free time sleeping, Wayne would heat water for shaving or tend to some hand-washing of his wardrobe. Wayne lost composure only when his cigar supply became exhausted at the end of our stay.

The glue that held the OHØMD/OJØ team together was Martti Laine. I don't think there exists a DXer who doesn't know who OH2BH is. Equally at ease on SSB or CW, Martti is a master DXer and contester. He has unlimited love for our hobby and a deep sense of its history. Martti's greatest attribute is his sense of humor. His "Micro-DB Theory" and his ideas about pile-ups as "theater" are masterpieces, yet it's not necessary to dig too deeply beneath the comedic to find truth.

(To Be Continued)



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Results of the 1986 CQ World-Wide WPX CW Contest

BY STEVE BOLIA*, N8BJQ

Eight years old and still growing. Several expeditions, generally excellent conditions, and lots of DX made the 1986 running of the CQ WPX CW contest the biggest and best so far. The contest was one of the closest in history, with one world championship decided by 36 points, and several others close enough that the margin of victory was only a few multipliers or QSOs.

No one continent dominated the scoring, as has happened in previous years. A check of the leader board shows world champions from three continents with competitive scores throughout the world. Less than 500K separate the top seven all band scores, with Kele, YU1AO, the 1986 leader. Challenging Kele were Lee, XL7CC, and Ron, 8P9AR (N6AUV). Lee's effort is a new North American record, and he needed all of it to beat out Ron by less than 30K. The number four spot goes to Fred, K3ZO, who turned some advice from KT3Y into the top U.S. score. Fifth place belongs to UF6FFF, with a new Asian record, while Mike, 4M4A, edged out Lothar, Y24UK, for sixth.

"After the contest I talked to Terry,

VP2VCW (N6CW), and exchanged scores, and he told me I've never worked so hard to win, and I told him I've never worked so hard to lose." These were the words of Felipe, NP4Z, after his operation as NP4A. Terry took advantage of 25 more multipliers to overcome a slight QSO point deficit and capture the 7 MHz title, and one of three world records established during the contest. Felipe's hard work earned him a second-place finish, with Asian record holder UP2NK/UF third. WC4E's trip to Puerto Rico netted him a world record and the 20 meter championship. Chasing Jeff were UZ9FWR and EK9AD. The new 15 meter champ is ZY4OD, with 4Z4NUT and YC8VCE in pursuit. YW7A topped the brave souls on 10 meters and UB4FWC is the new top band champion. In the closest race, CT5AT (K7ZZ) squeaked by UP2BOA/UF for the 80 meter title. Don won by only 36 points, proving that every QSO can be valuable. The QRPp title goes to Daniel, WP4F, with FO8JP less than 22K behind. WP4D is the low-power 15 meter champ, with UT5UIW on 20, DL2HCB on 40, Y25XA the 80 meter leader, and RZ8MS top band champ.

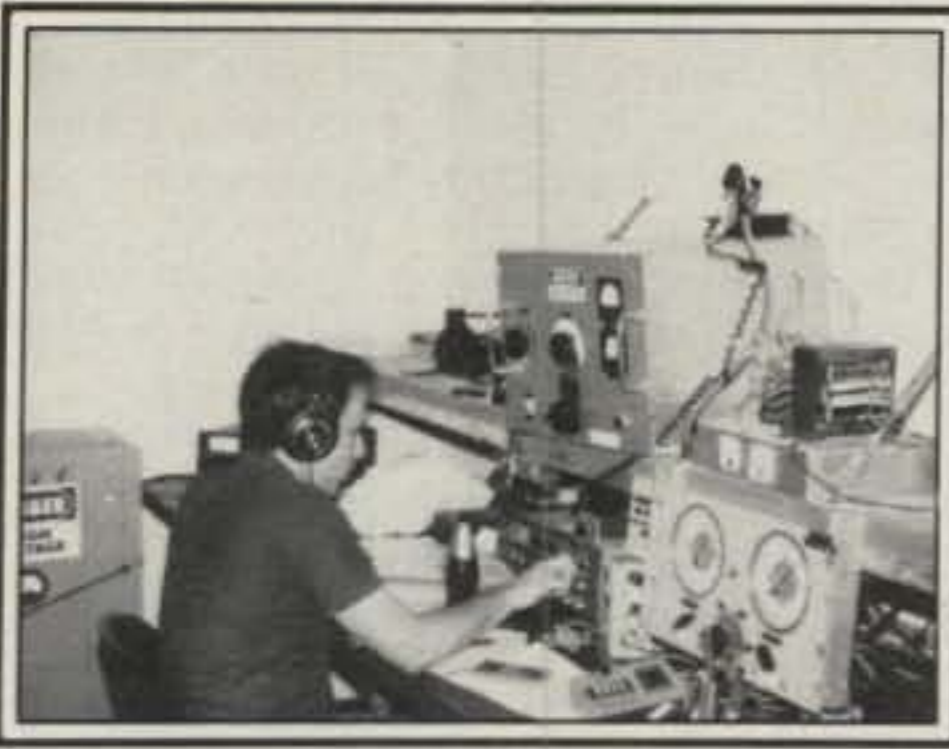
The crew at LZ7A, aided by guest ops DL7MAE and DL6RAI, are the new multi-single champs and owners of the European record. South American record

holder AZ8DQ challenged, but could not overcome the multiplier deficit. Multi-multi champs IO3JSS are the holders of the prefix record with 826 worked. One-thousand prefixes has been done on SSB. Now who will do it on CW?

Twenty meters was the place to be in the U.S.A. K2VV is the 20 meter champ and winner of the first N2AA 14 MHz trophy. John's U.S.A. record score placed him fourth in the world. Second place goes to KQ2M, who came up a little short in his bid to win the SSB and CW titles. Trophy donor N2AA finished third with Stu, KC1F, and Steve, WD8IXE, rounding out the top five. K3ZO is the new U.S.A. champion, with KI6P (WA6VEF) and KZ2S right behind. Mike, KE5CV, grabbed a North American championship and world second place on 28 MHz. On top band, W0ZV managed to pull enough stations through the static to edge out K5UR and KG7D for the top spot. Dick, K5NA/2, set a new U.S.A. standard on 3.5 MHz with his nearly 200K effort. Seven MHz honors go to Dave, KM3T, and Dick, WZ4Z, is the 21 MHz champion. The top QRP score is W8VSK's 372K points which was good for sixth in the world. N1AFC is the low-power 15 meter leader, and KU7Y the top scorer on 20 meters.

KR0Y teamed up with K4VX and KM9P to take the U.S. multi-single crown with a

*4121 Gardenview, Beavercreek, OH 45431



U.S.A. 40 meter champ KM3T tuning for the multipliers.



Victor, KD2HE/NP9, cools down after a hot weekend of contesting.

record-setting effort. N4WW's gang made 3 more QSOs but lost out in the multiplier count, 693 to 663. Multi-multi honors go to the Texas DX Society crew at NM5M with 3,482,757 points.

The Northern California Contest Club's 31 entries and 55,196,323 points were more than enough to give them the combined SSB/CW club championship and a new club record. Top U.S.A. club is the Yankee Clipper Contest Club with 20,505,227 points. Seventy-four clubs were represented in the 1986 contest.

A couple of new trophies were added for the 1986 contest. As mentioned earlier, N2AA is donating a U.S.A. 14 MHz trophy, and Les, K0SCM, now sponsors a trophy for the top Oceania 3.5 MHz station which was won by N7NR/WH6. In addition, Terry Baxter, N6CW, has assumed sponsorship of the world single operator all band trophy. There are still plenty of categories open for individuals or clubs wishing to sponsor a trophy. Drop me a note for more info.

Several contest expeditions were active during the weekend. Among them were 5W1FR (KB1CM & WB5VZL), C30CSA by the Northsea Contest Club, 3D2DD by N5RM (his sixth expedition), WC4E/KP4, VP2VCW, KD2HE/NP9, K8HVT/KP2, UF by UP2NK and UP2BOA, ZF9SV (VE7SV), GD0/N4ZC, 8P9AR (N6AUV), A25/ZS6BRZ, TK/DL4FF, DJIOJ/I4, and contest expedition trophy winner 4A1HC/2 (AA5B, W5AG, and XE1HC).

Many special prefix stations were also active during the contest. HS0A provided

SSB Results Additions

The following logs were inadvertently left out of the SSB results in the March issue.

Single Operator
YT3W 21 972,486 935 414
(Op. YU3EF)

Multi-Operator Single Transmitter
IO2UIY 1,873,612 1532 526
(Ops. I2UIY & IK2FOF)

The winner of the VE7KB Canadian Single Operator Single Band trophy should be VE1NG instead of XL7SV.

many with the last zone needed on CW for the special 50th anniversary WAZ award, and YE0X, 4M4A, RD9DM, RZ8MS, TE4T, 6Y6A, RD0DC, RD8DX, LJ2S, CR7DKG, CT5AT, 7S3FRO, 7S0FRO, GW6TM, YW5X, and YW7A were quite active. Thanks to all for making the contest more exciting and adding to our prefix and DXCC totals.

Please check the 1987 WPX contest rules for what constitutes a prefix, and for the correct QSO point value to use for your country. Most drastic score reductions, or increases, are usually the result of a misinterpretation of the scoring rule

for your continent. The current rules can be found in the January issue of CQ.

On a sad note, Don Riebhoff, K7ZZ (CT5AT), became a silent key early in 1987. Don was a long-time WPX contestant and DXer and provided many with a new country or prefix from his various stints around the world. Don will be missed.

In the odds and ends department, congratulations go to WA2ASQ on the birth of his son during the contest. I guess that's a good enough reason to miss the contest. KG6DX is the first 160 meter entrant from Oceania and thus becomes the Oceania record holder. Thanks, Joel. The only empty spot left on the record books is the African 1.8 MHz category.

Please remember that the 1987 contest does not fall on the holiday weekend. Due to a quirk in the calendar (I can't take any credit for it), there are 5 weekends in May. **The 1987 dates are May 30th and 31st.** Logs again go to: **CQ WPX CW Contest, CQ Magazine, 76 North Broadway, Hicksville, NY 11801.**

Thanks again to all those who help make the contest a success. The 1500 plus who turned in a log, those who went on an expedition or got a special prefix,

TROPHY WINNERS

SINGLE OPERATOR-ALL BAND

- WORLD** - Terry Baxter, N6CW Trophy. Winner: **Kele Kocman, YU1AO.**
- U.S.A.** - Steve Bolia, N8BJQ Trophy. Winner: **Alfred A. Laun, III, K3ZO.**
- ***CANADA** - Canadian A.R.F. Trophy. Winner: **Lee Sawkins, XL7CC.**
- ***JAPAN** - Palm Gardens Contest Club Trophy. Winner: **Station JA9YBA operated by JA9VDA.**
- OCEANIA** - Tom Morton, KT6V Trophy. Winner: **Ronald Pitts, AH6AZ.**
- WORLD QRPp** - QRP Amateur Radio Club International Trophy. Winner: **Daniel Ponce, WP4F.**

SINGLE OPERATOR, SINGLE BAND

- WORLD** - Pedro Piza Jr., NP4A (Pedro Piza Sr., KP4ES Memorial) Trophy. Winner: **Terry Baxter, VP2VCW.**
- U.S.A.** - Kansas City DX Club Trophy. Winner: **Robert L. Shohet, KQ2M.**
- U.S.A. 14 MHz** - Gene Walsh, N2AA Trophy. Winner: **John C. Yodis, K2VV.**
- U.S.A. 7 MHz** - Dennis Younker, NE6I Trophy. Winner: **David H. Pascoe, KM3T.**
- ASIA** - Bruce Frahm, K0BJ Trophy. Winner: **UZ9FWR operated by Igor.**
- OCEANIA 3.5 MHz** - Les Myers, Jr., K0SCM Trophy. Winner: **H. David Heumann, N7NR/WH6.**
- WORLD 3.5 MHz** - Lance Johnson Engineering Trophy. Winner: **Donald R. Riebhoff, CT5AT (K7ZZ).**

MULTI-OPERATOR, SINGLE TRANSMITTER

- U.S.A.** - Austin Regal, N4WW Trophy. Winner: **Station KR0Y operated by KR0Y, K4VX & KM9P.**
- ***CANADA** - Tehrahedral Contest Circle Trophy. Winner: **Station VE3UOT operated by VE3HTT, VE2BTW, VE1BLG.**
- WORLD** - Ron Blake, N4KE Trophy. Winner: **Station LZ7A operated by DL6RAI, DL7MAE, LZ2CC, LZ2PO, LZ2HE, LZ2DF, LZ2-E-72, & LZ2UA.**

MULTI-OPERATOR, MULTI-TRANSMITTER

- NORTH AMERICA** - Dick Weber, K5IU Trophy. Winner: **Station NL7G operated by KL7U, KL7Y, NL7GP, NJ7P, WL7Y & NL7G.**

CONTEST EXPEDITION

- WORLD** - Ed Roller, K4IA Trophy. Winner: **Station 4A1HC/2 operated by AA5B, W5AG & XE1HC.**

CLUB (SSB & CW)

- WORLD** - CQ Magazine Trophy. Winner: **Northern California Contest Club.**
- U.S.A.** - Northern Ohio ARS (NOARS). Winner: **Yankee Clipper Contest Club.**

*Donor is responsible for this trophy.

and also all the noncontesters who hand out contacts, are all important parts of the contest. Hope to see you the last weekend of May.

73 de N8BJQ

Random Comments

Great contest. We lost high 40 due to a breakdown. Too bad, as we were on a roll. CU next year . . . NL7G. A real challenge to stay with the competition on 160, not to mention the QRN. Was lucky to work 3 continents . . . VE3INQ. Best condx ever into Europe, but where did all the JA's go?? . . . VE6CB. No need to look for those rare multipliers as they are just next door . . . VO1QU. Many thanks to NP4A and NP4Z for their help and making it an enjoyable weekend . . . WC4E/KP4. Too bad didn't realize condx were good on 15 on Sat. or would have made a bigger effort . . . VO1AW. This is the first CW Contest in the world I have joined . . . YC4FRX. This year not backache but flu . . . VK2BQQ.

Yet another challenge and beginning to feel the pace (hi)—thoroughly enjoyed the contest and amazed at the number of contacts considering position of solar cycle! . . . VK5AGX. Good solid contest! Happy with 15 mtr. openings so stayed with the one band . . . KH6WT. Thanks for another first rate contest. Murphy's law type commitments kept interfering with the contest . . . KD6TB/DU2. 20 meters open to Europe thru whole contest . . . AH6AZ. Who said 10 meters is dead? I worked everybody that called me, but where were you all? . . . KH6DW. Took antennas down for super ty-



John, NJ9C, relaxing after the contest. John competed in the 20 meter QRP category.

phoon Lola and put them back up day before test only to be greeted with poor propagation . . . NY6M/KH2. There sure isn't much activity on 80 meters from Oceania! . . . N7NR/WH6. It is first time to take part in this contest from Nigeria . . . JG1FVZ/5N0.

Pity I could not work my own continent in almost 600 contacts . . . ZS6BCR. I initially thought the 18 hours off time would prove boring; as it turns out, it was quite pleasant not to be "zombified" by Sunday evening . . . 4M4A/K3UOC. One 3-500Z lost in the last period = 60% of QSO's 1 CQ for each one . . . ZY4OD. As ever, I hope I will do better next year . . . LU1EWL. It was my first experience in the big test world—FB test. I am a novice . . . YV7AXI. I chose to operate single band (160

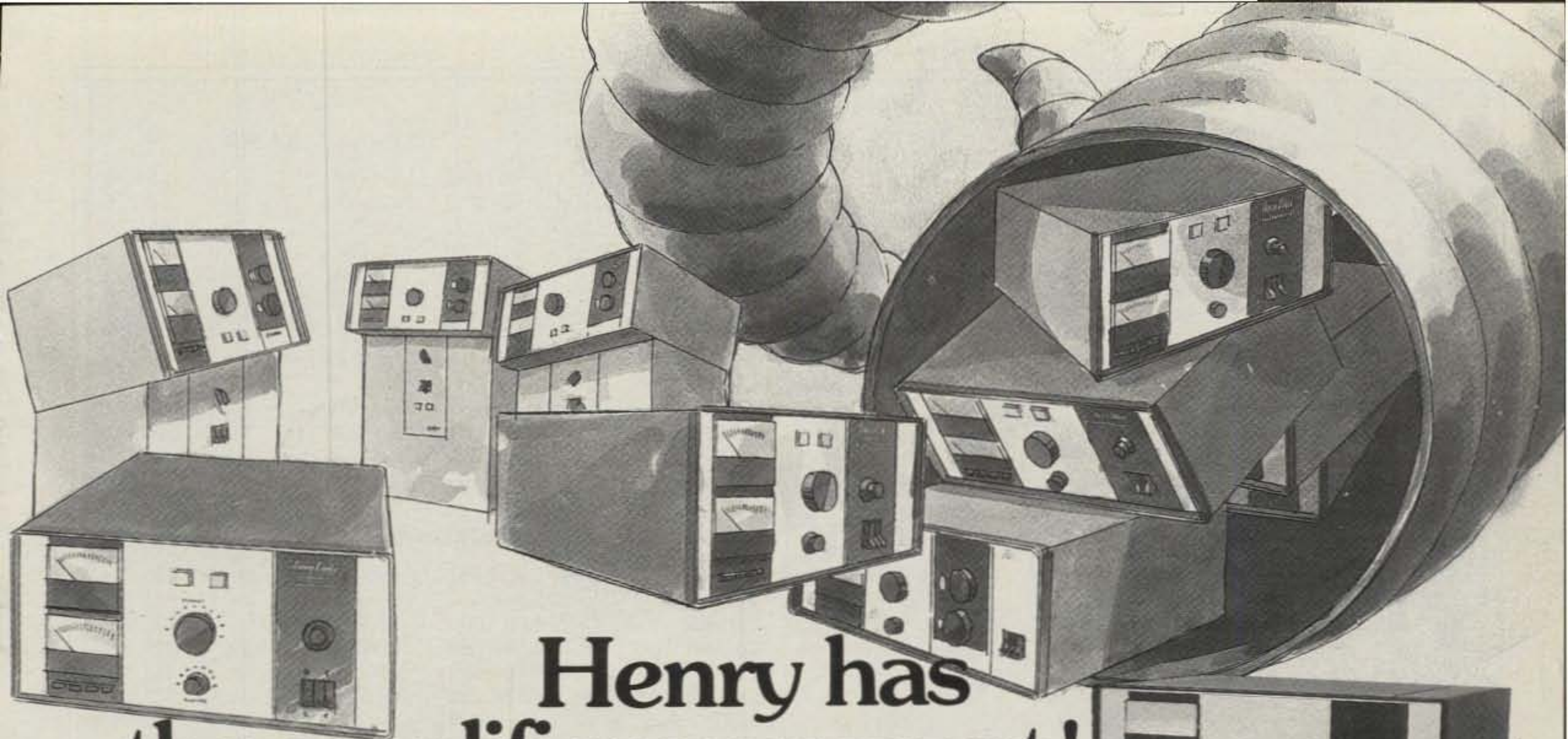
meters), but that was probably a mistake . . . HK3JJB. Made 50% progress as in '85 test. Will participate next year again to enjoy the fun . . . PJ2LS. This bloody propagation . . . PY2RLO.

Biggest thrill—To be DX! . . . 5W1FR. We'd like to try again next year. It was a fun contest . . . YE0X. It's hard to work European stations from Hawaii . . . WH6X. Our QTH was 2100 meters ASL, with snow all around. Without the very cold water from a nearby well, some of us would have fallen asleep during their turns . . . C30CSA. An 73's very special for everything that had patience the to listen my transmitter to fast how a tortoise . . . HK3MAE. First time we get guest ops. How wish to be already on the tower our new monoband 6 el QQ for 14 MHz . . . LZ7A. Our latitude at about 63 degrees so the greyline time very short for 6 point contacts but fine for 2 point dupes on low bands . . . OH7AB. This time no smoke went up from the linear. Very fun, we sure be back . . . SK6EI.

Very nice contest indeed . . . SP1PEA. Murphy help us to obtain a band resonance of the Butternut on 3.5 MHz. See you next year . . . EA6URP. KW's should be banned from contest to make things even. Not all countries are allowed QRO. Here max 500 watts input . . . OZ8JYL. PA6VHS special call to celebrate 25 years radio telegraphy very high speed club (VHSC). For VHSC info write to PA0DIN . . . PA6VHS. Our call, 7S0FRO, is a special call issued to commemorate 40 years of existence of FRO . . . 7S0FRO. The propagation on 10 meters was very poor during contest. I think for moment that my RX was broken. Hi Hi . . .

CW & SSB CLUB COMPETITION

Northern California Contest Club	55,196,323	Subic/Clark Contest Club (Philippines)	1,090,672
Yankee Clipper Contest Club	20,505,227	Overlook Mountain ARC	943,094
North Texas Contest Club	18,761,241	Cape Town Club (South Africa)	889,096
Northern Lithuania DX Group	12,504,386	South German DX Group	782,544
Texas DX Society	10,964,289	Central Arizona DX Association	702,078
Frankford Radio Club	10,594,583	Rhein Rhur DX Association	695,543
Osaka University Radio Club (Japan)	8,669,977	West Texas DX Association	635,679
Northern Ohio Amateur Radio Society	8,628,949	Grand Mesa Contesters	628,694
Kaunas Polytechnic Institute (Lithuania)	8,395,398	River City Contesters	463,793
The DX Gooses Group (Argentina)	7,710,734	Southeastern DX Club	334,114
Maui ARC (Hawaii)	7,685,008	Northern Ohio DX Association	297,984
YU DX Club (Yugoslavia)	7,357,632	Great South Bay ARC	286,068
Southern California Contest Club	6,017,887	Rodgau Contest Club	270,881
Mississippi Valley DX/Contest Club	5,527,315	Brazosport ARC	245,515
Lithuanian Contest Group	5,377,499	Armavir Radio Club (USSR)	236,223
Uruguay DX Group	5,247,783	Eastern Iowa DX Association	218,986
Lichfield ARS (England)	4,504,500	Farout ARC	201,398
Pest Country Contest Club (Hungary)	4,327,516	Bavarian Contest Club (FRG)	177,169
High Power Contest Club	4,250,078	Eastern Michigan ARC	164,752
North Sea Contest Club	3,720,840	University of Idaho ARC	159,786
Dixie DX'ers	3,666,493	Arrowhead Radio Amateurs	142,896
Carolina DX Association	3,615,834	Ohio Valley ARA	134,140
YU1EXY Alligators (Yugoslavia)	3,488,365	Dade Radio Club	121,752
New Mexico Big River Contesters	3,452,781	Rip Van Winkle ARS	121,536
Society Of Midwest Contesters	3,142,704	Central PA DX Club	110,175
Ontario Contest Club	2,979,014	Western PA DX Association	104,118
Potomac Valley Radio Club	2,714,624	Inland Empire DX Association	98,245
Southern California DX Club	2,596,620	Poway ARS	87,230
Kansas City DX Club	2,302,481	Rubber Circle Contest Club	81,180
WPG DX Group (Canada)	2,250,380	San Diego DX Club	57,160
Ashtabula ARC	2,036,778	South Jersey Radio Association	32,280
Down Under DX'ers (Australia)	1,736,928	Order of Boiled Owls	19,836
Mad River Radio Club	1,552,823	Northern California DX Club	16,456
Chelyabinsk Radio Club (USSR)	1,474,980	Radio Club Venezolano	11,550
Northern Illinois DX Association	1,280,781	Long Island DX Association	7,920
Madison DX Club	1,195,864	Willamette Valley DX Club	2,704
SP DX Club (Poland)	1,170,335	Dragor Radio Club (Denmark)	2,625



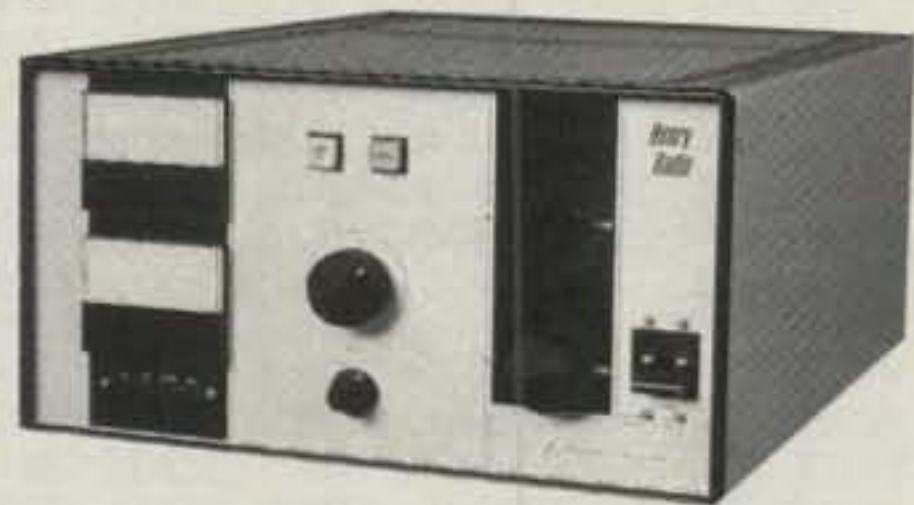
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XL7CC	3,398,598	G3FXB	2,801,149
8P9AR	3,369,072	KZ2S	2,536,916
K3ZO	3,125,704	UA9SA	2,478,780
UF6FFF	3,100,293	OK3CSC	2,396,388
4M4A	3,067,038	6Y6A	2,335,662
Y24UK	3,020,750	IK2DVG	2,203,230

SINGLE BAND

28 MHz		21 MHz	
YW7A	129,115	ZY4OD	2,042,658
KE5CV	16,560	4Z4NUT	1,370,800
YU7AJD	14,960	YC8VCE	986,062
KH6DW	6,888	4X6NM	748,494
VE2AEJ/3	4,756	ZV2KT	556,898
KU2Q	4,158	ZS6BCR	496,107
WB7FDQ	4,148	GD0/N4ZC	452,250

14 MHz		7 MHz	
WC4E/KP4	3,613,248	VP2VCW	4,641,120
UZ9FWR	2,570,940	NP4A	4,495,854
EK9AD	2,542,456	UP2NK/UF	2,084,880
K2VV	2,525,880	IO4IND	1,812,138
KQ2M	2,377,508	KM3T	1,640,820
N2AA	2,047,545	CX8BBH	1,115,370
YT3M	1,963,224	OK7AA	1,036,256

3.5 MHz

CT5AT	697,248
UP2BOA/UF	697,212
ZF9SV	346,620
YU1AWW	317,580
RR2RW	300,118
OE5JDL	277,780
HA6NL	255,200

1.8 MHz

UB4FWC	62,876
RT5UY	58,176
UP2BW	51,480
YU2TW	45,474
VE3BMV	43,428
OK1DXS	41,140
SP5GH	24,236

QRP/p

WP4F	A	594,375	UT5UIW	14	181,056
FO8JP	A	572,131	DL2HCB	7	99,468
J13BFG	28	24	Y25XA	3.5	38,382
WP4D	21	305,109	RZ8MS	1.8	19,992

MULTI-OPERATOR SINGLE TRANSMITTER

LZ7A	7,238,757	HG5A	4,359,204
AZ8DQ	6,964,584	HG7B	4,322,516
UP1BZZ	4,981,095	HG9R	4,292,096
OH7AB	4,693,380	N4WW	4,227,951
EA3VY	4,681,052	HG6N	4,117,514
RL8PYL	4,538,222	UB3IWA	3,871,701
KR0Y	4,516,974	C30CSA	3,720,840

MULTI-OPERATOR MULTI-TRANSMITTER

IO3JSS	8,903,454	JA2YKA	5,200,242
4N1C	7,593,216	JA3YBF	4,669,826
NL7G	6,791,670	NM5M	3,482,757
YZ4Z	6,576,045	JA1YXP	1,558,788

EA6WX. After 15 hours I had about 830 QSO's, but the propagation let me down . . . OH2AC/OH6EI.

Earlier W2 very common—today very rare, or I have some kind of a filter in my ear? . . . OH3TQ. First WPX since 1981 as W7LPF/DU2—next year with a better antenna . . . CR7DKG/W7LPF. GW6TM—club callsign of Conwy Valley Radio Club activated to add interest. Only one or two GW6's in force now . . . GW6TM/GW3JI. The best contest of JW0A . . . JW0A/SP2FWC. Very glad to have worked in this contest from a DXpedition! . . . TK/DL4FF. Finest contest every year . . . PA0PUR. First QRP contest = my new contest life . . . SM0DJZ. My first QRP contest. Interesting to see which of the big stations had good ears . . . G4ZFE. Fantastic condx during the test. When the EU stations were S9 it was as easy as with 100 watts—if they were only S6, don't waste time calling . . . KU7Y. Biggest thrill—working all those Russians QRP (their receivers must be getting better) . . . KG9N.

Worked EU with wire on floor and an ATU . . . KH6CP/1. Biggest thrill—working 38 countries with 5 watts in one weekend! . . . WA9FWO/5. Friday night to Europe was astounding!! Best condx in years . . . NT7S/K7SS. I made a trip to the top of Mt. Hiei in Kyoto-city for this contest . . . JA9SOT/3. Biggest thrill—JW0A interrupting his pileup to remember QSO'ing me on 80 meters and providing his QSL mgr. . . W6OKX/4. Where were the Asians and Africans? . . . NI0G. Hot wx + cold swimming pool = low score . . . W8AKS/6. Terrible QRN on 160 the second day . . . W0ZV. My hand still hurts: 30 hours of calling CQ with a "hand key" . . . KE5CV. Damm computer quit in middle of contest . . . K8CV.

I got last zone on CW for 86—HS0A . . . K9QVB. Nice to hear 10 meter activity—surprised to work 2 JA's on a dead band . . . WB7FDQ. Just put up a new 40 meter system

and was surprised when HZ1HZ called me on 40 . . . KQ8M. Great contest—one weekend for fun, one weekend for paperwork . . . WA6AUE. My first contest . . . K2CRT. Difficult to work the contest when the sun is shining and it's 80 degrees outside—spent too much time on my tan . . . NG2X. Good short path openings to JA both mornings . . . KM3T. Daughter's engagement announcement curtailed operating hours this year (her marriage, followed by her 3 sisters, then I can buy some new ham gear) . . . W2FTY. Murphy '86: (1) Week before the contest my 940 returned to Kenwood for repair. (2) Sat. 2035Z Drake AC-4 supply goes kaput. (3) Thanks to WA4WAY and the load of his 940 am able to get back on air and finish contest. Whew! . . . WB4TDH.

The biggest thrill of my life: Not operating very much because my baby son was born WPX weekend! . . . WA2ASQ. Lightning strikes, 12 hours of borrowed rig and 75 watts doesn't make good score . . . WA8YTM. WAC the first night . . . W8IMZ/WB8MRU. Broke old USA record but still probably won't make top 5 this year . . . WD8IXE. Tremendous thunderstorms here Saturday night totally wiped out the low bands . . . K5NW. Due to a stupid blunder (Is there any other kind?) I operated the entire contest with the RF preamp in my receiver blown! My apologies to those who called me but I didn't hear . . . AD6E. Terrible 40 meter opening to Europe Friday, even worse Saturday! . . . NE6I. It was great to work Europe on the west coast for a change . . . NN7L.

HS0A on the first call, with beam accidentally on long path! . . . WA2HZR. A special thanks to all the "non-contesters" for adding to the contest activity . . . W9SU. Practically fell off the chair when JY9RL answered my CQ! . . . WD8LLD. 160 meter condx very good with few operators taking advantage of additional QSO points and multipliers . . . KG7D. Last year's W3 champ, KT3Y, advised me to speed up this

year, and his advice paid off. Turns out most participants can copy numbers and calls at 35 wpm after all (3.5 MHz excepted) . . . K3ZO. Total frustration. Constant thunderstorms and lightning. Then found my new call (WM5K) in the mailbox when I went to mail the logs after such a poor showing . . . WB5YOT. Age 15. Enjoyed my first WPX contest very much. Was surprised to get HS0A through the European pileup with poor antenna . . . KA1LZR. Thrills (1) Being called by N5AU. (2) Finally working HZ1HZ (and on only the second call) . . . KT2D.

Station Operators Multi-Operator Single Transmitter

KR0Y K4VX, KM9P. N4WW & K8LUZ, NX4N. KE7V & K7CW, KA7WIA. WC6H & WC6I, W7MAP. KB1W & KB1KE, KS1N. NK2H: KI2P, NE2W, N6IN, WB2AFS, NI2T, WA3WKA, N2's HR, CIC & AEY. WL7E/6: N6VR, N6ADI, N6DX, AD6C & WL7E. AIGU & W6UQV, AA6GM, KB6HRB, N6MYV, WS6H, N6ESV. WR6R & AK6T, NP4IW, K4UVT, K6ZM, NB6L, N6OP, K16EZ. NZ5I & N5EA, W5ASP, WA5ZVE. KB0U & W0CY, W0AR, K0VXU. AC5K & KA5PXX. WG5J & WD5ABC. 4A1HC/2: AA5B, W5AG, XE1HC. VE3UOT: VE3HTT, VE2BTW, VE1BLG. TI20Y & TI20Z. ZS1CT: ZS1VP, ZS1QM, ZS1D. HS0A: HS1AOR, JA0JCJ, HS1AOL, HS1AMH, HS1AHT. JE2YRD: JA2E2D, JR2SCJ, JR2SQU, JF2XJE, JG2MWA, JI2KVV. JA1YWX: JG1ILF, JG1JMM, JI1CUP, JL10AQ, JM1MCF, JO1BMV, JO1NAH, JF2IWL, JI2GUT, JR4NIV, JE6MII, JH7PKU, JA1-38430, JA6-9330, G. Tanaka. JA1YBK: JH0LFE, JL11ED, JI2LCF. JA3YKC: JR5ARQ, JG3MRT, JG3WDN, JG6VTM, JG3CPF, JG3XJJ, JR4PMX, JJ3SRU, JE6LPM, JG3HYA, JH4IMK, JG3HJG, JI3ERV, JH4RHF, JG3HLV. JA7YFB: JH0QNT, JN1RON, JQ1NBV, JR7's JLU, OEF, GYC, WFH, JE7's JWB, MOY, JF7's AAD, TDN, LEI, JR0NUZ. JA1YAD: JN1AWY, JN1HYU, JP1DMX, JS1PAQ, JH5GHM, JH5MXM, JR6JOE, JH7UCC, JA9UFS, JH9AMJ. JA6YBR: JR6GKT, JF6DEA, JF6TMH, JG6CVO. JA4YPE: JF3MOK, JG3LZG, Kodama, Ookubo. JA8YBY: JJ2VXS, JH8PNE. JA8YAD: JH0TIS, JR0INT, JA8-4809. LZ7A: DL6RAI, DL7MAE, LZ2's CC, PO, HE, UA, DF, LZ2-E72. OH7AB: OH7's RS, UE, MA, VR, XI, XM, YF, KA. EA3VY & EA3's AIR, AVV, DXD, FER, FNN, KU & LL. HG5A: HA5's GF, MK, UA, WE, LN, FM, ML, HA7RY, HA7SU. HG7B: HA5WA, HA5PP, HA7UO,

HA7UG. HG9R: HA9's PP, RB, RU, PV, RP, RX. HG6N: HA6's ND, ON, OQ, NY, NQ, NF. C3CSCA: DL1HBT, DL3HAH, DL4BAH, DL4BBO, DL5BAD.

GB2MM: G4DSE, G3RZL, G8IUY, G1TQU. YT2R: YU2DQ, YU2MM, YU2MY, YT2AA. OK3RMM: OK3's EA, LU, CEM, CLD, CQW, CWS, TAP, OK3-27707. OK7ZZ: Club Group. HG1S: Gyula, Laszlo, Ferenc, Pal, Tibor, Laszlo T., Y33ZL & Y26WL, Y33VL. YT3T: YU3BQ, YT3EW, YU3DE, YU3EIJ. HG8UOT: HA5's MY, AIY, CP, KQ, XA, KM. IO2UIY: I2UIY & IK2FOF. SP5PBE: SP5's ANJ, ELA, FKW, JTF, JTM, LCT. HA3KNA: HA3's OV, OU, NS, NY. I1XPO & I1XA, I1ZEU, IK2EGL, I2VXJ. OH1AD: OH1PS, OH2BMD, OH1WZ. HG6V: Jozsef, Zoltan, Laszlo, Sander, Gyula, Peter. OK3KAG: OK3CDX, OK3ZFM, OL0COB, OL0CRG, OK3CIR. SK6EI: SM6's LPF, LPG, LJP, LJU, MCW, CST, BWQ, REA, GOR. Y39ZF: Y38UF, Y39TF, Y49RF, Y53PF. 4N1F: YU1FG, YU1ZM, YU1EFG. HA8KUC: Club Group. OK10AZ: OK1BLN, OK1DFP, OK1DDG. OH6OS & OH6UI. SP1PEA: SP1CU, SP1NQF, SP1MHZ.

EA6URP: EA6DO, EA6EJ. YU1ATA: YU1ZC, YU1TT, YU1VG, YU1RW. Y06KAL: Y06's EX, BZH, BTP, XM, EV, DQI, Y02CJX. F66OE & F50F. YU2CAH: Misko, Branko, Vlado. OZ8JYL: OZ8QW, OZ1III, OZ1KHZ. HA8KAX: Janos, Istvan. OK3KTY: Club Group. HA7KMP: HA7's JA, JB, JQK, Tamas. OK2KPS: Club Group. SK5LW: SM5IMJ, SM5OCK, SM5JZR. 4N2D: Club Group. OK3KGO: Club Group. HA7KWK: Lajos, Jozsef, Laszlo, Tamas. Y06KBM: Y06CJN, Y06DDF. OH5AB: OH5WR, OH5JP. OK1ORA: OK1-22310 & OK1AYD. PA6VHS: PA6INA & PA6ABM. HA7KNT: HA7ZT & HA7UB. OK2KNJ: Club Group. OK1KNA/P: Club Group. Y08KGS: Y08CEZ & Y08AII. OH6AT: OH6BZ & OH6QG. WH6X & WH6W, JH3PRR. YB0X: YB0TK, YC0BNX, YC0BRX, YD0KII, YD0JCT.

SW1FR: KB1CM & WB5VZL. AZ8DQ: LU2DBX, LU6KG, LU8DQ. HK3MAE & HK7IMB. RL8PYL: RL8PA, RL8PY, UL7's PAE, PAZ, PCZ, RL7PHL, UL7-023-468. UZ9AXX: UA8AFC, UA8AMA, UA8-103-712, UA8-103-239, JA8-103-729, UA8-103-235. UZ9AXB: UA9AO, UA9AGY, UA9-165-793. UZ9CYP: UA9CON, UA9-154-2105, UA9-154-2106. UZ9OWD: UA9-161-288, UA9-145-168, UA9-145-316. UZ0LWO: UA0LGK, UA0QKV, UA0LD. UL8GWF: Leonid, Yuri, Victor. UZ9AWB: UA8-103-9, UA8-103-73, UA8-103-390. UZ9LWX: UA8-107-725, UA8-107-748, UA8-107-772. UL8GWG: RL7GF, UL7GCZ, UL7GK. UP1BZZ: UP2BIG, UP2PAJ, UP2BIL.

UB3IWA: UB5IFZ, UB5I0K, RB5II, UB5IML, RB5ID, RB5IA. UQ1GWW: UQ2-037-83, UQ2GLK, RQ2GG, UQ20C. UB4WZA: UB5WCX, UB5-068453. UR1RWX: UR2's RJ, RRR, RDJ, RHF, RNA, UR2-083-165. UZ4HWG: RA4HF, UA4HAU, UA4HBW, UA4HTZ, UA4HTX. RA4HBY: UP1BZG, UP2QA, UP2BCO, UP2BCT, UP2BCW, UP2BOC, UP2-038-439. UQ1GZW: UQ2GM & UQ2GKA. RT0U: RT5UN, UB5RCA, RT4UF, UT5-186-2. UB4QWW: Club Group. UB4WXB: UB5-062-240, UB5-062-647, UB5-062-56. UR1RY: UR2RQ, UR2RE, UR2RMR, UR2RAT, UR2-083914. UC1WWC: Duka, Damaratskij, Kudryashov. UP1BZG: RC2ICC, RP2BIH, UP2BMO. UZ3AZG: Ostrenko, Kuleshov, Astahov. UZ6PWC: Club Group.

UB4AWW: Valezy, Alex, Igor. UZ1AWX: Lejvkin, Panarin, Capitonov. UZ1AWW: Club Group. UP1BYC: Jurgis, Andrius, Vita. UZ4YWW: UA4YBN, UA4YDZ. UZ10WR: UA10FT, UA1-113-18, UA1-113-17. UZ4WWC: UA4WEJ & UA4-095-683. UZ3DXW: UA3-142-1944, UA3-142-1945, UA3-142-1949. UP1BZM: UP2-038-1751, UP2-038-1744. UP1BWD: UP2BZ, UP2BCC. UZ6AYG: Club Group. UZ4CWA: Vaseikis, Orlov, Kudryashov. UB4QWV: Club Group. UZ2FVN: UA2DC, UA2-125-908. UZ4CWB: Melnik, Golovnyev. UB4RWW: Club Group. UZ4FWE: UA4-148-599, UA4-148-573, UA4FU. UZ1CXW: Kudriavcev, Stephanov, Mitrihshkin. SP0ITU: Club Group.

Multi-Operator Multi-Transmitter

IO3JSS: I3's JSS, FIY, FJV, JTC, OBO, VJW, ASE, XFY, YEG, IK3AFW, IN3TTL. 4N1C: YU1's FS, SA, DW, OYW. NL7G & KL7U, KL7Y, NL7GP, NL7P, WL7Y. YZ4Z: YU4's CC, NW, NY, RW, WQR, WTF, YU7XX, YU7RU, YZ7DX, Ana, Mladen, Zarko, Edwin, Suad, Sasa, Sejo, Kiki. JA2YKA: JE2JCV, JE2VYM, JF2DQJ, JF2UTL, JG2's AGD, AQI, BVO, MTC, VTD, XZG, JI2WYI, JJ2FAU, JJ2NJF, JK2CZL, JG30ET, JH4VBO, JE7BIZ, JA9SSY, JA9XXS, T. Igari. JA3YBF: JH4GRM, JN1DPL, JJ3KGS, JR4AGJ, JF4BME, JE6BXJ, JA9UXW, JJ2ICA, JR8AHE, JO1PS, JH9JFH, JM30US, JA3-30356. NM5M & N5IVF, K2TNO, K5LZO, WB5N, KE5IV, WB5RUS. JA1YXP: JM1AQU, JI2DLF, JN10TG, JR4HCV, JN1BST, JH9CAU. JA3YDS: JG1LNY, JH3HFE, JG3QBJ, JI3GAB, JI3OPT, JR4IKN, JR4WEI, JH5KQU. K6XO & K. Brubaker, 2 Mtr. Net. IO2MQP: IK2BHX & I2MQP.

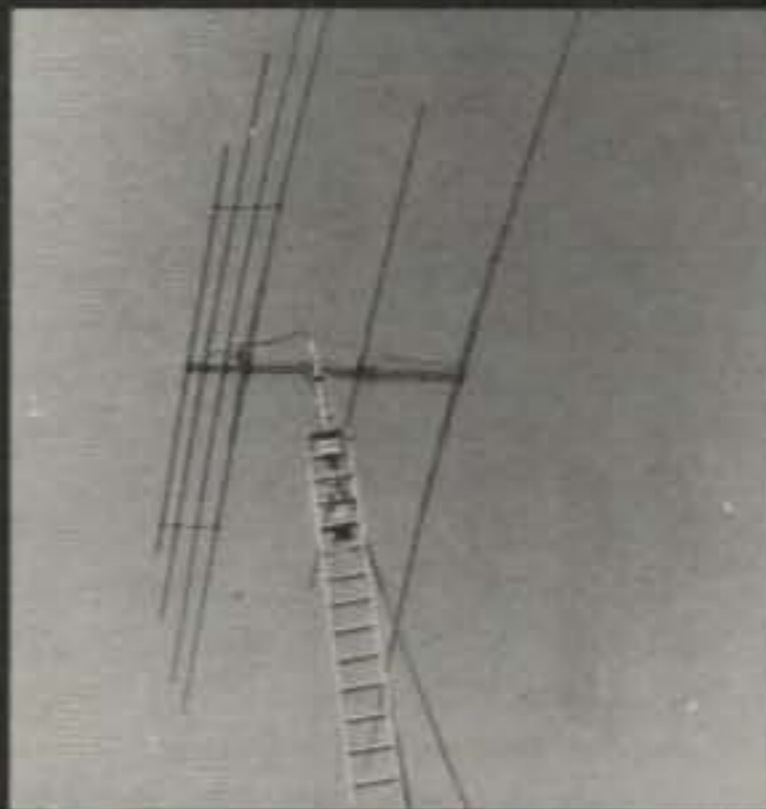
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AH-7000 Omnidirectional Ant. For IC-R7000	89.95
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IC-SP7 Base Station External Speaker	49.00
IC-SM6 Desk Microphone	44.95
IC-SM8 Desk Microphone	78.50
IC-27A 2-Meter, FM, 25 Watt Xcvr.	346.00
IC-28A 2-Meter, FM, 25 Watt Xcvr.	346.00
IC-28H 2-Meter, FM, 45 Watt Xcvr.	389.00
IC-37A 220-MHz, FM, 25 Watt Xcvr.	424.00
IC-38A 220-MHz, FM, 25 Watt Xcvr.	389.00
IC-3200A 2-Mtr./70-cm, FM, 25 Watt Xcvr.	519.00
AH-32 2-Mtr./70-cm. Mobile Ant. For IC-3200A	37.00
IC-2AT 2-Mtr., FM, Handheld W/Touch-Tone	249.50
IC-02AT 2-Mtr., FM, Handheld With T-T	299.50
IC-u2AT 2-Mtr., FM, Handheld With T-T	279.50
IC-03AT 220-MHz, FM, Handheld With T-T	383.50
IC-BP3 8.4 VDC, 250 mA., Ni-Cad Batt. Pack	37.50
IC-BP4 Battery Case	15.25
IC-BP5 10.8 VDC, 425 mA., Ni-Cad Batt. Pack	58.50
IC-BP7 13.2 VDC, 425 mA., Ni-Cad Batt. Pack	74.25
IC-BP8 8.4 VDC, 800 mA., Ni-Cad Batt. Pack	74.25
IC-BP20 Battery Case	15.25
IC-BP21 7.2 VDC, 120 mA., Ni-Cad Batt. Pack	33.99
IC-BP22 8.4 VDC, 270 mA., Ni-Cad Batt. Pack	37.50
IC-BP23 8.4 VDC, 600 mA., Ni-Cad Batt. Pack	47.00
IC-BP24 10.8 VDC, 600 mA., Ni-Cad Batt. Pack	49.00
BC-16U AC Wall Charger For IC-BP7, 8, 23, 24	20.25
BC-35 Drop-In Rapid Charger: IC-BP2, 5, 7, 8	74.95
BC-50 Drop-In Rapid Charger: IC-BP21, 22, 23, 24	74.95
IC-CP1 Mobile Charging Cord	13.00
IC-DC1 DC Converter For IC-2AT, 3AT, 4AT	23.25
IC-DC25 DC Converter For IC-u2AT	23.25
IC-HM9 Speaker/Microphone	47.00
LC-5 Leatherette Case, IC-2AT W/IC-BP5	20.50
LC-7 Leatherette Case, IC-2AT W/IC-BP3	20.50
LC-11 Leatherette Case, IC-02AT W/IC-BP3	20.50
LC-12 Leatherette Case, IC-02AT W/IC-BP5	20.50
LC-14 Leatherette Case, IC-02AT W/IC-BP8	20.50
LC-30 Leather Case, IC-u2AT W/IC-BP22, 23, DC25	TBA
LC-31 Leather Case, IC-u2AT W/IC-BP24	TBA
HS-10 Headset For Handhelds	23.25
HS-10SA VOX Unit For HS-10	23.25
HS-10SB PTT Unit For HS-10	23.25

BIRD

Model 43 Wattmeter With QC-UHF(F)	\$172.00
CC-1 Wattmeter Carrying Case	30.00
Model 8135 RF Coaxial Termination	160.00
Elements, Table 1, 25 to 1000 MHz	48.00
Elements, Table 1, 50H through 1000H	59.00
Elements, Table 1, 2500H & 5000H	85.00

ASTRON

RS-7A 13.8 VDC, 7 Amp Int., 5 Amp Cont.	\$46.30
RS-12A 13.8 VDC, 12 Amp Int., 9 Amp Cont.	64.60
RS-20A 13.8 VDC, 20 Amp Int., 16 Amp Cont.	82.90
RS-35A 13.8 VDC, 35 Amp Int., 25 Amp Cont.	125.60
RS-12M Same As RS-12A, With Meter	80.46
RS-20M Same As RS-20A, With Meter	98.76
RS-35M Same As RS-35A, With Meter	141.46
VS-20M Same As RS-20M, Adj. Volt./Curr.	117.06
VS-35M Same As RS-35M, Adj. Volt./Curr.	159.76
VS-50M 13.8 VDC, 50A Int., 37A Cont., Adj.	226.86
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supports the ARRL adopted AX.25 protocol.

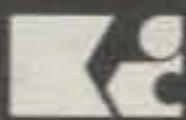
KPC-4 also contains the popular Personal Packet Mailbox™ feature, (optional on all other Kantronics Packet Communicators). You or others can leave and retrieve messages from the Personal Packet Mailbox.

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- Kantronics Personal Packet Mailbox feature included.
- External modem connection point provided for future use.
- RS-232 or TTL level operation by jumper selection.
- 32K bytes RAM, 32K bytes EPROM, 512 bytes EEPROM, 63B03X processor.
- Kantronics' industry standard extruded aluminum case.
- ARRL adopted AX.25 protocol.
- FCC part 15 compliant.

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The Santec ST-20T Two Meter Handheld Transceiver

BY DAVE INGRAM*, K4TWJ

Do you remember a few years ago when handheld FM transceivers were larger than a number 12 shoe, heavier than a pair of bricks, and crystal controlled on merely four or five channels? Changing frequency coverage or adding an autopatching tonepad was a time-consuming and tedious operation, yet those rigs were every amateur's delight and always more attractive than inconvenient. Today's era has definitely changed for the better, gang, and the Santec ST-20T featured in this review is a prime example of that situation.

Measuring 6.7"H x 2.6"W x 1.6"D and weighing approximately 1.3 pounds, the ST-20T is designed with an upper area speaker and mike, center frequency display and keypad, and bottom area battery pack. The transceiver is dark charcoal gray color, and it has the "solid feel" of a well-built unit. Top-mounted controls include volume, squelch, high/low power switch, plus an analog S/Rf power meter and connectors for antenna, external power, and speaker/mike. As initially purchased, the ST-20T covers 142.0 to 150.995 MHz with 3.5 watts high-power output and .5 watt low-power output. Additional specifications are included in fig. 1.

An optional 12 volt battery pack or input from a car's cigarette-lighter socket will increase the ST-20T's output to 5 watts. Likewise, a simple distributor approved modification will add frequency coverage of 158.9 to 167.89 MHz to the rig for receiving continuously available NOAA weather broadcasts and other public services. The transceiver is supplied with its standard 250 maH BP-2 rechargeable battery pack, 15-hour wall charger, flexible antenna, belt clip, wrist strap, external DC power plug, and earphone.

Overview

The ST-20T packs a phenomenal amount of modern technology into a



The Santec ST-20T FM handheld transceiver features a tremendous amount of modern technology and super "bells and whistles" in a handsize package.

small case. It's fully microprocessor controlled with four modes of scanning, 10 full-function memories, easy lockout of any occasionally undesired memories, 37 PL tones, autopatching tonepad on transmit, a programmable two telephone number autodialer, and a 24-hour clock. All of the previous capabilities are selected via the rig's front keypad and monitored on its LCD multi-readout. A backlight is included for night use. In addition to providing numerical inputs of frequencies, memories, PL tones, etc., the keypad can also be switched into its secondary/function mode for selecting scan types, offsets, subaudible tones, autodialer operation, and clock mode. During typical operation a frequency is selected by pressing 6-9-4-0 followed by ★ on the keypad. The display then reads 146.940

MHz. Adding -600 kHz transmitter offset is accomplished by pressing the A/function button, then the 7/DUP button. Programming that information into (random example) memory 8 merely requires again pressing the A/function button followed by the D/memory button, then the 8 button. After programming memories, the ST-20T operates quite smoothly. Selecting a new frequency is accomplished by pressing its last four digits and the keypad's ★. Pressing the D/memory button shifts to memory mode. Selecting or shifting between memories then simply involves pressing only its number (0 through 9) on the keypad. In fact, it's easy to select memories "one hand style" with your thumb while cradling the talkie with your fingers. When you prefer scanning local activity and a repeater stays "tied up" with chatter, merely press the A/function button followed by the 6/Scan lockout button to delete the busy channel. Repeating that step after a busy repeater "quiets," toggles the memory channel back into use. The previous operating techniques seem more complex on paper than in actual use. After spending 30 minutes of (interrupted) "studying and playing," for example, I was putting the ST-20T through its many paces in high style.

Those Special Features

Clever layout of the ST-20T's keypad provides convenient access to the rig's special features. Function mode use of the top row keys (1, 2, 3, A), for example, selects various types of scanning, while right horizontal keys (B, C, D) activate subtone, autodialer, and memory operations.

When the **MANUAL** scan mode is activated, sequentially pressing the **A** and **5** keys changes frequencies one step at a time. Pressing the **A** key then holding the **5** key one full second shifts the rig into non-pausing scan (it squawks on busy channels but doesn't stop until you press the **PTT** or ★ key). When the regular **SCAN** mode is selected, the ST-20T pauses on busy channels approximately 15 seconds, then resumes scanning. When the

*Route 11 Box 499, #1201 South, Birmingham, AL 35210

VHF FM TRANSCEIVER MODEL ST-20T	
General	
Frequency Range	142.000 to 150.995 MHz
Type of Emission	F3
Memory Channels	10 Channels
Antenna Impedance	50 ohms
Power Source	9.6V Nicd battery pack 9V Dry battery pack D.C. 8.4-16V
Transmitter	
RF Output Power	5.0 Watts (H), nominal at 12V 3.5 Watts (H), nominal at 10.5V 0.5 Watts (L), nominal at 10.5V
Modulation	Frequency modulation
Maximum Deviation	± 5 KHz
Transmit Spurious	- 60 dB
Microphone	Electret Condenser Microphone
Receiver	
Receiving Methods	Double superheterodyne
I.F.	1st 16.9MHz 2nd 455KHz
Sensitivity	Less than - 0.25uV at 12dB SINAD
Band Width	± 7.5 KHz at 6dB down
Selectivity	± 15 KHz at 60dB down
Audio Output Power	400mW at 8 ohm

Fig. 1— General specifications of the Santeo ST-20T handheld FM transceiver.

ST-20T is operated in its **OPEN** scan mode, however, the pause on a busy channel continues until the frequency clears. The ST-20T's **SEARCH** mode is similar except when the ST-20T pauses on a busy channel, further scanning is cancelled. Overall, one mode is ideal for initially spotting an area's activity, and the other mode is good for closely following activity. The

ST-20T can also be programmed to scan specific frequency ranges by entering an upper limit in memory **0** (zero) and a lower limit directly on its keypad.

Modifying the ST-20T for NOAA weather channel reception is a simple 15 minute operation. It begins by removing the talkie's battery pack, back cover, and bottom battery retainer plate. The back

cover is then gingerly lifted 1 or 2 inches so a small wire can be added between the top terminal of the frequency lock switch and the top side of R423. Both of those components are located in obvious view at the talkie's bottom (right above the battery pack), thus making the modification a cinch. Using the modification involves subtracting 16.9 (MHz) from the desired frequency and entering that number on the keypad (Example: desired 162.550 - 16.900 = 145.650 keypad entry). The rig's frequency lock switch is then used to shift reception to 162.550 MHz. Assuming you store 145.650 in memory, later weather checks are simplified to activating the frequency lock switch.

Some Technical Points

As a convenient means of overviewing the ST-20T's general design, its block diagram is included in fig. 2. Circuitry is contained on four PC boards, with liberal use of ICs for compactness. A battery-saving mode is included in the microprocessor's control, but specs on its current reduction were not included in the manual. The receiver is double conversion with an S-curve detector providing symmetrical audio and ensuring band scans stop right on "center frequency." That circuit's operation is also apparent in the display: a true carrier (but not un-squelch/noise) activates the "RCV" indicator. On the transmit side, notice the power control circuit reduces drive to the final for low-power operation—a good design.

On the Air

As I mentioned earlier in this review,

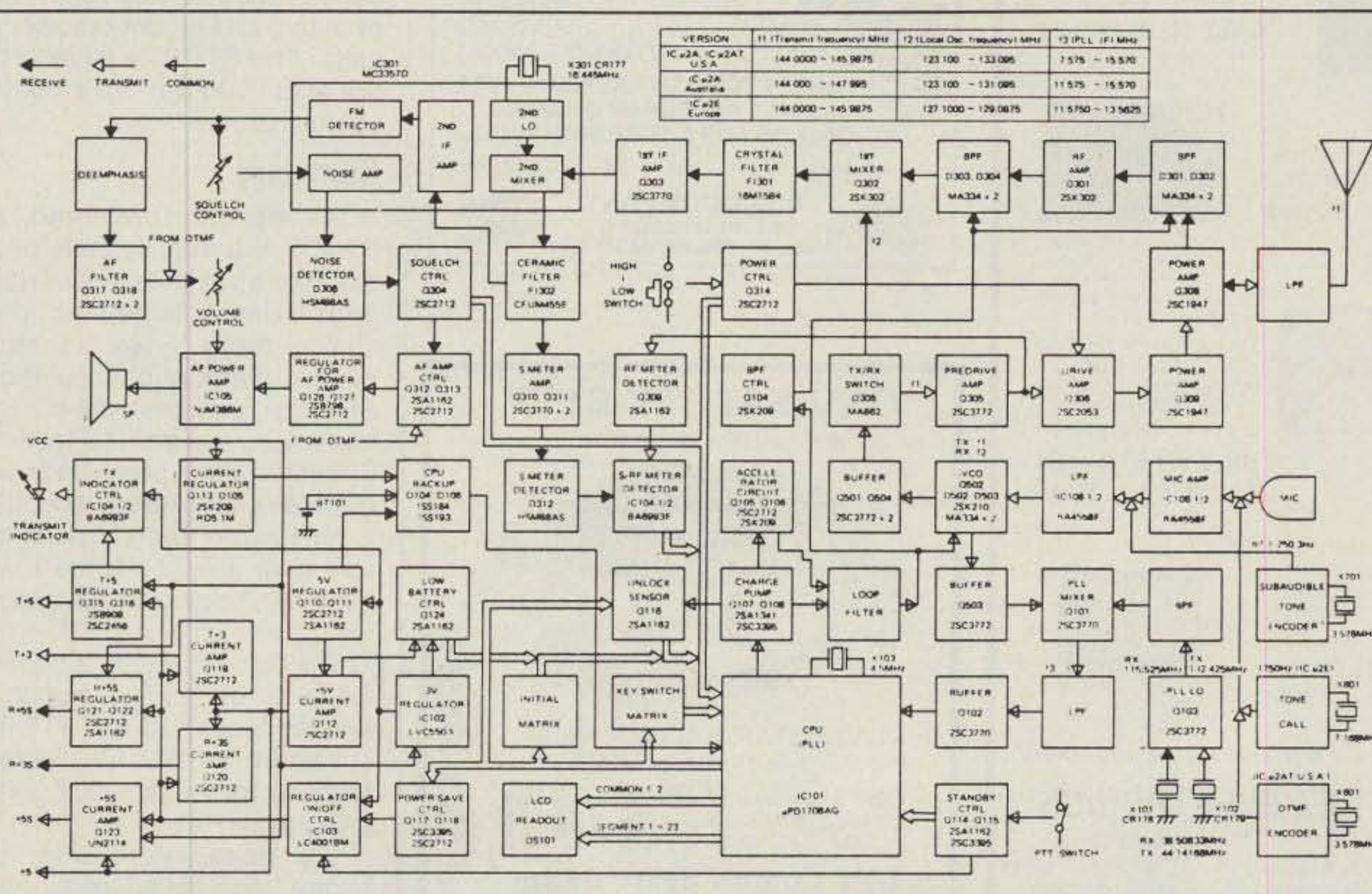
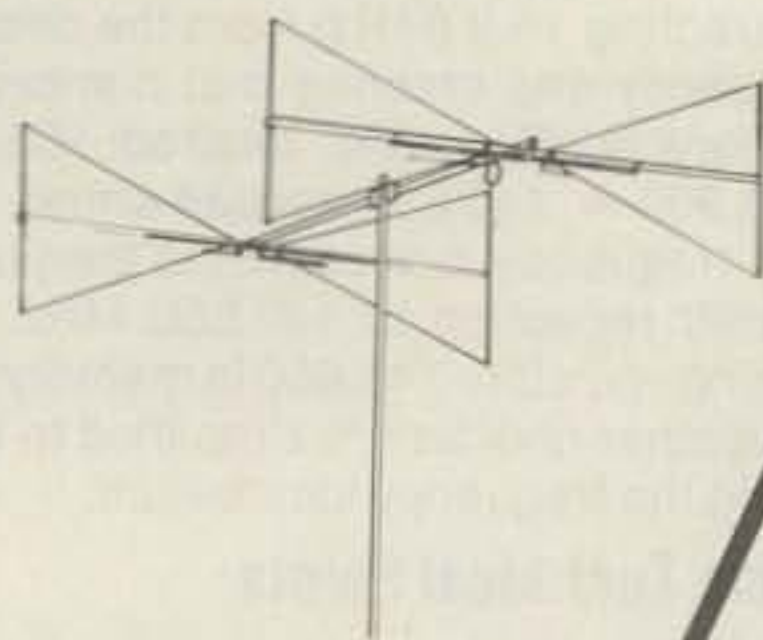


Fig. 2— Block diagram of the Santeo ST-20T handheld FM transceiver.

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the Santec ST-20T boasts a tremendous number of operating capabilities in a small package. Consequently, I heartily suggest taking time to study its manual for enjoying the talkie to its full extent. After that initial familiarization and memory/lock/autodialer/PL tone programming, I think the ST-20T is a fantastic "bells and whistles" rig.

The ST-20T's 3.5 watts does a very good job on the air, and its receiver is impressive in both sensitivity and full-bodied audio. "Full-size" talkies such as the ST-20T, with their larger speakers, have an edge over "pocket-size" talkies with their necessarily smaller speaker. So what's new? Most items today are a trade-off in one way or another.

The transceiver's two-memory auto-patch autodialer is a clever feature. However, I continue to need instruction-manual guidance for programming. After programming it's a real attention-grabbing showpiece. Since I only call one person, two autodialer memories are quite sufficient for me personally. I merely loaded 911 emergency into the second memory.

In my opinion, the ST-20T's included 24-hour clock is a great idea. More talkies should include that feature. Maybe it's a holdover from my days of broadcast engineering and delving into high voltages, but hand/arm jewelry annoys me. Hand-held transceivers, however, are a natural part of any radio amateur's wardrobe.

Finally, some negative and positive points. I found the ST-20T's subaudible tone encoder rather complex to program into memory. Several keystrokes were required. On the positive side, the rig's S-curve detector works great for ensuring band scans stop dead on frequency rather than 5 kHz higher or lower as in many units. The ST-20T's keyboard functions are also "laid out" in a convenient and useful manner.

Summary

All aspects considered, the Santec ST-20T is a super "bells and whistles" unit and an impressive performer. Amateurs living in large metropolitan areas should really enjoy its multiple scan modes, memory channel lockout/recall, PL tones, variable offsets, and wide frequency coverage. The talkie's standard 3.5 watts output provides good communications range. Adding its optional 12 volt/5 watt output battery pack and a "pull-up" gain antenna turns it into a good mountaintopping or boondocks VHF DX-ing rig.

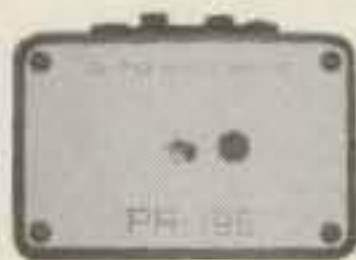
The Santec ST-20T is supported with a full line of mating options including leather cases, VOX or PTT headsets, or speaker/mike, and it's backed with Santec/Encomm's two-year extended service policy.

For more information, contact Encomm, Inc., 1506 Capital Avenue, Suite 300, Plano, TX 75074.



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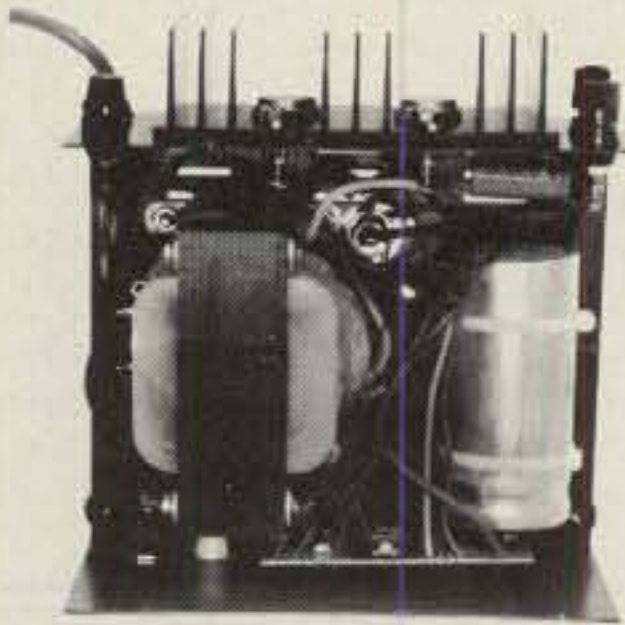
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• SEPARATE VOLT & AMP METERS				
RM-35M	25	35	5 1/4 x 19 x 12 1/2	38
RM-50M	37	50	5 1/4 x 19 x 12 1/2	50

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RS-4A	3	4	3 3/4 x 6 1/2 x 9	5
RS-7A	5	7	3 3/4 x 6 1/2 x 9	9
RS-7B	5	7	4 x 7 1/2 x 10 3/4	10
RS-10A	7.5	10	4 x 7 1/2 x 10 3/4	11
RS-12A	9	12	4 1/2 x 8 x 9	13
RS-20A	16	20	5 x 9 x 10 1/2	18
RS-35A	25	35	5 x 11 x 11	27
RS-50A	37	50	6 x 13 3/4 x 11	46

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MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H x W x D	Shipping Wt (lbs)
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RS-12M	9	12	4 1/2 x 8 x 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 x 9 x 10 1/2	18
RS-35M	25	35	5 x 11 x 11	27
RS-50M	37	50	6 x 13 3/4 x 11	46

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VS-50M	37 22 10	50	6 x 13 3/4 x 11	46

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RS-10S	7.5	10	4 x 7 1/2 x 10 3/4	12
RS-10L(For LTR)	7.5	10	4 x 9 x 13	13
RS-12S	9	12	4 1/2 x 8 x 9	13
RS-20S	16	20	5 x 9 x 10 1/2	18

How far you can talk may depend on how fast you can talk. KB1N explains how we can tune our vocal cords as well as our rigs to maximize that distance.

Getting Your Voice Speed Up

BY PETER R. O'DELL*, KB1N

Sounds silly, doesn't it? Yet it is true. It will take you some time to "get up to speed" on voice operation. There are things that you will do on the air that will identify you as a new operator. Part of the cure is simply learning the ropes. Watch a baby learning to walk. Are those initial tries truly first steps or are they first stumbles? The same is true of any new activity. If you add tension and pressure to it, it is doubly true. (Psychologists talk about things like performance anxiety.) Let's take a look at some things that will "get you up to speed" on the voice modes.

They Won't Work You If They Can't Hear You

The first place to start is with your equipment. To put it simply, it must be adjusted properly or the other operator is going to have trouble hearing you.

Older equipment with tube-type circuitry must be tuned before use, but if you have been doing CW with it, you already know that. When you switch to voice, you add another dimension to the tuning or adjustment of the equipment. The audio coming from your microphone must be amplified just the proper amount before mixing it with the RF.

It is true that modern equipment usually requires no tuning, but you still must adjust the microphone gain to the proper level. Some things just haven't changed that much.

If the microphone gain is set too low, your output power will be below the capabilities of your equipment. When the bands are crowded, you need every watt you can get out of your equipment. With some rigs, there can be other difficulties encountered running the equipment well below its rated power level.

So that means that you should crank the mic gain up all the way, right? **WRONG!** If you want to know what that sounds like, just tune around an active band. Listen for something that sounds like someone trying to talk with 22 bananas stuffed in his mouth. (It's almost always men. Either



The controls and switches on ICOM's 745 provide the user with plenty of flexibility. With modern rigs like this one, it is imperative that the operator read and understand the user's manual. (Photo courtesy ICOM)

it's a macho thing, or women are smart enough to read the operator's manual.) Now check 5, 10, or more kHz up and down the band. You should hear something that sounds like burps. These "burps" will be synchronized to old banana-breath's voice peaks.

The technical name for this malady is **splatter**. You see, old banana-breath noticed that the wattmeter needle moved higher if he cranked up the microphone gain control. He figures, "Might as well push it for all it's got. If I blow a final, I can always replace it." After you reach a certain point with any given SSB rig, driving it harder does two things. First, it distorts the signal, often to the point of unintelligibility. Second, spurious signals are generated up and down the band.

But old banana-breath didn't know that. All he noticed was that the wattmeter needle moved up one more tic mark on the scale. He sits and complains that no one can ever hear him, so everyone else must be "running high power." The sad truth is that *everyone* hears him, even stations two or more QSOs away on the band. His signal is so muffled that no one can understand him.

Unfortunately, he often decides to purchase the biggest amplifier his budget will allow. What do you get when you take

a bad signal and amplify it? That's right, more garbage on the bands. He still doesn't work many people, which is something that he can't understand. The perceived rejection leads to paranoia and hostility. That brings on aggressive, rude behavior. In short, he turns into a real lid just because he never learned to properly adjust his equipment.

Fortunately, almost all SSB transmitters and transceivers have **Automatic Limiting Control (ALC)** circuitry built in. Its purpose is to keep the transmitter from generating splatter. Also, a built-in meter is usually available to monitor the functioning of the ALC circuit. It will tell you when your transmitter is performing at an optimum level. You'll have to refer to your operator's manual for the specifics of adjusting your microphone gain. It varies from one rig to the next

Darth Vader, Please Call Your Office

While you were tuning around, you probably heard something else that is a good example of a misuse of technology. There was a voice there unlike anything else ever heard on earth, right? It is sort of like a cross between a broken speaker cone and Darth Vader's voice box. If the guy paused for a second or two without releasing the PTT switch, you began to

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Even a state-of-the-art, top-of-the-line rig like Kenwood's TS-940 must be properly adjusted to sound good on SSB. Follow the instructions in the manual for best results. (Photo courtesy Trio-Kenwood)

hear fan motors. Then you would hear the kids three houses down from this lunatic, if it was really a long pause. This is the mark of someone who has learned to misuse a **processor**.

Suppose you record the human voice for a few seconds. You then measure the energy in the voice at a thousand different points in time on the recording. There will be peaks and valleys of energy. The peaks are very high, and the valleys are very low. Your SSB transmitter must be set to handle the peaks to avoid splatter. That means that the transmitter isn't putting out much power during the valleys, which means that the average power level is quite low.

Some genius decided that the thing to do is to knock some of the high peaks off the **voice wave form**, as it is called. The device that performs this trick is called a voice processor. Cutting the tops off flat produces something that looks and acts a lot like square waves. This process is called **clipping** and is usually done with complicated and expensive devices that

go between the microphone and the input to the transmitter. Experienced operators are much more likely to use this type of processor, so we will skip over it.

Many, if not most, of the modern SSB rigs have a built-in voice processor that is of the compressor type. Compressors do pretty much what the name implies. They electronically squeeze the voice peaks down to fit into an overall pattern that looks more like a sine wave than the regular voice pattern. (Yes, I know this is oversimplified, but if you have an EE, why are you reading this article, anyway?)

Properly adjusted, the average power of the signal is increased, and you are more likely to be understood. By definition, compression is a *distortion* of the signal. When you overdo it, you make it more difficult for the operator on the other end to understand you.

If your goal is to make the needle on your wattmeter hang up high on the scale for a longer period of time, then by all means crank that compressor (processor) control up. On the other hand, if your goal



The Yaesu 767GX provides the user with a method of using the S-meter to adjust the built-in audio compressor. (Photo courtesy Yaesu)

is to make contacts, then follow the instructions in your operator's manual. A "little" is much better than a "lot."

VOX Popular

Most modern rigs offer you the choice of operating in either a PTT or VOX mode. PTT refers to **Push-To-Talk**. When you want to talk, you push the microphone button. You have to be real creative to foul that up.

VOX operation (**Voice Operated Relay**), on the other hand, can make you sound silly when done improperly. A VOX circuit waits for a loud sound at the microphone. When it detects such a sound, the VOX circuit automatically turns on the transmitter and generates a signal which goes out over the air.

Typically, you have three controls to adjust in VOX operation. First, the VOX-gain control tells the circuit how loud the signal must be to activate the transmitter. If it is set too low, you must scream to transmit.

The anti-VOX control compares the sound at the microphone with that coming from the receiver. You certainly don't want a loud noise from the receiver turning on the transmitter. There will be some interaction between the VOX-gain and anti-VOX circuits. Follow the instructions in your manual for setting these controls.

A third control is the VOX-delay. This control tells the transmitter how long to stay keyed. You need this, because there are normal gaps between words and sentences as we speak. Nothing is more annoying (to me) than listening to a relay cycle on and off between words. But you don't want to be sitting there waiting 5 seconds for the receiver to come back on after you've turned it back to the other operator. Experiment and find a comfortable balance for you.

A Friend in the Neighborhood

How can you tell what your signal sounds like? Until you learn to be two places at once, you can't. Bob Heil, K9EID, is an audio expert who founded Heil Sound, the company that works with many of the top singers and bands. Bob recommends the following procedure, and I don't know of anything simpler or better.

You should find another amateur two or three miles from your home who can listen to and record your transmissions. Set up things in advance. Make up a check sheet that lists settings for your VOX, compressor, and microphone gain controls. Label each combination of settings as "Condition number 1, Condition number 2, . . ." etc. Have your friend listen to your transmission on a quiet band—10 meters is ideal when the band is closed. Also, set up a recorder so you can listen and evaluate each variation for the optimum in intelligibility of your signal.

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Table 1— This ITU adopted phonetics list should be kept posted near your rig so you can see it anytime.

What's the point of being louder if no one can understand you? If you cannot find a satisfactory combination of settings, you may want to consider adding an equalizer to your station. (No, an equalizer is not an ex-CIA agent who blows away anyone who doesn't respond to your call.) That is a subject of its own and beyond the scope of this article.

Gibberish is Gibberish

Years ago when I worked in a two-way radio repair shop, I was riding along with my boss (an old ham) and the company radio salesman, Bill. We noticed an out-of-state van pass us with several antennas on it. Bill grabbed the CB microphone and unleashed about 50 goofball words that sort of asked, "Hey there. Why do you have all the antennas on the van?"

We saw the driver reach for a microphone, pause, shake his head, put the mic back, and hit the accelerator. Bill said, "Gee, I wonder what that was all about?"

I volunteered that the guy was probably a ham and took offense at Bill's verbal onslaught. My boss added, "Yeah, I never could figure out why some CBers think they have to sound like a half-drunk, uneducated, backwoods cracker just to talk on a radio."

Cutie-pie language has no place in amateur radio, and the old timers will let you know that, one way or another. Oh, that is not to say that we don't have our jargon, because we do. You'll never get in trouble sticking to plain English, though.

The jargon has been adopted down through the years to speed up and simplify communication. For instance, if conditions are noisy, it is sometimes difficult to tell when the other operator has stopped talking. All that is necessary is simply to say "over" at the end of your transmission.

One of the most boring things in SSB operation is the lid who says something like this, "KB1N this is WB1XYZ. That's a roger on the tower. KB1N this is WB1XYZ. Go ahead." The FCC only re-

quires that you identify once every 10 minutes, not every transmission!


What about phonetics? Remember that even though English is the semi-official language of amateur radio, many foreign amateurs only know a few words. The International Telecommunications Union (ITU) has adopted the phonetics shown in Table 1. Years of research have indicated that these are the most easily understood words for each letter of the alphabet. They are the ones the foreign amateurs with limited English will most easily understand.

Actually, you don't have to be a foreign amateur with a limited knowledge of English to have difficulty with strange phonetics. Once, well into the CQ WPX Contest, I was attempting to work a station in the Netherlands. He kept telling me that I had the suffix wrong, and he would repeat the phonetics. It was something like, "Germany Europe Maryland." I was going back to him with "Gulf Uniform Mike." After several frustrating exchanges, I decided that I would write down the words he was saying. As soon as I started to write "Europe" down, I realized his call was "GEM." Phonetics are just that. Use the standard ones that everyone will recognize on the air, and save the cute ones for the club meetings.

When I got my first SSB rig, one of the first contacts I had, I momentarily forgot my name. Honest. I was so excited that I stumbled over my name. I totally messed up the phonetics. My suggestion for the new voice operator is that he/she do the same as with CW—make up some "cheat sheets" that list everything that's likely to come up in a short QSO. Use the phonetics in these notes for yourself. Also, keep a copy of the phonetics from Table 1 posted near your rig where you can see them anytime.

Summary

So you see, the title of this article is something a little more than a silly pun. SSB operation requires more adjustments of equipment, which means there are more things that can be adjusted improperly. Anything that is adjusted improperly will *slow down* your progress. Use the manual that came with your rig to learn to properly adjust your equipment! Get a friend to record your signal so you know what you sound like. (You can tune up and down the bands and find plenty of lids who obviously never have.)

Also, with SSB operation—or FM, for that matter—there are new social customs to learn. There is a period of time before you will be relaxed making a contact. Prepare yourself with a list of the ITU phonetics and any "cheat sheets" that will be of benefit. And speaking of FM, next time we will take a look at the new operator and that mode. In the meantime, I'll give you a hint: It's not "kosher" to get on the local repeater and call "CQ." 

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Beef Up Your Heathkit SB-200/220 Amplifier Power Supply

BY KEITH STIEB*, VE5XZ

The Heathkit SB200/220 series of linear amplifiers has been around for years now. These linears have proven to be the workhorse of many amateur stations around the world. There have not been that many modifications made to these amplifiers. I suppose that is because Heathkit designed them right the first time.

My own personal experience with a "flaw" in the design of these linears occurred a few days ago. I turned on my SB-200 linear, intent on using it on 20 meters for a DX contact (a good one, I might add). However, when I went to transmit there was an immediate series of "snaps" and "sizzles."

After I shut off everything and took the covers off the linear, I found the problem. Three of the high-voltage series-string-diodes had exploded. At first I was just going to replace them. However, upon looking at the schematic of the linear, I reflected on the long-term dependability of these diodes—especially when they are used in a full-wave voltage doubler circuit.

So I decided to try something slightly different. After referring to some technical manuals, I came up with the following changes to the power supply. Fig. 1 is the original circuit, and fig. 2 is my modified one.

The basic changes made are in the diode strings. There are now only four diodes on each leg instead of six. As well, each has been beefed up in value to 3 amps at 1000 PIV. The reason I chose these diodes is their price. They cost about 60 cents apiece. I would have acquired higher voltage diodes and gone with less in each leg of the supply, but their cost would have far exceeded the gains made. Because these diodes are capable of handling 3 amps, they can take any sudden current surges, as in ini-

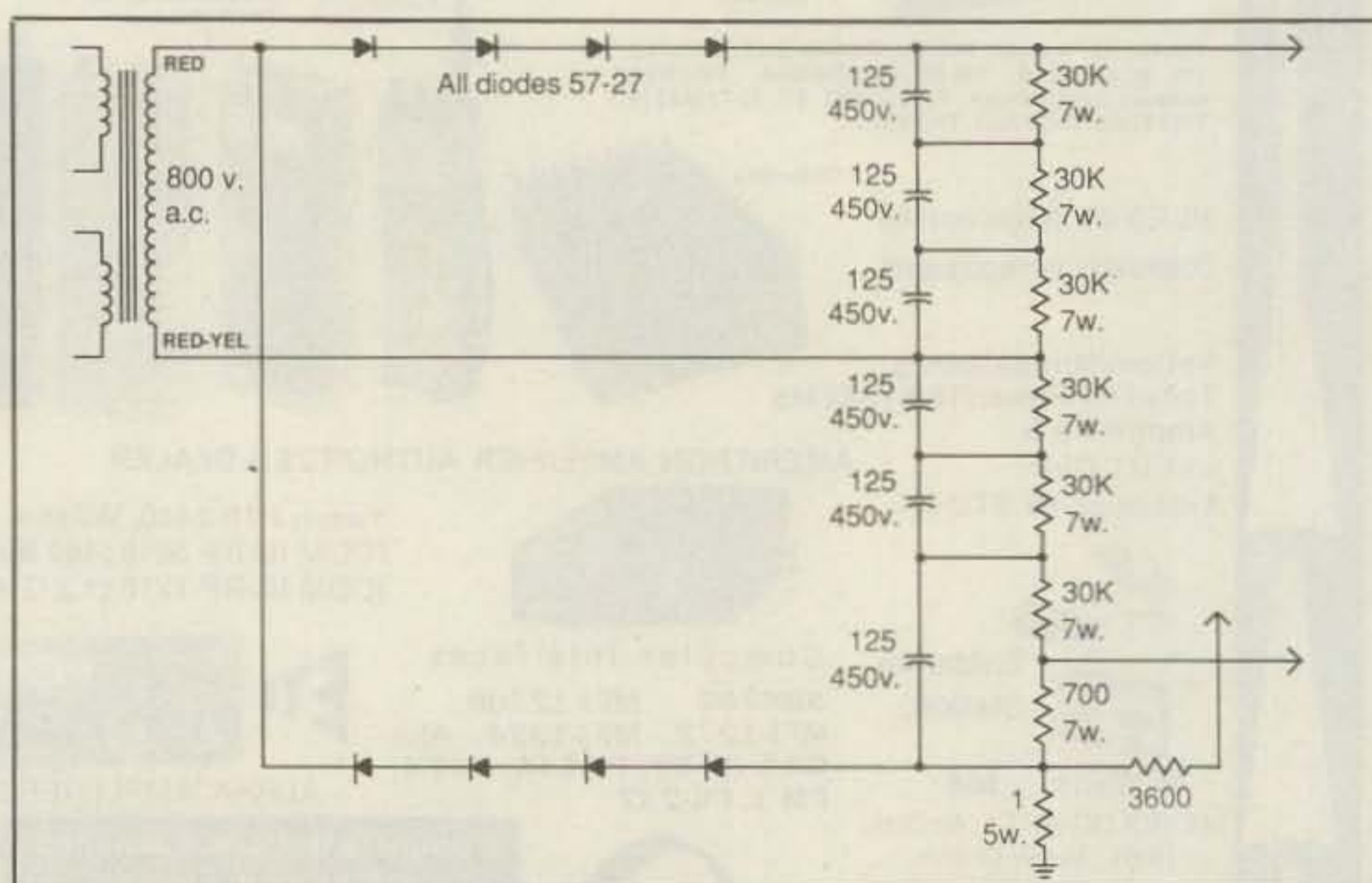


Fig. 1—The original schematic diagram for the SB-200 power supply.

tial power turn on and the sudden T/R switching.

Each of the diodes is paralleled by a capacitor and resistor. The resistor keeps the voltage constant across each diode when reverse voltage is present. This prevents the first diode from taking the "brunt" of the initial reverse voltage. The capacitors are there to absorb surges, etc., from the diodes switching, and anything else that could appear on the line. These spikes, and so on, could damage the diodes.

The 20 ohm 25 watt resistor serves a special function. If you do not want it in the circuit, that is fine. Its purpose is to limit the current flow in the entire HV supply when you first apply power. This is because the filter capacitors have no charge at this time and act like a "short circuit" until they build up a charge. So what could possibly happen is damage to the rectifier diodes, or worse yet, the

transformer winding! In commercial applications this resistor is switched out of the circuit after a few seconds by a time delay relay. However, in our application it is not necessary to be that elaborate.

The results of this power-supply modification have been excellent. In my SB-200 the HV line increased about 300 volts. My power output has also increased by around 50 watts.

Mounting the parts required to complete this modification is up to you. I soldered the capacitors across the body of the diodes and located the resistors on the foil side of the PC board. Be sure to put them in the right locations! The 20 ohm resistor can be mounted on this side as well. I leave it up to your imagination to do this. Some people have mounted the resistor on terminal strips located beside the PC board. Others have cut the PC board trace in appropriate locations and directly soldered the resistor on the bot-

*358 8th St. East, Prince Albert, Sask., Canada S6V 0W2

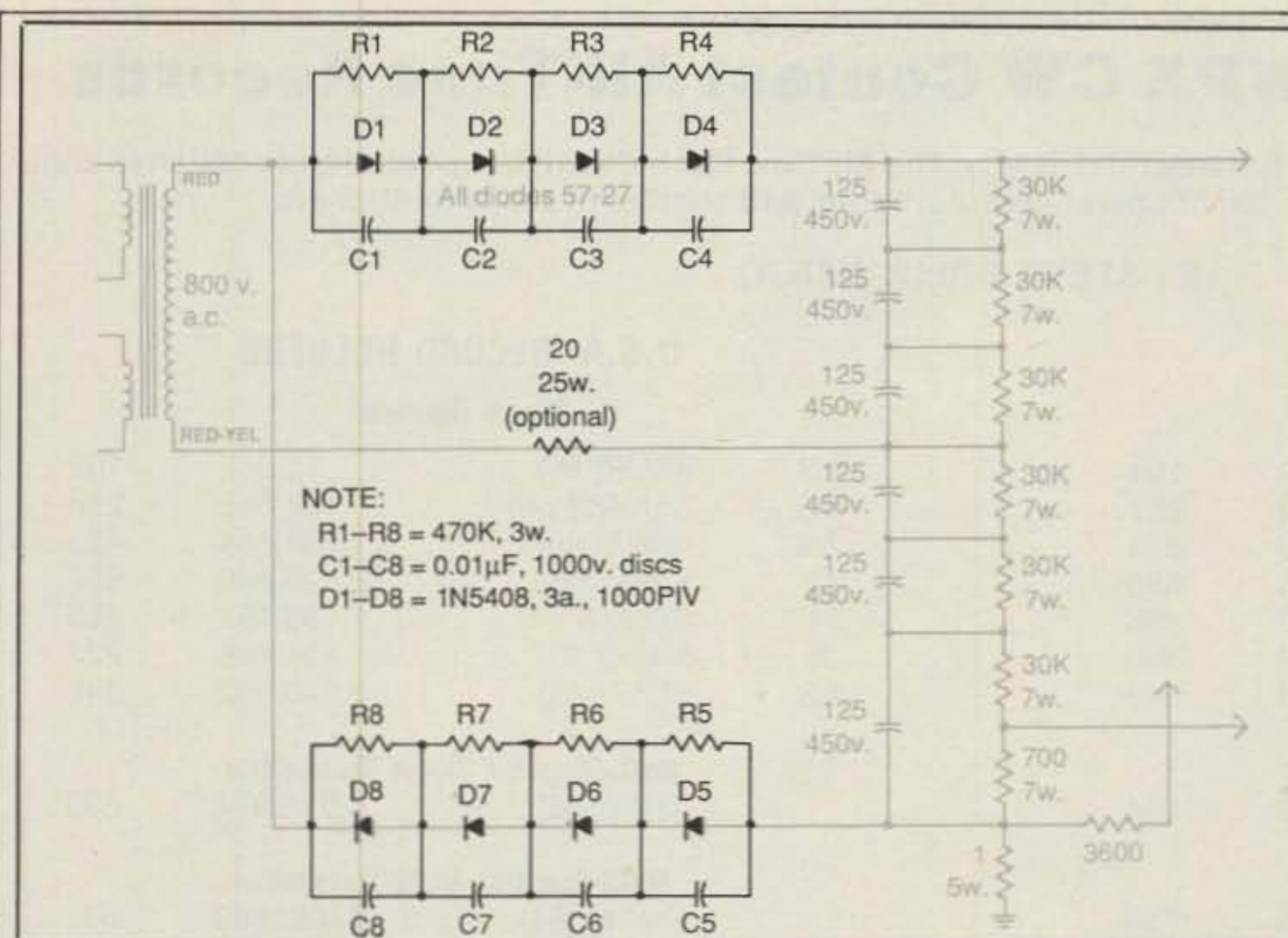


Fig. 2- The modified amplifier power supply.

tom of the board. This, of course, will depend on your preference, and the size of the resistor you use.

This modification should be done to the SB-220 linear as well. It might be wise to add another diode in the series string, though. I always like to keep a "safety margin" in the use of diodes. If they are

1000 PIV, for instance, I will rate them as 750 PIV, keeping a 25% safety factor.

I hope you enjoy doing this modification. It does not take long, and can be classified as an easy "weekender" project for a stormy winter! Once it is done, I doubt if you will need to worry about this problem again.

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The contest is held each year on the last full weekend of May. The All-Time Records will be updated and published annually. Data following the calls below are: year of operation, total score, and number of prefix multipliers.

BY STEVE BOLIA, N8BJQ

WORLD RECORD HOLDERS

Single Operator

1.8	UP3BP/UF('85)	125,240	101
3.5	UP2NK/UF('85)	701,012	221
7.0	VP2VCW('86)	4,641,120	586
14	WC4E/KP4('86)	3,613,248	656
21	HD0E('80)	3,544,416	496
28	LU8DQ('80)	1,627,660	388
AB	L8DQ('83)	4,128,084	548

Multi-Operator Single Transmitter

VP2EC('84)	7,599,480	664
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Multi-Operator Multi-Transmitter

YZ1EXY('83)	9,858,240	756
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U.S.A. RECORD HOLDERS

Single Operator

1.8	K5UR('85)	13,668	102
3.5	K5NA/2('86)	197,856	216
7.0	N5RZ('85)	1,754,664	452
14	K2VV('86)	2,525,880	582
21	K6LL/7('81)	1,433,457	459
28	N4ZC('81)	136,086	222
AB	KC1F('85)	3,140,592	546

Multi-Operator Single Transmitter

KR0Y('86)	4,516,974	693
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Multi-Operator Multi-Transmitter

NM5M('84)	4,432,883	637
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CLUB RECORD

N. California Contest Club('86)	55,196,323
---------------------------------	------------

WPX (Prefix) RECORD

IO3JSS('86)	826
-------------	-----

QRPP RECORD

4X4UH('82)	1,028,904
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CONTINENTAL RECORD HOLDERS

AFRICA

1.8	No Entrant		
3.5	EA8RL('84)	453,456	201
7.0	EA9GT('81)	579,824	217
14	EL2AV('82)	906,840	330
21	5Z4CS('82)	2,104,245	429
28	ZS6BUX('81)	8,850	50
AB	5Z4MX('85)	2,922,318	486

ASIA

1.8	UP3BP/UF('85)	125,240	101
3.5	UP2NK/UF('85)	701,012	221
7.0	UP2NK/UF('86)	2,084,880	365
14	UZ9FWR('86)	2,570,940	540
21	4Z4NUT('86)	1,370,800	400
28	4X4UH('81)	1,081,262	338
AB	UF6FFF('86)	3,100,293	537

EUROPE

1.8	LZ2CJ('85)	93,800	134
3.5	CT5AT('86)	697,248	324
7.0	DF9ZP('85)	1,998,372	482
14	YU4GD('84)	2,147,148	564
21	YU3BO('81)	1,550,390	394
28	9H1CH('81)	307,433	259
AB	YZ4GD('85)	3,554,460	651

Multi-Operator Single Transmitter

AF	ZS6CT('84)	3,129,216	464
AS	UZ9A('80)	5,500,135	511
EU	LZ7A('86)	7,238,757	821
NA	VP2EC('84)	7,599,480	664
OC	KH6XX('84)	4,646,859	553
SA	AZ8DQ('86)	6,964,584	682

NORTH AMERICA

1.8	VE3BMV('86)	43,428	77
3.5	ZF9SV('86)	346,620	218
7.0	VP2VCW('86)	4,641,120	586
14	WC4E/KP4('86)	3,613,248	656
21	KP4EQF('83)	1,816,416	476
28	KP4EQF('81)	577,500	300
AB	XL7CC('86)	3,398,598	576

OCEANIA

1.8	KG6DX('86)	1,224	12
3.5	T32AF('83)	93,480	95
7.0	T32AF('85)	1,249,176	276
14	VK4QK('80)	1,276,584	344
21	N6HR/NH6('83)	1,203,552	378
28	KG6DX('81)	1,238,806	334
AB	KG6SW('79)	2,848,320	345

SOUTH AMERICA

1.8	YV1OB('86)	11,550	35
3.5	4M3AZC('83)	142,780	121
7.0	OA4AWD('82)	1,752,254	329
14	YX5A('85)	3,016,155	557
21	HD0E('80)	3,544,416	496
28	LU8DQ('80)	1,627,660	388
AB	L8DQ('83)	4,128,084	548

Multi-Operator Multi-Transmitter

AF	EA9CE('84)	4,383,308	482
AS	JA2YKA('83)	5,895,628	614
EU	YZ1EXY('83)	9,858,240	756
NA	NL7G('86)	6,791,670	690
OC	KH6XX('85)	8,551,399	647
SA	HD1A('79)	6,052,032	474

QRPP

AF	EA8ACL('82)	139,965	155
AS	4X4UH('82)	1,028,904	344
EU	YU3BC('86)	439,624	307

NA	WP4F('86)	594,375	317
OC	FO8JP('86)	572,131	259
SA	OA8V('81)	444,768	246

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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!

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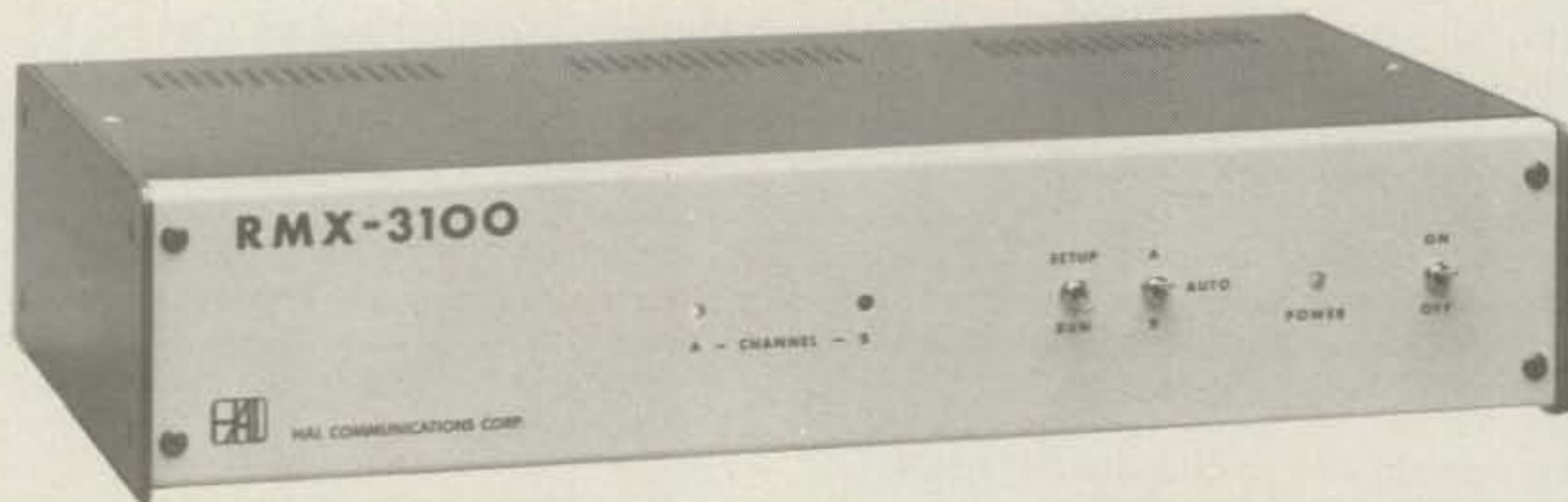
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The QSL Dragnet

Part II – Selecting QSLs

BY DON DASO*, WA8MAZ, and Roger Burt, N4ZC

The noon hour. My partner and I were on the south side of town. We went into the radio store to see a guy—a guy named Al. Al always had something to tell us. A story, a little bit of news or information. Today he wanted to complain. We let him talk.

"There are too many ads, I'm telling you," he said, waving a magazine around.

"Too many ads for what?" my partner asked.

"Printers. There are too many QSL printers."

"Why are there too many printers?" I asked.

Al grinned. "It's a plot," he said. Al had a sense of humor.

My partner and I shared a look. We knew Al.

"So I can't decide," Al said.

"Decide what?" I said.

"What to do about my cards! Getting cards printed up. What kind, what color, how many, what printer . . . I'm telling you, there are too many ads for printers. How'm I gonna decide?" Al shook his head.

"What do you think you'd want?" my partner asked.

"Huh?"

"What do you like?" I asked.

"I want something snappy," Al said.

"Snappy."

"Real sharp. Something that'll knock 'em dead!"

"Sharp."

"Something so good, I'll always get a card back," Al said.

My partner and I shared another look.

"What'd I say?" Al asked. "What'd I say?"

Al's "wished-for" or magical card doesn't exist. Try as we might, wish as we might, nothing can guarantee a 100% response rate to QSLs.

There are, however, certain factors to consider or keep in mind when making choices for your own personal QSL cards. You want what you send to other amateurs to represent you and your sta-



Illustration 1—An example of specially prepared and printed QSLs, in this case, from a DXpedition. Informative, yet capable of saving literally hours of time when answering.

tion and your operating style as well as possible. You want the quality of your QSLs to be as high as the quality of your signal.

Before we talk about card selection, a few words about sending cards are in order, since we've touched on it here. Especially the sending of SWL cards.

We've all heard about how our hobby is dying—how no new people are getting into amateur radio. Probably many of you have tried to solve that problem, at least locally. Well, many of you, perhaps inadvertently and unknowingly, have hindered the growth of amateur radio internationally by not responding to QSL cards from shortwave listeners abroad. In many countries a set minimum of SWL card verifications is needed before one can even take an amateur exam. For instance, Bulgarians need 50 cards; in the USSR 500 cards are necessary.

Even if you don't "work DX," your signal may have been heard by an SWL, and it's conceivable you have gotten cards from overseas—usually sent through the bureau. So please keep an envelope on file. And respond when those SWL cards come through. You'll be helping our hob-

by grow. (Full details on the workings of the QSL bureau system appear in our earlier article, "The QSL Dragnet," Part I).

Card Selection

Certainly, it only takes a moment of looking through the back pages of the amateur magazine ads to realize that QSL card printing can be a good business. A variety of printers are available; each offers a variety of cards and styles. No one design is best, nor can one printer serve everyone's needs. But here are some thoughts on the selection of a card—thoughts which cover all types of operating activity.

Primarily, the selection of a QSL card should be based on your operating style and budget. Do you operate a lot, a little, or a mixture of activities? If you're not that active, you won't need to order 5000 cards at one time, no matter how good the price. If you are, you can have that many contacts (or more) in a single season of contesting. If you specialize in a certain kind of operating, you might wish to emphasize it on your card. You might even wish to have two kinds of cards, if

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Time _____ on _____ MHz
Mode _____ RST _____
Rig _____
Remarks _____

WA8MAZ Gaston County NC
Don Daso
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Mt Holly NC 28120

Illustration 2— Author's handmade QSL. Using dry transfer lettering and a quality typewriter, 1000 cards were obtained in an afternoon from a local printer. Cost for the cards was \$15.00.

you can afford them. Here are some thoughts to keep in mind when dealing with your own QSL printer.

First and foremost is the size of your card. The "standard" size for QSL cards has become a horizontal format of 3½" × 5½". Any variance from this norm makes your card hard to handle, difficult to display, tough to file, and thus susceptible to "round-filing," the very last thing you want. So stick to what's become the standard size.

Next consider the actual cardstock itself. If you choose something heavy, you'll end up spending more money mailing them whether you send cards individually, or by the hundreds, or thousands, via the bureaus. A compromise between something so flimsy it has no dimensional support of its own and cardstock of, say, 30 pounds weight should suffice. Again, a standard-size card will weigh less than something larger. A coated (glossy) stock or one with a buff finish is up to you. Each is attractive, but check with your printer for printing limitations for such stocks. They can vary from printer to printer.

Next consider the actual "art" or layout and design of your card. This is an area where aesthetics, or attempts at cuteness and complex designs, sometimes get in the way of communication. Remember, you're trying to make things as easy as possible for the other guy. You want your card verified as quickly and as easily as possible. Obviously, original artwork or photographs can help to create a card which is unique and different. But consider this: It may cost more initially, and unless you purchase several thousand cards, this may be prohibitive. But assume you've decided on a two-sided card with a beautiful glossy picture of you and your station on the front, with all the printed information on the backside of the card. What do you consider?

The photograph itself should be properly lighted and exposed. Normally, this implies something more elaborate than a flash mounted atop your trusty 35mm camera. Larger negatives help, as does

having the picture made professionally, but again, this may be too costly. If you attempt this project yourself, spend some time just looking at your station through the lens. Use a "stand-in" for yourself if needed. Try different angles. Think about what you see. Remove anything extraneous; remove anything that dates the picture. Try to light everything evenly, especially faces. (To soften it, bounce light from the ceiling; use sheets of foam-core board to help bounce light into dark areas.) Turn the gear on and set it for normal operation. Use a medium-speed film such as Plus-X; use a tripod. Meter the light carefully, and expose in half-stop increments each side of the indicated F/stop. Devote a roll of film to this project, and process it at once, using a reputable black-and-white lab.

If you've been careful, this will produce a good photograph, and you can indeed create a beautiful and effective QSL card. However, the picture side *must* contain your callsign. It must be bold and immediately recognizable. Nothing causes frustration faster than flipping a card over, back and forth, trying to determine who sent it. Picture yourself doing this 50 times a day, and you can imagine the level of desire you'd have to answer such cards. So don't rely on a small sign atop your rig to identify your station in a photograph. If you choose this type of card, please include either a "reversed type" printed callsign (meaning your call would be white, within the black-and-white picture), or use a simple "blocked-in" area containing your call and perhaps your name and address. If you try printing "over" the picture (meaning you run the cards through the printer again, printing on top of the photo), make sure the printing remains sharp and clear and contrasts well with the photo. And then don't forget that the back side of this same card should also contain your callsign, again prominently displayed.

Eliminating these problems can give you a card that's impressive and personal. They can be expensive, though, and

you may end up ordering a large quantity. Then you can end up sending out cards where you no longer look quite like the photograph, or no longer use the gear pictured, which some people may feel isn't very personal at all.

Special events (such as DXpeditions) may utilize cards with as much information as possible pre-printed. The simple act of writing out the date, or the band, multiplied several thousand times makes lots of extra work. (See illustration 1.) Specialized operations (such as OSCAR work) may use a distinctive QSL as well.

You may elect to print your cards locally; many small "quick copy" type print shops can handle cardstock. This is an expedient solution and quite often inexpensive. Here are some hints on graphics and layout for designing your own card. Be clear and concise. Use a simple typeface. For the least amount of confusion, choose one without serifs, say Franklin Gothic or Helvetica. (You may possess the skills to do the layout yourself using any of the widely available dry-transfer lettering. Work carefully and cleanly. You can walk into your local print shop with "camera ready" artwork—a further savings to you in both time and money. Or you may rely on the printer to provide this service. (See illustration 2 for an example of a "home-made" QSL.)

Besides your callsign, the card must also contain blanks for relevant QSO information. The use of an "information block" which contains spaces for this data is probably the least confusing way to present the information. Again, the "standard" format has become as follows: QSO with Date (day, month, year); Time (always given in UTC or GMT, so printing UTC above this block makes sense); Band; RST; Mode (always indicate a two-way contact, whatever mode). Leave room to sign your name. When printing your address, leave out the county. It's an important feature, but should be printed elsewhere on the card itself.

If a photo or other design cannot be made to your satisfaction, postcards may

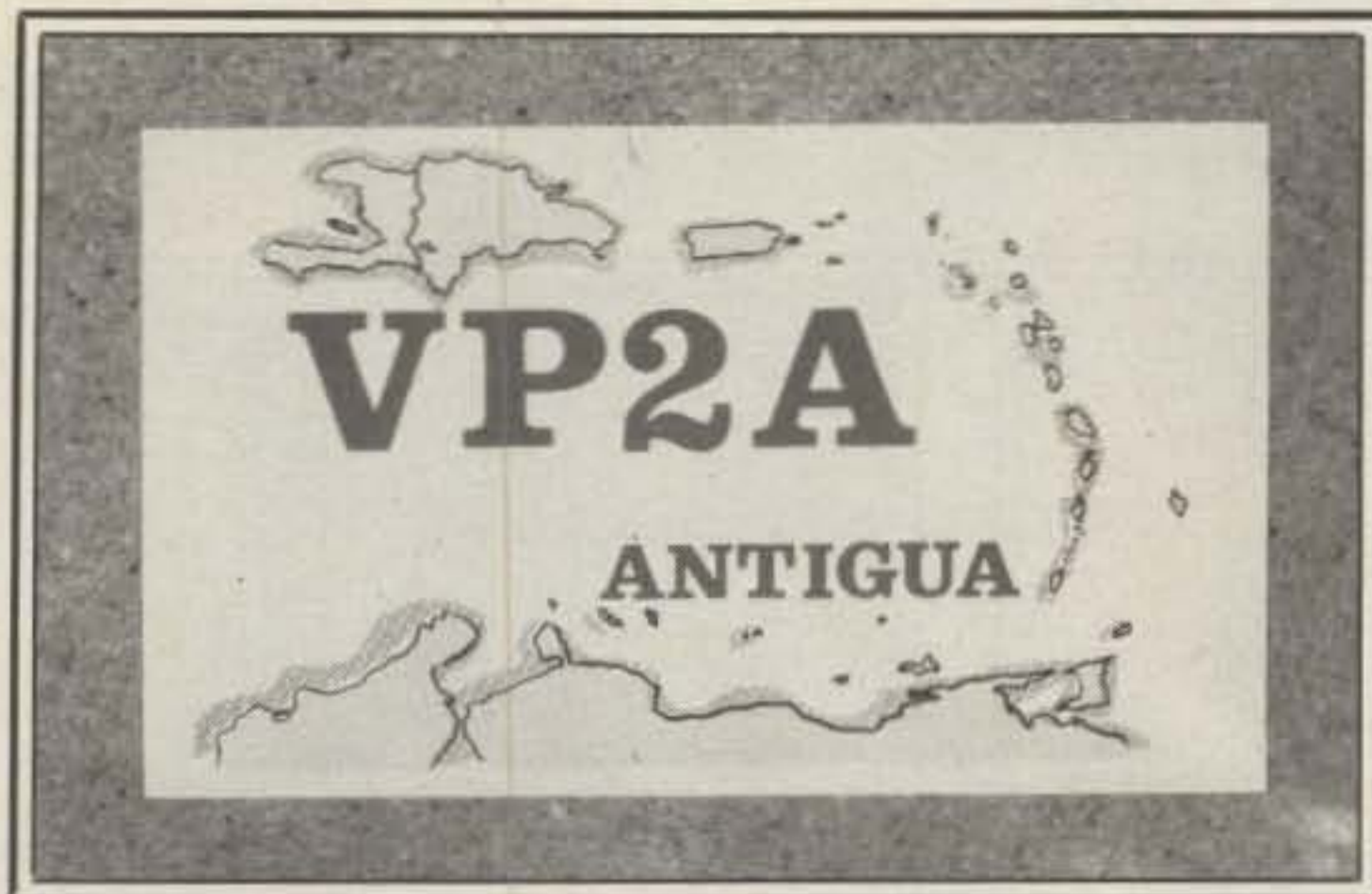


Illustration 3— A variety of cards promoting places, activities, or groups. Examples of several points discussed herein.

Many of you may feel that all of this sounds too bland, that following these guidelines will make each and every card look exactly the same. This may appear to be the case. Indeed, many cards may have certain similarities. But each call-sign, each station and operator, each QSO is different. Often language and culture make communication difficult. Remember: You want to make that communication as easy as possible. Following standard formats for the information you wish to present is a good idea.

By following guidelines outlined here, you will come up with a card which meets all the requirements of a true confirmation. Your card will be simple and direct and should help make the recipient's job easier.

Following these guidelines while being creative, and while talking with your printer, should give you an attractive card—a card as good as your signal.

be used as QSLs. If you find a card you like (preferably featuring something relevant to the area in which you live), you may write to the company supplying the card and order in bulk. The QSO information block can be printed on the left half of the postcard. A rubber stamp with this information is an inexpensive source for this data.


In fact, rubber stamps can be used in a variety of ways. It is not uncommon to see a stamp which says something like "The information presented on this card is accurate" and which is stamped on *your* card by the DX station, then signed, and returned to you. Not very glamorous, but we've never heard of anyone turning down such a card.

In the same category with rubber stamps are the wide variety of printed labels available. These can contain just name, address and/or call-sign, or other information. They're one good way to update information on older cards. Several companies offer such labels; check the back pages of "home and garden" type

magazines, usually 500 labels of up to 4 lines of printed information cost around \$3.00. Using such labels on your own cards and envelopes, especially on SASEs, will save you a great deal of time and look neater as well.

If you have a computer and printer, you can probably run off your own labels using any of the widely available pre-gummed stocks. In fact, more and more stations are beginning to use computers for logging purposes, and computer-gen-

erated QSLs are on the increase.

Obviously, any or all of the methods outlined have limitations. Use your imagination. But remember to follow the basic guidelines. YOUR job is to make the work of whoever receives your card as easy as possible. And while we've all heard stories of coconuts or lumps of coal or hunks of wood being used as QSL cards, those are unique and limiting situations. Many of you may feel that we're trying to stifle such creative activity. 

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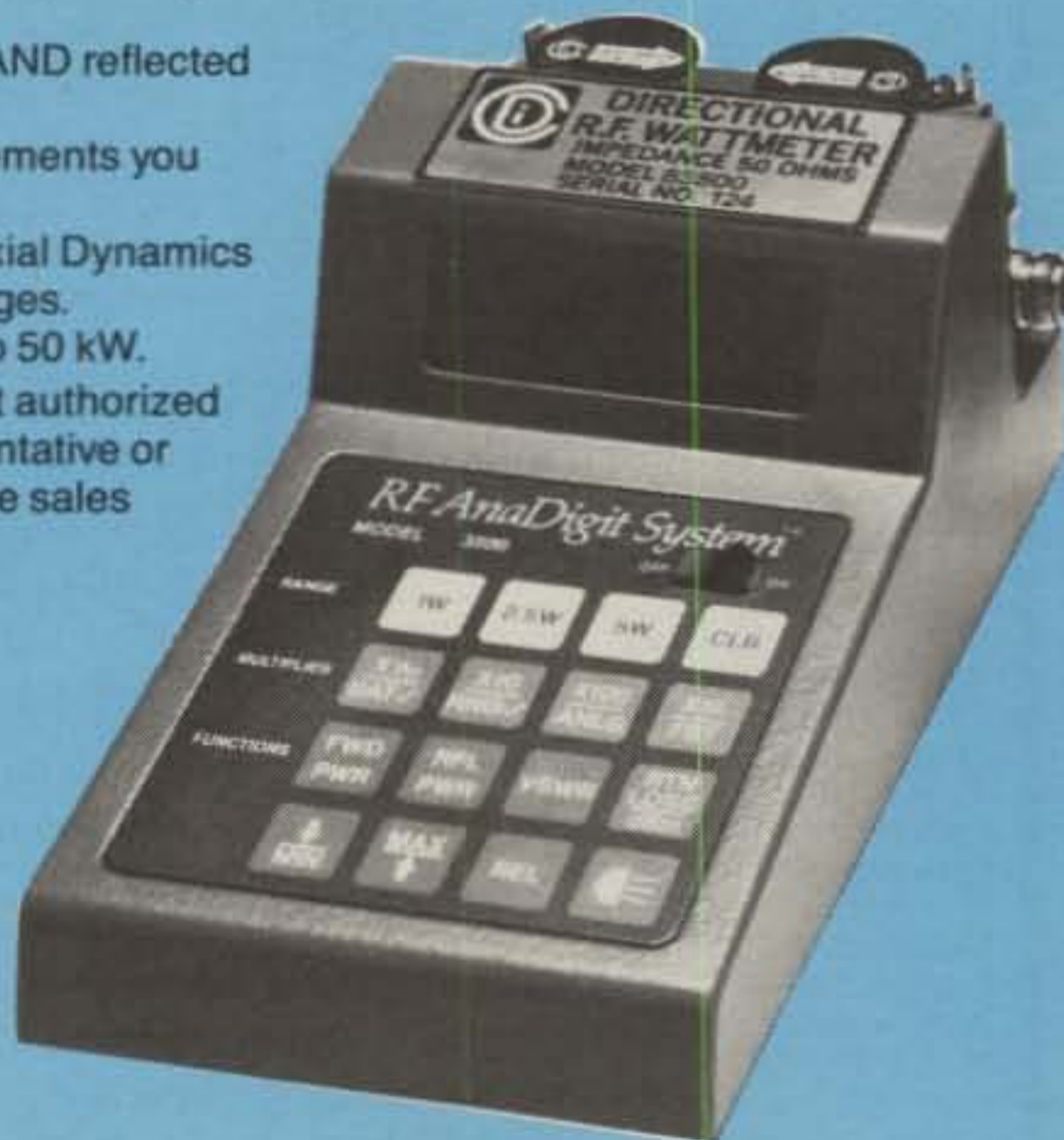
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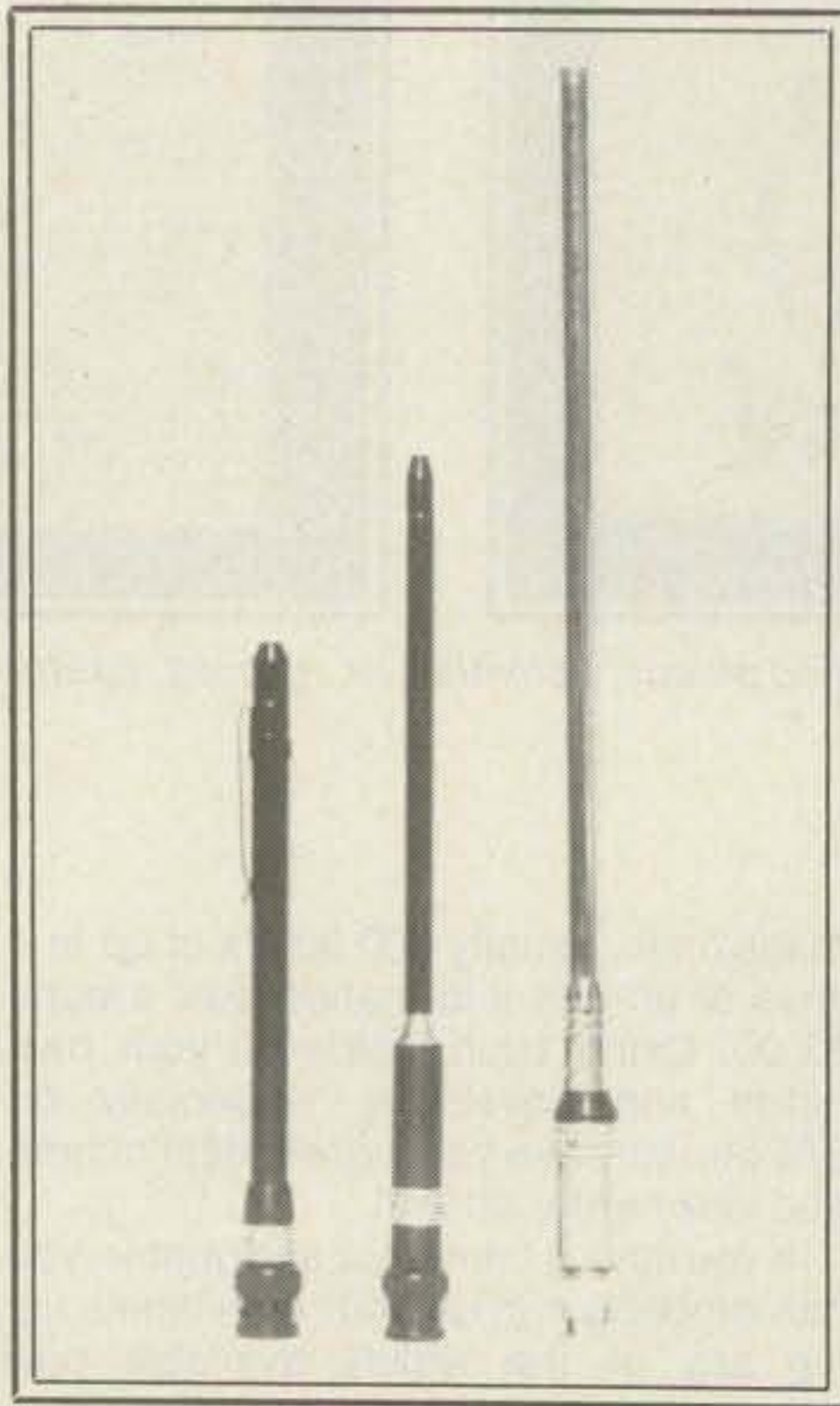
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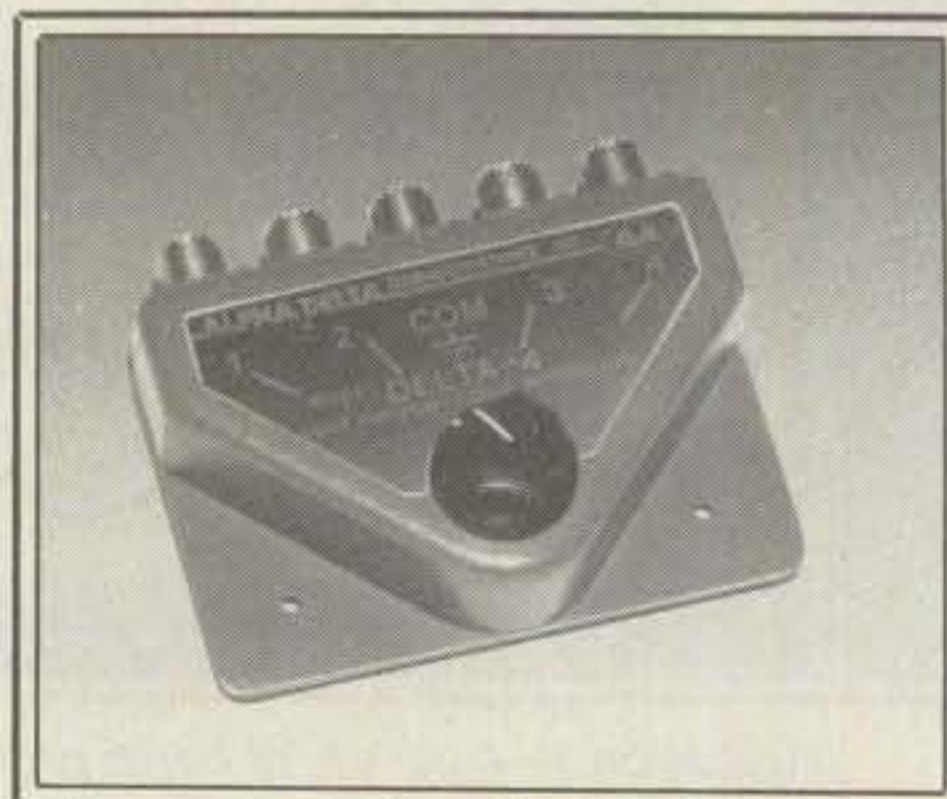
MFJ's Three New Antennas

MFJ Enterprises has announced several new telescoping antennas. The MFJ-1710 (\$9.95 retail) is a $\frac{3}{8}$ -wave, 2 meter telescoping antenna with BNC. It comes with a convenient pocket clip and is 5 $\frac{3}{4}$ inches collapsed and 24 $\frac{1}{2}$ inches fully extended. The MFJ-1712 (\$14.95 retail) is a $\frac{1}{4}$ -wave, 2 meter, $\frac{5}{8}$ -wave 440 MHz telescoping antenna with BNC. It is 7 $\frac{1}{4}$ inches collapsed and 19 inches fully extended. The MFJ-1714 (\$16.95 retail) is a $\frac{1}{2}$ -wave, 2 meter telescoping antenna with BNC. This unit is an end-fed, half-wave dipole which is shorter, lighter, has more gain, and places less stress on the connector than a $\frac{5}{8}$ -wave mounted on a handheld. When collapsed it performs like a rubber duck.

To order or for more information contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762, or circle number 106 on the reader service card.

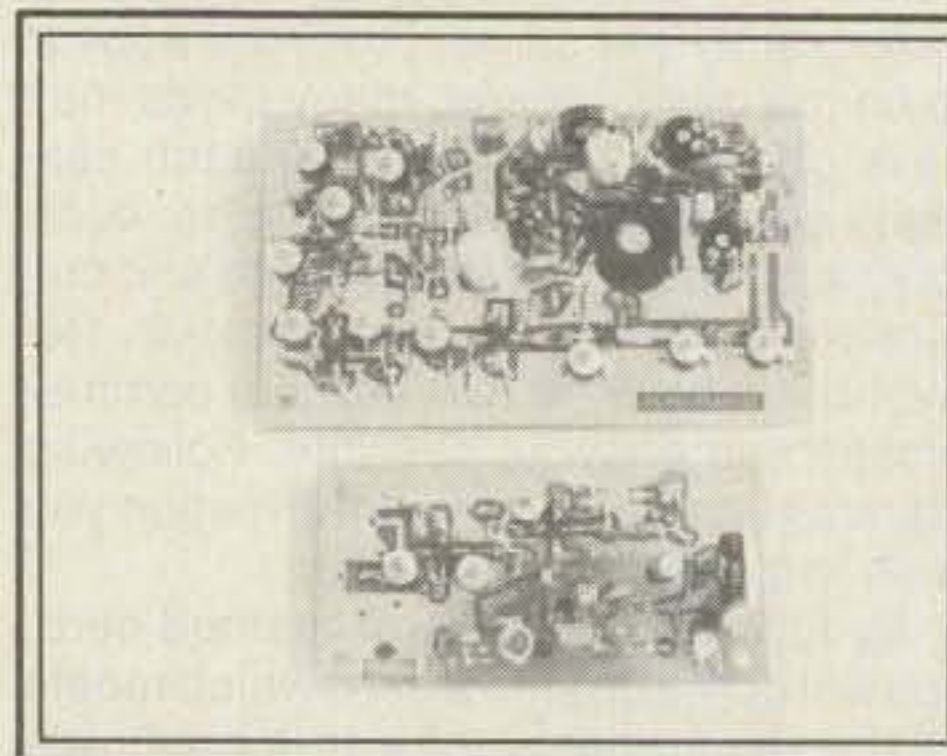
Alpha Delta-4 RF Coax Switch

The Alpha Delta-4 is a lightning surge protected four-position RF coax switch with field-replaceable surge protector pill. Power rating is 1500 watts RF, impedance is 50 ohms, and connectors are type SO-239. When the knob points to the center (ground) switch position, all antenna circuits are internally disconnected and grounded. When the knob is in an active position, the unused antenna ports are grounded. A separate, external ground wire must be used from one set of user supplied mounting hardware



(through either through-hole on the base plate) to the station ground system.

For more information, contact Alpha Delta Communications, P.O. Box 571, Centerville, OH 45459, or circle number 104 on the reader service card.



P.C. Electronics 1 Watt ATV Exciter/Modulator Board

P.C. Electronics has introduced their model TXA5-33 1 watt ATV exciter/modulator board for the new 33 cm (902-928 MHz) band. The board will enable Technician class or higher amateurs to transmit to other hams live-action color or black-and-white composite video from cameras, VCRs, or computers. By also having a 33 cm ATV station, amateurs can run full duplex video and audio crossband with another station on 70 cm. The TXA5-33 board should also make putting up a short distance video link, crossband ATV repeater, bulletin board video repeater, and public service applications like Space Shuttle video and weather radar video easy without tying up one or both of the usual 70 cm ATV channels. The 3" x 5" wired and tested TXA5-33 board accepts the standard 1 volt peak to peak composite video from any source. For sound, the P.C. Electronics FMA5 or XFMA5 Sound Subcarrier board is connected to the 4.5 MHz input pad of the TXA5-33 modulator circuit.

The TXA5-33 transmitter board is \$139. For more information, contact P.C. Electronics, 2522 Paxson Lane, Arcadia, CA 91006, or circle number 107 on the reader service card.

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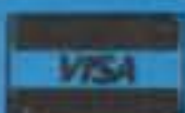


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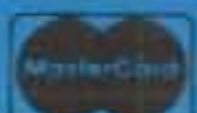


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The Cushcraft 40-2CD 40 Meter Yagi Antenna

BY JOHN DORR*, K1AR

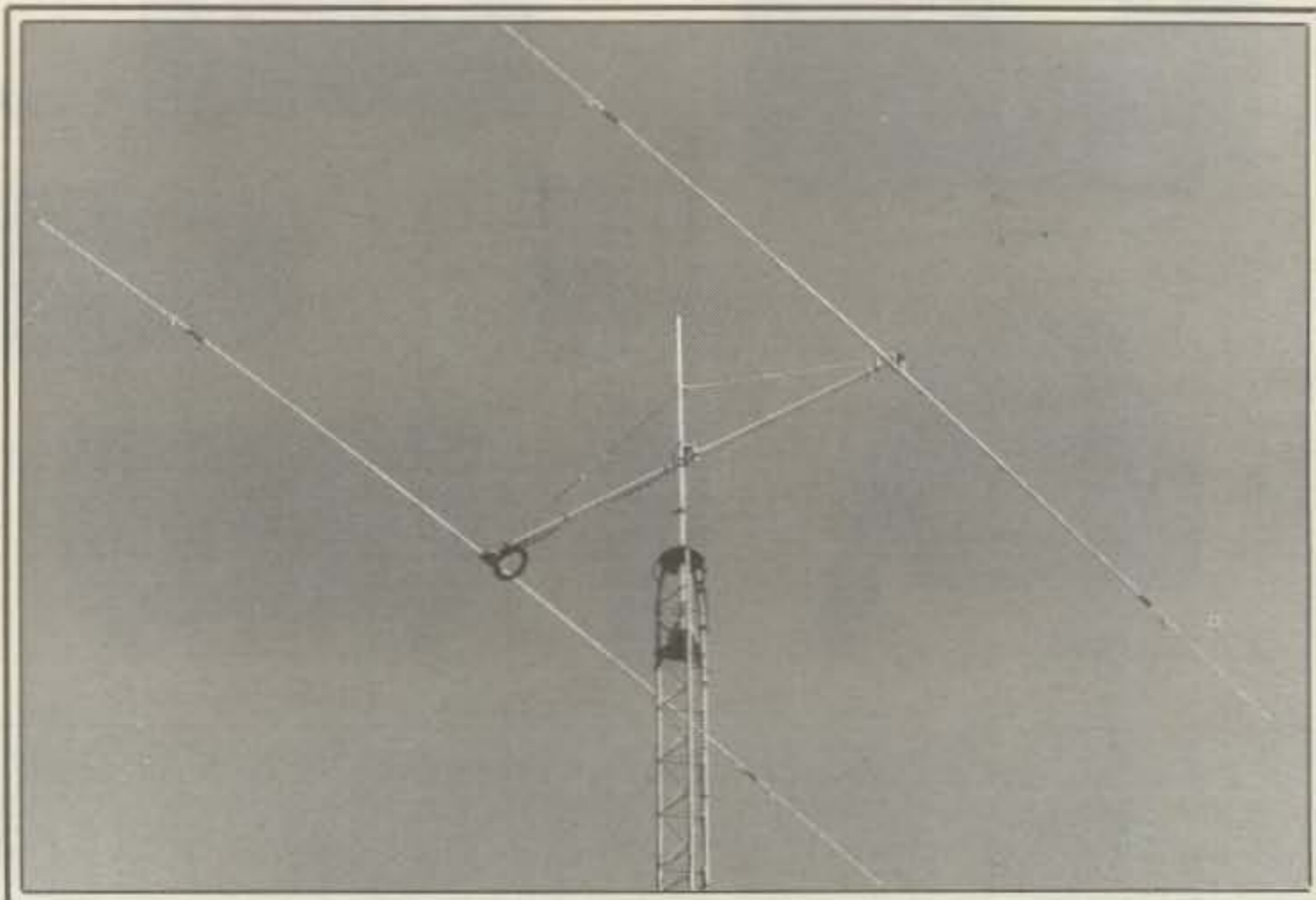
It used to be that a Yagi on 40 meters was a luxury limited to the amateur who had large financial resources and exceptional mechanical prowess. Perhaps you can envision that large antenna being lifted over the top of your 150 foot tower with the local neighborhood helicopter. Unfortunately, many have become discouraged with the band, as they have been driven away by their inability to cut through the QRM with dipole/vertical antennas.

Unwilling to take on the possibilities afforded by 50 foot booms requiring rotators the size of my automobile engine, I searched for an antenna that was not only light-weight, but that possessed SWR characteristics that made dual-mode operation practical. Much to my pleasure, the Cushcraft 40-2CD, 40 Meter Skywalker met those requirements. Cushcraft engineers have conquered the age-old problem of making a 40 meter Yagi practical for the average amateur.

Construction

Made from 6063-T832 Seamless Aluminum tubing, Cushcraft has created a 40 meter Yagi that is only slightly larger than a 2-element, 20 meter array (see Table I). Like most Cushcraft Yagis, I found the antenna extremely easy to construct with total assembly time less than one hour. All of the element/boom sections are coded so that assembly can virtually be accomplished without instructions.

Fortunately, stainless steel hardware is used throughout, ensuring a long-lasting mechanical structure. The approach used to electrically shorten the length of the antenna is implemented with a combination of four coils (covered with shrink-wrapping) and capacitive hats that bolt directly into the elements. Early versions of the Yagi used a less reliable method of attaching the capacitive hats, although this problem has been corrected in recent



The Cushcraft 40-2CD 40 meter, 2-element Yagi antenna.

shipments. I recommend reinforcing the shrink-wrap around the coils, as it has a tendency to split open due to weathering.

Cushcraft has elected to use a split-element feed system that eliminates any need for gamma matching or other more complicated matching systems. As such, the antenna is simply resonated by adjusting the length of the elements to the desired part of the 40 meter band. My ex-

perience was that the antenna tuned exactly to their claimed specifications.

Although the antenna is light-weight (44 pounds), a boom brace is provided that extends approximately 3 feet above the antenna. This makes it very practical to mount one or more additional Yagis on the same mast. My installation, for example, consists of a 20 foot mast (12 feet of mast outside the tower) that has the

Boom Length, ft. (m)	22.3 (6.8)
Longest Element, ft. (m)	43 (13.1)
Turning Radius, ft. (m)	23.93 (7.3)
3 dB Beamwidth, deg.	75
Assembled Weight, lb. (kg)	44 (20)
Surface Area, sq. ft. (sq. m)	6.38 (.59)
Frequency Coverage, MHz	7.0-7.3
Bandwidth, 2:1 VSWR	200 kHz
Wind Survival, mph (kph)	80 mph (125 kph)
Maximum Mast OD, in. (cm)	2.125 (5.34 cm)
Material	6063-T832 Seamless Tubing
Termination	Stainless Steel Terminals

Table I—Specifications for the 40-2CD antenna.

*2 Baldwin St., Windham, NH 03087

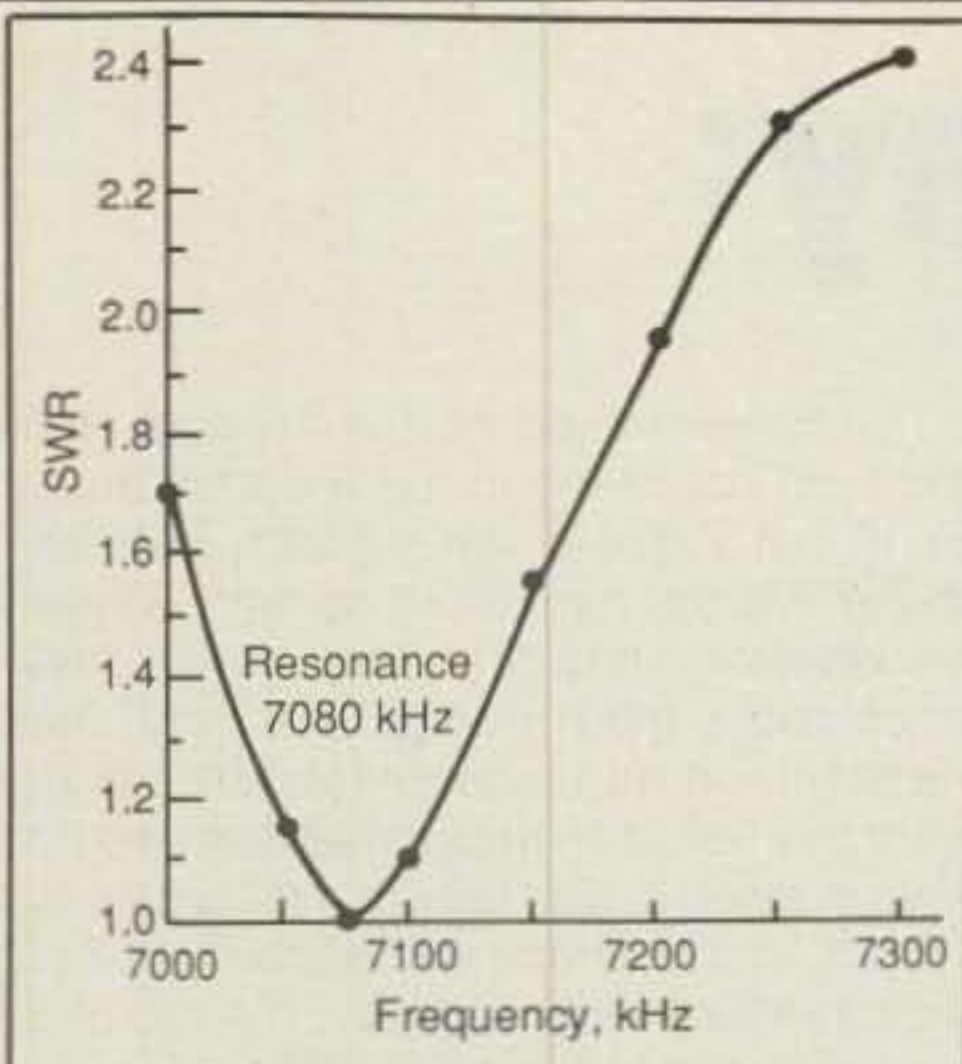


Fig. 1- SWR curve for the Cushcraft 40-2CD measured at K1AR.

40-2CD on the top with 15 and 20 meter Yagis below.

Performance

When first considering the 40-2CD, I found myself wondering where the compromise was hidden. After all, a 40 meter Yagi cannot weigh only 44 pounds, have a reasonable SWR curve across the entire band, and maintain a significant pattern at the same time, can it? (See fig. 1.)

Cushcraft has managed to deliver a "shortened" 40 meter Yagi that is usable across the entire band. I was so surprised with the results of my antenna that I repeated the measurements with a station across town (K1DG) whose data is also noted in Table II.

I have not only been impressed with the antenna's SWR characteristics, but also the ability to maintain its pattern. The Yagi not only preserved front-to-back ratio across the whole band (something not all shortened Yagis can claim) but still had 2 dB front-to-back at 7500 kHz!

Not unlike most installations, I found that antenna interaction is a potential problem with this Yagi as well. For example, the front-to-side measurements vary between the K1AR and K1DG 40-2CD installations. K1DG has a 160 meter dipole at the top of his tower. When measuring the front-to-side ratio, his 40 meter elements extend directly over the 160 meter antenna. In similar fashion, I have noticed significant pattern degradation of my 15 meter system with the 40 meter Yagi so closely mounted (only 5 feet

Frequency	K1AR 40-2CD		K1DG 40-2CD	
	F/B	F/S	F/B	F/S
7000 kHz	18 dB	48 dB	14 dB	33 dB
7100 kHz	11 dB	48 dB	8 dB	33 dB
7200 kHz	6 dB	45 dB	4 dB	33 dB
7300 kHz	6 dB	45 dB	4 dB	33 dB

Table II- Front-to-back/front-to-side measurements.

away). Smart planning of your installation is no exception in this case.

Operation

As with many amateurs, 40 meters has always been a problem for me. The very nature of the band (broadcast interference, *et al*) requires extra effort to be competitive. My experience in using the 40-2CD has been nothing short of pure excitement. Having tried verticals, fixed-wire Yagis, loops off the tower (you know, the ones that always get hung in the guy wires and surrounding trees), nothing has come close to the operation of the Yagi. My very first experience with the antenna was in the IARU Radiosport contest in which I worked 117 stations in the first hour. At last, success on 40 meters!

Not only has the antenna proved to be invaluable for contesting, but I have seen a tremendous difference in casual DXing.

My personal 40 meter country total has climbed to over 240 countries with catches such as 3Y1EE, FT8WA, TT8AQ, 9Q5KI, VU7WCY, VK0HI, YB3ATB, etc. Does the possibility of working 55 JA's from the East Coast before work excite you?

Conclusion

Antenna performance, pattern, mechanical stability, and ease of construction are all factors in selecting a superior design. Cushcraft offers what I consider to be one of the best antenna bargains available by providing a broad-band Yagi that has survived New England winters, helped win contests, and worked rare DX.

List price of the 40-2CD is \$425.00. For more information, contact Cushcraft Corporation, 48 Perimeter Road, Manchester, NH 03108. CQ

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Our Readers Say:

Shroud of Turin Photo Credits Due

Editor, CQ:

The spread you gave my article on the Shroud of Turin in the March issue was most gratifying. There is, however, one detail with which I am a bit concerned. The photos of the shroud were supplied to me by Dr. Vernon Miller of the Brooks Institute of Photography. They are copyrighted material, and Dr. Miller had given his permission for their use on the condition that he and the Shroud of Turin Research Project (STURP) be acknowledged as the copyright owners. I had accordingly included the acknowledgement in the original manuscript for the photo captions. I would be very grateful if you would help me keep my word to Dr. Miller by acknowledging the photo copyrights in the next issue. Many thanks for your attention.

Bill Hood, W2FEZ
Avon, NY

Oops We Goofed

In the article "Build Your Own NiCad Battery Charger" by Jim Burtoft,

KC3HW, which appeared in the March issue on page 64, we made an error in fig. 1. Several readers were kind enough to point out that C1 should be connected between D1 and L1 and not before D1 as shown.

Interference To A Good Net

Editor, CQ:

I presently hold an Advanced ticket, but two years ago I was an active SWLer with no ham ticket. My favorite frequency to listen to was the 3898 Traders Net, and, for the record, it is still one of my favorites.

I live 100 miles and more from any hamfests, and then they are fairly small. So as an SWLer I occasionally needed some radio gear, but could not afford to buy new stuff all the time. I would listen in to the Traders Net and eventually would be able to buy what I needed at reasonable prices.

After becoming a ham, I also used the Traders Net to buy my rig, a Kenwood TS520. The rig works fine and did not cost me an arm and a leg. I've also purchased other items such as antenna tuner, portable antennas, and more.

I've never talked on the Traders Net and I am not trying to run a commercial for it, but I would like to point out the abuse this net has to put up with. There are whistlers, hecklers, CW, music, and much more interference with only one purpose—to ruin a good net. More than once I've heard an item listed that I would have wanted to buy only to not be able to copy down the phone number because of the intentional interference. It's too bad the net has to put up with all this, when if someone doesn't like the net, simply tune to another frequency or shut the rig off.

I'm not saying other nets are not good. I'm just saying that the 3898 Traders Net is my favorite and I hope the net controllers don't get disgusted with all the junk they have to put up with and throw in the towel and give it up. Good job and good luck to the Traders Net.

Mark Bills, KA0VHY/AA
Mystic, IA

Looking For A Radio Op

Editor, CQ:

Many years ago I was on the ship *John Mosby* with a radio operator and we main-

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tained contact for many years thereafter. He worked for a time at Bell Laboratories and then went back to sea in the Isthmian S.S. Co. ships, "Steel Chemist," etc. We lost contact somehow, and now I can't remember his name. I contacted several of the retired Isthmian captains and all of them recalled the R.O. but not his name, except maybe Paul

Please publish a query in your magazine to see if I can locate this fellow. (Isthmian went out of business several years ago.) Perhaps one of your readers can help.

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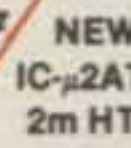


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The Perfect QSO

BY WILLIAM MARON*, KE6BL

The five of us were sitting around the WD6—repeater installation on top of Mt. T—. We had just finished running hard-line up the tower to reduce the line losses. Since the temperature was over 90°, it was a hot, sweaty job and we were relaxing with a couple of cold six-packs of beer that had been brought along for the occasion.

My name is Al (which is not my real name, nor are any of the other names real. You will soon appreciate why I won't give real names, actual call letters, or locations). The other guys in the group are Tony, Paul, Sam, and Dan.

Conversation had been desultory at best and had died down. We were thinking of the long, trying drive down the narrow, twisting mountain road. Sam gulped down the rest of his beer and said, "Have you guys heard KK6—?"

"On what band?" I asked.

"On all bands," Sam replied.

There was a chorus of "Nopes."

"Well, give a listen. That guy is on all the time," Sam continued, reaching for another beer.

"Must be someone who's retired or has lots of money," Tony commented non-chalantly.

There were a few more remarks and the subject was dropped.

I forgot about that conversation until a week or so later when I was on 15. I had just finished a QSO and was tuning across the band when I heard a station calling CQ. The needle of the S-meter was against the pin on the right side—60 dB over S9!

The voice was cultured like some announcers you hear on the FM broadcast band. Perfect diction, precise enunciation, faultless pronunciation, no accent, no noticeable inflection. I flipped on the

tape recorder and here is a transcript of a portion of the tape:

Calling CQ, calling CQ, calling CQ. This is KK6— calling CQ. Calling CQ, calling CQ, CQ, CQ. This is KK6—. King Kong 6— calling CQ and listening.

Pandemonium broke out on the frequency. There must have been at least 30 stations calling him. It was the granddaddy of all DX pileups.

ZL2—, this is KK6—. Good evening, old man, many thanks for the call. Your signal in California is Q5 and S9 plus 10. Please give me your name and location on your next transmission. ZL2—, this is KK6—.

I have a damn good receiver and a beam atop an 80 foot tower, but I never heard that ZL. While KK6— was transmitting, I swung my antenna a full 360 degrees and couldn't determine from which direction the signal was coming.

After listening to King Kong make a few more contacts, I turned off everything and joined the XYL in the family room. We watched the TV until bedtime, but my mind was not on the program.

Sam and Dan and I happen to work for the same company. Next day during lunch I told them about King Kong. We kicked it around for awhile and they said they would listen and see if they could make any sense out of it. Dan said he would call Tony and Paul and ask them to listen, too.

Several times during the week I heard King Kong on other bands. I called him time and again, but he never came back to me. Maybe he didn't waste time talking to locals.

As time went by I became aware that all of King Kong's QSOs were the same. He never called anyone—only CQ. The QSO consisted of the same phraseology. He never volunteered his name and after getting the other fellow's name and location, he signed with the station.

A few weeks later the five of us met at a local pizza parlor to pool our information

about King Kong. He was not in the latest call book. None of us could determine from which direction his signal came.

Tony came up with an interesting observation. Since he has a separate general-coverage receiver, he found that King Kong operated on at least two bands simultaneously.

"You mean," Sam asked, "you heard him on both bands at the same time?"

"Yep! I was listening to him on 15. For the hell of it, I fired up the R70 and switched to 40. He was on there, too."

We sat up at attention.

"Go on," I said.

"He called CQ, and then he talked to two different stations at the same time. He was talking to a 4 on 15 and a 7 on 40."

Paul shook his head. "If I were you, Tony, I'd stop drinking that rot-gut wine every night."

Tony bristled. "I'm telling you what I heard, believe it or not!"

Soothingly, I said, "I'll take my rig to Tony's house and we'll be able to listen on three bands."

"Count me in," Dan said. "Then we can listen on four bands."

"Me, too," Sam added.

That Saturday we took our rigs and went over to Tony's house. It took a while to connect the antenna to all the rigs. Dan went to the local amateur radio emporium and picked up several coax T-connectors and soon we were in business.

With eager anticipation we fired up the rigs on 75, 40, 20, 15, and 10. I know you won't believe this and I'd never tell anyone about this for fear they would call the closest funny farm and have us committed.

Anyway, King Kong was on all five bands and to our amazement was working five different stations at the same time. When the shock wore off, we all began talking at once, interrupting each other like kids.

During the course of the afternoon Sam mentioned that one of his friends had a twin-engine Beech Baron. He said he'd ask him to take a couple of guys and

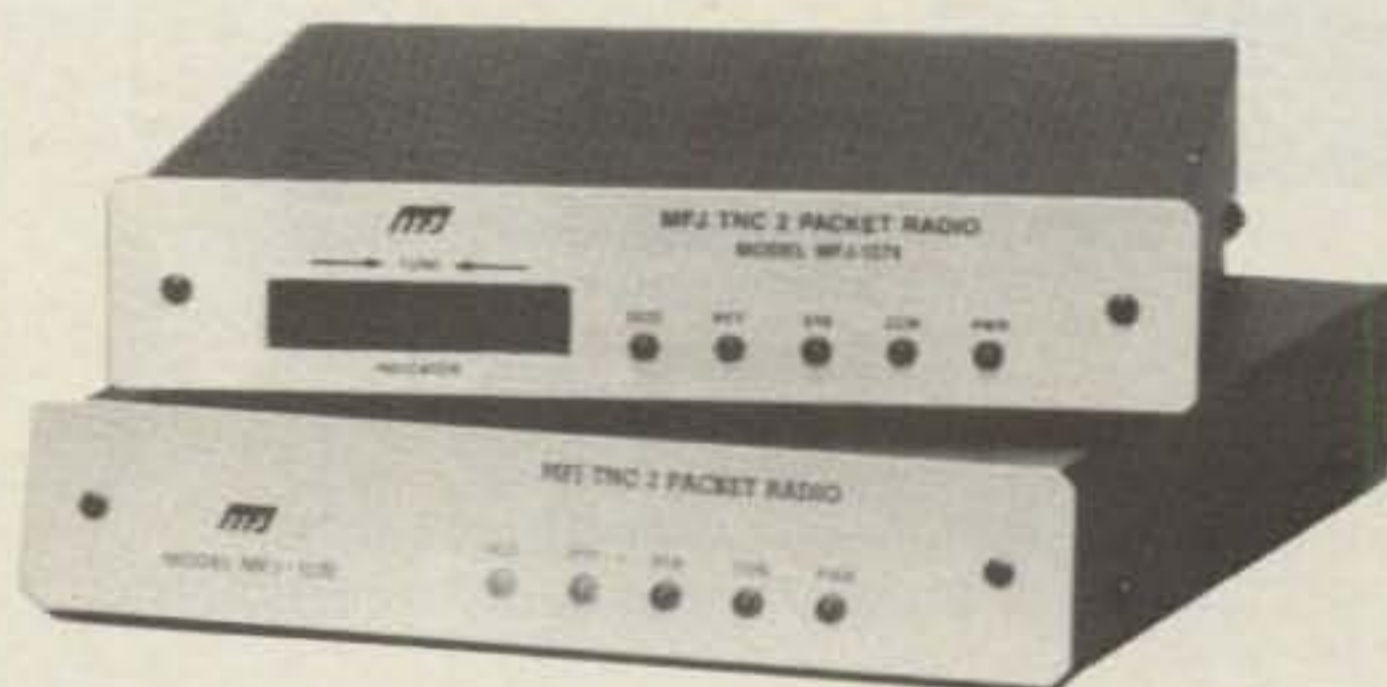
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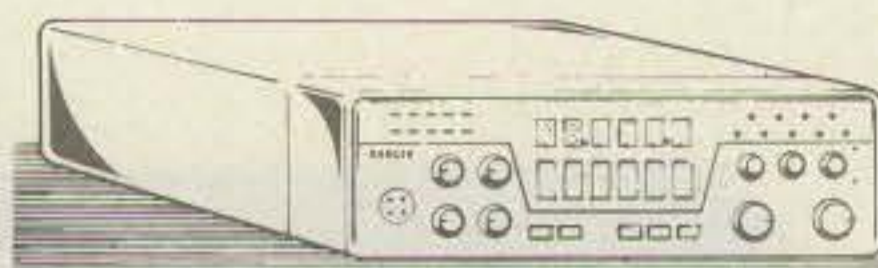
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radio equipment so we could do some DFing from the air.

Some of the fellows were not too keen on flying, especially in small planes, so Sam and I said we'd go for the good of the cause. We ginned up a couple of DF antennas and checked them out. I wouldn't want to navigate across the ocean with those antennas, but they did point in the general direction from which a signal was coming.

Saturday morning we met Harve, the pilot, at the San Jose Airport. We transferred the gear from the car to the plane, strapped ourselves in, and took off. After Harve climbed to about 2500 feet, we fired up the transceivers and listened on 40 and 15.

King Kong was on the air and we tried DFing. Harve flew a 10 mile square pattern. It was uncanny. The signal was coming from everywhere at the same time.

Harve suggested getting some distance away, perhaps 50 or 100 miles. That was fine with us and he turned the plane in a northerly direction. Over Santa Rosa we tried DFing again. This time the signals were coming from a southerly direction, but the direction was poorly defined.

"How about flying down to San Luis Obispo?" I said. "San Luis is about 300 miles south of Santa Rosa and might give us some sort of clue."

Harve enjoys flying and he was also intrigued by the mystery of King Kong. He did a 180 and headed the Baron south. About an hour and a half later we were approaching San Luis.

Sure enough the signals were now coming from a northerly direction. Based on this flimsy information, we deduced the signals must be originating somewhere in the San Francisco Bay Area.

We had been airborne for over four hours and Harve said, "I don't know about you two, but I'm getting hungry."

"I've been hungry for hours," Sam said. He's a big eater and it shows on him.

"I'll land at the San Luis airport and we'll have lunch."

I admired the way Harve handled the plane. He touched down so smoothly that I didn't know when the wheels contacted the runway. Learning to fly was something I'd always wanted to do. I just never got around to doing it.

Late afternoon, when we got back to San Jose, Sam and I offered to pay for the gas. Harve graciously waved the offer aside and said he was glad to help. Unfortunately, we still didn't know much more than we did before.

From time to time we talked about King Kong, and that's where the matter rested until this morning.

The five of us were going to a hamfest in Reno. Sam was driving—it was his van—and we were on 680 heading north. Approaching D— Road, Tony pointed to a group of houses atop a high ridge on a

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CIRCLE 147 ON READER SERVICE CARD

series of rolling hills.

"Looks like a good location to put an antenna," he said.

"Yeh," Paul agreed.

"There's an exit ahead," I said to Sam. "Turn off and drive up the hill and let's look around."

In a few minutes we were on a surfaced, winding road. The road climbed steeply, and rounding a curve—surprise! There was a closed gate across the road. A sign on the gate proclaimed that beyond this point was private property and NO TRESPASSING. Furthermore, we tried the gate and found it was locked.

Dan was for turning around and continuing to Reno. Tony and Paul wanted to climb the fence. I was neutral. In the end Sam parked the van and we climbed the fence.

The black top was hot like an oven and soon we were drenched with sweat. When we reached the summit we saw seven large two-story houses. The road ended in a circular drive and the houses were situated around the circle. The middle house was the largest, and as we got closer I saw several microwave antennas on the roof pointing in different directions.

There were no cars in any of the driveways. There was no sign of life—not even a dog or a cat. If not for the carefully tended lawns, one would think that all the houses were unoccupied. I'm not a good judge of real estate values, but I'd guess

these houses were in the \$500,000 to \$800,000 class, maybe more.

The microwave dishes on the roof of the one house intrigued us. We walked up to the solid double-front door and rang the bell. A chime sounded faintly within the house. We rang it several more times, but still no answer. There was an eerie silence. Then for a few seconds the silence was broken by the sound of a jet heading toward the Oakland airport.

"Let's see what's around back," Tony said.

Behind the house was a large swimming pool. On the roof were more microwave dishes pointing in different directions.

"What would anyone want all those dishes for?" Dan said, voicing our thoughts.

We peered in the windows. The house was expensively furnished, but there was no sign of life.

"Let's go, I said. "We're not going to learn anything and it's getting hot."

Tony walked to the fence around the swimming pool and picked up a brick. "I'm going to see what's inside," he said, grimly.

Sam grabbed his arm. "That's breaking and entering. You'll go to jail."

Tony pulled his arm free. "If you're afraid, don't go in." He stepped to the French door and smashed the glass near the lock. I held my breath waiting for an

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alarm to go off. After the sound of tinkling glass stopped, all was quiet again.

Without hesitation Tony reached in, turned the handle, and slid the door open. "Who's coming in with me?"

Oh, what the hell, I thought. Why not? "I'll go," I said.

Sam stayed outside as a lookout, while Dan and Paul followed Tony and me into the house.

We checked the downstairs. There was nothing out of ordinary there. The furniture conservative, massive. Works of art hung on the walls. Everything had the look of good taste and elegance.

Then we made our way to the second floor. The thick carpet muffled our footsteps as we climbed the stairs. There are times I believe RF affects the brain, or we wouldn't have been there facing a criminal charge of breaking and entering.

We opened several doors that were bedrooms. Then we came to a door in the corner of the house that was wider than the other doors.

Without hesitation Tony pushed the door open. The familiar voice of King Kong calling CQ assailed our ears. I didn't know whether to go in or run!

My knees were shaking from fear and excitement as I followed the others into the room.

The ceiling and walls were covered with acoustic material. Three large racks filled with equipment stood along the far wall. In the center of the room was a large executive desk and a huge swivel chair. On the desk was a CRT monitor and a printer. A broadcast microphone hung from a boom over the desk. Suspended from the ceiling were several large speaker enclosures. Aside from the equipment, there was nothing else in the room.

The printer came to life and we looked at the printout. Yes, it was printing the call letters of the station being worked and other information.

As the shock wore off, we looked at the equipment in the racks. There were UHF receivers and transmitters, several reel-to-reel tape recorders, and sophisticated test equipment.

After studying the display on the monitor for a few minutes, I had an idea why we couldn't locate the station by DF. On the screen was an outline of the Santa Clara Valley. Each prominent mountain peak periodically had a bright spot appear. The appearances of the spots were random, or so it seemed.

Having already gone this far, there was no point in being squeamish. We looked through the desk drawers and found a thick loose-leaf notebook containing a manual that explained the operation of the station.


The introduction supplied the general idea of how King Kong was set up. Each mountain peak had a receiver, transmitter, and antenna for each band. These

were linked to the house with microwaves. One computer checked receiving conditions and switched to the mountain receiver having the best signal. During transmission another computer randomly switched from transmitter to transmitter, operating on the same frequency, which explained why we couldn't determine from where the signals were coming. Simple enough when we knew the answer.

Here was the epitome in amateur radio

stations. King Kong was a computer. It was the ultimate sick joke on the stations who answered the CQs!

There was more, but we had seen enough. We left the house and hurried back down the road to the gate. The gate, we discovered, could be opened from the inside, which did away with climbing the fence again. We piled back in the van, turned around, and continued on to Reno.

Surely you now understand why I won't give names, call letters, or locations. 

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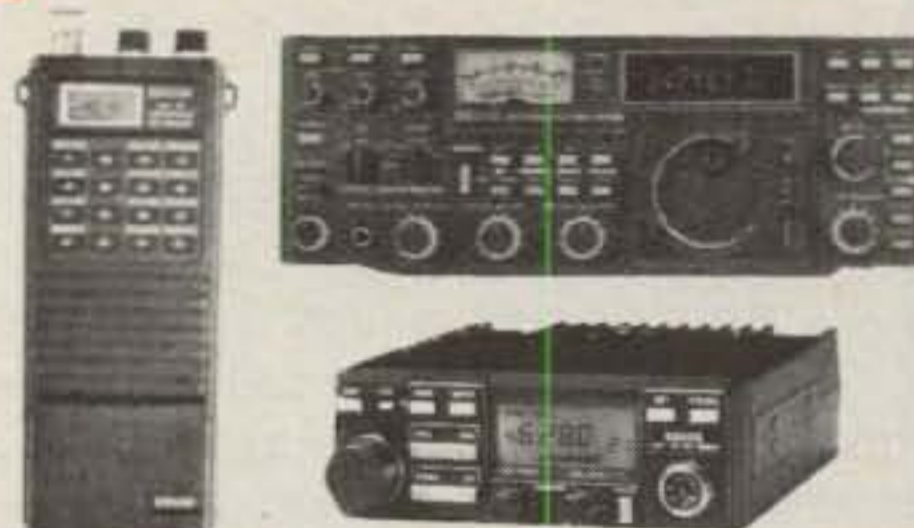
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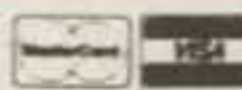
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CIRCLE 80 ON READER SERVICE CARD

Contest Calendar

a monthly feature by
FRANK ANZALONE, W1WY

NEWS/VIEWS OF ON-THE-AIR COMPETITION

We certainly did not plan the double contest dates on February 21st and 22nd, with both the ARRL CW DX and our World-Wide 160 SSB contests on the same weekends. These two major contests are traditionally held on the third and last weekends of February each year. Unfortunately, there were only three full weekends in February this year, so they both ended up on the same dates. Fortunately, this will not happen again for the 10 next years.

The anticipated confusion, however, did not materialize. No serious QRM problems between the two activities were heard or reported. The ARRL CW activity kept below 1830 kHz, and the CQ SSBers wisely operated above that frequency well up in the band. The advised use of the DX Window was not practical for SSB operation, as that spot was completely saturated with CW activity.

We probably lost quite a few of the prominent top banders who normally complete in the CQ 160 SSB Contest, but they chose CW for their weekend contesting. The band was sure loaded with SSB signals, however, and you can expect many new winners in this year's affair. Conditions were fairly good except for high QRN levels in some areas.

Some of the DX stations still neglect to sign their call when they have a run going and only identify after someone asks, "What is your call?" It was a pleasure to work those who used their call instead of QRZ after each completed contact.

You can expect a crowded Contest Calendar this fall. I foresee many conflicting dates in September and October, which are already full with established contests. The addition of new activities, some of which are similar in format to those already scheduled, is sure to add to the frustration. *C'est la vie*, what is to be will be.

Again, a reminder: deadline for material of events in August is May 15th, and June 15th for your September announcements. Send them to my home address, please.

73 for this time, Frank, W1WY

Florida QSO Party

May 2, 1400Z-1900Z Saturday
May 3, 0001-0500 & 1500-2300 Sunday

This is the 21st annual QSO Party sponsored by *Florida Skip*. The same station may be worked on each band and on

14 Sherwood Road, Stamford, CT 06905

Calendar of Events

* Apr.	25-26	Swiss "Helvetia" Contest
* Apr.	25-26	North Carolina QSO Party
* May	2-3	Utah QSO Party
* May	2-3	County Hunters SSB
May	2-3	Florida QSO Party
May	9	Nevada QSO Party
May	9-10	USSR CQ-M Contest
May	16-17	ARI International Contest
May	16-17	Michigan QSO Party
May	16-17	World Telecomm. Contest
May	16-23	Mich. Achievement Week
May	23-24	UBA SWL CW Award
May	30	ARCI QRP CW Sprint
May	30-31	CQ WW WPX CW Contest
June	6	YLRL Novice/Tech. Day
June	6-8	PVRC On The Air Reunion
June	13-14	S. America CW Contest
June	13-15	ARRL VHF QSO Party
June	20-21	SMIRK QSO Party
June	20-21	NINE Land QSO Party
June	27-28	ARRL Field Day
July	1	Canada Day Contest
July	10-11	Kansas VHF/UHF Sprint
July	11-12	IARU World Championship
July	18-19	CQ WW WPX VHF Contest
Sept.	26-27	CQ WW RTTY Contest
Oct.	10-11	Pennsylvania QSO Party

* Covered last month.

each mode. Phone and CW are separate contests and require separate logs. FL stations may work other FL stations, but for QSO points only.

Fla. stations are divided into two classes. Class A—Portables and mobiles operating outside own county using emergency power of 100 watts or less output. Class B—All other single and multi-operator stations.

Exchange: RS(T) and QTH. County for FL; state, VE province, or country for others.

Scoring: For Florida—One point per QSO. Multiply total by sum of states (49), VE provinces (12), and DX countries (maximum of 27) worked (maximum multiplier of 88). Class A stations multiply total score by 1.5 factor.

Out-of-state—Two points for each FL contact. Multiply total by FL counties worked (maximum of 67).

Frequencies: CW—3555, 7055, 14055, 21055, 28055. SSB—3945, 7279, 14279, 21379, 28579. (Also 160 and 2 meters.)

Awards: Certificates, both phone and CW, to the top single operator score in each state, province, and DX country, and each FL county. There are five plaques as follows: to the top single operator in FL and out-of-state, both on

CW and SSB, and to the FL club with the highest aggregate score.

There is the usual disqualification clause for taking credit for excessive duplicate contacts and multipliers and other infractions.

Include a summary sheet showing the scoring and all essential information, include a dupe sheet for entries with 200 or more contacts, and the usual signed declaration.

A large SASE will get you sample log forms. Mailing deadline for all entries is June 6th to: Florida Skip Contest Committee, c/o North Florida ARA, P.O. Box 9673, Jacksonville, FL 32208.

USSR CQ-M Contest

2100Z Sat. to 2100Z Sun., May 9-10

Keep in mind that this is a world-wide-type contest, so do not limit your operation to the USSR only. Contacts may be made on CW or SSB, 3.5 through 28 MHz. The same station may be worked on each band, but not both modes for QSO and multiplier credit. Contacts via Oscar count as an extra band if made on UHF.

Classes: (A) Single operator, single band. (B) Single operator, all band. (C) Multi-operator, single transmitter, all band only. (D) SWL.

Exchange: RS(T) plus a three-figure QSO number. USSR stations add the number of their region (oblast) to their report.

Points: Contacts between stations on the same continent one point; different continents three points. Own country may be worked for multiplier credit but no QSO points.

Multiplier: Is determined by the number of countries worked on each band. The USSR "R-150-S" list is the standard, which essentially is the same as our DXCC, plus the following oblasts: 002, 013, 014, 056, 084-5-6-7-8-9, 090-1-2-3-4-5-6-7-8, 159, and UA1 Novaya Zemlya, UA0 Kuril Is., UA0 New Siberian Is.

Final Score: Total QSO points from all bands times the country/oblast multiplier from each band.

The SWL's get one point for reporting one station in the exchange, and three points if both stations are reported.

Awards: A large selection of trophies, medals, and badges in all classes for overseas winners. Badges to all entries contacting at least 10 USSR stations.

Contest contacts may be credited for USSR awards in lieu of QSL cards if request is made with entry (R-150-S, R-100-O, W-100-U, R-15-R, R-6-K, R-10-R).

1986 WAE SSB Contest Results Single Operator North America

U.S.A.		Canada	
K1ZM	262,584	VE3DZB	62,167
AK1A	243,320	VE1CBF	33,488
W2DKM	37,449	VE7FJE	2,520
N4UH	34,272	VE3ST	902
K4YKZ	31,302		
N3BNA	15,190	Dom. Rep.	
AB8K	10,028	HI8LC	580
W4KF	8,601	Alaska	
W3ARK	7,728	WL7E	1,012
WD8QVD	4,066	Hawaii	
KD8NS	3,204	KH6IJ	228
W2DW	3,168	U.S.A.	
W2FCR	3,150	Multi-Opr.	
N6AW	1,040	WB3JRU	110
KA1DBK	432		
NG0T	300		
W5EIJ	16	<i>Winners boldface.</i>	

Mailing deadline is July 1st to: Krenkel Central Radio Club, CQ-M Contest Committee, P.O. Box 88, Moscow, USSR.

Nevada QSO Party

0000Z to 2400Z Saturday, May 9

This is a new one sponsored by the Frontier ARS and should be a welcome event for WAS and County Hunters.

Modes: CW, SSB, Packet, RTTY, and SSTV.

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

Scoring: Each Nevada contact is worth 5 points per band and mode. All other QSOs 1 point per band and mode.

Multiplier: States, VE provinces, DX countries, and Nevada counties worked for Nevada stations (counted once only).

Out-of-state stations use Nevada counties for their multiplier (maximum of 17, maximum of 17 per band).

Frequencies: None indicated, but all bands 160 through 6 meters can be used. (No cross mode or repeaters.)

Awards: Certificates to the top scorers in each state, province, DX country, and the top scoring Novice and Technician in each state. The three top scorers in Nevada and the three top scoring Novices and Techs in Nevada will also receive certificates.

Mailing deadline for logs in June 5th to: Frontier ARS, Att: Bob Herrell, WB5PTO, 1813 Silver Birch Lane, Las Vegas, NV 89104.

ARI International Contest

1600Z Sat. to 1600Z Sun., May 16-17

It's the world working the Italian stations in this one, including San Marino, Vatican, and SMOM.

Classes: Single operator, CW, SSB, or

both modes. Multi-operator, single transmitter both modes, and SWL.

Bands: All six bands 1.8-28 MHz, 1830-1850 kHz on 160, and 3613-3627, 3647-3667 kHz on 80 for Italian stations.

Exchange: RS(T) plus a QSO number starting with 001. Italian stations will include two letters indentifying their province.

Scoring: Europeans earn 2 points per QSO; others 4 points.

Multiplier: Each province and T7, HV, SMOM worked on each band.

Final Score: Total QSO points times the sum of the multiplier from each band. A declared score exceeding more than 5% of the actual score means disqualification.

Awards: Certificates to the top-scoring stations in each country in each class. Special awards to the five leading stations in each class.

Use a separate log sheet for each band, and a summary sheet showing the scoring from each band and other essential information. Include your name and address in block letters.

The Worked All Italian Provinces award is issued to stations working at least 60 different provinces. Application can be made by including a separate list of provinces worked during the contest with your log. QSL cards are not required. Include 10 IRCs to cover cost.

Mailing deadline is 40 days after end of contest to: Giorgio Beretta, I2VXJ, via Sciesa 24, 20135 Milano, Italy; or ARI Contest Manager, via Scarlatti 31, 20124 Milano, Italy.

Michigan QSO Party

1800Z Sat. to 0300Z Sun., May 16-17
1100Z Sun. to 0200Z Mon., May 17-18

This year's party is again being sponsored by the Oak Park ARC. The same station may be worked on each band and mode, portable/mobile in each county change. Contacts between Mich. counties are permitted for QSO and multiplier credit.

Exchange: RS(T), QSO no., and QTH. County for Mich.; state or country for all others.

Scoring: For Mich.—One point for phone contacts, 2 points if on CW, and 5 points if with club station W8MB.

Multiply total by (states + countries + Mich. counties) worked for final score. KH6 and KL7 count as states, VE as a country (maximum of 85).

Out-of-state—One point for each Mich. phone QSO, 2 points if on CW, and 5 points if with W8MB. Multiply total by Mich. counties worked for final score (maximum of 83).

VHF scoring same as above except multipliers from each band are added together for final multiplier. Repeater contacts are not permitted.

Frequencies: CW—1810, 3540, 3725, 7035, 7125, 14035, 21035, 21125, 28035, 28125. SSB—1855, 3905, 7280, 14280, 21380, 28580. VHF—50.125, 145.025, 146.52.

Awards: Certificates to the winners in each state, country, and Mich. county (minimum of 50 QSOs). Six plaques to top Mich. winners: single operator, upper peninsula, multi-operator, VHF, mobile, and aggregate club score (minimum of 100 QSOs). And out-of-state station.

Party contacts do not count toward the Michigan Achievement Award unless one fact about Mich. is exchanged.

A summary sheet is requested with your entry showing the scoring and other pertinent information, plus a signed declaration that rules and regulations have been observed. Include a large SASE for a copy of the results.

Mailing deadline is July 1st to: Mike Shaw, K8ED, 27600 Franklin Road, Apt. 516, Southfield, MI 48034.

Michigan Achievement Week

May 16-23, 1987

All contacts with Michigan stations made during Michigan Week, May 16-23, including the QSO Party, may be used for this award if the following requirements are fulfilled.

1. Mich. stations—Submit a log with information, name and address of station worked if possible, of 15 or more QSOs with out-of-state or DX stations with information about Michigan.

2. Out-of-state stations including Canada—Submit a log with information, name and address if possible, of at least 5 Mich. stations worked who related facts about Michigan.

3. DX stations—Work at least one Mich. station, with log information, name, and address, and relate a fact about Mich. given by the station worked.

4. Only contacts made during Michigan Week, May 16-23, are valid for this award.

Applications for certificates must be postmarked no later than July 1, 1987. Mail to Governor James Blanchard, Lansing, MI 48902.

(Facts about Michigan: State Bird, Robin; Fish, Trout; Flower, Apple Blossom; Tree, White Pine; Stone, Petoskey; or any local facts.)

World Telecomm. Contest

0000Z Sat. to 2400Z Sun., May 16-17

This world-wide activity is sponsored by the LABRE in celebration of the World Telecommunication Day, May 17th.

Phone and CW are separate contests and require separate logs. Use all six bands 10-160 meters. (No WARC bands.)

Categories: Single operator, all bands.

Multi-operator, single transmitter, all band. (Must remain on same band at least 10 minutes before changing to another band.)

Exchange: RS(T) plus ITU Zone. (See ITU Zone chart.)

Points: Contacts between stations on the same continent but different countries are worth 1 point on 10/15/20 meters, 2 points on 40/80/160 meters. Contacts between stations on different continents are worth 2 points on 10/15/20 meters, 4 points on 40/80/160 meters.

Contacts between stations in the same country are permitted for zone multiplier only, no QSO points.

The same station may be worked on each band for QSO and multiplier credit. The WAC and DXCC lists are the standards.

Multiplier: The 75 geographical ITU Zones worked on each band.

Final Score: Total QSO points from all bands times the sum of ITU Zones worked on each band.

Awards: Certificates to the first-place winners in each category in each country; second- and third-place awards will also be considered. A handsome plaque goes to the country with the highest aggregate score determined by the top 5 single operator scores plus the top multi-operator score of that country, both on phone and CW. The plaque remains in the possession of the national amateur radio association of that country affiliated with the IARU.

Use a separate sheet for each band and indicate the zone multiplier in a separate column only the first time it is worked. Logs must be checked for duplicate contacts, correct QSO points, and multipliers.

The usual disqualification rules are in effect—regulations in the country of operation and the contest, excessive dupli-

cate contacts, and unsportsmanlike conduct.

Include a summary sheet showing the scoring, a signed declaration that all rules have been observed, and your name and address in block letters.

Mailing deadline is July 31st to: LABRE ITU Contest Committee, P.O. Box 07-0004, 70 000 - Brasilia - DF, Brazil.

CQ WW WPX CW Contest

0000Z Sat. to 2400Z Sun., May 30-31

Just a reminder, as if you needed one, that our WW WPX CW Contest is coming up the last weekend of this month. Rules and scoring are the same as for the SSB section last March and were given in detail in the January issue and briefly reviewed in the March Calendar.

Following are a few items to keep in mind:

Par. I—Only 30 hours out of the 40-hour contest period may be used by single operator stations. Off times must be at least 60 minutes long. Multi-operator stations can use the full 48 hours.

Par. IV—Multi-operator, single transmitter. Only one transmitter and one band permitted during the same time period (defined as 10 minutes). No QSYing to another band to pick up a new multiplier.

Par. VI—QSO points on the three lower bands (7, 3.5, and 1.8 MHz) are worth double those for contacts on 28, 21, and 14 MHz. Own country may be worked for multiplier credit only (making U.S. contacts very attractive).

Par. VII—The prefix multiplier is counted once only, not once on each band. Definition of a prefix is clearly spelled out in the rules. The WPX Awards list cannot be used as a guide in the WPX Contest.

Stations operating in a call area other than that of the call sign are required to indicate the area of operation. The portable prefix is the multiplier (i.e., W8IMZ/4 counts as W4; N8BJQ/KP2 counts as KP2).

Par. IX—Eligibility for the many plaques remains at two years except for categories as indicated.

Mailing deadline is July 10th, but will be extended for rare isolated areas. Be sure to indicate CW on the envelope.

All logs go to: CQ Magazine, WPX Contest, 76 N. Broadway, Hicksville, NY 11801 U.S.A. Questions pertaining to the WPX Contest can be sent to: WPX Contest Director, Steve Bolia, N8BJQ, via CQ.

ARCI QRP CW Sprint

0500Z to 0900Z Saturday, May 30

This is a shorty, only 4 hours, but it's going to take you another 4 hours to score your log. The ARCI really went overboard on the scoring in this one. I strongly advise you to send a large SASE to KA5NLY for a detailed copy of the rules and official forms.

Following is a basic summary of the format.

Exchange: RST and state, province, or country. ARCI members will also include their membership number. Non-members their power output.

Scoring: Contacts with members 5 points. With non-members 2 points. The same station may be worked on each band for QSO and multiplier credit.

Multiplier: States, VE provinces, and DX countries worked on each band.

Power Multiplier: 4 to 5 watts output $\times 2$, 3 to 4 watts output $\times 4$, 2 to 3 watts output $\times 6$, 1 to 2 watts output $\times 8$, less than 1 watt $\times 10$, and over 5 watts check log only.

Bonus Multiplier: Power source natural or battery $\times 1.5$. Antenna single element, dipole, vertical, etc., $\times 1.5$. Double whammy—if you qualify for both do not use above, use $\times 2.5$.

Bonus Points: Work all 10 US call districts add 200 points. Work 5 VE provinces add 200 points. Work 5 DX countries add 200 points. Homebrew transmitter add 300 points. Homebrew receiver add 500 points. Earn any three of the above and you've hit a home run, so double your bonus points. Earn all the above bonus points and you've hit a grand slam, so triple your bonus points. (I told you it wasn't going to be easy.—ed.)

Final Score: Total QSO points \times QTH multiplier \times Power multiplier \times Bonus multiplier + Bonus points.

Frequencies: 1810, 3560, 7040, 14060, 21060, 28060, and 50360 kHz (no WARC bands).

Awards: Certificates to the top 5% scores in overall scores and the top scor-

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ing station in each state, province, and DX country. There will be certificates for those earning the double whammy, home run, or grand slam.

Use a separate sheet for each band and a summary sheet showing the scoring and other essential information. Include a large SASE for a copy of the results.

Mailing deadline is June 30th to: Eugene Smith, KA5NLY, Pentagon P.O. Box 46599, Washington, DC 20050-6599.

YLRL Novice/Tech Day

1700Z to 2100Z Sat., June 6

This is a new one organized by the YLRL to promote activity for the YL Novice and Technicians. Operation will be for YL's, on CW only.

Exchange: Station worked, RST, name, QTH, and class of license.

Scoring: Three points for each YL Novice/Tech worked. Two points for YL General or Advanced class, and 1 point for YL Extra class.

The same station may be worked on each band for credit. Score each band separately. The sum of your score on each band is your final score.

Frequencies: 3730, 7130, 21130, and 28130 MHz, plus or minus 10 kHz. Maximum power of 200 watts.

Awards: YLRL postcards to the top scoring Novice/Tech and General class or higher YL.

Submit original log only, which must be signed by the station operator. Include a summary sheet showing the scoring and other essential information, including your license class and address.

All entries must be received by July 3rd and go to: Mary Lou Brown, NM7N, 504 Channel View Dr., Anacortes, WA 98221.

PVRC On The Air Reunion

1400 to 1800 UMT Sat., June 6
0000 to 0600 UMT Sun., June 7
2200 Sun. to 0200 UMT Mon., June 8

This "On The Air Reunion" is open to all past and present Potomac Valley Radio Club members. At the last count there were about 530 eligible.

Look for activity on 3547, 7047, 14047, 21047 MHz CW, and 14247 MHz SSB only.

(Carl Anderson, W3XE, who sent me the announcement, made no mention about any awards, but I wouldn't be surprised if the "top banana" received his just reward.—ed.)

Your logs go to: Walt McGugan, W3FG, 1059 Omar Dr., Crownsville, MD 21032.

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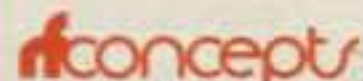
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A new USA company is being formed by the two original co-founders of Mirage Communications. Everett L. Gracey, WA6CBA and Kenneth E. Holladay, K6HCP. The new company name is RF Concepts, "RFC."

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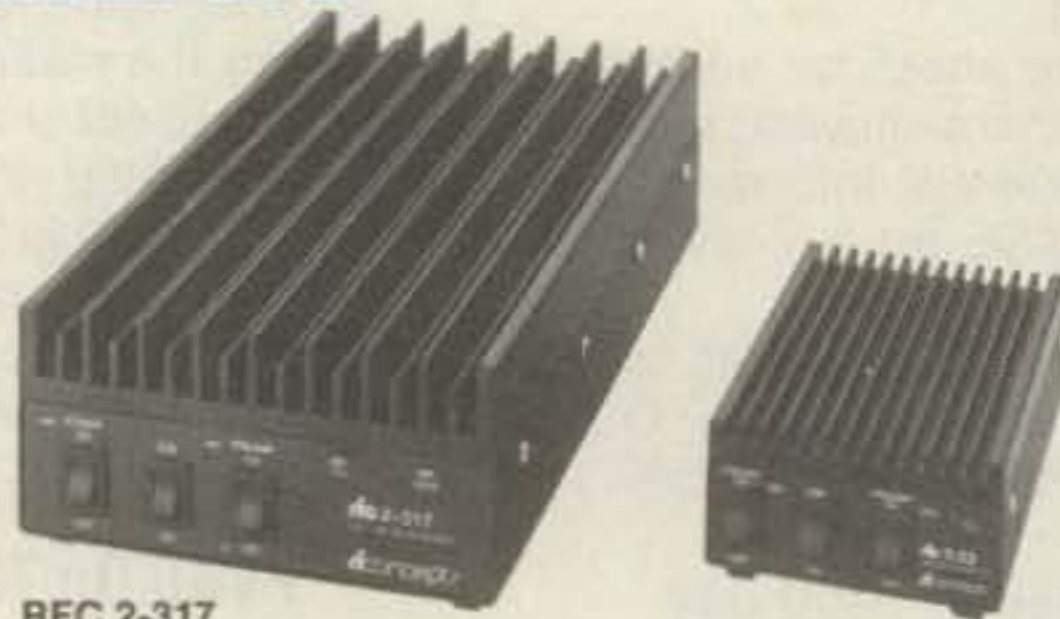
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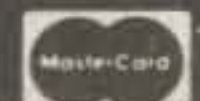
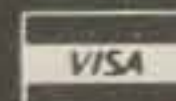
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A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

More on Propagation

This time columnist W8FX revisits a subject that never goes out of style, even in the depths of the sunspot cycle. That subject is propagation. He also examines an updated computer-based propagation tool for the DXer.

—K2EEK

Last time we got together we again held mail call to pull out two interesting letters we received, one from W6RQ on the G5RV antenna, the other from WD5T on the Extended Double Zepp. We discussed several new antenna products, described some informative reading matter, and highlighted some new hamshack software.

This month in the Antennas & Accessories column we'll revisit the propagation discussion contained in the April 1984 and November 1985 columns. Following our review of some propagation basics, we'll focus on the computer determination of propagation and grayline parameters by the updated Super DX EDGE™, a new version of a popular software package for the Commodore 64 computer. We'll also look at a few items of current interest in the "Short Bursts" section of the column.

First let's review some important propagation considerations, an important preliminary to any discussion of computer-based propagation software.

HF Propagation Revisited

Most amateurs are aware that three waveforms are generally associated with the propagation of radio signals: groundwave, tropospheric, and ionospheric. For the purposes of HF DXing, it's the ionospheric waveform with which we are most concerned.

To recap, the ionosphere is that portion of the earth's atmosphere which lies between altitudes of 60 and 200 miles. The ionosphere is usually subdivided into three layers (D, E, and F) which bend and absorb radio waves at different rates. Both the D and E layers may have a significant impact on HF propagation, but the F layer is the one most responsible for DX communications. This layer is further subdivided into the F1 and F2 regions. Most propagation routines analyze the F-layer characteristics for Maximum Usable Frequency (MUF) predictions, and the D- and E-layer characteristics for Lowest Usable Frequency (LUF) forecasts.

Ionospheric propagation is dependent upon many things besides the layer structure which we mentioned. Among these other factors are ultraviolet light and particle emissions from the sun; the travel time of these emissions; the critical frequency at which wave bending becomes ineffective; the time of day; absorption



Having a top-performing antenna is only part of the equation in successfully tracking DX. The other half of the equation is in knowing where and when to point the antenna for optimum results. This month's column looks at propagation from several aspects. (Photo courtesy NTAM)

rates; and the season. Other important factors include the latitude and direction of the wave path; the point on the 11-year sunspot and 27.5-day solar cycles; the earth's geomagnetic activity and level; and solar disturbances of various kinds.

Before continuing, it's a good idea to define some key terms used in propagation discussions. These include:

1. Highest Possible Frequency (HPF). This is the highest frequency on which a signal will propagate over a given path for at least 10% of the time. Signals higher in frequency will not propagate due to insufficient bending. The HPF may be considered to be an almost physical barrier that can't be overcome by employing a higher power transmitter or a high-gain antenna.

2. Maximum Usable Frequency (MUF). This is the maximum frequency at which HF signals will propagate over a given path for at least 50% of the time. This is not the highest possible frequency for communications, however, and MUF is not synonymous with the "critical frequency."

3. FOT, or Frequency of Optimum Transmission (or Traffic). This is the frequency at which a signal will propagate over a given path at least 90% of the time. Thus, the maximum usable frequency for communications will generally be above this value. FOT may be considered to be the best choice for HF communications when extreme reliability is required, as for military and commercial purposes.

4. Lowest Usable Frequency (LUF). This is the

lowest frequency which will generally support HF propagation over a given path. For 50% of the time the actual lowest frequency that will allow communications over a path will be below the LUF. For the remaining 50% the lowest frequency will be above the LUF.

5. Critical Frequency. This is the highest frequency at which a signal will be returned to the earth. Contrary to popular belief, the MUF may be considerably higher than the critical frequency. For example, it's possible for 10 meter refraction to occur when the critical frequency is but 7 MHz under excellent conditions.

6. A- and K-indices. The A-index is a measure of geomagnetic activity which ranges from 0 (extremely quiet) to 400 (very disturbed). The K-index is a quasi-logarithmic index of geomagnetic activity ranging from 0 to 9 units. The two indices are closely related, but use different scales of measurement for geomagnetic states. The A-index describes conditions for the previous 24 hours and is based on the K-index, which describes conditions for the past 3 hours.

7. Solar Flux and Sunspot Number. The solar flux is a measure of the sun's energy output in terms of solar electromagnetic radiation, and may range from about 60 to 400 units. There is a positive correlation with the sunspot number, which physically refers to the total number of "spots" and cluster groupings visible on the sun's face using a high-power telescope.

From all this we can see that the chances of communications over a path are greatest for frequencies which lie somewhere between the MUF and the LUF, thus defining the so-called "DX window." A rule of thumb is that DX signals will typically be strongest at frequencies bracketing the MUF.

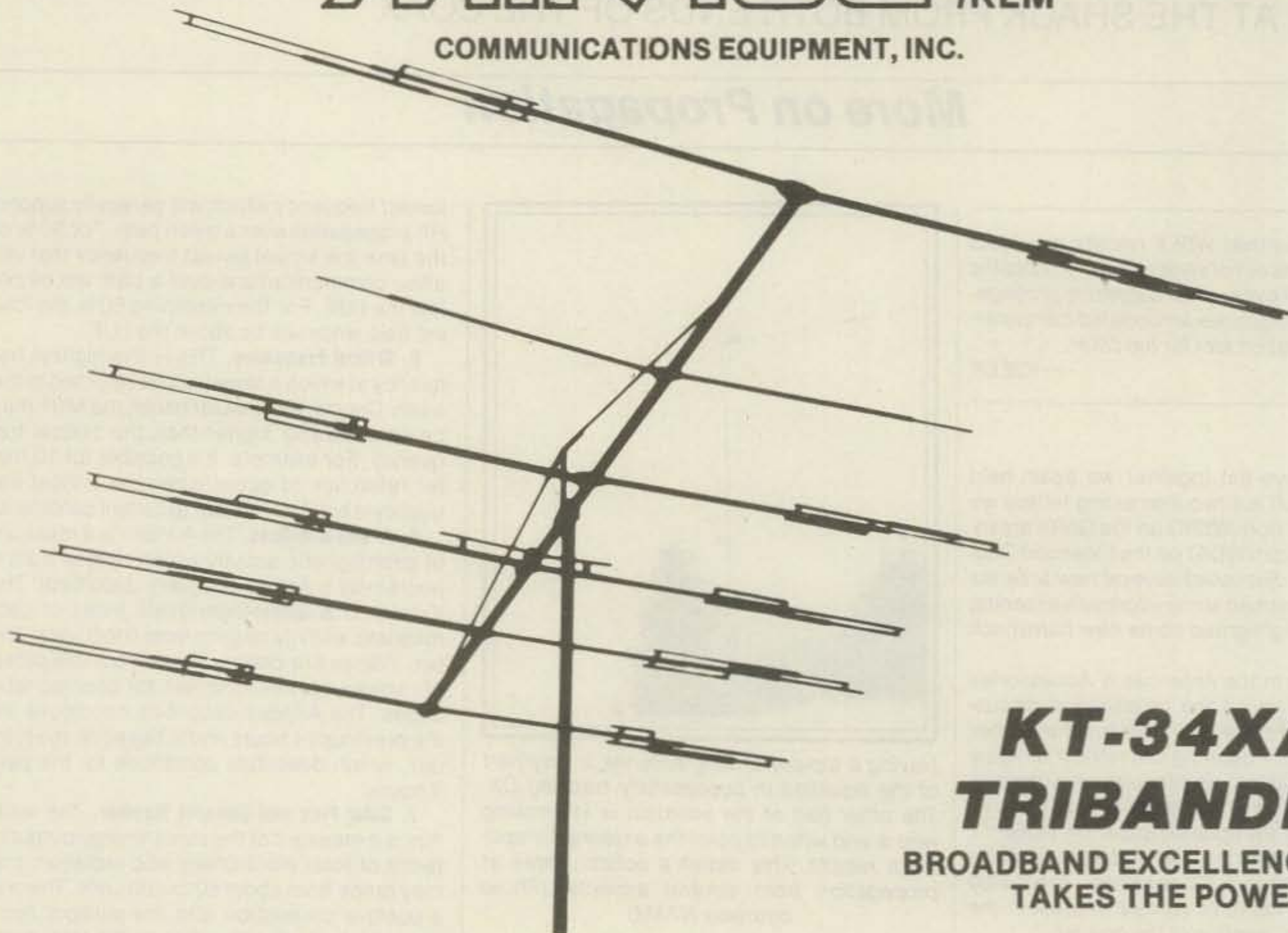
Most HF DXers are primarily interested in the MUF. The majority of commercial MUF prediction programs make use of public-domain algorithms which owe their existence to extensive work done at the Naval Ocean Systems Center (NOSC) at San Diego. A personal computer version of the large Navy MUF program was introduced in amateur radio circles by Bob Rose, K6GKU, in his landmark December 1982 QST article, "MINIMUMUF: A Simplified MUF Prediction Program for Microcomputers."

The MINIMUMUF program calculates single-skip MUF, where the MUF equals the critical frequency of the F2 layer times a certain "M" factor. The critical frequency is dependent upon the cosine of the angle of the sun at the midpoint of the propagation path (the "solar zenith angle"), the sunspot number or solar flux, time of day, and several constants. The "M" factor takes into account layer size, and it adjusts for factors such as midnight sun conditions over the path, high latitudes (those greater than 45 degrees), and transequatorial paths. Where more than a single hop occurs along a path, two MUFs are calculated and the lowest of the two is chosen by the program.

General propagation condition forecasts can be readily obtained from the monthly prop-

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KT-34XA TRIBANDER

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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 $\frac{1}{4}$ -wave elements possible on 15 and 10 meters, and brings 20 meters much closer to the desirable $\frac{1}{4}$ -wave than any conventional tribander.

BANDWIDTHS:...	14.0-14.350 MHz	GAIN:.....	8.5-9dB
	21.0-21.50 MHz		9-9.5dB
	28-29 MHz		11-11.3dB
VSWR:.....	1.5:1	BOOM LENGTH:....	32 ft. x 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)

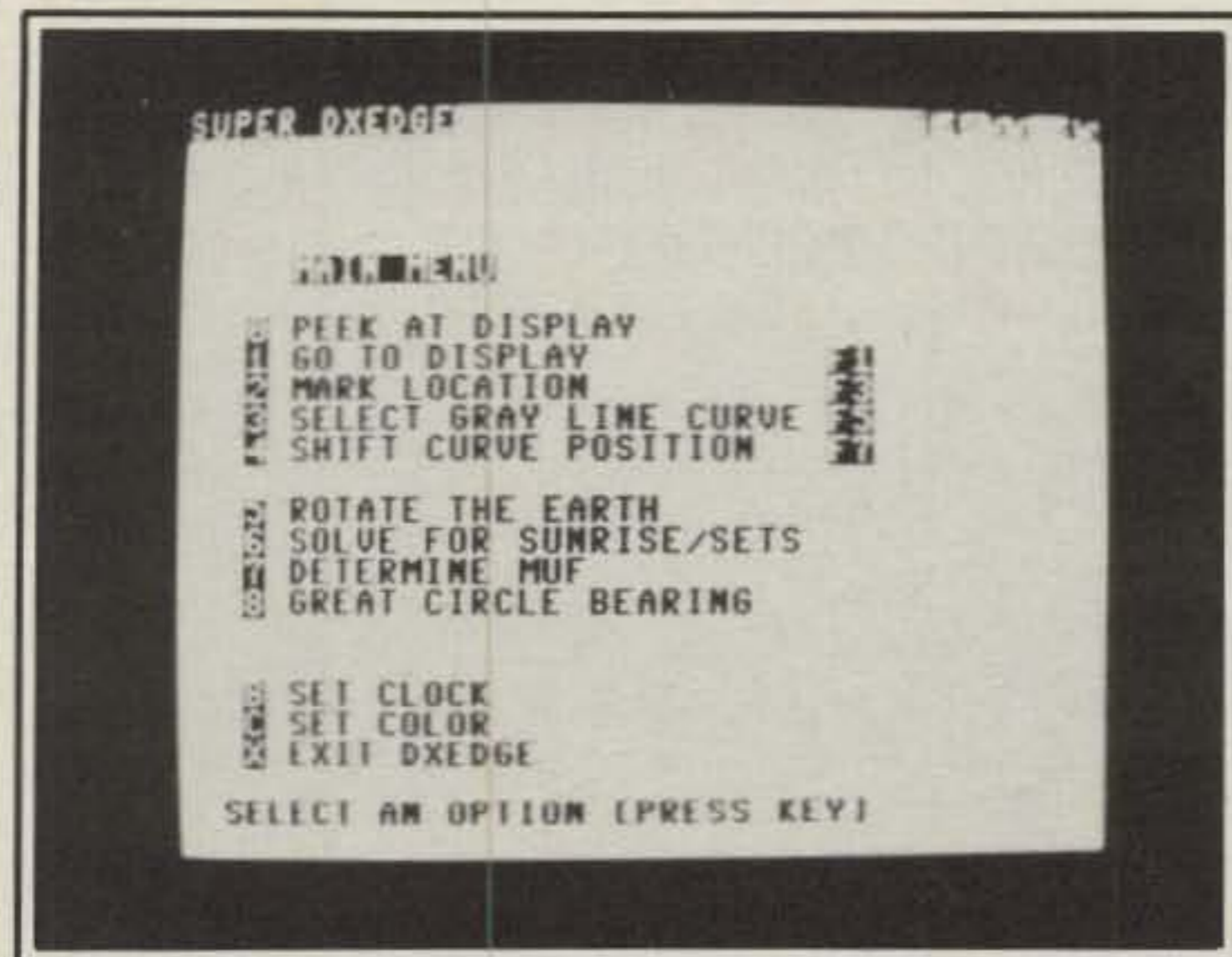
Mechanically, the KT-34XA has been built to survive the toughest weather conditions. All aluminum, including the boom, is strong 6063-T832 alloy. All electrical hardware is stainless steel. Virtually indestructible "Lexan" insulators, just like those on KLM's 40 meter "Big Sticker," are used for mounting 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.

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Call your local dealer for price.
W. W. Scott*

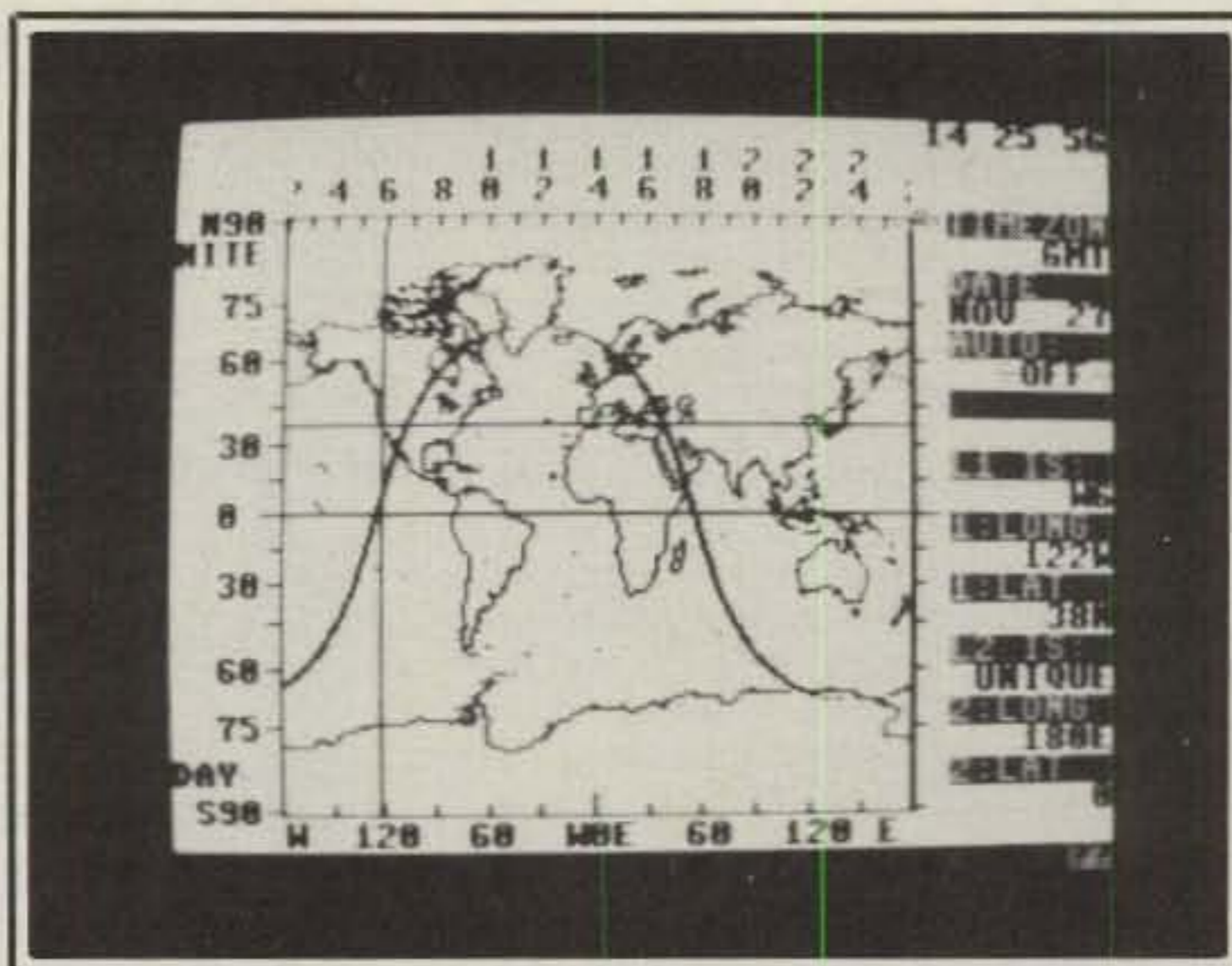
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Main Menu Screen of the Super DX EDGE. Several of the Main Menu options can be brought up in two ways, either by keying in the appropriate number to the left of the option, or by pressing the indicated function key. (Photo courtesy N2UN)



The Display Screen on the Super DX EDGE is similar to that on the earlier version. Though not particularly complicated, a good deal of information is presented, thus requiring some "getting used to." (Photo courtesy N2UN)

agation columns which appear in the major amateur magazines and in various DX newsletters. "Same day" raw information is not difficult to obtain for use with various MUF/LUF computer programs. The National Bureau of Standards provides current basic propagation data over station WWV, which broadcasts on 2.5, 5, 10, 15, and 20 MHz. A propagation bulletin prepared by the National Oceanic and Atmospheric Administration (NOAA) is aired by WWV every hour at 18 minutes past the hour. This bulletin provides much useful propagation information, including yesterday's solar flux and A-index; the current K-index; past solar and geomagnetic activity; and expected solar and geomagnetic activity for the following

24 hours. The solar flux data is updated each day at 1818 UTC. Propagation parameters are also broadcast over the ARRL station, W1AW.

It's been found that when geomagnetic conditions are quiet, and there are no more than two hops in a given signal path, a sound estimate of MUF can be produced within about ± 3.8 MHz using versions of the NOSC algorithms. However, there can be great and unpredictable changes in band conditions when various anomalies, such as solar flares, occur, producing SIDs (sudden ionospheric disturbances) and SWFs (shortwave fadeouts). A key to anticipating such disturbances can be found in monitoring the A- and K-indices broadcast by WWV.

Interestingly, minimum absorption and best propagation occur when the A-index is roughly 7 or less and the K-index is 0 to 2. For example, with a solar flux of 90, an A-index of 10, and a K-index of 3, the unsettled geomagnetic activity leads to "low normal" conditions—just "fair" for DXing.

We've indicated that there is also a lower limit for communications, a fuzzy boundary known as the LUF. As the frequency of operation decreases, atmospheric absorption increases to the point where practically none of the signal remains to be passed through the D and E layers on to the F layers and back to earth. This is most notable during the daytime, when ionization levels and therefore absorption are highest.

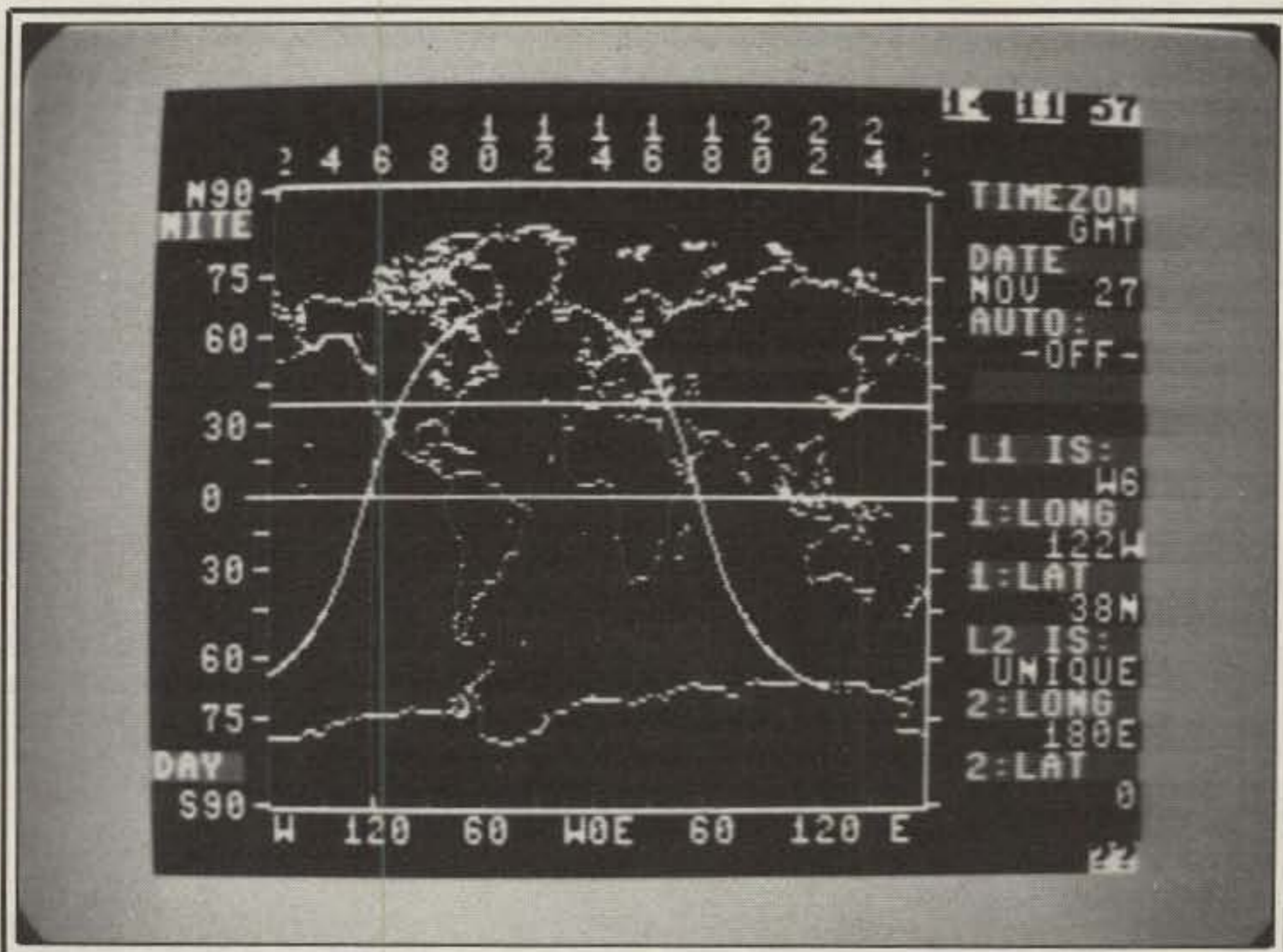
LUF can be determined, however roughly, in a more straightforward manner than MUF. Since the density of the D and E layers is directly related to the position of the sun in the sky, the time of day can provide a useful approximation of E-layer density. This approximation, especially when coupled with information about power level and antenna gain, can be used to estimate the LUF "barrier," below which communication isn't likely to be supported.

In practice, rather than being a mathematically precise number, the LUF, in effect, tells you at which times of the day the absorption is at its worst, as a guide for choosing the time for the most reliable communications. At other times absorption may simply be too strong to support communications.

With this background on propagation in mind, along with specialized "grayline" and sunrise/sunset conditions, let's revisit a useful computer-based DX propagation aid, the Super DX EDGE, which we've described and discussed on several occasions in the column.

The Super DX EDGE

Currently popular propagation prediction techniques involve not only the determination of MUF, but also the calculation and following of so-called "grayline" and sunrise/sunset phenomena. Such techniques are becoming increasingly useful and very much in vogue, especially as the 11-year sunspot cycle bot-



Super DX EDGE Display Screen is a Miller Cylindrical Projection, which displays the world from 90 degrees north to 90 degrees south. In addition to the map and the grayline itself, the screen contains information, including time, day/night indications, latitudes, longitudes, and various labels (at the right hand side of the screen) and program "action codes." (Photo courtesy N2UN)

toms out and favorable propagation conditions markedly emphasize the lower bands. Bands such as 160 and 75/80 meters provide good opportunities to take advantage of all-darkness paths and the anomalous propagation that borders on sunrise and sunset periods.

We first discussed the original slide-rule-like DX EDGE in the May 1984 column. With this mechanical device, which we found to be a very useful operating aid for the DXer and contest, you can rather quickly determine those areas of the world which are in darkness, and those which are in daylight, at any time of the day and in any month of the year. It is also possible to determine sunrise and sunset times throughout the world, the location and shape of the "grayline" (an important propagation indicator), and local times around the world.

The DX EDGE, which consists of a carrier and a set of slides, is basically a device for tracking the sun's path across the earth's surface. It allows you to "solve" a number of problems relating to unusual long-range propagation paths. You can, for example, find local sunrise and sunset times, for operating at those times when transient conditions are likely to occur. With the device you can easily determine the general direction in which to look for unusual DX; find propagation paths that will see the most sunlight (or darkness), as desired; judge when and where to look for rare DX multipliers; and determine when long-path openings are most probable.

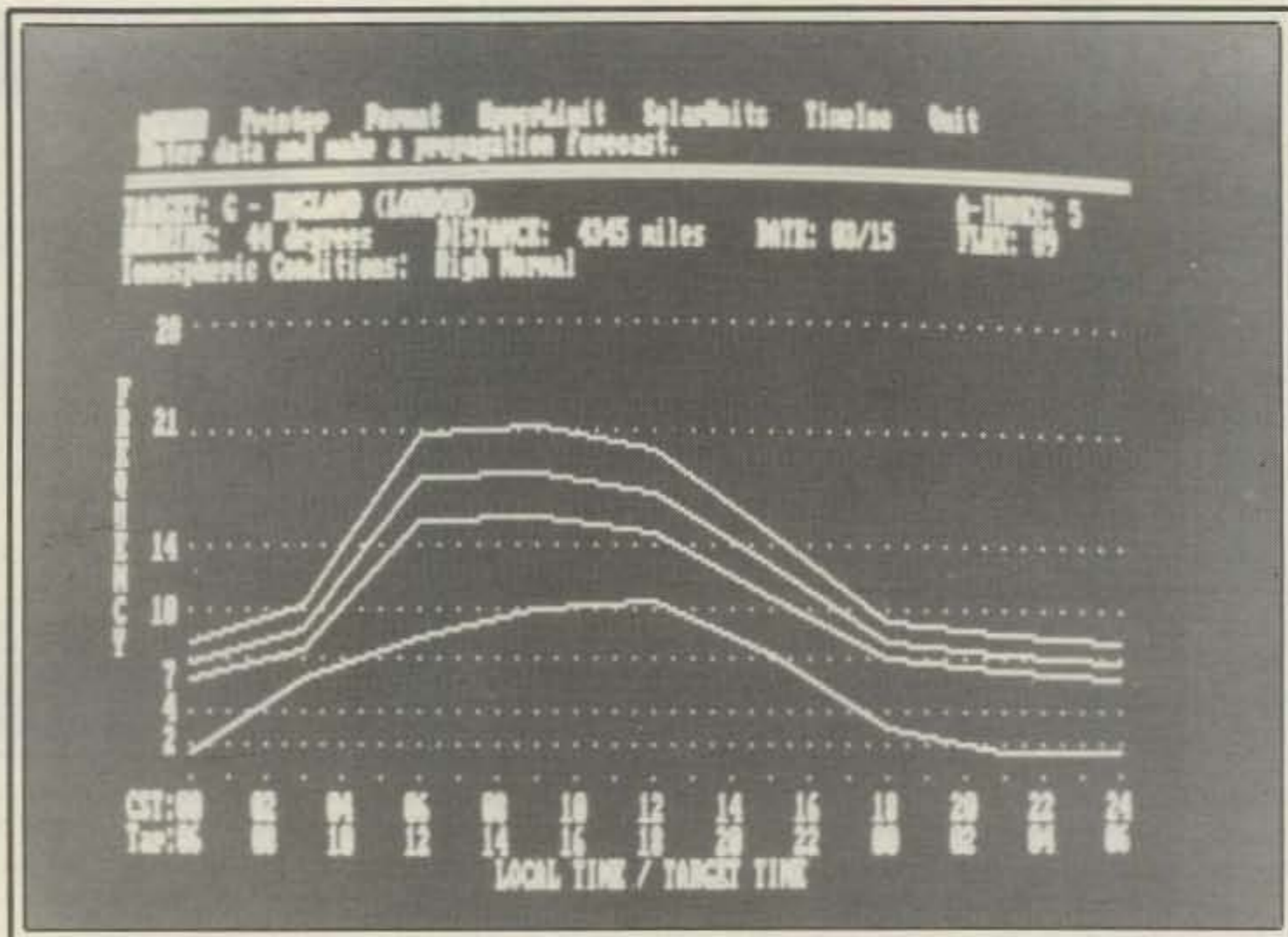
Also, it can be useful to know the actual shape of the "grayline" (which separates the areas of the world in darkness from those which are in daylight). The shape of this demarcation changes throughout the year, and its position changes during the day. Often, special propagation conditions exist along the line; the individual monthly charts provide a graphic depiction of the grayline.

The Super DX EDGE is a high-tech follow-on to the original paper and plastic version, as well as to the first generation software product. The updated menu-driven program lets you see the shape and position of the grayline on keystroke command, displayed on a hi-resolution world map, a Miller Cylindrical projection that displays the world from 90 degrees north to 90 degrees south latitude. At the same time you can see the areas of the world that are in daylight and those which are in darkness. When day and date are inputted, the grayline is shown in the correct position; new curves are built into the program for 15-day increments.

Using the computer's internal clock and the program's automatic update feature, the position of the grayline may be shifted automatically every 15 minutes in real-time. This allows you to simulate the motion of the earth in order to keep track of daylight and darkness areas. Thus, the most interesting and "productive" propagation paths are instantly visible, and you can move the grayline by command, too.

As with its slide-rule predecessor, the program is also used to see the times for sunrise and sunset at any location in the world. QTHs are keyed to the DXCC prefixes and zone numbers, as well as latitude and longitude, so that you can easily and conveniently pinpoint the QTH desired. In addition, the position of the map may be changed to place any area of the world in the center of the screen to suit individual preferences.

The Super DX EDGE is useful on all HF bands from 160 through 10 meters, though for different purposes. On the higher frequency bands, paths fully in daylight are often desired,



This month we covered the Super DX EDGE. In an upcoming column we will describe the new BandAid program for the IBM-PC, a comprehensive propagation package from Base (2) Systems. A typical display screen is shown here. (W8FX photo)

while on the lower bands—40, 75/80, and 160 meters—darkness paths are used. As we've suggested, finding darkness paths on the lower bands can be particularly rewarding during years of low sunspot activity and reduced opportunities for daylight DX on the higher bands.

Both the original mechanical and follow-on computerized DX EDGES were limited in that they told you nothing about MUF or specific beam headings, very important information for high-band DXing. The Super DX EDGE adds two very significant features to the DX EDGE: it calculates MUF between any two locations, and it also calculates Great Circle bearings (antenna direction) and distance between any two locations on the earth. These new features were added in response to DX EDGE users' requests in order to provide all the propagation aids that the DXer would need to plan on-the-air activities and to provide real-time assessments of propagation possibilities.

Now when you identify any two locations, the program calculates the MUF between those points for any sunspot number or solar flux value to determine the best frequency band to use between these two locations. The Great Circle bearing calculator tells you the right direction to point your antenna for the distant point. Distance between the two locations is automatically calculated and displayed in miles, nautical miles, and kilometers. Thus, the program provides not only the best times for transient DX openings based on conditions of daylight and darkness, but on overall MUF propagation data as well—and it also helps you to point your beam.

The program is easy to use and requires a minimum of setup, which basically just requires the inputting of date and time, and your location, which serves as a reference point. The correct grayline is placed on the world map, and areas of daylight and darkness are immediately visible. As indicated previously, both the grayline and the world map may be changed to any desired position.

Documentation consists of a 20-page booklet, which provides basic instructions for the program, an explanation of the display screen and main menu options, operating procedures, miscellaneous rules, and several problem-solving-oriented examples. The disk-based Commodore 64 program is priced at \$34.95, and owners of earlier versions of the program are eligible for a discount.

Incidentally, according to Tony Japha, N2UN, Xantek obtained the basic data for constructing the device from charts showing the zenith angle of the sun at various latitudes published by the Federal government. These data were then transposed into curves that show all of the points that have zenith angles of 90 degrees at the same time. This line is the "grayline" we mentioned previously, which shows all points on the earth that are going through local sunrise or sunset at the same time.

For more details and a very instructive brochure on the updated product, contact Tony Japha, N2UN, at Xantek, Inc., P.O. Box 834, Madison Square Station, New York, NY 10159.

Short Bursts

Calling All Atarians. Early last year we received a sample copy of *Ad Astra*. This is a monthly publication published by and for the members of the Atari Microcomputer Network, a radio amateur group using Atari microcomputers in their hobby. The Net is a non-profit organization of hams, SWLs, and Atari computer enthusiasts who share a common interest in exchanging information on Atari applications, programming, and operation.

Amateur radio operators and SWLs are especially encouraged to directly participate in the weekly on-the-air meetings. The national net meets every Sunday at 1600Z on 14.325 MHz with Dave Byrd, KD7VA, acting as net coordinator.

Unfortunately, in mentioning the net in last July's column, ol' Murphy was with us, and the

14.325 net frequency was incorrectly printed in the column. This sent readers to the wrong 20 meter frequency, causing most folks to think that the lack of activity was due to poor propagation. In any case, our apologies to readers who were inconvenienced by our typographical error.

To review some of the information which was garbled last time around, *Ad Astra* is published six times per year by the Net and is an optional part of membership. Net membership is, of course, free, while members who wish to receive the journal are asked to help offset printing and postage costs by remitting an annual donation of \$10 (U.S. funds) to Editor Gil Frederick, VE4AG. For more details on the Atari Microcomputer Network and *Ad Astra* magazine, contact Gil at 130 Maureen St., Winnipeg, Manitoba R3K 1M2 Canada.

I might note that recent issues have strong coverage of the popular Atari ST series of microcomputers, as well as some competent amateur radio programs for the Atari 800 series. The magazines and net also maintain a fair-size library of useful software routines for a variety of Atari machines.

AMTOR File Transfers. Harv Nelson, N9FHO, an active Commodore computerist and frequent contributor to the column, dropped us a note to let us know that he's heavily involved with AMTOR, and has been successfully transferring programs for the Commodore 64 computer on an AMTOR link involving YV1AQE, XE1M, PY2DV, KT7H, and KO5T. However, he points out that some special techniques are involved in doing so.

The transfer process he uses involves converting the program to be transmitted to a hexadecimal image file, putting the image file in a message buffer, and only then transmitting it. On the other end, the received hex file is converted back into executable program form. Harv sent along a copy of the C-64 program that he uses for these purposes.

Harv adds that on the 20 meter AMTOR link, the programs arrive in better condition than do ASCII transmissions, and he finds it to be much faster than trying to do the same thing via packet radio. By the time this column appears, Harv's AMTOR file transfer article and associated program should have appeared in *QEX* magazine. Alternately, one may obtain the program directly from N9FHO for a SASE disk mailer and exchange disk, free of charge, or for \$4 if Harv does all the work. Contact Harvey A. Nelson, N9FHO, P.O. Box 736, Stevens Point, WI 54481.

Is a Ground Really a Ground? Antenna-raising season is fast upon us, and just about everyone knows the importance of protecting his station (and home) from the destructive effects of lightning. But there are some "fine points" and details of antenna and hamshack electrical protection that may easily be missed in the process. Joe Myers, KD4A, writing for the Telephone Pioneer ARC of Alabama newsletter, summarized the high points of a series of 1984 and 1985 articles which appeared in *Mobile Radio Technology* magazine. Here are those points, to which we've added our own "two cents":

1. Guyed towers with properly grounded guy wires reduce lightning vulnerability, since tower inductance is lowered.

2. If a radio tower is more than about 150 feet high, even side-mounted antennas are not immune to direct lightning hits. However, side-mounted antennas can be protected by extending horizontal rods out from the tower both above and below the side-mounted antenna.

3. Shunt-fed antennas installed on towers don't necessarily protect ground-mounted equipment from damage.

4. The higher the point on the tower where the coax leaves the tower for the hamshack, the higher the voltage which will be induced on the coax due to lightning effects.

5. Coaxial cable shield should be grounded at the base of the tower.

6. Solid wire or ground straps should be used instead of braid or stranded wire, and the ground conductor should enter the ground as close to the base of the tower as possible, with no sharp bends along its length.

7. The quality of a ground is determined by the inductance in addition to the DC resistance of the ground path. An adequate ground should be no more than 10 to 50 ohms.

8. Dissimilar metals, especially copper and galvanized steel, should not be placed in contact with one another.

9. Only the first 5 to 10 feet of a ground rod are effective; as a result, several shorter ground rods are more effective than a single long rod.

10. A single ground rod at the base of a tower located in low-conductivity soil is inadequate.

11. A second ground rod located at least 5

feet from the first rod will significantly reduce ground resistance.

12. Buried radials of bare wire constitute a good ground system, whether used alone or in conjunction with ground rods.

13. Rust on ground rods may be tolerated, but not on the connections; corrosion of connections must be avoided. Don't place chemicals around ground rods to increase soil conductivity, as most chemicals will significantly increase corrosion while only temporarily improving conductivity.

Wrapping It Up

We still have a great deal more material for the column, but unfortunately that's all we have room for this time around.

This month we've revisited our previous discussions on propagation and highlighted a very comprehensive propagation tool, the revised Super DX EDGE for the Commodore 64. Concluding our column was a discussion of a newsletter of interest to Atari computerists, and AMTOR file transfer program, and some helpful hints on antenna and station grounds. Next month we'll have several more topics of current interest. See you then.

73, Karl, W8FX



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INFO ON AMATEUR RADIO LICENSING

The History of Communications—Part II

Telegraphy in England, Europe: Across the sea, railways, and telegraphs went hand-in-hand during the early 1800s. Railroad, the new means of transportation, could not have operated without the telegraph, the new means of communication. Circa 1840 telegraphy consisted of electromagnets deflecting needles. The English inventors of the electric telegraph, William Cooke and Charles Wheatstone, netted a fortune in royalties as steel rails and copper telegraph wires spread across the European continent. Success promptly ruined their relationship, which broke into a terminal argument as to which of them *really* invented the telegraph.

Samuel F. B. Morse Arrives on the Scene

The word *telegraph* is derived from the Greek *tele* (far) and *graphein* (to write). Fire and smoke signals are a form of *visual* telegraphy! The Greeks first signaled by placing combinations of torches representing letters of the Greek alphabet on walls. Semaphore is also a form of telegraph.

England claims to be the inventor of *electrical* telegraphy, but so does the United States. Samuel F.B. Morse, a mildly talented Massachusetts portrait painter, conceived the idea of the magnetic telegraph while returning to America from a three year visit to England in 1832 aboard the sailing ship *Sully*. He got the idea from a fellow passenger. The concept immediately fired his imagination, and he spent his leisure time working out a code of dots and dashes to carry messages over wires. Morse, penniless, did not pursue his notion for some three years.

In 1835 Morse was appointed instructor of art at New York University. With the help of a brilliant young student, Alfred Vail, Morse produced a working model of his telegraph instrument in 1836 in a factory loft in Morristown, New Jersey. His design provided for the marking of a strip of paper by a pen or pencil deflected by an electromagnet. Concentrating on the telegraph, Morse painted only one portrait after 1837.

He gradually improved his design and his now-famous Morse code was de-

vised. His first effort was simply a dictionary of commonly used words with a numerical reference. Needed were only 10 different characters, 1 through 0. Long message composition and translation delays led to the development of another code using letters.

To cut down on transmission time, Morse devised his alphabet code by assigning the simplest formats to those letters of the alphabet which were the most frequently found in the type cases of a local printer. His original version used both long and short dashes. Some dot characters had varying spacing between them. Sometimes the same dot/dash sequence was used for more than one letter! It was up to the operator at the receiving end to decide which character was correct! The code format of G and J, I and Y, S and Z all were the same! Only 5 characters never changed from Morse's original code. The letters E, H, K, N, and the number 5 are the same today as he first devised in 1838. All others were later revised.

Morse patented his device in the United States in 1840, but efforts to secure patents in England and Europe failed because of the prior applications of Wheatstone and Cooke. On March 3, 1843, after eight years of heartbreaking difficulties, Morse was granted an appropriation of \$30,000 by the U.S. Congress to build a telegraph line from Washington to Baltimore.

Miss Annie Ellsworth, the daughter of the Commissioner of Patents, brought the news of the appropriation to Morse. He was so delighted with the news that he told Miss Ellsworth that she could decide on the first message to be sent over the wires. A deeply religious young woman, she chose a passage from the bible (Numbers 23:23). The first message sent was: "What Hath God Wrought."

In 1844 Morse revised his code for a third time with a separate symbol for each letter and number. The letters A, B, D, G, I, M, S, T, U, V, and W took on the binary sequence we use today. It wasn't until 1854 that the complete Morse code we as amateurs use was fully developed.

The beauty of Morse's system was its simplicity. It was so simple that indeed we tend to take it for granted and forget that someone had to invent it. Earlier telegraph systems involved many wires and cumbersome sending and receiving apparatus. Morse produced a telegraph that needed only one wire; the earth provided the return circuit. The transmitter

was nothing more than a key to make and break the connection. By means of the dot-dash code this single key could send any character.

The first receiver Morse built consisted of a magnet-operated pen writing *jiggles* on a moving tape. It soon was discovered that the human ear could directly interpret the long and short buzzes into characters without the need for a reference dictionary, and the Morse sounder came into widespread use. The "code" survives virtually unchanged to this day.

There is a striking parallel between the histories of Morse in America and Cooke in England. Each was a bona-fide amateur, and each had to consult a professional in order to make any progress. Morse was helped by Joseph Henry, the great pioneer of electromagnetism and induction. Each translated electromagnetic impulses into ciphers—the audio American Morse and the visual "needle telegraph" Continental codes. In due time Morse and Henry became involved in quarrels over priority, exactly like Cooke and Wheatstone, a professor of physics and inventor of many electrical devices.

The Washington-Baltimore line was sold by Congress to private interests in 1847. Not until many other private companies which sprung up were consolidated in 1865 by Hiram Sibley as the Western Union Telegraph Company was there any real and rapid expansion. By 1866 Western Union owned 2,250 offices, and their original wires had extended from 500 to some 70,000 miles. One great contributing factor was the development of the telegraphic news service for the New York newspapers, which was led by the Associated Press.

International Communications

By 1850 the tentacles of the electric telegraph had spread all over England, Europe, and the more settled areas of North America. But all wires stopped at the edge of the great seas.

The first primitive underwater cable was laid across a river by a Dr. O'Shaughnessy, director of the East India Telegraphs. In 1840 Professor Wheatstone carried out experiments in Swansea Bay Wales, sending signals between a boat and a lighthouse. A little later—in 1842—Samuel Morse carried out experiments in New York Harbor sending signals through a length of rubber-insulated wire enclosed in a lead pipe. This led Morse to

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conclude, as early as 1843, that "telegraph communication may with certainty be established across the Atlantic Ocean." This was considered a fantastic statement with questionable chances of success.

During 1850 an insulated cable was laid from France to England across the channel by two brothers, Jacob and John Brett. It was nothing more than a single copper wire surrounded by a quarter inch of insulation. It was assumed that once the cable had been safely laid on the seabed nothing could happen to it and so it would need no protection. Only the shore ends were given protection by being encased by lead tubes.

There was great excitement when the cable was completely laid joining England and France. A flowery greeting from John Brett to Prince Louis Napoleon Bonaparte was drafted. Part of the message got through, but most of the message was unintelligible since the cable transmitting properties were altered, it being surrounded by a conducting medium. When the tired and rather disappointed telegraphists sat down at their instruments the next morning, the line was completely dead. A fisherman had taken part of the cable up with his trawl, cut off a piece, and showed it with triumph as a specimen of rare seaweed, *with its center filled with gold!* A second cable laid the following year was more successful and remained in operation for many years.

Once it had been determined that submarine cables were possible and economically profitable, there was a veritable rush of them. The first trans-Atlantic cable broke in 2,000 fathoms of water. A different plan in 1858 had two warships, one British and one American, meet in mid-ocean and proceed toward their prospective home ports. The cable also snapped. A third attempt was successful, and on August 5th, 1858 a total of 2,008 miles of cable had been laid. At 2:45 a.m. on that day the first telegraphic message passed across the Atlantic Ocean from Valentia, Ireland to Trinity Bay, Newfoundland.

The news of the success was delightfully received both in the United States and England. Queen Victoria telegraphed her congratulations to President James Buchanan. Less than a month after the first message was sent across the Atlantic, a telegraph operator accidentally applied 2,000 volts to the cable and the circuit was destroyed for all time.

Only after electrical telegraphy had become an important instrument of international communications did real collaboration between countries begin. Up until then messages were physically handed from one national telegraphy operator to another at their border. Next month Part III of our series will chronicle *Birth of the*

International Communication Union and Wireless Telegraphy—Mirror in the Sky.

From The Mailbag . . .

This is a monthly feature based on questions involving amateur radio licensing submitted by readers.

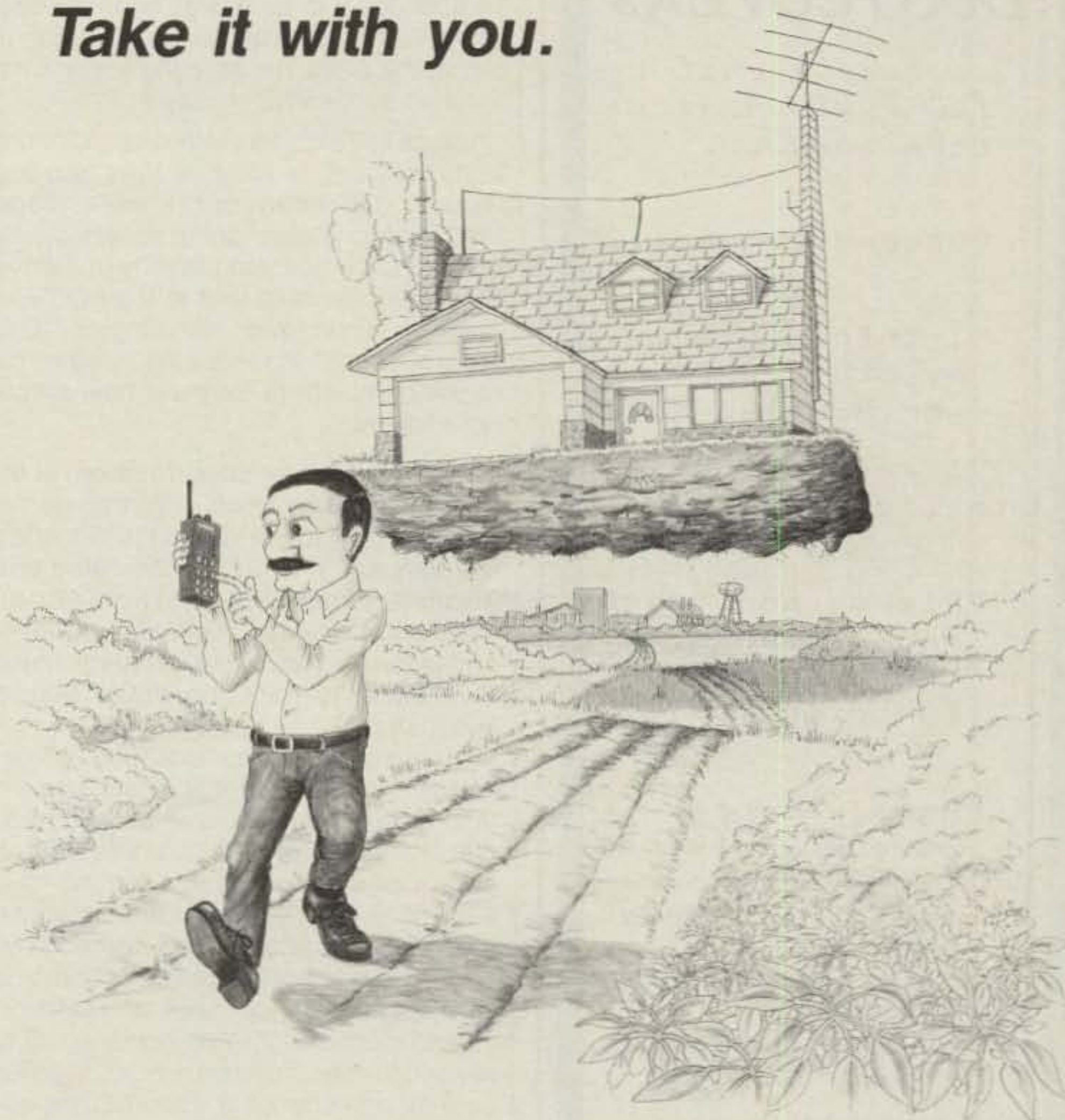
How do I know what to study for an amateur radio examination? The FCC has been turning over amateur testing to the amateur radio community in stages. It is now in the final stage. As you no doubt know, the FCC used to handle everything including amateur test question/answer development, conducting the test sessions, grading the results, and issuing amateur license upgrades. They now only *oversee* the amateur self-testing program and issue the licenses at the direction of VEC's

—Volunteer Examiner Coordinators. It has taken some five years for the FCC to get out of the amateur testing business.

Stage 1: . . . saw legislation enacted by Congress and signed into Public Law 97-259 by President Reagan in 1982 allowing the government to accept the services of volunteer examiners to administer and prepare amateur radio operator examinations.

Stage 2: During 1982 and early 1983 the FCC mounted a campaign enlisting amateur assistance in developing *banks* of questions that would form the various amateur radio examination pools. Ten times as many questions were developed as would be needed in any one examination. (There are 200 Novice questions, 500 each Technician/General and Advanced, and 400 Extra class questions. A

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CIRCLE 9 ON READER SERVICE CARD

proposal seeks to increase the Novice pool to 300 questions.)

Stage 3: The FCC adopted a Report and Order in 1983 authorizing volunteer amateur testing and, at the same time, announcing a system of regional VEC's. Volunteer Examiner Coordinators act as the link between the government and teams of three volunteer examiners. It was at this point that we (W5YI-VEC) applied to participate as a coordinator in all regions. The Novice licensing program was essentially left intact and is not a part of the newer Technician and higher class VE program.

Stage 4: VEC's were issued coordinating instructions by the FCC, and were asked to recruit volunteer examiners and develop a testing program using pool questions specified by the Commission. Later the FCC authorized the VEC to design the tests from published questions in the various FCC pools. At first VEC's supplied the answers for VE's to use. Eventually the ARRL multiple-choice answers became the defacto standard which most (but not all) VEC's used in their testing. (We initially used answers obtained from the FCC under the Freedom of Information Act.)

Stage 5: Legislation was introduced and signed into law providing for expense reimbursement. A \$4.00 amount was approved and increases were tied to annual inflation. Currently a \$4.37 figure is authorized, although most VEC's charge \$4.35 since it is an easier figure to deal with. With expense reimbursement in place, the ARRL became the second national-in-scope VEC on July 21, 1984.

Stage 6: VEC's found that coordinating tests was not as easy as they had first thought and many errors were made. VEC conferences (training sessions) held at the FCC's licensing facility in Gettysburg, Pennsylvania and at the FCC's offices in downtown Washington, D.C. were successful in reducing these errors to the point where they are now almost nonexistent.

Stage 7: Maintenance (revision) of the various question pools was transferred from the FCC to the various VEC's effective January 1, 1987. At the same time Volunteer Examiners (VE's) were also authorized to design individual written examinations—that is, to *properly* select the questions from the VEC's pool of questions.

Now to answer your question. While it is true that the potential exists for each VEC organization to have different pool questions, it is doubtful that this will happen. Coordinators, representing over 90% of all examinations administered in the Amateur Radio Service, agreed at the 1986 VEC Conference that only one Amateur Radio Service pool of questions should exist and that no pools would be revised further until January 30, 1988 (except for rule changes). The FCC has sent out a Public Notice stating that they "... expect all VEC's to honor the agreements made at the 1986 Conference of VEC's concerning use of the existing examination questions ..."

The answers to the pool questions (and the Morse code tests) are the responsibility of the volunteer examiner. It is anticipated, however, that all VE's will utilize answers provided by their VEC. *They are not required to.* At this point any nationally distributed license preparation material should suffice, providing it was published for the 1986-87 question sets. We

distribute all of them. (Send an SASE for a list.)

Starting next year the various question pools will again be revised. Just what the revision schedule will be is unknown at present, since the various VEC's have not collectively agreed on this yet. We will keep you posted.

What should I do if I suspect test fraud? I would notify the coordinating VEC of the facts that have come to your attention. The FCC has instituted a new policy on examination irregularities. Basically, it empowers the VEC to investigate the situation and to take any required action. The VEC has the authority to invalidate the examination results of any candidate, or the entire test session if necessary. This is administratively handled in one of three ways by the VEC.

If the VEC still has the application and paperwork, the VEC advises the applicant that in accordance with their obligations to the FCC, the examination cannot be certified to result in an upgrade. The VEC can declare that examination void, in which case the application is not forwarded to the FCC in Gettysburg for license issuance because the VEC does not have confidence in it. Any issued Certificate of Successful Completion is recovered from the applicant.

If the application has already been sent to the Commission and an examination irregularity comes to the VEC's attention, then the FCC in Gettysburg, Pennsylvania is notified by the VEC and the application recovered and upgrade rescinded. A license can only be set aside during the 30 days following issue.

The final phase is if an amateur license has already been issued and an irregularity is discovered. Retesting will not necessarily be the routine response, although it could be if the FCC decided to. Unless the irregularity amounts to *provable* fraud or other cause for which the FCC would revoke a license, the VEC would take other steps such as removing the accreditation of the VE testing team. No VEC is required to accredit anyone, and accreditation can be removed for any reason—or even for no reason.

Can non-citizens be FCC Volunteer Examiners? Yes, they can. There is no rule that VE's need be American citizens. They must be FCC licensees, of course, and meet other volunteer examiner qualifications. We have a British accredited volunteer examiner who participates in RSGB (Radio Society of Great Britain) examination sessions. U.K. amateurs need FCC issued licenses if they intend to operate in the 146-148 MHz 2 meter subband while in the U.S. This is because FCC rules prohibit U.S. *reciprocal* amateur operation on any spectrum that is not authorized for amateur operation in a foreigner's own country. (146-148 MHz is allocated to the Fixed and Mobile Services in the United Kingdom.)

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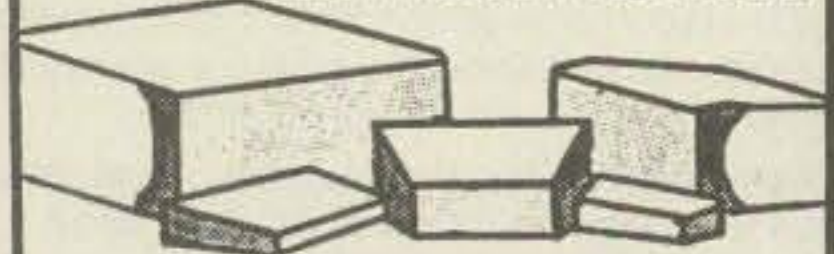
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CIRCLE 49 ON READER SERVICE CARD

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Getting Started—Part IV

This is the fourth part of an eight-part article that is intended 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.

Stacking Equipment

New amateurs often stack their station equipment into one pile. This approach may look impressive, but it is a poor way to arrange a station. For one thing, equipment cooling is reduced when hot units are stacked on top of each other. A more important argument against stacking is that it is more difficult to use equipment that is not set down on the surface of the operating position. It is particularly important to have receiver controls down where they can be used without lifting your arm off the table. Receiver controls are used much more often than the controls on the rest of the station equipment. In addition to locating all gear at the level of the operating surface and positioning everything within easy reach, it is also helpful to tilt each unit up in front to provide improved viewing of controls, meters, and dials. Some equipment has lifters (bails) installed to tilt up the front panel, but you usually have to customize your installation to obtain good front-panel visibility.

If you are right-handed, it's best to position the transceiver to your left. This leaves your right hand free to use your telegraph key, and you can very comfortably control the transceiver with your left hand.

Custom Console

Some amateurs customize their stations by building operating consoles to house their equipment. I have seen some very well-made station consoles, but I have never seen one that is as pleasant to use as when the gear is set on the operating surface of a table or desk. One problem related to customized station consoles is that amateurs do change equipment, and it can be a major job to revise a custom console to house different equip-



This is Wenjie Yan at the operating position of BY4AA in Shanghai, China. He was a shortwave listener. He became interested in amateur radio when he wrote an article about the Shanghai Amateur Radio Station (BY4AA) for the 16 October 1984 issue of the China Daily, the only English language newspaper published in China. He uses Bill as his name during on-the-air contacts. Bill is a 25-year-old teacher of English Writing at Fudan University in Shanghai. The station includes a Kenwood TS-930 transceiver, 200 watt linear amplifier, and a 7-element Yagi-Uda antenna mounted atop a 3-story building. We just sent Bill an assortment of training materials which he requested to help promote amateur radio among Chinese teachers and students.

ment. I have noticed that very few custom consoles provide adequate cooling, which causes installed gear to run hotter than is necessary. It is also easier to make (and change) rear apron connections on equipment that is not mounted in a console. The major point against installing equipment in a customized console is that it is harder to use. Operating comfort and ease are important factors that can contribute to successful and satisfying operating results.

Safety

Be sure you install a completely safe station. If you use a receiver and transmitter combination, do not leave the antenna changeover voltage (usually 115 VAC) exposed at relay coil terminals. Tape over (or otherwise cover) all exposed points that may present an electrical hazard to your family, pets, or yourself. Children and pets are naturally curious, and it is up to you to make it impossi-

ble for them to receive an electric shock from anything external to your equipment. One side of the keying lead is usually connected to the chassis (ground) of the transmitter, and this wire should be attached to the terminal that connects to the base of the key. The ground lead connects to the barrel of the key plug, and it is easy to trace keying leads to make sure the transmitter chassis is connected to the base of the key. Erect your antennas so that they cannot come in contact with electric power lines if they do come down. It is a good idea to take a first aid course to learn how to help anyone who suffers an electric shock. The April 1983 Novice column is about electric shock.

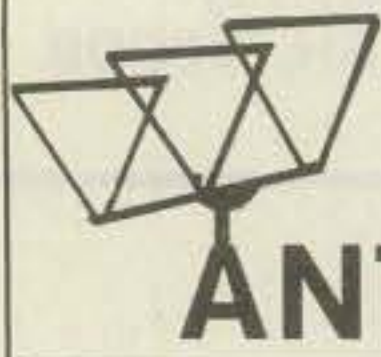
Electric Power

The electric power requirements of most initial amateur radio stations are not high. One can normally plug gear into nearby house power sockets and have no problem sharing a circuit with household electrical and electronic devices.

If you want to customize your station's electric power input, there are several good power-line strips available which allow you to power all your station equipment through a separate fuse, and include a switch used to turn all station power on or off at once. These power strips use a single plug connection to the house electric power wall socket. Several AC power receptacles are mounted on the strip, and station equipment AC power cords are plugged into these strip receptacles. An indicator lamp is usually included in these strips to indicate whether power is, or is not, available at its outlets. It is not necessary to install this type of electric power input control in a station, but many amateurs like to add this feature. When using one of these strips, it is common practice to leave all required equipment power switches in the on position at all times, and to simply turn the whole station on and off with the switch on the power-line strip. Use of a strip also minimizes the messy appearance related to many power cords extended to remote wall sockets. It is certainly better to install a power strip than to use extension cords and cube taps (multiple outlets), neither of which is safe to use.

The March 1985 Novice column covers electric power for fixed amateur radio stations, and it covers this subject in detail. Electrical ground fault interrupters

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are mentioned in the August 1986 Novice column.

RF Ground

It is important to establish an excellent RF ground for your station, and this is the one thing I usually find lacking in new stations. Grounding has been covered very well in the September through November 1978 Novice columns. This article just mentions a few major facts that you should know.

Do not assume that you have an adequate station ground simply because you have connected a large-diameter wire between your equipment and some assumed ground point, such as the electric power ground or a cold-water pipe. Suitable RF grounds seldom exist where they are needed, and one usually has to be carefully established for each station. Your home's electric power ground can be more than adequate at the 60 Hertz house power frequency, and still be very poor at the much higher frequencies you will be operating. House power electrical grounds are occasionally found to provide an adequate RF ground, but this seldom occurs.

Some amateurs greatly overrate the RF grounding capability at cold-water pipes. Even if your house has good metal piping, it very seldom provides an ade-

quate RF ground. When a station ground is attached to a cold-water pipe (usually with a C-clamp), just that one section of pipe is normally trying to function as the RF ground, because each pipe is quite well insulated from the rest of the pipes and fittings by sealant and dirt at each joint. A lot of water pipes are made of materials that are not good conductors of RF. Good RF grounds can be obtained by soldering or clamping a suitable ground line to copper tubing used to supply water to lawn sprinklers. There should be no water in it when a ground lead is soldered to such a copper tubing.

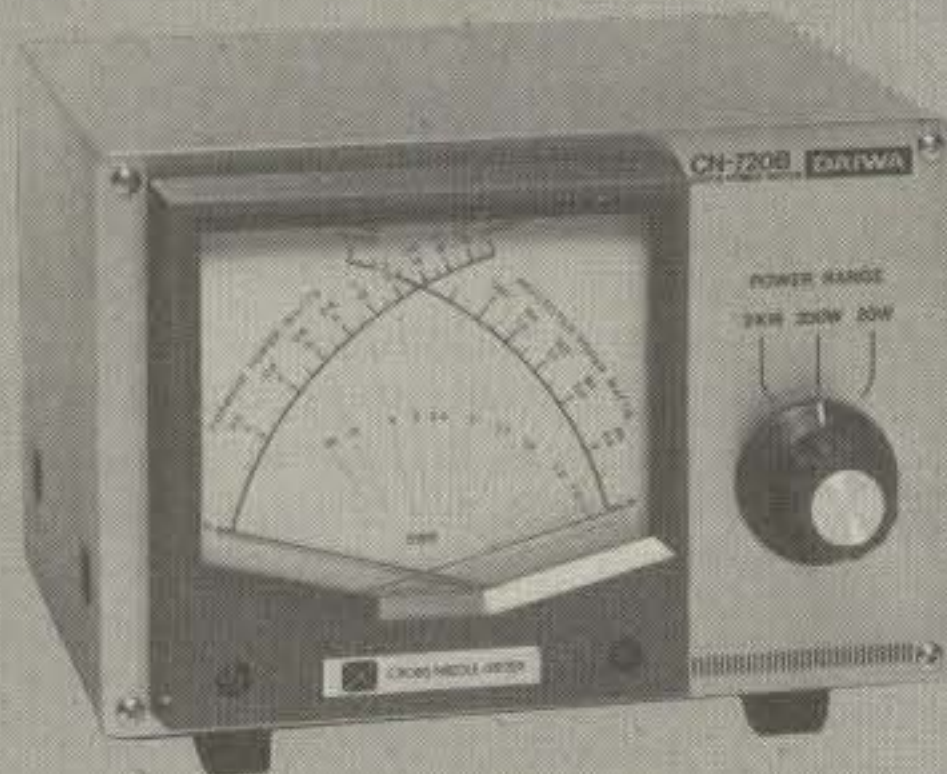
It can be effective to bury pairs of quarter-wave dipoles in the ground to function as an RF ground. This amounts to burying a dipole antenna for each band to be operated. This system requires more space than most amateurs have available. It is usually easy to cut slits in a lawn for burying wires.

The majority of amateurs find that the simplest way to establish an RF ground is to install about an 8 foot long ground rod as close as possible to where the equipment is to be operated. However, those of us who live in poor ground areas have to work to establish good RF grounds. Use a heavy-duty ($\frac{3}{8}$ inch diameter minimum) ground rod with a steel center (for mechanical strength) and an outer copper coating (for electrical conductivity). Make the area where the ground rod is to be installed electrically conductive with table salt, or some similar material.

Once the RF ground has been established, use a piece of heavy-duty ground braid to interconnect the ground post (chassis) of the transmitter (or transceiver) to the RF ground. A piece of wire that is electrically a quarter-wavelength long can act like an insulator; consequently, no size of wire can be depended upon to function properly as an RF ground line at all frequencies related to the operation of an amateur radio station. It is best to use ground braid for all ground connections, and all other station equipment should be connected to the transmitter (or transceiver) ground post, where the external station ground is attached. Good ground braid is not cheap, and one way to get it at a lower cost is to strip the shield off old (scrap) coaxial cable. It is easy to strip shielding off scrap coax. Just use a razor blade (or a sharp knife) to slice the outer protective jacket of unarmored coax and the jacket can then be pulled off very easily. Then just loosen the shield off the inner conductor by bunching (pushing) it from one end towards the other end. It is easy to strip up to 100 feet of coax at a time, and the removed shield serves as an excellent ground line.

Ground braid can be purchased from electronic distributors, but the cost is high. The best way to make ground-braid connections is to flatten out one end of the ground braid and to open up an at-

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tachment hole (with a pencil or similar object) to fit the associated ground lug or screw. Once the correct size hole has been made in the end of the ground braid, solder the area around this hole using a heavy-duty soldering iron or gun. The soldered braid end, with the attachment hole, provides a very good electrical and mechanical connection. Station equipment must be connected to a single good ground point to eliminate any possibility of electric shock hazards existing between different pieces of gear. A good RF ground also provides improved station performance. As an example, your transmitter and receiver circuits bypass many kinds of energy to the chassis, and an RF ground is required to hold the chassis at (or close to) a zero voltage potential.

A quick check of the effectiveness of your station ground can be performed once your rig is set up. With the transmitter loaded to the antenna, and the key closed in code mode, observe the final RF amplifier collector (or plate) current as you touch the transceiver's bare chassis with one finger. If this current does not vary when you touch the bare metal, dampen the finger with saliva and repeat the check. If no current change is observed, and no RF heating is felt, the station ground is acceptable. If either occurs, the station ground needs to be im-

proved. This check should be conducted near the low and high end of each band with each appropriate antenna.

This concludes the fourth part of this eight-part article. The fifth part covers antennas.

Printed Aids

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

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

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 at \$2.00 each from John W. Spence, 465 Creekwood Drive, Silsbee, TX 77656.

HW-8 Handbook

The second edition of *The Hot Water Handbook* is available from Michael Bryce, WB8VGE, 2225 Mayflower N.W., Massillon, OH 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. A list of my licensing program printed aids will be sent to anyone who requests it and supplies the usual SASE.



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from 1300-2300Z. Active duty, reserve, and retired military personnel will combine efforts. Plans call for operation on SSB at 7.230 MHz, 14.280 MHz, and 21.370 MHz (± 10 kHz). CW frequencies will be 21.145 and 28.145 MHz. Two-meter frequency will be 146.52 simplex. Operation will hopefully be continuous on all bands, but check all frequencies to be sure. Special certificates will be available to those who work W4ODR (no SASE required). Calls not in the Callbook should QSL to Military Club Station W4ODR, P.O. Box 54278, Naval Air Station Memphis, Millington, TN 38054, providing frequency and contact number. Special attention given to those hams stationed at Millington over the years. For more information, contact Station Custodian, Senior Chief Petty Officer Bob Donan, KA4FAL, (901) 872-2007.

• **St. Joseph County ARPSA**—On May 16 the St. Joseph County ARPSA will be operating a special event station from Centreville, Michigan from 1200-2400Z to celebrate Michigan's Sesquicentennial Birthday using members' stations and call signs. Frequencies will be 3.930, 7.230, 14.250, 21.350, and 28.550. To receive a certificate, send QSL and SASE to Lynn Norris, KB8AET, 535 E. Main St., Burr Oak, MI 49030.

• **Armed Forces Day 1987**—The annual Armed Forces Day Communication Test is set for Saturday, May 16 and marks the 38th anniversary of this event which emphasizes a continuing climate of mutual assistance and esteem between the military and amateur radio communities. The traditional military-to-amateur cross band operation and broadcast of the Secretary of Defense message are the featured highlights and include operations in CW, SSB, and RTTY. Special commemorative QSL cards will be awarded to those amateur radio operators achieving a verified two-way radio contact with any of the participating military radio stations. Interception of these contacts by SWLs are not acknowledged by QSL cards. However, anyone who receives and accurately copies the Armed Forces Day CW and/or RTTY message from the Secretary of Defense can qualify to receive a special commemorative certificate from the Secretary. For more information, contact Arthur R. Delperdang, Chief, Navy-Marine Corps MARS, Naval Communication Unit, Washington, DC 20390-5161.

• **KABAWS Special Event Station**—The ham radio operators of Union Electric Co. will operate KA0AWS on May 17 from 1900-2400 UTC to commemorate the many years of operation by the Page District Works Headquarters. Frequencies will be 3.950, 7.230, and 14.235 \pm QRM. For a 8½" x 11" certificate, send an SASE (9" x 12" envelope and \$.39 postage) with your log number to KA0AWS, 241 Tapesstry Dr., St. Louis, MO 63129.

• **Abegweit Award Day**—The Prince Edward Island ARA will sponsor the Abegweit Award Day on May 17 from Prince Edward Island on CW 21.100, 14.050, 7.100, 3.700; and SSB 21.300, 14.250, 7.200, 3.800 from 1200-0000 UTC. VE1 and VO1 stations must confirm contacts with all three counties (Prince, Queens, and

Kings). All other VEs and US amateurs must confirm contacts with any three PEI stations, regardless of the county. All amateurs other than continental US and Canada must confirm contacts with any two PEI stations. Any Island contacts after January 1, 1960 are also valid for the award (must have QSL card). For May 17th only a copy of the log is required (certified by two other amateurs). . . . To receive the award send log copy and \$2.00 or 10 IRC's to P.O. Box 1232, Charlottetown, PEI, Canada C1A 7M8. For more information, contact VE1CIK, Dave Smith, Box 529, Kensington, PEI, Canada C0B 1M0 (902-836-4246 after 2200 UTC).

• **Carroll County, Maryland**—The Carroll County ARC will operate K3PZN May 23, 24, 30 from 1300-0100Z, and May 31 from 1300-1900Z in celebration of Carroll County's Sesquicentennial. Operations will be in the lower 50 kHz of the General phone bands. For an 8½" x 11" certificate, send QSL and SASE to Carroll County ARC, P.O. Box 2099, Westminster, MD 21157.

• **Old Barney ARC Special Event**—To commemorate the 75th anniversary of the building of the Tuckerton Wireless Tower, New Jersey. Call used will be KT2W. Operation will be from 0001Z May 23 through 2359Z May 24 on CW 160-10 meters, 50 kHz up in the CW bands; phone 1850, 3890, 7250, 14280, 21380, 28480, 144.220, 146.52, and local repeaters. For a special QSL send SASE via KT2W.

• **W6SG From Marin County**—The Marin County, California ARC will operate W6SG from 1500 UTC May 24 to 0300 UTC May 25 to commemorate the 50th anniversary of the Golden Gate Bridge. Suggested frequencies are CW 3700, 7100, 14050, 21100; phone 3900, 7250, 14275, 21350 (\pm QRM and interest). For a special QSL, send a #10 business-size SASE and contact to MARC, P.O. Box 1231, San Rafael, CA 94901.

• **Morse Special Event**—On May 24-25 will be the commemoration of Samuel F.B. Morse's message "What hath God wrought" from North Freedom, Wisconsin sponsored by the Morse Telegraph Club, Inc. from 1500-2300Z. Frequencies will be CW only 44 kHz (\pm QRM) up from the low end of CW bands 80-10 meters. Call used will be AD9E. Send QSL and SASE to R.L. King, KA9GNY, 411 Lynn Ave., Baraboo, WI 53913.

• **Charleston, South Carolina**—The Trident Amateur Radio Club will operate N4EE to commemorate the Piccolo Spoleto Festival. Frequencies: SSB 7.249, 14.240, 21.340; CW 7.120, 21.120. Times and dates 23-24 and 30-31 May. Certificate for QSL and large SASE (39¢ postage) to TARC Special Event Station, P.O. Box 73, Summerville, SC 29484-0073. SWL reports welcome.

• **Alamance ARC K40G**—The Alamance ARC will operate K40G on May 30-31 from the 12th annual Fiddler's picnic at the Alamance County historic museum. Operation will be on 40 meters SSB around 7.250, on May 30 from 1430-

(continued on p. 88)

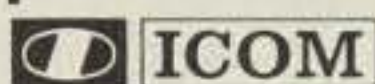
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1000 watts	1000H	1000A	1000B	1000C	1000D	1000E
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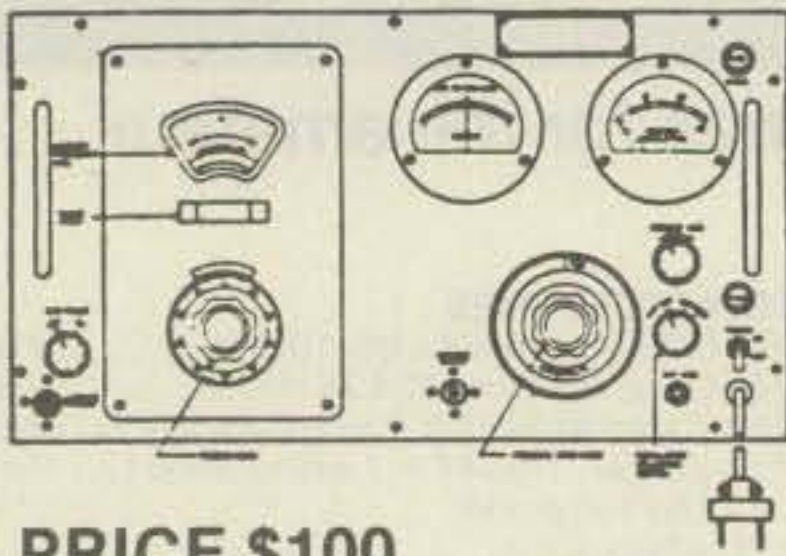
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*The following hamfests, etc., are slated for May:

May 1-3, **Fresno ARC Hamfest**, Fresno Airport Holiday Inn, Fresno, CA. Contact Glen T. Caine, Fresno ARC, P.O. Box 783, Fresno, CA 93712 (209-292-4611).

May 1-3, **Cochise ARA Hamfest**, Sierra Vista, AZ. Contact Don Morgain, W7ACI, 602-458-5293, or CARA, P.O. Box 1855, Sierra Vista, AZ 85636.

May 2, **Cedarburg Swapfest**, Cedarburg, WI. Contact 1986 ORC Swapfest, 101 E. Clay St., Saukville, WI 53080 (SASE), or call 414-284-3271.

May 2, **Bemidji ARC Hamfest**, Bemidji, MN. Contact Bemidji ARC, P.O. Box 524, Bemidji, MN 56601 (218-751-7920).

May 2, **Northwest Arkansas ARC Hamfest**, Rogers, AR. Contact Roy Milliren, AF5W, 2014 S. 16th St., Rogers, AR 72756 (501-636-6750).

May 2, **Southern Tier Hamfest**, Owego, NY. Contact STARC, P.O. Box 7082, Endicott, NY 13760 (SASE).

May 2-3, **Greenville Hamfest**, Greenville, SC. Contact Blue Ridge ARS, P.O. Box 6751, Greenville, SC 29606 (SASE).

May 2-3, **Baton Rouge ARC Hamfest 50**, Baton Rouge, LA. Contact Rick Pourciau, NV5A, 879 Castle Kirk Dr., Baton Rouge, LA 70808 (SASE).

May 3, **DeKalb Hamfest**, Sandwich, IL. Contact KARC, Box 264, Sycamore, IL 60178.

May 3, **Delaware County ARA Hamfest**, Drexel Hill, PA. Contact Hamfest, DCARA, P.O. Box 236, Springfield, PA 19064, or contact N3DLG at 215-535-1616.

May 3, **Suffolk County Radio Club Electronic Flea-market**, Melville, LI, NY. Contact Bill Sullivan, N2ETG, 516-689-9871 (evenings).

May 3, **Moultrie ARK Hamfest**, Moultrie County 4-H Fairgrounds 5 miles east of Sullivan, IL. Contact MARK, P.O. Box 79, Sullivan, IL 61951, or call K9SWY at 217-728-7596.

May 3, **Tri-County Radio Assn. Hamfest/Flea-market**, Stirling, NJ. Contact Dick Franklin, W2EUF, 201-232-5955, or write to P.O. Box 182, Westfield, NJ 07090.

May 3, **Lynchburg ARC Swapfest**, Lynchburg, VA. Contact Lynchburg ARC, P.O. Box 4242, Lynchburg, VA 24502.

May 3, **Tri-County Radio Assn. Hamfest/Flea-market**, Stirling, NJ. Contact TCRA, P.O. Box 412, Scotch Plains, NJ 07076.

May 9, **Cherryville Repeater Assn. Hamfest**, Flemington, NJ. Contact Bill Inkrote, K2NJ, 201-788-4080.

May 10, **Medina County Hamfest**, Medina, OH. Contact Medina Hamfest Committee, P.O. Box 452, Medina, OH 44256.

May 15-17, **Green County Hamfest**, Broken Arrow, OK. Contact Ron Gamel, N5WX, 918-663-0385, or Green County Hamfest, P.O. Box 4970, Tulsa, OK 74159.

May 16, **Pikes Peak Radio Amateur Assn. Swapfest**, Colorado Springs, CO. Contact Al, N0CMW, 303-473-1660, or PPRAA Swapfest, P.O. Box 16521, Colorado Springs, CO 80935.

May 16, **RI Amateur FM Repeater Service Flea-market & Auction**, Woonsocket, RI. Contact Rick

Fairweather, K1KYI, Box 591, Harrisville, RI 02830 (401-568-0566, 7-9 pm).

May 16, **Wexaukee ARA Swap Shop**, Cadillac, MI. Contact Wexaukee ARA, P.O. Box 163, Cadillac, MI 49601, or call KX8Z at 616-797-5491.

May 16-17, **Central Washington State Hamfest**, Yakima, WA. Contact Yakima ARC, P.O. Box 9211, Yakima, WA 98909.

May 17, **Knox County Hamfest**, Knoxville, IL. Contact Keith L. Watson, WB9KHL, 119 S. Cherry St. #3, Galesburg, IL 61401-4527 (309-342-3885 evenings).

May 17, **LIMARC/ARRL Long Island Hamfair**, Old Westbury, LI, NY. Contact Hank Wener, WB2ALW, 516-484-4322 (evenings).

May 17, **Northern Berkshire ARC Flea-market**, Dalton, MA. Call 413-458-8452 days, or 413-458-8267 evenings, or write to the Northern Berkshire ARC, P.O. Box 591, Williamstown, MA 01267.

May 17, **OBRA Computer & Hamfest**, Old Bridge, NJ. Contact N2DHN, 50 Harrison Pl., Parlin, NJ 08859 (201-727-1769).

May 17, **Kankakee Hamfest**, Kankakee, IL. Contact Frank DalCanton, KA9PWW, RR1 Box 361, Chebanse, IL 60922.

May 17, **Bluefield Hamfest**, Bluefield, VA. Contact Don Williams, WA4K, 412 Ridgeway Dr., Bluefield, VA 24605.

May 17, **Chicago ARC Mini-Hamfest**, Chicago, IL. Contact Chicago ARC, 545-3622.

May 17, **Warminster ARC Hamfest**, Wrightstown, PA. Contact Frank Charlton, KA3FBP, 1479 Kingsley Dr., Warminster, PA 18974 (215-675-2549).

May 17, **Athens County ARA Hamfest**, Athens, OH. Contact Carl J. Denbow, KA8JXG, 63 Morris Ave., Athens, OH 45701.

May 17, **Portage ARC Hamfair**, Randolph, OH. Contact Joanne Solack, KJ3O/8, 9971 Diagonal Rd., Mantua, OH 44255 (216-274-8240).

May 17, **Southington ARA Flea-market**, Southington, CT. Contact Chet, KA1ILH, 628-9346, 5-9 pm).

May 22-23, **Down East Flea-market '87**, Halifax, Nova Scotia, Canada. Contact Jack Guilfoyle, VE1OU, 6339 Almond St., Halifax, NS B3L 1V4 Canada.

May 24, **Quebec Provincial Hamfest**, Tracy, Quebec, Canada. Contact Sorel-Tracy ARC, P.O. Box 533, Sorel, QC J3P 5N6, Canada.

May 24, **Maryland FM Assn. Hamfest**, West Friendship, MD. Contact Jim Clifford, N3FBV, 7461 Terry St., Ft. Meade, MD 20755 (301-674-4752).

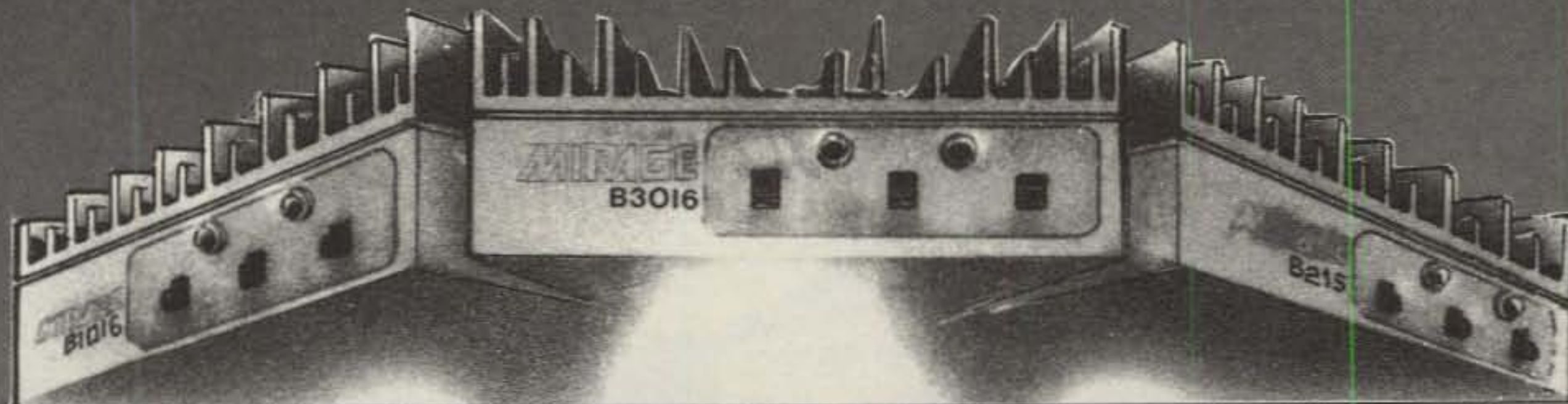
May 29-31, **Hamboree #9**, So. Sioux City, NE. Contact Al Smith, W0PEX, 3529 Douglas St., Sioux City, IA 51104.

May 30, **Skaneateles Ham & Computer Fest**, Skaneateles, NY. Contact Hank Bryant 315-685-7658, or Skaneateles Hamfest, 49 Elizabeth St., Skaneateles, NY 13152.

May 30, **Central Michigan ARA Hamfest**, Midland, MI. Contact CMARA Hamfest, P.O. Box 67, Midland, MI 48640 (SASE), or call 517-631-9228 (evenings and weekends).

May 31, **NARL Hamfest/Flea-market**, Newington, CT. Contact Les Andrew, KA1KRP, 23 Grove St., West Hartford, CT 06110 (SASE) (203-523-0453).

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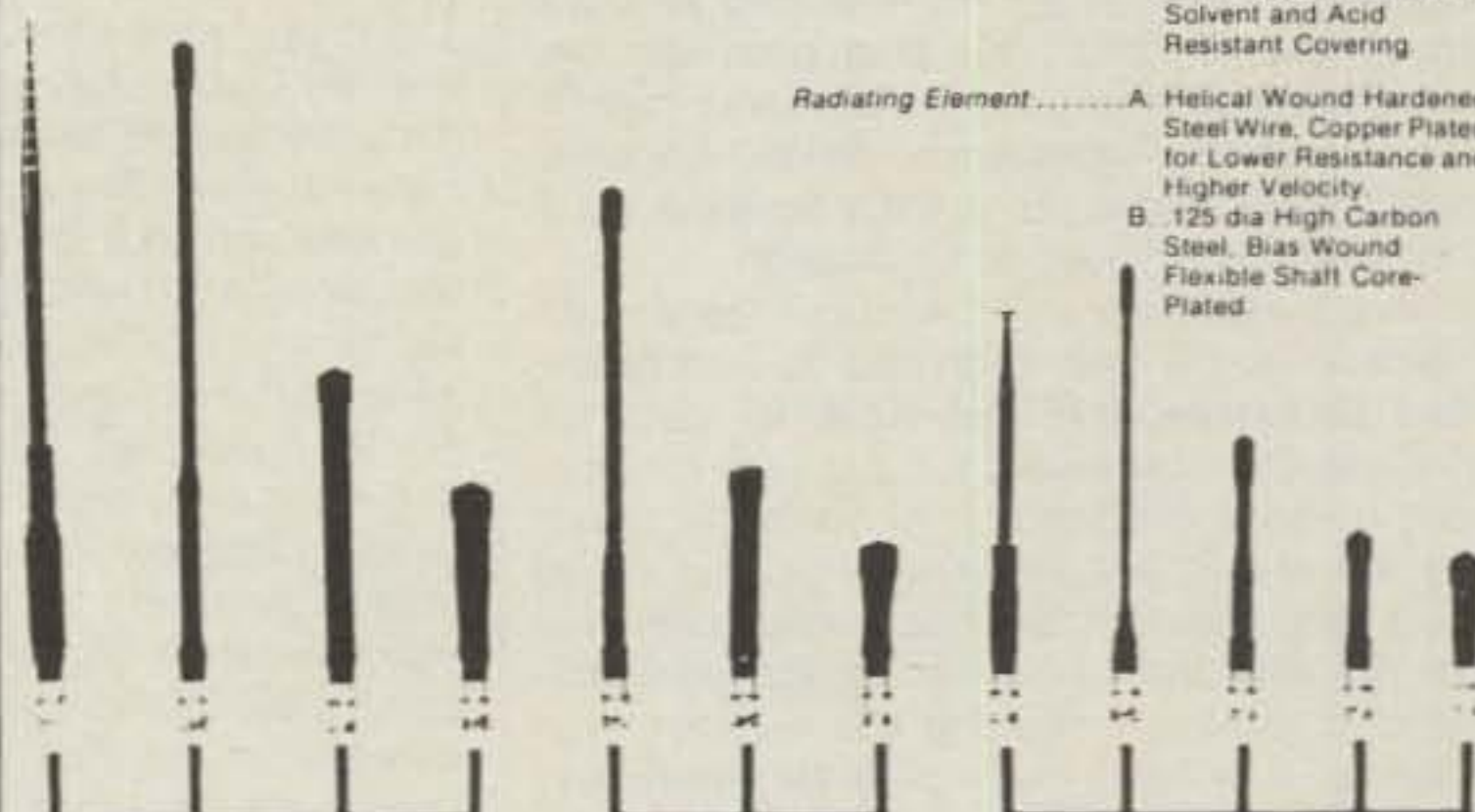
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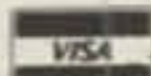
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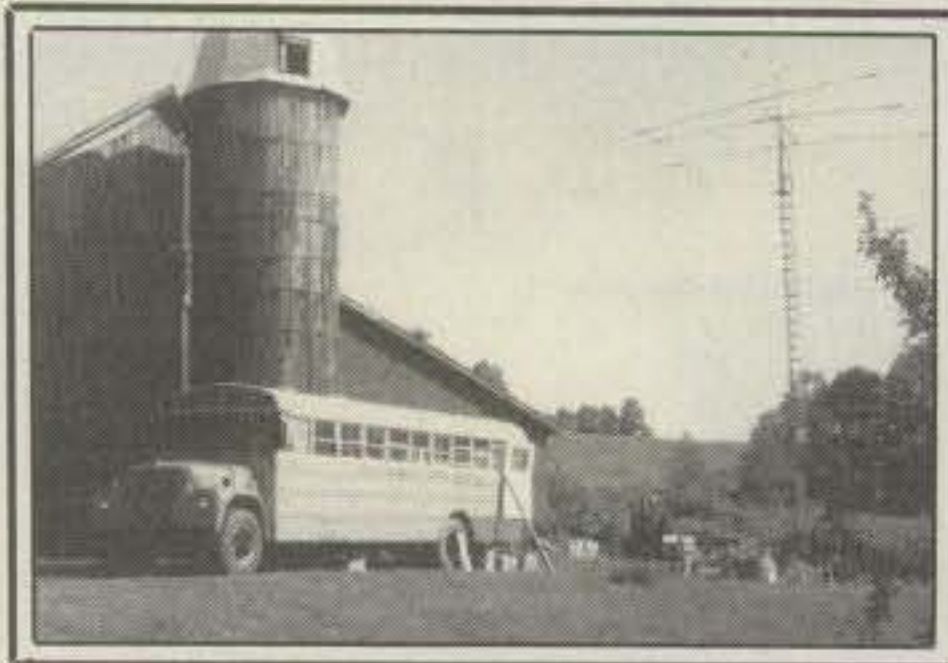
QRP Field Day 1986 Results—Part II

This month we continue reports of the 1986 Field Day results, including the club category.

Veteran QPRer **Leo Delaney, KC5EV**, drove up from Texas in his pickup to the Dayton QRP bash at the end of April, and then on up to New England where he teamed up with **John Collins, KN1H**, last year's One Watt Trophy winner, for a somewhat disappointing outing. John reports: "Leo made his first trip to Vermont and we set up on the top of Mt. Ascutney with absolutely no plan in mind. [Ed: Really???] I brought my Argosy along with visions of an all-out full 5 watt assault on the ether, and Leo, somewhat dazed by the altitude and the line-of-sight-to-everywhere view, started setting up the killer antenna—3 longwires spaced 120 degrees. Within 30 minutes I was headed down the mountain to get the old reliable Argonaut because the Argosy wouldn't stay on any one frequency (PTO trouble as it turned out). We finally got KN1H on the air as the afternoon waned, running 1 watt from the Argo into a G5RV at 50 ft. and 4 watts from a TS130V into the monster longwires. It became apparent that we were in serious antenna trouble. The G5RV was just too low for an effective radiation angle from our altitude. Only the weakest stations would respond to our calls. We were shooting right over the heads of the close-in stations that we were hearing the loudest. This made for a terrific QRM problem in copying the stations we could work. Unfortunately, we'd only brought 50 ft. of feedline, so all hopes rested on the longwire array. Leo was having a super time tuning up the wires, both singly and as V-beams, but the results were pretty much the same as with the G5RV. Sometime in the middle of Sunday morning Leo found a combination of wires and ground that at last got some results on 40 meters and saved us from total disgrace, but it was too late. We had already been beaten by our own lack of understanding. But wait till next year! We're armed with the knowledge of Field Days past now, and the new improved killer antenna just can't miss!" Good learning experience, fellas. Readers note: (1) rig failure, (2) no extra feedline, (3) a "killer antenna" nullified by location.

I've saved the two "adventure" stories by 5 watters for the end. Each has its own flavor. **Paul Zimmerman, NY5T (ex-WD5BRR)**, gets the Trauma-Survival Award for this year for obvious reasons. He reports: "I couldn't make it back to Alabama this year, so I thought it would be a good idea to find a local back-up location for FD. And find it I did—a mothballed underground salt-dome storage site teeming with nice tall structures made of girders and cross beams just begging for a rope. Had a bit of adventure at this point, however. While climbing up one of those structures I put my head into a wasps' nest which was hidden in the shad-

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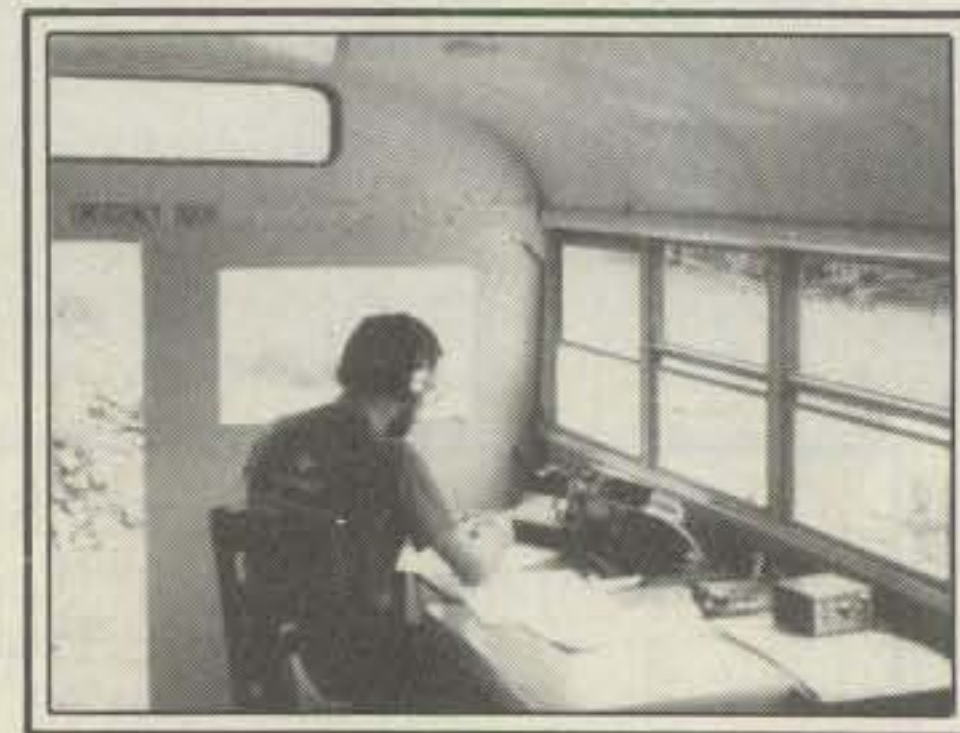


The picture postcard (wish you could see it in color) location of the Walton Radio Association with the 3-element Yagi in place at about 30 ft. The function of the nylon line dropping from the left end of element 1 was not specified—manual rotator? The pair of dipoles fed with 72 ohm open line are mounted at one end on the top of the silo. Paul, W2TFL, notes: "After operating FD from one place for 22 years, we had to find another spot this year. We were fortunate that one of the hams has a farm, so we moved to this spot. When you go to a new location, the antenna setup is a gamble." This one looks like a pretty good bet to me!

owed portion of an I-beam! I'll bet you didn't know that human beings could fly! All I remember is leaping from about 12 ft. up, hitting the ground at a dead run, and covering about 100 ft. of ground so fast that I couldn't figure out how I had gotten there! And with three direct hits on the temple and two behind the left ear, I got proof positive that I'm not allergic to wasp stings! Did that stop a true QRP'er? Certainly not. I went on to beat last year's QSOs total and score, learn a few things, and have a great time in general. I used the same rig as last year—the HW-9, HFT-9 transmatch, and the 134 ft. doublet center-fed with poly open-wire line. My 20A/hr. gelcell laid down on me prematurely, but no sweat, as I had brought two 5A/hr. spares. The antenna was up 55 ft. on one end and 30 ft. on the other and reception was excellent. I was very glad that water-tight shelter was available at the site since it rained all day Saturday and most of Sunday." Paul offers the following: "To call CQ FD or not to call—that is the question." I think this will have been my last year to use the 'hunt and pounce' approach. I tried a few CQs this go-around, just out of curiosity. Sometimes I got a short string going (say, four to six replies in a row) and at other times, no dice. My conclusion is that I need a gain antenna (at least on 20 meters) and a game plan based on 'CQ FD.' Even in a non-rotatable configuration aimed at the northeast, it would be a big boost in QSOs. So, my goal for the interim will be to come up with a 20 meter antenna that is light, portable, and can be put up 30 ft. or so without an in-ground support. I will then concentrate on 20, trying to



KA2HDO, K2GUW, and W2TFL of the Walton gang preparing the bow and arrow with line for another shot at stringing up an antenna. This is the only published photo of someone actually using the bow and arrow technique.



KU2O of the Walton group at the operating position located in the spacious interior of an old school bus that the group requisitioned.



Steve Gibson, WB4NBI, and N4KEZ set up on the Chesapeake Bay. That's N4KEZ racking up points with the Argosy feeding open-line to the antenna. It could have been an ideal spot, but as Steve reports: "Aside from the heat, the black flies and mosquitos, and a very rainy squall that went through in a hurry and few assorted thunderstorms, it was an interesting experience. We tested several wire antennas without any definite conclusions as to which was best. But we did decide that the 20 meter beam will come down off the roof next year and be transported to the mountains. We may not have as good a ground, but we will have a little more height!"

run strings as long as possible before a QRO station steals my frequency!" This approach just might work. One thing to bear in mind is propagation (again!). On 20 meters a strong station may be quite weak in the area favored by your antenna and skip. It'll be necessary to find the quiet holes for calling not based on incoming signal strengths, but on a seat-of-pants assessment of frequency occupancy and probable skip ranges of competitors.

And finally, **Mary Lou Brown, NM7N**, certainly deserves the QRP Persistence Award this year (and for several past years!). OM Bob, NM7M, stayed at home to mind the ranch while Mary Lou set out in search of FD adventure with companion Fred the dog. Mary Lou recollects: "I had located a spot in the eastern Cascades that looked like a great FD site. Red Top Mountain has an old lookout tower (abandoned) and has an exposed ridge just before the end of the road. There were even three camp sites. I left home Friday morning in the company of Fred, my four-legged canine protector, and arrived on Red Top Mountain in early afternoon and set up my station to test it out. After a couple of good QSOs and favorable signal reports I went for a before-dinner exploratory hike of the area. If permission could be obtained, the old lookout tower seemed like an ideal place. It even had an antenna mast attached. However, I'd have to carry gear uphill for about a half-mile on a steep trail. I went to bed early, as I planned to dismantle everything and be ready to start setting up again at 1800Z. However, I awakened about 0600 local time to the tune of thunder, lightning, and rain. The exposed ridge didn't seem the best place to be nor did running the radio seem the best thing to be doing! So, I quickly packed up and headed out before the worst of the storm hit the area. Next problem: Where to go? I decided to head for Goldendale Observatory Hill (about 160 miles away), and upon arriving, I found that the area didn't open until afternoon and didn't permit overnight parking! Nuts! Since time was getting short, I headed for Maryhill State Park in the Columbia gorge—not an ideal spot to operate, but the gorge is quite wide at that point and the radiation angles are acceptable. I got on by 1120 local time and all went pretty well until I quit at midnight. I walked the dog and got back on by 0540 next morning, until 1030 when horrendous local QRN came on. Fought it out for a while, then decided it was time to walk the dog. When I got back, the QRN was still on, so I packed up the station again and moved to a roadside rest-stop west of Lyle. Got back on the air at 1925Z to finish out the contest. As you can see, the contest didn't work out as planned, but I had a good time anyway. Fred the dog was very tolerant of the whole affair, but let me know when it was over that he wanted more action right away. All I wanted was a cold beer and comfortable chair. We went for a walk instead!" Good show, Mary Lou. I get the feeling that this is a new record for the number and separation of locations for a single FD effort!

Club Category

The Club Category includes entries simultaneously using two or more transmitters and operators. Entries increased this year, and the Club Plaque was taken by a new group, **W1ECH**, the **Zygo ARC** of Middlefield, CT. This company club was formed just two years ago by **Gary Foskett, W1ECH**; **WB1DQT**; and **W1TKG**. The six operators included **Matt Florentz** and **Stephen Foskett** who were graduates of the ZARC's 1985 Nov-

QRP Field Day Club Standings

Top 20 Club Scores 1979-1986

Call	Year	QSOs	Score
1. N4BP	'82	1170	7170
2. K9NG*	'86	533	6546
3. K9NG*	'85	503	6186
4. W1ECH	'86	904	5574
5. K8BX	'81	854	5274
6. K9NG*	'84	418	5166
7. W6JTI	'86	829	5124
8. W3TS	'85	776	4806
9. N6UU	'84	731	4536
10. K8IF	'79	732	4488
11. W6SKQ	'86	712	4422
12. N2RI	'83	699	4344
13. N5AF	'82	685	4260
14. K8IF	'82	684	4254
15. W2LZ	'85	667	4152
16. KN9W	'83	643	4008
17. W2LZ	'83	637	3972
18. AC2U	'81	627	3912
19. N2RI	'82	625	3900
20. W3TS	'84	597	3732

*One-watt club entry

ice class which is part of the club's active efforts to interest company people in hamming, including demonstrations in the cafeteria and nice write-ups in the company newsletter. Shows what can be done! The gang operated from two tents and a van in a field behind company property and used only wire antennas to rack up 904 QSOs (including 43 at the Novice position), the second highest club total ever submitted here.

The **Michigan QRP Club** used **WB8IEK** as its call with operators **WB8IEK**, **W8LHG**, **K8JRO**, **WB8UJJ**, **KE8P**, **WD8PRW**, **W8WQU**, **WD8PCV**, and **WD8IRW** manning three rigs (HW-9, Argo 509, and Argosy) in Genesee County. Antennas included a 133 ft. dipole fed with ladder line, a G5RV, an Inverted-V with tuned feeders, and a 12AVQ with 16 radials. The group felt the outing was very successful: "success = fun." They discovered that "WB8IEK" is not a good call to use on FD, and that stereo "Y" splitters do not work well for monitoring with two sets of headphones.

The **Gateway QRP Society** consisting of **N9TW**, **KC0PP**, **N8ZZ**, and **WB8SIL** operated from Groom F. Moore Park in Alton, IL using a 515, 509, and HW-8 with a TA33Jr at 35 ft., a Skeleton Cone at 40 ft., and a pair of rhombics (300 ft. legs) about 15 ft. above ground and fed with 300 ohm line. Keith, **KC0PP**, reports: "Our group has operated FD six times since 1978. The bands were tough this year, especially on the first day. The Skeleton Cone antenna was a very impressive performer. The rhombics were hard to compare with previous antennas that we've used. We had a great time as usual." **N7FU** and three others used an FT757 and 80 meter centerfed Zepp, but switched to a 509 and 22 watt solar panel for natural-power contacts in Flagstaff, AZ.

Ken Miller, N8CGY, teamed up again with **Mel Moore, NM8L**, and **Harry Kaufman, N8GNI**, and reports: "This year we decided to enter QRP FD again and our efforts to rack up a reasonable score did not prevent us from having a lot of fun. We used a pair of Argo 509's hooked to G5RVs and a Yaesu 757 to a 40 meter dipole.



The assembled troops of the Zuni-Loop Mountain Expeditionary Force on Table Mtn. (CA). Front row (left to right) includes Fred, K6MDJ; Bob, W6SKQ; NX6M; W6SIY; and WN6F. Back row: WF6D, N7FEG, N6GTI, and N6GA. The Force used a pair of Argo's and an HW-9 with an impressive antenna farm which included a ZL-Special (15 meters), Six-Shooter Broadside Array (20 meters), 3-element Delta Loop (40 meters), and a VK2ABQ Button Beam for 80 meters. Like all QRPers, the Zuni-Loopers are constantly searching for the perfect antenna. Ever notice the variety of antennas you come across in this FD report? I bet it's all new stuff to the QRO/Yagi gang!



Fred, K6MDJ, hold the monofil spool while WN6F draws the slingshot and takes aim for a notch in a branch at 75 ft. up. A classic photo. Note the intense concentration exhibited by both adventurers, the near-perfect angle at which the monofil spool is held, the perfect flowing form of WN6F.



Zuni-Loopers WN6F at the controls of the HW-9 with W6SIY logging. WN6F's look of determination and commitment surely bodes ill for K9VOL and the HAH! in 1987. The Zuni-Loopers mean business. The T-shirt shredding at Dayton will provide the HAH! with a moment of exhilaration, but it just might be short-lived. The Zuni-Loopers will grimly endure the humiliation of the shredding only to respond on FD '87 with a fierce determination to avenge their honor. Vanquishing the HAH! in combat for the Club Plaque seems the only "wergild" adequate for regaining their honor.

Forty turned out to be the bread-and-butter band followed by 20 and then 75/80 meters. The weather cooperated nicely with hardly a cloud in the sky, but it was pretty cool after dark, forcing us to wear jackets. Although we fully intended to stay on the air for the full 24-hour period, it was difficult staying awake after midnight, so we eventually climbed into sleeping bags, but were back up at it early Sunday. The contacts came easier and most of our QSOs were netted on Sunday."

Bill Stocking, WBVM, was back leading the Principia College ARC in what has become an annual event located on the campus. Bill notes: "The antenna farm was the best that the club has ever had. One antenna was a 132 ft. tuned doublet (or centered Zepp) about 36 ft. up. The other was an east-west bi-directional beam. It consisted of two bottom-fed vertical 8JK end-fire beams spaced 36 ft. apart and connected in parallel by means of open-wire line made from #10 wire using BIC pen barrels as spacers. Ladder line connected the array to a transmatch in the shack." A gain antenna of some sort was the club's objective for this year, and the effort seemed worth it: "The value of having a high-gain east-west beam was proven. It was interesting and valuable to be able to switch the rig between the Zepp and 8JK beam. On some signals the beam brought in a station much louder than it was on the Zepp. Operators responded to stations on whichever antenna brought the loudest reception." Another interesting result was: "The value of having the big 132 ft. doublet horizontal

instead of in the form of an Inverted-Vee was demonstrated on the 80 meter band, where it is a half-wave. Forty-five contacts were made on 80 meters during two hours, averaging about 22/hr. In 1985, when the same antenna was in the form of an Inverted-Vee, 88 contacts were made in about 7 hours for a 12/hour contact rate."

Readers may recall that in last year's FD column, Randy, KA9HAO/7, reported bagging it after about seven hours because he didn't like solo operation. He asked, "Where are the QRPers in AZ?" hoping to attract some partners. That didn't work, "So, being determined to go FD-86 other than solo, I created the following strategy—meet a lot of people near the new QTH, learn their ways, chase their hot-air balloons, show and tell them about ham radio, help and coach them so that they can get their ham tickets, show them how contacts are made with less than a watt, confide in them about the loneliness of solo FD outings, and once they have tickets take them to the AZ high country and have them operate KA9HAO/7 for 24 hours in a very successful and enjoyable FD." The group included first-timers Cary, KA7YIX; Vel, KA7YHB; Don, KA7YHC; Diane, KA7YGY; Frank, KA7YGZ; and Randy, and used a 515 and Century 21 on both CW and SSB on 40, 20, and 15 meters with a G5RV and Inverted-Vee. Randy notes: "Our objective was to have FUN, and we certainly did!" Randy gets this year's Chief QRP Recruiter Award. It certainly is gratifying to think of these new hams starting out with a QRP FD experience!

And finally, the outcome of the challenge match between the Zuni-Loop Mountain Expeditionary Force led by W6SKQ and the "Cast Iron Balloon Boys" of the HAH! (Harper Air Hawks) led by hot-air specialist K9VOL and signing K9NG. The HAH! apparently made all the right mistakes this year but learned a valuable lesson, as Red (K9VOL) noted: "Since we were out to attempt to win again, and had challenged the Zuni-Loopers, we managed to eliminate the fun of QRP FD." Even so, the HAH! did win and thereby earned the right to publicly shred a Zuni-Loop T-shirt at Dayton and drink a free case of beer gratis the vanquished Zuni-Loopers. It was a sad day for the Zuni-Loopers when Red called Fred, K6MDJ, to inquire about their results. Fred recounts the conversation: "Red was cocky but cautious as we probed each other with small talk. Suddenly he lunged for the throat, blurting out, 'How many contacts did you guys get?' I parried and countered with '724, how about you?' There was a long pause. In an almost inaudible QRP-1 voice Red mumbled something like '533.' I knew in an instant we had been beaten as the HAH! ran in the 1-watt power multiplier class. Red, however, was unaware of our 5 watt status and was suffering the pain of defeat. I withheld the truth as long as I could, knowing mine would come soon enough . . . At a point just short of telling a lie, I confessed the truth. Red's voice came up to 20 over S-9, and I felt the pain as Red twisted the cold steel . . ." As Fred later mulled over the situation, he concluded: "Alas, we did a fine job, mates, but we allowed the arithmetic of the system to assist in our demise . . . this race could have gone right down to the wire in the 1 watt multiplier class," and he recommended dropping to that level next year. And so, gang, we'll all have to wait with baited breath to see if the logic of the multiplier makes milliwatts out of Zuni-Loopers for FD 1987. There will be more on the line than T-shirts and beer this time. The HAH! will once again be eligible to win the Club Plaque!

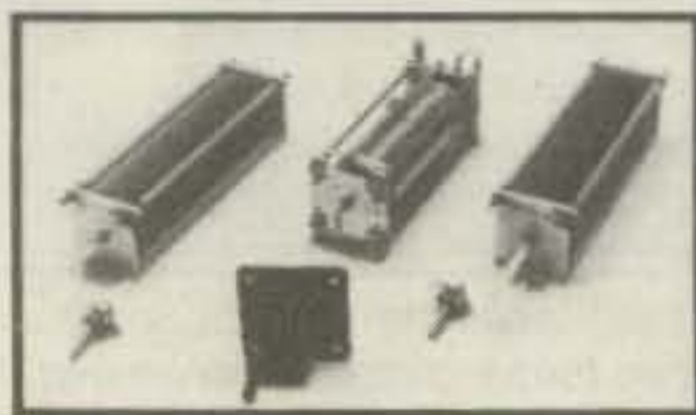
As for the rest of the gang, we all can look forward to more of the unique excitement and challenge of QRP FD! In closing, some interesting propagation info surfaced in reports of QRPers heard but not worked. KK7C heard W6SKQ, NM7N, and W7LNG, while W6SKQ heard KK7C, NM7M, NM7N, NJ7M, and (argh!) K9NG. Note the KK7C-W6SKQ-NM7N triangle.

Scoring: Total QSOs x Power Multiple (x 8 for 1 watt output, x 4 for 5 watts), x 1.5 Battery/Solar + 150 Full Portable (temporary antennas, no AC mains or home conveniences). Submit summary sheet listing number of QSOs by band and mode, output power, number of rigs/operators to: Ade Weiss, W0RSP, 833 Duke St. #83, Vermillion, SD 57069 by August 30, 1987. Entries: One Watt and Five Watt categories: one transmitter and maximum of two operators; Club category: two or more transmitters in simultaneous operation. A given operator, pair of operators, or club group, regardless of the call used, is eligible to win the award in the same category only once each three years.

Membership in the QRP ARC I, including annual subscription to the excellent *QRP Quarterly*, is \$8.00, to: Wm. K. Harding, K4AHK, 10923 Carter's Oak Way, Burke, VA 22015. If reading this column interested you, don't delay. Join today!

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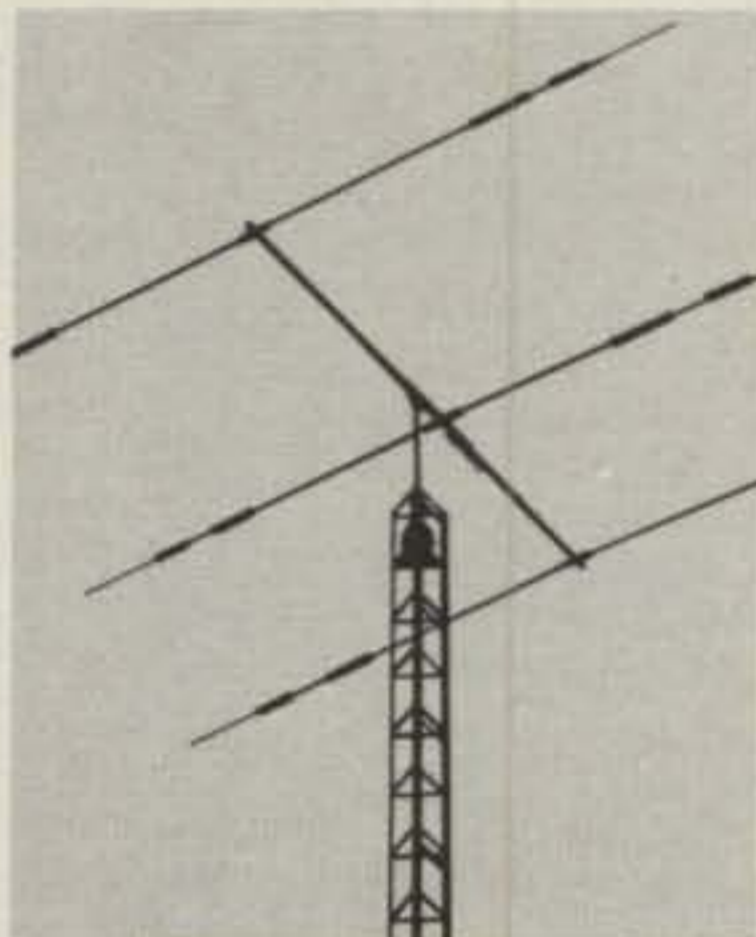
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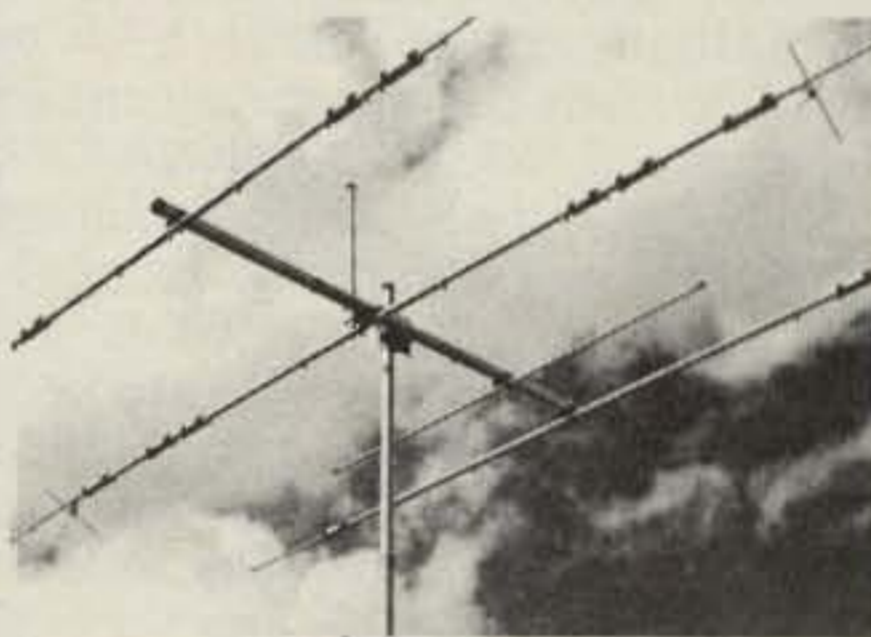
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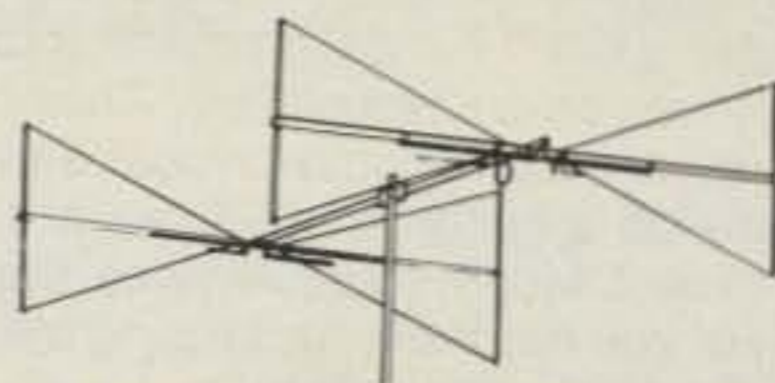


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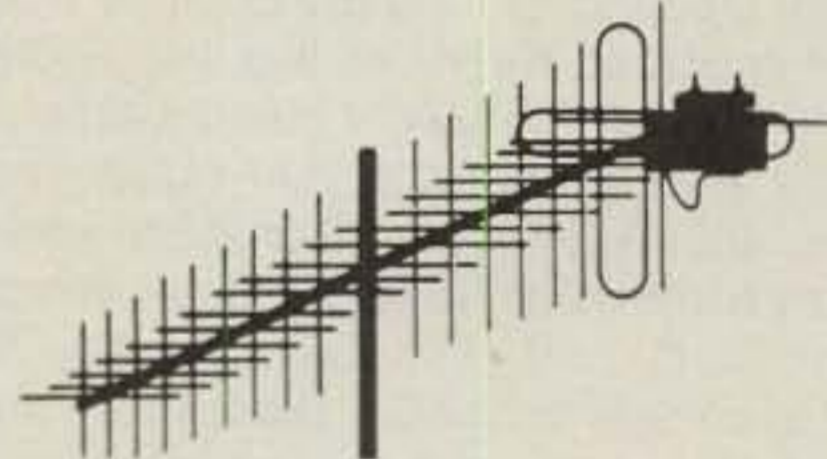
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NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for May is:

**Robert A. Kemp, WA4CHI
USA-CA All Counties #520,
All SSB, 9-15-86**

"I became interested in radio around 1956 when a friend let me listen to his shortwave radio. I am a stamp collector and was fascinated to listen to people of other countries whose stamps I had. My dad helped me buy a Hallicrafters S-85 and a Mosley trap vertical and I was in business SWLing. I became WPE4ARK of *Popular Electronics Magazine*, and F.R.S. 309 of the RSGB, and submitted SWL reports to both magazines for years.

"I finally became a ham in 1961 as a Novice, WN4CHI, during my senior year in high school. Don't start counting back; I'm 43. I had three Elmers. One, a fellow high school senior, was David Noff, K4NUZ. The others were Sol, K4YLP, and Charlie Justice, W4JUJ, USA-CA All Counties #281. Many of you old timers remember Charlie through his Dennis the Menace QSL cards and the cartoons he drew for the "MARAC Newsletter" and *QST*. More about him later.

"I upgraded to WA4CHI in 1962 and was on CW mostly for the next four years. In December 1966 I joined the Army Security Agency and was sent to the Army Language School in Monterey, California to learn Russian. While there I joined Army MARS. From California I went to Ft. Benning, Georgia to take airborne and Ranger training. During my copious free time I operated K4TIS as a guest. From there I was sent to MACV Headquarters, Saigon, and operated at AAA6USA, the MARS station of the 69th Signal Bn. while off duty at then Son Nagut Air Base. When I finished my four year obligation, I went back to college on the G.I. Bill to finish undergraduate and graduate school, during which time I was inactive as a ham. In 1973, when I got out of graduate school, I moved to Dothan, Alabama where I put up my vertical antenna. (That is how I met my wife, Sandy, but that's another story.)

"I ran into the County Hunters net by accident one Saturday morning in 1973 while waiting for the YL System to begin on 14.332. I answered a CQ from another ham and was promptly told, in no uncertain terms, that I was interfering with an established mobile net. So I finished my QSO immediately and started listening on



Bob Kemp, WA4CHI, USA-CA #520 (right) with friends (left to right) Karl Adkins, WA6MAR, USA-CA #128, and Paul Buggen, WA3TUC, USA-CA #156.

14.336 to this group who had so rudely interrupted me. In those days there was time between mobiles to rag chew a bit on the net, so NCS asked for calls, comments, or queries. Being dumb, I stuck my call in there, and when recognized, asked if anyone needed Houston County, Alabama. I must have worked 35 people as a fixed station. I was hooked. I'm afraid my appearances as ISSB #1039 on the YL system declined to nothing over the next few months, and I had 500 counties worked by the end of the year.

"Some highlights of my county hunting have been: driving a couple of hundred miles to Mississippi two years in a row to give out the same county to finish up two county hunters, WA5YSC and WA4CFI, for USA-CA; giving out over 600 counties through the years with many last counties in a state; being elected to the MARAC Board of Directors in 1975 from the Southeast Region, and again in 1985 from the South Central Region, becoming the first Director elected in two regions; working with Bing, W0GV, and WB0ICP on the 1980 National County Hunters Convention in Denver; and going along with Bing to a mountaintop pass in the Rockies in a blizzard to give my Elmer, W4JUJ, his last one to finish up.

"My XYL, Sandy, WA4QER, became a ham in self-defense in 1975 so she could see me occasionally. Sandy has been to most national conventions and some minis with me, and we agree that we have never met a nicer bunch of people. County hunters don't cut each others' throats for a place on an 'Honor Roll.' They help each other reach a common goal, and will literally go a hundred miles out of their way to do it. Mushy, huh! Anyway, thanks to all of you out there for helping me get USA-CA All Counties #520.

"I will host the 1987 National County Hunters Convention in Longmont, Color-

ado. It will be held on July 8-11, 1987 at the Raintree Plaza Motel on Colorado Route 119 on the southwest side of Longmont, Colorado. Registration at the motel includes continental breakfast for all registered guests and their families, use of a Nautilus-weight room and sauna, and free happy-hour drinks at the motel's own hospitality room. We, of course, will have our own hospitality room. Tentative (at press time) tours are to Coors Brewery, the National Bureau of Standards, the National Center for Atmospheric Research, and IBM. Also planned are an afternoon of browsing in Estes Park and a chuckwagon dinner with western music. For information on rates or queries, call WA4CHI on the air or at telephone number 303-776-9317. My address is 1623 Atwood Street, Longmont, CO 80501."

USA-CA Special Honor Roll

Kenneth L. Lucas, WA4WIN
All Counties #530, Mixed, 1-12-87

Robert L. Klepper, W7IEU
All Counties #531, Mixed, 1-15-87

Richard B. Burke, N4IWY
All Counties #532, All SSB, 1-23-87

USA-CA Honor Roll

3000		1500	
WA4WIN	562	WA4WIN	778
W7IEU	563	N4IWY	779
N4IWY	564		
2500		1000	
WA4WIN	632	WA4WIN	950
W4IWY	633	N4IWY	951
2000		500	
WA4WIN	693	W0KG	2155
N4IWY	694	WA4WIN	2156
		N4IWY	2157

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.

Awards Issued

Kenneth L. Lucas, WA4WIN, completed all of his paperwork and qualified for USA-CA All Counties #530, USA-CA 3000 #562, USA-CA 2500 #632, USA-CA 2000 #693, USA-CA 1500 #778, USA-CA

333 South Lincoln Ave., Mundelein, IL 60060.

1000 #950, and USA-CA 500 #2156, Mixed, dated 1-12-87.

Robert L. Klepper, W7IEU, submitted his qualifying application for USA-CA All Counties #531, and USA-CA 3000 #563, Mixed, dated 1-15-87.

Richard B. Burke, N4IWY, made a clean sweep and received USA-CA All Counties #532, USA-CA 3000 #564, USA-CA 2500 #633, USA-CA 2000 #694, USA-CA #779, USA-CA 1000 #951, and USA-CA 500 #2157, All SSB, dated 1-23-87.

USA-CA 500 certificates went to:

Bill B. Squires, W0KKG, USA-CA 500 #2155, 1-10-87, All Mobiles.

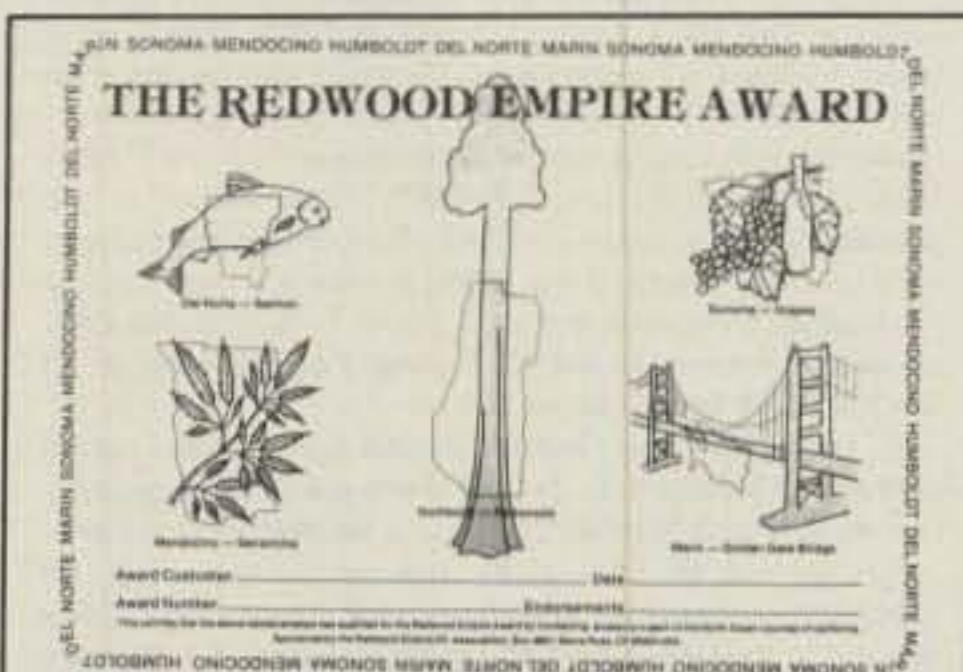
Kenneth L. Lucas, WA4WIN, USA-CA 500 #2156, 1-12-87, Mixed.

Richard B. Burke, N4IWY, USA-CA 500 #2157, 1-23-87, All SSB.

Awards Available

Redwood Empire Award. The Redwood Empire Award is sponsored by the Redwood Empire DX Association. Work at least one amateur in each of the five California north coast counties: Marin, Sonoma, Mendocino, Humboldt, and Del Norte. Contacts after January 1, 1981 are valid. Any band 160-10 meters, any mode. GCR rules apply, endorsable.

The cost of the award is \$2.00 U.S. or 7 IRCs. Send application to Redwood Empire DX Association, Box 4881, Santa Rosa, CA 95402 USA.



The Redwood Empire Award sponsored by the Redwood Empire DX Association.

Union des Radio-Clubs (URCA). This award is available to licensed amateurs and SWLs (heard basis) who can demonstrate having participated in or heard two-way contact with the maximum number of Radio Club stations worldwide. All bands and modes are acceptable. Request endorsement for band and mode at time of application for the awards. Contacts after January 1, 1968 are valid. This award is issued in three (3) classes:

HF Class I—100 confirmed QSOs. A minimum of 30 French Radio Club stations plus 70 worldwide Radio Club calls. At least one in each of 6 continents.

HF Class II—80 confirmed QSOs. A minimum of 20 French Radio Club stations plus 60 worldwide Radio Club calls. At least one in each of 5 continents.

HF Class III—50 confirmed QSOs. A minimum of 10 French Radio Club sta-



Union Des Radio Clubs Award offered by URC, France.

tions plus 40 worldwide Radio Club calls. At least one in each of 4 continents.

The valid continents are North America, South America, Europe, Asia, Africa, and Oceania. One continent may be substituted by a "joker." Each joker is also equal to 3 French Radio Club stations and FF6URC for 5.

The "joker" calls are: F1 or FC1QY, F1 or FC1CQQ, F1 or FC1GKF, F1KCE, F1 or FF1URC, F5 or FE5SP, F5 or FE5XM, F6 or FE6BUG, F6 or FE6DLA, F6 or FE6DZS, F6 or FE6EBN, F6 or FE6EMA, F6 or FE6EVT, F6 or FE6EYS, F6 or FE6FNA, F6 or FE6GHT, FD1JCH, FC1JLJ, FD1LAL, F6KCE, F6URC, SWL FE1107 or F11ADB.

VHF Class I—75 confirmed QSOs with any Radio Club stations.

VHF Class II—50 confirmed QSOs with any Radio Club stations.

VHF Class III—30 confirmed QSOs with any Radio Club stations.

Do not send QSL cards. A list showing full details of logged contacts, verified and confirmed by your local club official or by two licensed amateurs, is enough.

The charge for each award (Class I, II, or III) is \$4.00 US or 12 IRCs. Send application and fee to: URC Diplome Manager, B.P. 73-08, 75362 Paris Cedex 08, France; or to Mr. J.P. Lehembre, F6FNA, 8 rue de Verdun, 77270 Villeparisis, France.

Note: Lists of applicants will be published in the French magazine *Ondes Courtes Information* each year in December. The best Radio Club score in Class I will receive *OCI* magazine free for one year. The second and third will receive another award.

All French military Radio Clubs in RFA (FFA) are valid for French Radio Clubs. The first suffix K calls with three suffixes are French Radio Clubs—i.e., F6KCP, F6KAW, F6KMX, etc. Since January 1, 1986 the French RC prefix is FF.

Principality of Monaco Award (PMA). The Association des Radio-Amateurs de Monaco offers this award, in one class, for having worked (two way), or heard, three resident stations of Monaco since January 1, 1980. Contacts via a repeater are not valid. All bands, modes, endorsements. To apply for the award, send QSLs or photocopy of logbook, or list of requested QSOs confirmed by the national

award manager or two licensed amateur radio operators. Price: 10 IRCs or \$6.00 U.S. Add 5 IRCs for air mail registered mail. Mail application to C. Passet, 3A2LF, 7 rue de la Turbie, MC 98000, Monaco.



The Principality of Monaco Award offered by the Association of Radio Amateurs of Monaco.



The Worked All Small European Countries Award available from the Association of Radio Amateurs of Monaco.

Worked All Small European Countries (WASEC). This award, also offered by the Association des Radio-Amateurs de Monaco, is for working (or hearing) small European countries. Class I is all eight countries, and Class II is three countries and Monaco. The small European countries are C31, HB0, LX, 9H, IA0, 3A, T7, and HV. All bands, modes, endorsements. Contacts via a repeater are not valid. The same cost and confirmation procedure as defined for PMA above. Mail application to C. Passet, 3A2LF, address above.

Of Special Interest To County Hunters

MARCO (Mobile Amateur Radio Club of Colorado) officially disbanded in September 1986. Awards offered through MARCO will be available until September 1987. Send applications to Bill Miller, KC0VB, MARCO Awards Chairman.

Don't forget the 1987 (16th Annual) MARAC County Hunters SSB Contest on May 2 and 3, 1987. Complete information, including sample log and summary sheet, is available for an SASE to Barry Brewer, WA5DTK, 1013 North Blvd., Universal City, TX 78148.

Garry Hammond, VE3GCO/VE3XN, has revised his *Awards Directory of the World*. The 1986-1987 issue is available for \$10.00 US, postage paid. Garry's address is 5 McLaren Avenue, Listowel, Ontario N4W 3K1, Canada.

73, Dorothy, WB9RCY

Propagation

a monthly feature by
GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The Royal Observatory of Belgium reports a monthly mean sunspot number of 9.8 for January 1987. This results in a 13-month running smoothed sunspot number of 14 centered on July 1986. The solar cycle is measured by the level of smoothed sunspot number. The level has remained constant at a count of 14 for the past four monthly readings.

The National Geophysical Data Center at Boulder, Colorado indicates that a new sunspot cycle, Cycle 22, began during March 1986, and that solar activity is now on the increase. They forecast a smoothed sunspot number of 28 for May 1987, with a possible range between 10 and 36. Dr. A. Koechelenbergh, Director of the Sunspot Index Data Centre at Brussels, is calling for a smoothed sunspot number of 21 for May. Although the experts still may not agree on the date that Cycle 22 may have begun, it appears almost certain that solar activity is now on the increase, and that this should translate into noticeably improved propagation conditions on the HF amateur bands.

The 10.7 cm solar flux level for January 1987 was 73, according to daily observations made at the Algonquin Radio Observatory at Ottawa, Canada.

May Propagation

The following is an overall picture of HF amateur band conditions expected during this month. For specific times of DX openings refer to the DX Propagation Charts which appeared in last month's column. This month's column contains Short-Skip Propagation Charts valid for May and June, as well as charts centered on Alaska and Hawaii. The Short-Skip Charts contain propagation forecasts for openings varying in distance between 50 and 2300 miles. For day-to-day propagation conditions expected during May, see the Last Minute Forecast which appears at the beginning of this column.

Twenty meters should continue to be the best band for DX propagation during the month. Opening shortly after sunrise, expect good DX conditions to one area of the world or another throughout most of the day and well into the evening hours on this band. Conditions should peak for an hour or two after sunrise and again during the late afternoon hours, with openings possible to most areas of the world. When conditions are High Normal or better, ex-

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for May 1987

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 4, 16, 23	A	A	B	C
High Normal: 3, 10-11, 17, 22, 28, 31	A	B	C	C-D
Low Normal: 1-2, 5-6, 9, 12, 14-15, 18-19, 21, 24-25, 27, 30	A-B	B-C	C-D	D-E
Below Normal: 7, 13, 20, 26, 29	B-C	C-D	D-E	E
Disturbed: 8	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 and 2nd, good (B) on the 3rd, excellent (A) on the 4th, good-to-fair (B-C) on the 5th and 6th, etc.

pect the band to remain open, often with exceptionally strong signals to many areas of the world, well after sundown and into the hours of darkness. A considerable improvement is also expected in short-skip openings between distances of approximately 350 and 2300 miles. Quite often, particularly during the afternoon hours, optimum conditions may exist for both short and long skip, with stations a few hundred miles away QRMing DX stations.

Expect some fairly good DX openings on 15 meters during the daylight hours, particularly towards southern and tropical regions when conditions are High Normal or better. Best time to check for DX is during the afternoon hours. An increase in short-skip openings, between approximately 600 and 2300 miles, can be expected during May.

An occasional DX opening towards deep South America or into the South Pacific area may be possible on 10 meters, particularly during the afternoon hours when conditions are High Normal or better. Frequent short-skip openings between distances of about 750 and 1400

HOW TO USE THE SHORT-SKIP CHARTS
1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular Meter band (10 through 160 Meters), as shown in the left hand column of the Chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate Meter band column (10 through 40 Meters) for a particular geographical region of the continental USA, as shown in the left hand column of the Charts. An * indicates the best time to listen for 80 meter openings.

2. The propagation index is the number that appears in () after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parenthesis, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. 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) " " " between 14 and 22 days
- (2) " " " between 7 and 13 days
- (1) " " " on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the Charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. On the Short-Skip Chart appropriate daylight time is used at the path midpoint. For example, on a circuit between Maine and Florida, the time shown would be EDT; on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones, add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone, and 6 hours in the EDT zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 P.M. in Los Angeles; 18 or 6 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to daylight time in other areas of the USA, subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 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 10db loss, it will lower by one level.

5. 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.

miles, however, should be possible on many days.

Shorter hours of darkness and higher static levels in the northern hemisphere mean less DX on 40, 80, and especially 160 meters. But some fairly good openings are still expected on 40 meters, and to a lesser extent on 80 meters, from about an hour or two after sundown, through the hours of darkness, and until sunrise.

If you're very patient and can stand the increased static levels, look for some DX openings on 160 meters as well during the hours of darkness and particularly during the sunrise period.

CQ Short-Skip Propagation Chart May & June, 1987 Local Daylight Savings Time At Path Mid-Point (24-Hour Time)

Band (Meters)	Distance Between Stations (Miles)			
	50-250	250-750	750-1300	1300-2300
10 Nil	08-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-23 (0-1)	08-09 (1) 09-13 (2) 13-17 (1-2) 17-21 (2) 21-23 (1) 23-07 (0-1)	08-09 (1) 09-13 (2) 13-17 (1-2) 17-21 (2) 21-23 (1) 23-07 (0-1)	08-09 (1-0) 09-21 (2-0) 21-23 (1-0) 23-07 (1-0)
15 Nil	07-09 (0-1) 09-13 (0-2) 13-17 (0-1) 17-21 (0-2) 21-00 (0-1)	07-09 (1-2) 09-13 (2-3) 13-17 (1-2) 17-19 (2-3) 19-21 (2) 21-00 (1) 00-07 (0-1)	07-09 (1-2) 09-13 (2-3) 13-17 (1-2) 17-19 (2-3) 19-21 (2) 21-00 (1) 00-07 (0-1)	07-09 (2-0) 09-13 (3-1) 13-17 (2-1) 17-19 (3-1) 19-21 (2-0) 21-07 (1-0)
20 Nil	07-09 (0-2) 09-12 (0-3) 12-17 (0-4) 17-19 (0-3) 19-23 (0-2) 23-07 (0-1)	07-08 (2) 08-09 (2-3) 09-12 (3-4) 12-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (2-3) 21-23 (2) 23-07 (1)	07-08 (2) 08-09 (2-3) 09-12 (3-4) 12-17 (4) 17-19 (3-4) 19-20 (2-4) 20-21 (2-3) 21-23 (2) 23-07 (1)	07-08 (2) 08-09 (3-2) 09-15 (4-2) 15-17 (4-3) 17-20 (4) 20-21 (3) 21-23 (2) 23-07 (1)
40 08-10 (0-2) 10-16 (1-4) 16-18 (2-4) 18-20 (1-3) 20-22 (0-2) 22-08 (0-1)	08-10 (2-4) 10-15 (4-2) 15-16 (4-3) 16-19 (4) 19-20 (3-4) 20-22 (2-3) 22-08 (1-2)	08-09 (4-3) 09-10 (4-2) 10-15 (2-1) 15-16 (3-1) 16-19 (4-2) 19-20 (4) 20-22 (3-4) 22-01 (2-4) 01-03 (2-3) 03-08 (2)	08-09 (3-1) 09-10 (2-1) 10-16 (1-0) 16-19 (2-1) 19-20 (4-3) 20-01 (4) 01-03 (3) 03-06 (2) 06-08 (2-1) 03-08 (2)	08-09 (3-1) 09-10 (2-1) 10-16 (1-0) 16-19 (2-1) 19-20 (4-3) 20-01 (4) 01-03 (3) 03-06 (2) 06-08 (2-1) 03-08 (2)
80 08-10 (4) 10-18 (4-3) 18-20 (4) 20-22 (3-4) 22-00 (2-4) 00-06 (2-3) 06-08 (3-4)	08-10 (4-1) 10-16 (3-0) 16-18 (3-1) 18-20 (4-2) 20-00 (4) 00-06 (3-4) 06-08 (4-3)	08-09 (1) 09-10 (1-0) 10-16 (0) 16-18 (1-0) 18-20 (2-1) 20-22 (4-3) 02-06 (4-3) 06-08 (3-2)	08-09 (1-0) 09-18 (0) 18-20 (1-0) 20-22 (3-2) 22-02 (4-3) 02-06 (3-2) 06-08 (2-1)	08-09 (1-0) 09-18 (0) 18-20 (1-0) 20-22 (3-2) 22-02 (4-3) 02-06 (3-2) 06-08 (2-1)
160 06-09 (4-1) 09-10 (2-0) 10-19 (1-0) 19-21 (3-1) 21-23 (4-2) 23-06 (4-3)	06-09 (1) 09-19 (0) 19-21 (1-0) 21-23 (2-1) 23-01 (3-2) 01-04 (3) 04-06 (3-2)	08-09 (1-0) 09-21 (0) 21-23 (1) 23-01 (2-1) 01-04 (3-2) 04-07 (2) 07-08 (1)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (1-0)	08-21 (0) 21-01 (1) 01-04 (2) 04-06 (2-1) 06-07 (1) 07-08 (1-0)

See explanation in "How To Use Short-Skip Charts" which appears in the box at the beginning of this column

Good daytime short-skip openings are expected on 40 meters ranging between 150 and 750 miles, and extending out to the one-hop limit of 2300 miles during the hours of darkness. On 80 meters look for excellent short-skip openings during the daylight hours ranging between 50 and 250 miles. During the hours of darkness the short-skip range should increase to about 1800 miles, and considerably further when static levels subside. Expect short-skip openings up to about 1000 miles on 160 meters during the hours of darkness, with a chance for longer openings during periods of low static.

VHF Ionospheric Openings

Sporadic-E ionization usually increases considerably during May, and some fairly frequent 6 meter short-skip openings should be possible. These are most likely to occur over distances between approximately 1000 and 1400 miles. Although sporadic-E openings can happen at any time of the day or night, the best time to check is between 10 a.m. and 2 p.m., and again between 6 and 10 p.m., local daylight time.

During periods of intense and wide-

ALASKA Openings Given In GMT

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	Nil	00-02 (1) 02-04 (2) 04-05 (1) 12-14 (1)	07-10 (1)	Nil
Central USA	00-02 (1)	01-03 (1) 03-05 (2) 05-06 (1) 13-15 (1)	08-12 (1)	Nil
Western USA	00-03 (1)	00-02 (1) 02-04 (2) 04-06 (3) 06-07 (2) 07-08 (1) 14-15 (1) 15-18 (2) 18-20 (1)	08-09 (1) 09-14 (2) 14-15 (1)	10-14 (1)

HAWAII Openings Given In HST

To:	15 Meters	20 Meters	40 Meters	80 Meters
Eastern USA	12-15 (1)	06-08 (1) 10-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1)	19-20 (1) 20-23 (2) 23-00 (3) 00-01 (2) 01-02 (1)	21-00 (1)
Central USA	12-14 (1) 14-16 (2) 16-17 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-21 (2) 21-22 (1)	19-20 (1) 20-21 (2) 21-01 (3) 01-02 (2) 02-04 (1)	21-21 (1) 21-00 (2) 00-02 (1) 22-01 (1)*
Western USA	13-17 (1)** 09-14 (1) 14-17 (2) 17-18 (1)	05-06 (1) 06-07 (2) 07-09 (3) 09-11 (2) 11-16 (3) 16-18 (4) 18-20 (3) 20-21 (2) 21-23 (1)	18-19 (1) 19-20 (2) 20-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1)	19-20 (1) 20-22 (2) 22-03 (3) 03-04 (2) 04-05 (1) 22-03 (1)*

* Indicates best time for 160 Meter openings
** Indicates best time for 10 Meter openings
Note: The Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.

spread sporadic-E ionization, two-hop openings considerably beyond 1400 miles may be possible for brief periods on 6 meters, and short-skip openings between approximately 1200 and 1400 miles may also be possible on 2 meters.

If the very intense sporadic-E ionization in the North Atlantic region observed last summer repeats itself again this year, look for occasional multi-hop openings between the east coast of North America and western Europe on 10 meters.

The Eta Aquarids meteor shower should intersect the earth's atmosphere between May 4 and 6. This should be a major shower, reaching maximum intensity during the early morning of May 5 with an average of 20 meteors an hour. Chances are good for meteorburst short-skip openings during the three-day period of this shower.

Not much auroral activity expected during May, although some may occur during periods of radio storminess. Check the Last Minute Forecast at the beginning of this column for those days that are likely to be Below Normal or Disturbed during May.

73, George, W3ASK

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U.S. Patent 4349825, 4460896

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PRINCIPLES, PRACTICES, AND PROJECTS FOR THE VHFER

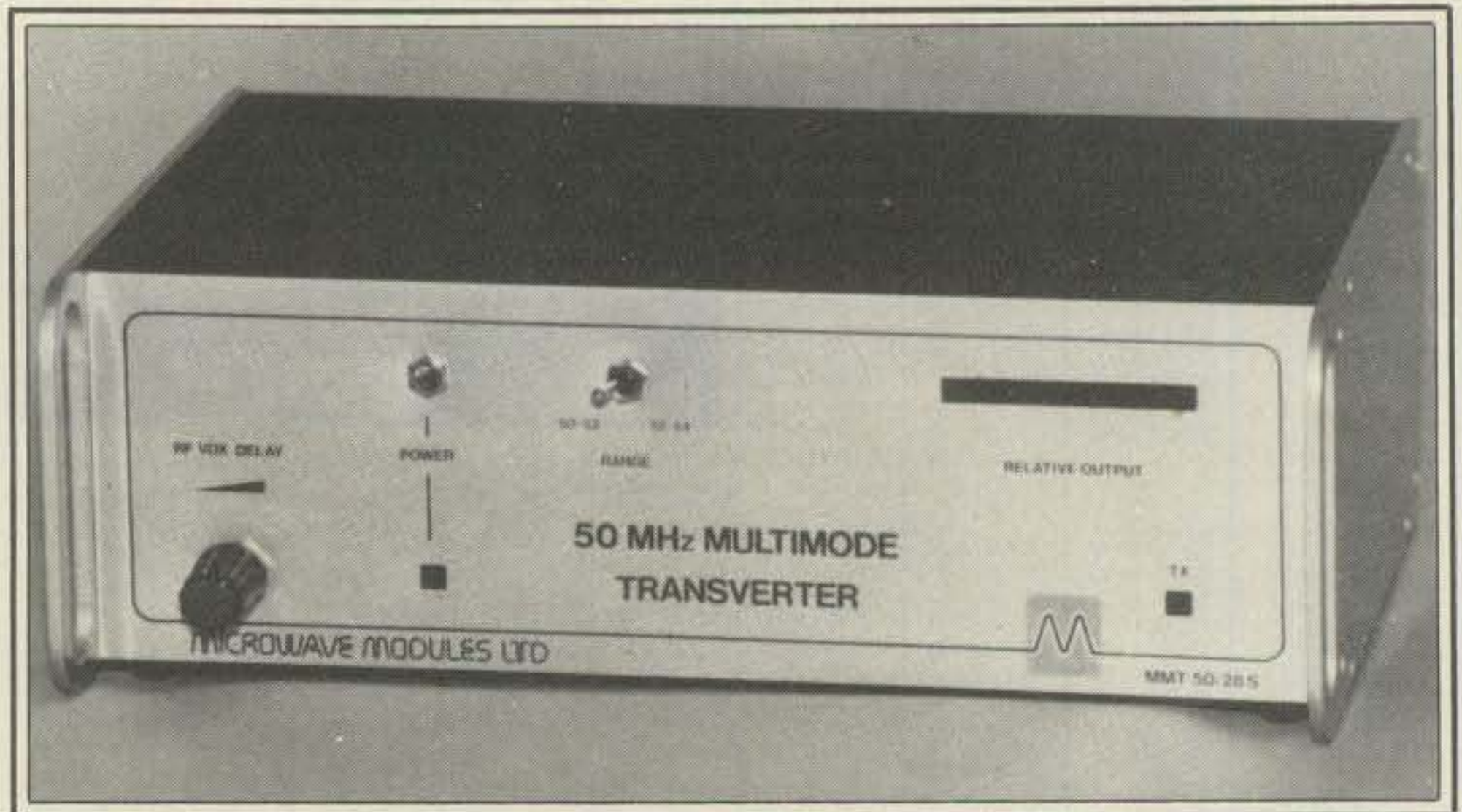
FCC Actions

The month this column was written, February, held both good and bad news for amateur radio. Good news, I think, was that PR Docket 86-161, Novice Enhancement, was released as an FCC Report and Order, with an effective date of March 21, 1987. This action allows Novice class licensees the use of 222.10 through 223.91 MHz for all authorized emissions, with a power limit of 25 watts output; it also allows Novices all authorized emissions in the 1270 through 1295 MHz portion of our 23 cm band, with a 5 watt output limit. This action will, I think, dramatically popularize these two VHF/UHF bands—at least in the "FM" subbands. And voice privileges for Novices, not only in these two bands but also in the 28.3 to 28.5 MHz segment of 10 meters, should help train new operators in the use of effective voice operating techniques.

The bad news, I'm certain, was that the FCC released General Docket #87-14 on February 12, 1987 in response to petitions received from the land mobile (commercial) user community. General Docket #87-14 states, "... we are proposing to reallocate the 216-225 MHz band as follows . . . reallocate the 220-222 MHz band on a primary basis to the land mobile service for both government and nongovernment operations and delete the existing primary allocations to the amateur, fixed, and mobile services; and maintain the primary amateur allocation in the 222-225 MHz band and delete the existing primary allocation to the fixed and mobile services . . ."

This action would, in effect, reduce the width of our amateur 135 cm band by 2 MHz, leaving no place for weak-signal operators, Packet radio users, and those maintaining remote inputs and "link" operations for amateur repeaters operating in other bands. I foresee all kinds of problems that would be created by the FCC's proposal. Infighting among amateurs vying for a useful piece of the remaining allocation is probably the most serious and deleterious matter. Can you imagine trying to receive nanovolt level signals from the moon amidst local repeater signals? Then think about trying to maintain an effective 135 cm repeater only 100 kHz or so away from high-powered weak-signal buffs running 100 kw ERP (effective radiated power) or more. Dense city! Which repeater owners would be willing to relocate, change frequency, or shut down altogether to make room for digital and weak-signal subbands in the 222-225 MHz allocation?

Rather than ponder how we could survive under the proposed rules changes, our energy will be better spent writing the FCC (and our representatives in Congress) in protest. Since the General Docket which contains the FCC's proposal clearly indicates that they (the Commission) are well aware of the public-service good amateur radio has done and continues to



The front panel of the MMT50/28S contains on/off switch and indicator, band range switch, RF VOX delay adjust, and 10-segment LED bar indicator.

do, I wouldn't concentrate a lot of effort rehashing this. Paragraph 11 of the General Docket states, "The majority of the amateur operations in the 220-225 MHz band are base/mobile repeater operations and are located in the 222-225 MHz portion of the band . . . Further, in view of the current light loading of the 220-225 MHz band, and the availability of other amateur bands, it appears that the future needs of the amateur service will continue to be satisfied." These are the points with which I take issue.

The FCC used the *ARRL Repeater Directory* to determine the "loading" of the 135 cm allocation. Obviously, this directory does not address the number of repeater users or other users of the band; it merely lists currently coordinated repeater stations. If each repeater had a thousand users, the band loading would be anything but light. Further, the number of weak-signal and digital communications enthusiasts are not even addressed in any standard directory, and our numbers are growing rapidly.

Without reprinting in total the text of the four-page letter I personally mailed to the FCC in comment to General Docket #87-14 and its Notice of Proposed Rule Making, I strongly urge anyone reading this column to first determine if the deadline for filing comments has been extended beyond April 6, the original date as published in the General Docket. If the deadline has been extended, and I hope it has, please send your own comments in favor of retaining the 220-225 MHz allocation. **Your comments will only be read by all Commissioners if you send the original plus eleven copies to the FCC, Washington, DC 20554, Attention: The Secretary, Mr. Wm. J. Tricarico, in the Matter of General Docket #87-14.** The General Docket number must appear on the cover page of any comments. Sending additional copies to your own repre-

sentatives in Congress couldn't hurt. We don't need to lose any more spectrum space.

Product Review: The Microwave Modules Ltd. MMT50/28S Six Meter Linear Transverter

Well, it's finally here: The accessory we've all been waiting for, a high-quality 50 MHz linear transverter for use with 28 MHz equipment.

When Microwave Modules Ltd. of Liverpool, England introduced their model MMT144/28R about 18 months ago, they promised a high-performance 6 meter version would follow "shortly." I guess "short" is a relative term. If an Englishman had to wait this long for a pint of bitters, he'd be hopping mad. In any case, the long-awaited 6 meter version of the MMT high-performance transverter has finally appeared, with the first units coming through customs in January this year. Were they worth waiting for? I'd say, yes!

When I opened the carton containing MMT50/28S serial number 187001 (which I presume means number **one**) and looked through the 12-page operator's manual, I began to understand what took so long. Rather than simply a reworked MMT144/28R, as I suspected the 6 meter unit would be, this is an entirely new design from ground up. It has absolutely nothing in common with the 2 meter version other than its physical appearance, which, I must say, is very pleasant. While the 144 MHz model features a low-noise GaAsFET front-end followed by a high-level doubly-balanced mixer in the receive section, a single-ended TX output stage (PA) and PIN diode T/R switching, the 50 MHz model uses a parallel JFET (!) front-end driving a balanced JFET mixer, a push-pull TX output stage (PA), and relay switching.

As if these major changes in circuit design



MMT50/28S rear view: fuse holder, power receptacle, all input and output jacks, and RF drive adjust are within easy reach.

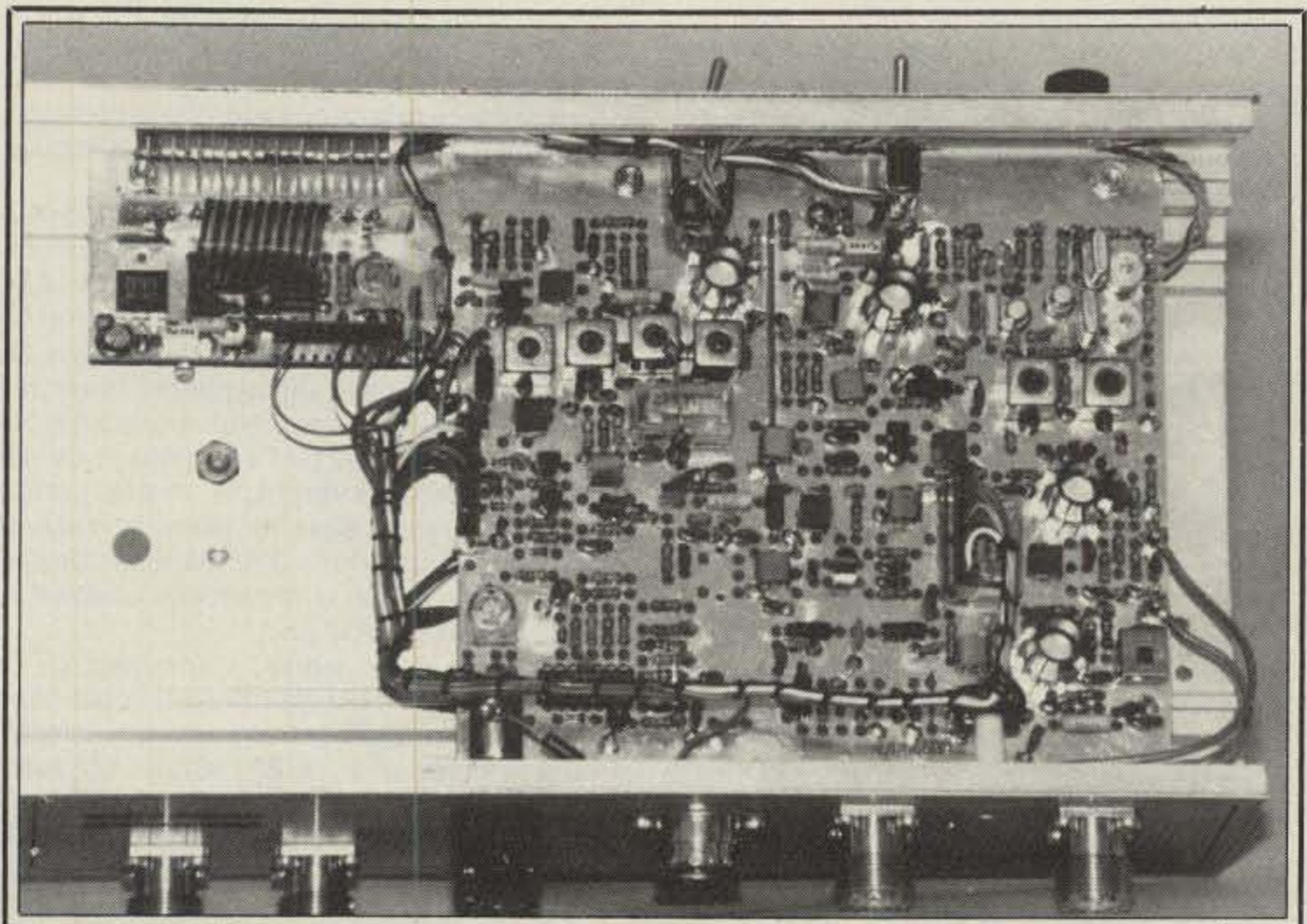
weren't enough, the 6 meter transverter uses an amazing number of high-pass, low-pass, and bandpass filters throughout—many more than would be required for a 144 MHz design—and follows the filters with buffer amplifiers to recover the intended signals attenuated by filtering. But before I go on and on detailing the differences between the 50 MHz and 144 MHz designs (which, after all, make a rather arbitrary comparison), I should describe what the new unit does and how it works.

"The MMT50/28S is designed for operation in conjunction with a 28 MHz transceiver equipped with suitable transverter facilities," says the new operator's manual, and this pretty well sums it up. It should be noted that this transverter is versatile enough to work with any transceiver or transmitter/receiver combination that is capable of operating the 28 MHz band, whether the equipment has "transverter facilities" or not. Adding such facilities is a very simple matter with most any commercially-made 28 MHz gear, tube-type or solid-state. And a lot of older gear does have transverter

facilities without the owner's even knowing it. Examples: The Drake 4-series; the Heath SB300/400, SB301/401 series; the Collins S-line; Drake TR-7; and Collins KWM-380 are just a few examples of equipment which is immediately capable of working with transverters with very minor or no modification.

The MMT50/28S allows one's 28 MHz station to effectively reproduce whatever features it offers, on the 50 MHz band. The transverter requires only 100 μ w (microwatts!) exciter signal at 28 MHz to generate its full 20 watts output power on 6 meters. The receiving converter section has sufficient gain and sensitivity to allow weak-signal reception of 6 meter signals even when followed by a less than ideal 10 meter receiver. All TX/RX operations are automatically performed by an RF "VOX" circuit in the transverter, if one desires to use this feature. In other words, the MMT50/28S is an ideal way for anyone owning a 10 meter station to activate on the 6 meter band with a very high performance-to-cost ratio.

Since the MMT50/28S is such a new model,



The top side of the MMT50/28S is neat and serviceable. Note finned heatsinks on the high-level transistors.

the early operator's manuals contain no manufacturer's specifications. While this seems a sneaky way to avoid being called "out of spec," I'm certain the oversight is the result of being rushed to publish a manual to go with transverters already built and tested; future manuals should contain specifications. In the absence of any specs, I cannot say whether or not Microwave Modules meets their design goals.

First I checked power output. I believe the intended maximum power output of the /28S is 20 watts PEP, to comply with power limitations imposed in the U.K. The review unit measured 22.5 watts maximum (saturated) output power into a 50 ohm resistive load. It maintained perfect linearity to 20 watts. This is an ideal power level for a 6 meter rig—low enough power to minimize QRM while engaged in local contacts, high enough power to drive a legal-limit amplifier when necessary. My own 4-1000A amplifier for 6, affectionately named the "Blockbuster," operates in grounded-cathode (grid-driven) Class AB1 service and requires exactly 20 watts drive for 1200 watts output—a nice level. Amplifiers using paralleled 4CX250-series tubes will be easily driven by this level as well. The 8877 six meter amplifier I built last summer, which is the subject of a future construction article for CQ, can be driven to about 800 watts output with 20 watts exciter power.

Next I checked DC current drain: 320 ma on RX, 2.6 amps on TX at maximum output power.

Just for fun, I logged the "number of LED segments lit" on the front-panel bar-graph display against actual measured output power. The bar display is a good PEP wattmeter, showing just 3 lighted segments at 1 watt output, all 10 lighted segments at 20 watts output, and linear indications in between. (See fig. 3.)

Next I tested the RF "VOX" sensitivity to be -9 dBm (125 μ w). This sounds very sensitive, but would actually be most useful for full-carrier modes like CW, AM, or FM. An undermodulated SSB signal might cause the RF "VOX" circuit to trip off unexpectedly, and for this reason I strongly recommend using the "hard" keying provision of the transverter. (A third wire connected to its power receptacle allows hard-wired keying of the transverter by a ground-on-transmit line provided by the exciter or other station equipment.)

RF "VOX" (actually "carrier-operated relay" would be a more appropriate description) is only useful on CW and SSB when it incorporates a drop-out delay to prevent constant chattering. The MMT50/28S does have an adjustable "VOX" drop-out delay, with the control brought out to the front panel. Maximum delay time was measured to be 2.0 seconds.

Next I measured receive converter gain to be 20.0 dB at 50.0 MHz. The minimum discernible signal in a 2.1 kHz bandwidth was measured to be -121 dBm (0.2 μ v). This is a fair degree of sensitivity, but it could stand some improvement if very weak-signal work such as meteor scatter is intended. Thankfully, the receive converter is so immune to overload that any good, low-noise preamplifier can precede the converter without any fear of reducing its strong-signal performance.

Speaking of strong-signal performance, just how immune is the MMT50/28S to overload? I measured its 1 dB compression point to be $+22$ dBm output at 28 MHz, or $+3$ dBm input at 50 MHz. This is an amazingly strong signal (>300 mv at 50 MHz) which I should expect

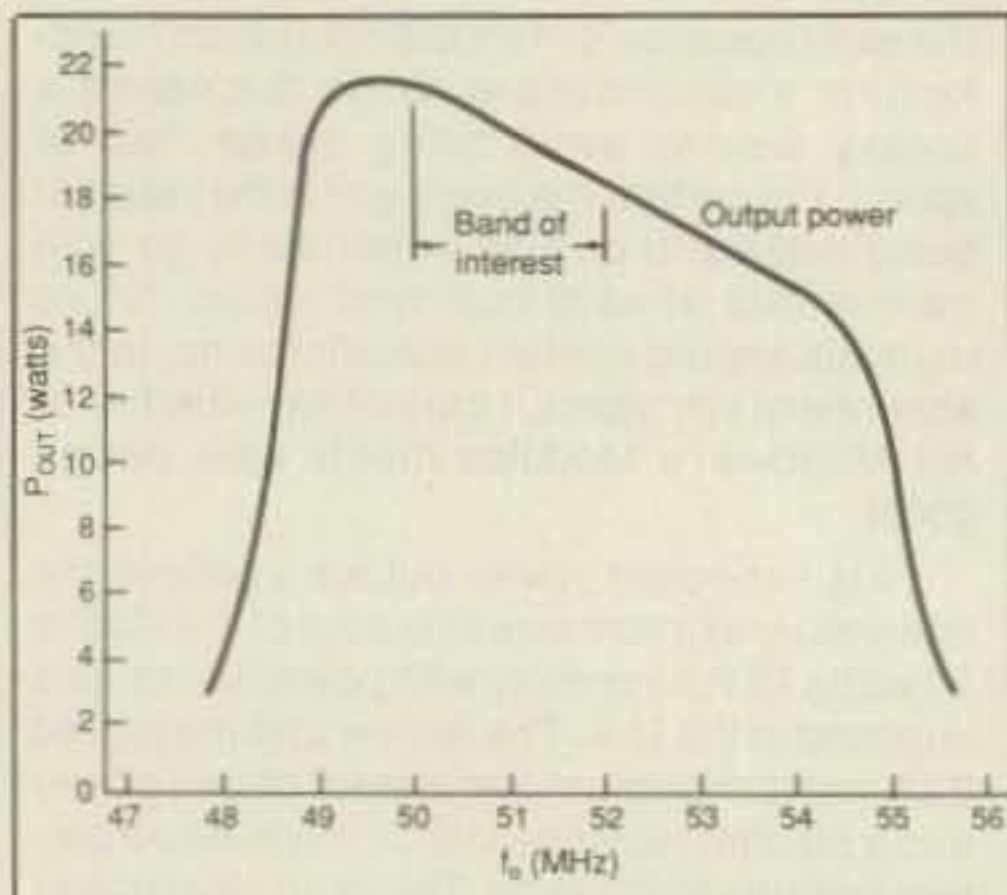


Fig. 1—MMT50/28S transmitter output frequency response.

would never be encountered in normal operations.

I measured the L.O. frequency accuracy to be ± 100 Hz, which is within the error limit of my frequency counter and should make the transverter very usable for any mode of operation. To accommodate field crystal replacement or aging, trimmer adjustments are provided for both L.O. crystals.

The minimum 28 MHz TX drive signal required for full transverter output at 50 MHz was measured to be -7 dBm, or about 200 μ w. This sounds like the manufacturer didn't quite meet his specification of 100 μ w TX input sensitivity, but remember my measurement was for maximum (saturated) 6 meter output power; at the rated 20 watts output, the drive sensitivity was -13 dBm, or 50 μ w. The amount of 28 MHz drive required is adjustable down to this low a figure, but one needn't use all this sensitivity; the transverter will accommodate drive levels up to 300 mw without saturation if the proper adjustments (per the operator's manual) are made.

Next, I measured the "keying" current required to activate the transverter to the TX mode when the "hard" keying line is employed. This figure is an entirely reasonable 3 mA dc, with which any transmitter's "amplifier key" circuit should cope.

The last measurements made were regarding spectral purity of the transmit section. Needless to say, I was very determined to find any "spurs" which fell within the TV broadcast band, as these are the sure-fire causers of TVI. I breathed a sigh of relief upon initial key-up of the MMT50/28S when connected to a Hewlett-Packard 8554 spectrum analyzer. All spurious

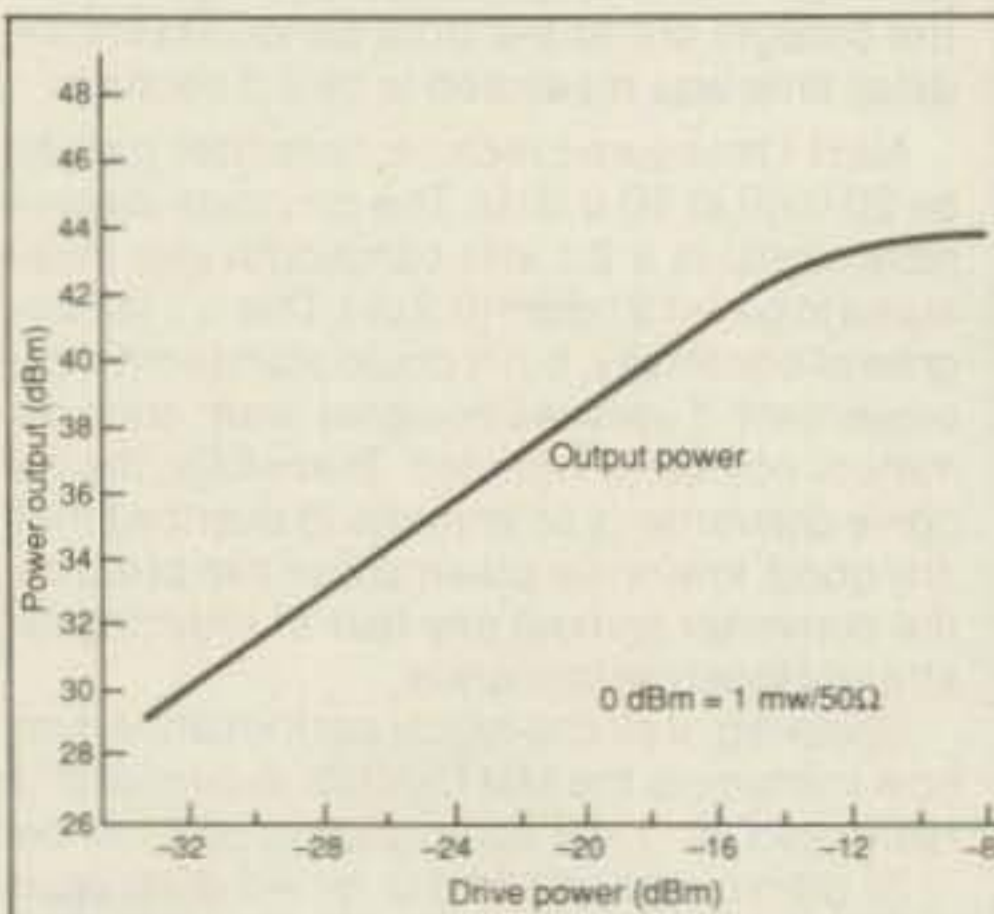


Fig. 2—MMT50/28S transmitter linearity.

outputs are -40 dB or lower from the main output signal, and the most troublesome products, at 56 MHz (TV Channel 2) and 100 MHz (FM broadcast band), are both -55 dB from the 50 MHz output signal.

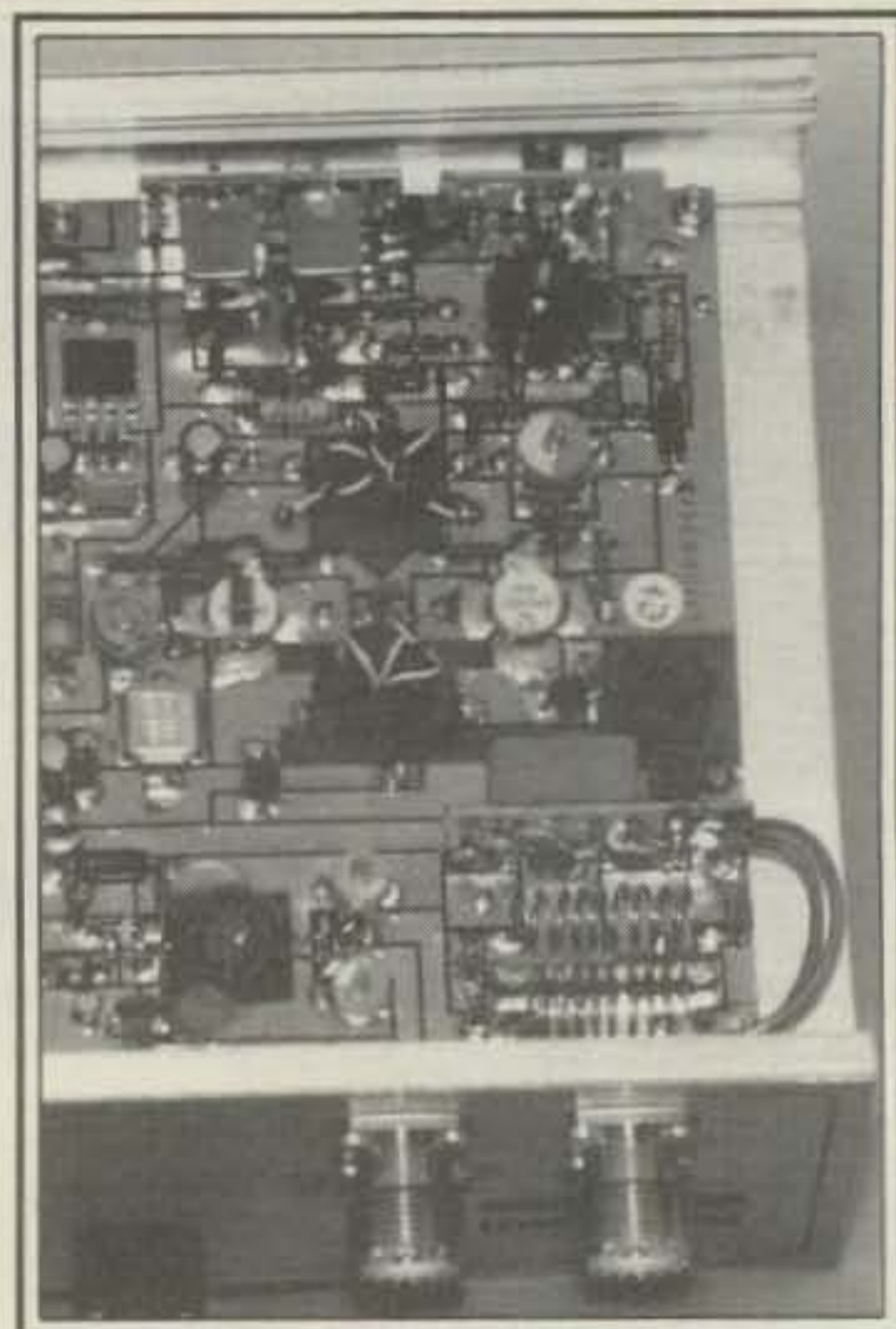
Actually, the output spectrum from the MMT50/28S is rather "busy," with a lot of little spurs in close to the 50 MHz carrier (see the 20 MHz/division display photo). Closing in on these to see where they fell, I found them to be $+2$, $+4$, $+6$ MHz, and -2 , -4 , -6 MHz from the desired signal. These are undoubtedly intermodulation products of some sort, and I double-checked the signal source (28 MHz) for spectral purity before proceeding. The 28 MHz source, a Hewlett-Packard 8640B, was clean as could be with no spurs anywhere near its main carrier, so the little 2 MHz sidebands shown are produced by the transverter. These spurs should be of little consequence, since the first-order products at $+2$ and -2 MHz are -70 dB from the desired signal, and even the worst product at $+4$ MHz is -44 dB. At full carrier output, this worst-case spurious product represents a power of less than 1 mw. Still, I would like to know where these signals are generated.

It is difficult to produce a "clean" transverter when the intermediate and local oscillator frequencies are spaced as near as they are in a 6 meter design. In the MMT50/28S, the L.O. is 22 MHz and the IF is 28 MHz, with the desired product being the sum at 50 MHz. This mixing scheme produces primary images at 6 and 72 MHz, with secondary images all around the block. While the MMT design makes liberal use of filters where appropriate to maintain a high degree of spectral purity, a different (preferably, higher) IF would make the job much easier. To this end, Microwave Modules does offer a 144 MHz IF version of this transverter called the MMT50/144. In close to the carrier, this unit is a bit "cleaner" than the 28 MHz IF version. (Note: MMT50/144 serial number 029 was on hand for brief evaluation during our laboratory testing of the MMT50/28S.)

In all, the MMT50/28S is a remarkable unit with carefully thought out circuits chosen to optimize performance at this frequency. A few details of those circuits are in order.

Looking inward from the antenna jack, the 50 MHz signal first encounters a 5-pole low-pass filter which is in line on both TX and RX. From this point, the signal passes to the common port of the 6 meter T/R relay, an encapsulated unit mounted on its own little circuit board near the output filter. There is provision made for an independent RX antenna. A separate SO-239 receptacle on the rear panel is pre-wired for this, and a miniature slide switch mounted on the relay PCB accomplishes the common/independent function. The NC (receive) side of the T/R relay feeds a 3-pole high-pass filter and then a parallel pair of J310 JFET devices in common gate. This unusual design is presumably responsible in part for the phenomenal strong-signal performance of the receive converter.

The output of the dual J310's feeds a 7-pole bandpass filter which is common to both the transmit and receive functions. This filter is totally symmetrical except that its "input" is preceded by a 3 dB resistive attenuator in the receive mode, while its "output" is terminated by that same attenuator in the transmit mode. This clever scheme offers the desired gain distribution for both functions, with the resistive pad offering a good, low-ripple termination for the filter. All interstage coupling is accom-



The transmitter PA section of the MMT50/28S contains the driver and push-pull output stages, plus T/R relay and low-pass filter.

Output Power in Watts	No. of LED Bar Segments Lit
1	3
2	5
3	6
4	7
5	7
10	9
15	9
20	10
22	10

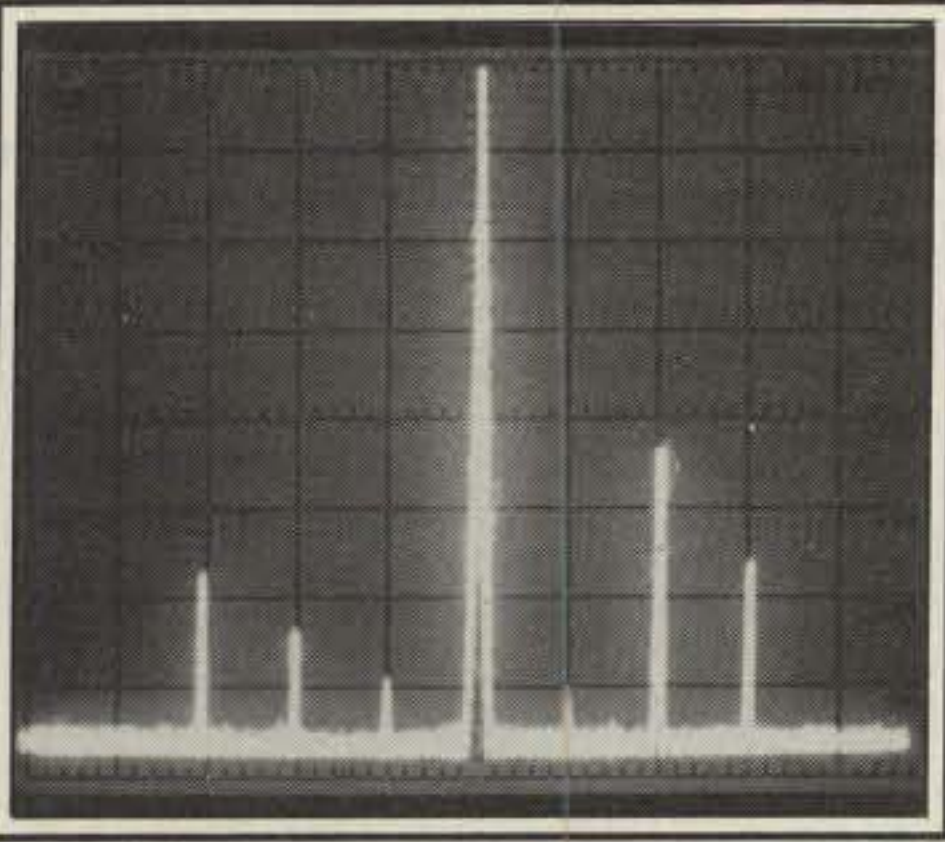
Fig. 3—MMT50/28S LED bar display response.

plished by broadband transformers (toroids), bifilar or trifilar wound as required. The use of broadband coupling with bandshape filtering is unusual in amateur VHF equipment, but commonplace in both commercial (laboratory-grade) instrumentation and amateur HF equipment alike.

The output of the common BP filter feeds the balanced J310 receive mixer in which the common gates are driven by a powerful $+14$ dBm L.O. signal, while sources are driven at 50 MHz and the push-pull drains provide the 28 MHz IF output. The IF signal passes through a 5-pole bandpass filter to a high-intercept bipolar amplifier (2N5109 CATV-amplifier type device, renowned for its very high-intercept performance and responsible for drawing much of the receive converter's 320 ma total current) the output of which is broadband coupled to the 28 MHz RX output port.

Even the L.O. signal, generated by a 2N2369A Colpitts oscillator crystal-controlled at either 22 or 24 MHz (range-switch selectable) and buffered by a BFY90/2N4427 feedback amplifier, is filtered nearly to death by a 5-pole low-pass network before driving a hybrid 50 ohm splitter which feeds both the transmit and receive mixers.

This entire lineup is unique to the 6 meter transverter; as far as I can tell, nothing was



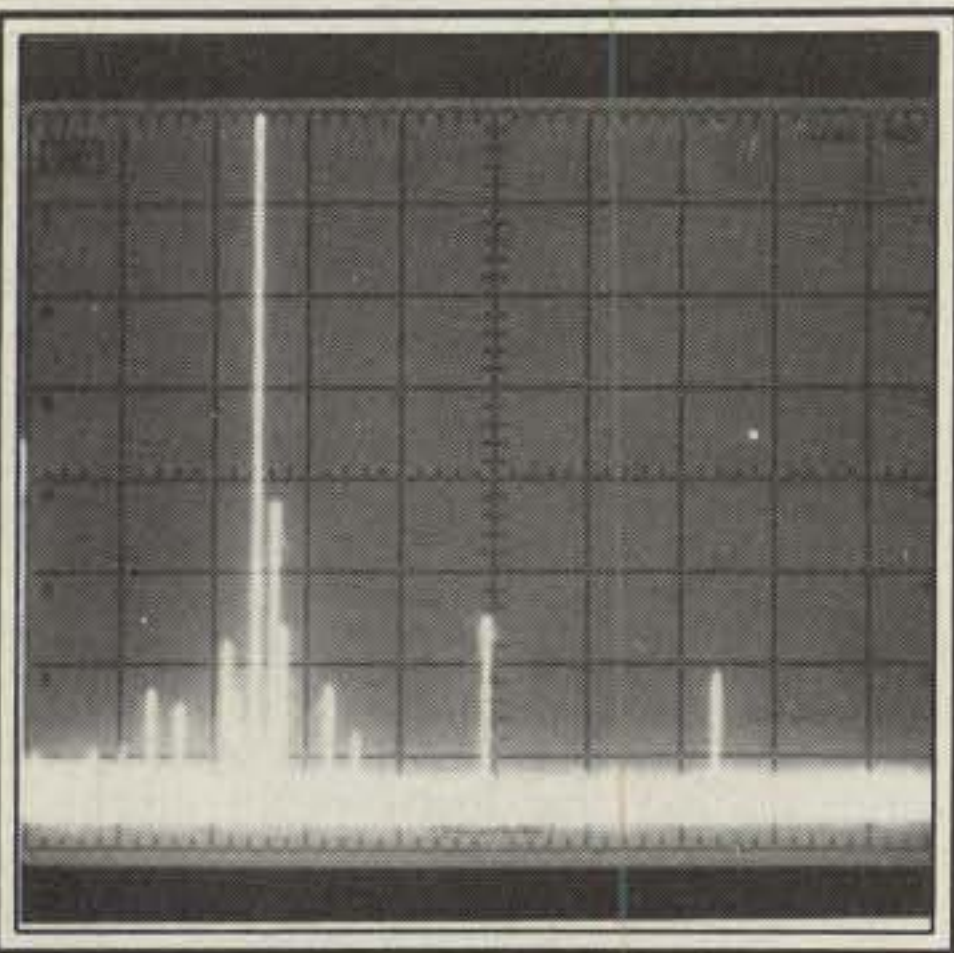
A closer look at the MMT50/28S output spectrum, 2 MHz/division horizontal and 10 dB/division vertical. Strongest spurious response is at +4 MHz, -44 dB.

drawn from previous circuits used in the higher frequency transverters.

The transmit mixer uses a balanced pair of J310's in a circuit similar to that used in the receiver. In this setup the L.O. signal is once again applied to the common gates; the 28 MHz IF signal is fed to the drains, and the 50 MHz RF sum signal is coupled to a 3-pole high-pass filter by a broadband, trifilar-wound toroid transformer. The first RF buffer amplifier is a bipolar NE02136, the output of which is coupled to the common bandpass filter described earlier.

On transmit, the "output" of the 7-pole bandpass network feeds a 2N4427 amplifier, then still another bandpass network (5 poles!) before driving the MRF237 first power amplifier, located on the "Power Amplifier" PCB. The MRF237 driver is toroid coupled to the bases of a pair of 2N6082 bipolar final power amplifiers operated in push-pull. This is a most conservative approach for a 20 watt output stage, since each 2N6082 could easily deliver this much power on its own. The push-pull circuit reduces even-order harmonics, and this task is well accomplished, as evidenced by the -55 dB second harmonic performance of the transmit converter.

Other circuit features of the MMT50/28S include an internally-switchable 28 MHz TX buffer amplifier (2N4427, operating at 13 dB gain) used to reduce the minimum drive signal required for full-power operation and a TX ALC



MMT50/28S output spectrum, 20 MHz/division horizontal and 10 dB/division vertical. All spurious outputs are below -40 dB.

(automatic level control) circuit which folds back transmitter output to a pre-set level regardless of RF overdrive. The ALC amplifier, one-half an LM324 quad op amp, uses signal diodes as variable resistance elements in a feedback loop which is driven by the PA RF detector circuit. This unique circuit should keep the MMT50/28S sounding very clean regardless of operator error—to a point. Obviously, if one were to inadvertently transmit with 100 watts delivered to the 28 MHz TX input port (which is intended for 300 ma maximum), all bets would be off.

I'm very impressed with the laboratory performance of the MMT50/28S, another fine product from Microwave Modules Ltd. The review unit is so new, having just arrived in the U.S. a couple of weeks before this is being written, that I have not had a chance to put it on the air yet. My 6 meter antenna system is not yet erected at my new QTH (waiting for the snow to melt!), but I should be on the air by the time this is published. If feel very confident that the 6 meter "Module" will perform every bit as well as I expect, and I am anxious to try a GaAs-

FET preamp ahead of its receiver to see what impact that has on minimum discernible signal. I expect this conversion will result in a number of less than .02 uv in a shielded system, but it is unlikely that one could take advantage of that kind of sensitivity with an outdoor antenna connected.

The MMT50/28S, and its "sister" unit, the MMT50/144 (2 meter IF version) transverter is available directly from the importer, The PX Shack, 52 Stonewyck Drive, Belle Mead, NJ 08502. Price class is \$350.

Late item news flash: Just as this column was being put to bed, news of a grid-expedition in the southeast U.S. arrived. WA4VCC and KB4CSE will be operating from EL79 in the southern Florida panhandle (a grid which is mostly water) using 100 watts on 6 meters, 200 watts on 2 meters, and 125 watts on 70 cm, on April 28-30. This group will also operate from EM61 in SW Alabama, on the Florida border, 2 meters only, on April 21-22. Those needing these grids should contact WB4TWX at (704) 889-7316 to coordinate schedules.

73, Steve, WB2WIK

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NEWS OF COMMUNICATION AROUND THE WORLD

*Morning waits for the DXer
At the end of the world,
And the world is all at your call . . .*

With winter gone, Cycle 22 headed up, and the warm days of May at hand, one might think that a DXer would have time to relax and enjoy the good life of DXing. Don't you believe it! There are still forces out there to disrupt your serenity, and last week one of them came ambling up the hill in the guise of a Local. We were caught unawares.

"Tell me," this one said in all innocence, "what are the age limits for a DXer?" Age limits? What sort of a question was that? And before we could get a grasp of things, the Local continued, "Maybe it might be better to ask how old would one be not to be a DXer?" This second effort left us as confused as the first. Why would such a question be asked, the answer being a bit obvious? DXers never grow old! But one can learn that while the answers may be obvious, the intent of the question may not.

"It's this friend of mine," the Local explained. "For some years, every time he runs into me he talks about DX. What's it like? How do you get started? Things like that. And lately I've seen him about every week and it is always the same topic. DX! He says that he is ready almost to jump in. Almost." Listening to the words we thought that this was something running on rails. Who can resist being interested in DXing? No one with a high level of intelligence. We knew that, but it was that last "almost" that was the sticker. Almost. . . almost what? We had to know more.

"This fellow is an old schoolmate of mine," the Local explained, and we immediately started to hear a distant bell chime. "He has always been the enthusiastic sort. You know, the go-go-go, non-stop type. Lots of energy, but in recent years he has been thinking of retirement. Now every time he sees me he has to talk about DXing and amateur radio. Maybe you know the type?"

Maybe we did. More than one DXer has dazzled a visitor with his ability to raise a station far on the other side of the world. But this Local had said something about this one being a "schoolmate," and the Local was neither a novice in amateur ra-



Here is a line-up that DXers should recognize. Taken at the IARU II Conference in Argentina last fall, you will note LU2DX on the right. This is Jose Ahumada, who was on the first South Sandwich effort some years back. In the center is JH1VRQ, Naoki Akiyama, once known as the DX Terror of Tanashi, now signing N1CIX at ARRL Newington, where he is in the IARU section. On the right is CX4AA, Luis Monges, out of downtown Montevideo. (LU2DX photo)

dio nor by the calendar. But before we could get started with some of our own questions, the Local was again speaking.

"This friend of mine is great for planning," he continued. "Now he says he is planning his retirement. And he has a lot of plans for things to do, really big plans. One of them is to get into amateur radio and DXing. Sounds good, doesn't it?"

Of course it sounded good. With the world being taken over by the senior citizens, it is always good to hear one planning his future. But there was a distinct turning up at the corners of the mouth of the Local as he told us all this, and we were sure there was a reason. But we had to know more. "What's his callsign?" we asked, and the Local had to advise us that his friend had none . . . yet.

"But he is thinking about it," the Local continued, "and he is subscribing to a lot of magazines so he can develop some background knowledge. He reads them all. He says that he has a lot to learn and a lot of territory to cover. It is real interesting to hear him talk about his plans. He says that he has always wanted to hike the High Sierra, so he is planning to backpack the John Muir Trail, all 250 miles of it. He got interested in the yacht races down in Australia a couple of months back, and now he says that he is going to get into boating. He's planning to buy a sailboat and sail the bay. Heck! He's even bought himself one of those Greek fisherman's caps, those sporty things with the short brim. Doesn't that show he's serious?"

How could one have any doubt at all? Of course the friend was serious. Every-

thing that the Local recounted bolstered a belief that this was a serious approach. It was that twitching around the mouth of the Local that bothered us. It was almost obvious that he was fighting off something. Then the Local had to continue.

"Yes, he's really planning for an active retirement. He's talking of the Baja in winter, possibly signing up for a scuba diving class, this after he visits the new aquarium down in Monterey. He tells me there is no age limit there, just your physical condition. He says that when he retires he will want to live a full life and will need activities to keep himself occupied. He's really planning."

This was getting to be too much. We had to hold up our hands to stop the flow. "How old did you say this friend of yours is?" we asked, and this time the Local had to laugh.

"We graduated from the local high school back in 1935," he advised us, the smile growing a bit broad. "So let's see. That would make him about . . ." When the answer dragged, we stepped in to add our own quick computation. "About 70, right?" It was.

"And when will he retire?" we asked, adding, ". . . he's still working, isn't he?" The Local admitted that he was.

"He still is," he explained, "but he is thinking of retirement. A year or so back he thought he was retiring this year, but they changed some law on mandatory retirement so he figures he will stick around for a bit longer." The Local paused to lean closer and pat our shoulders. "But keep in mind, when he does retire, whenever that might be, he will need a lot of things to keep him busy. And DXing is at the top of his list. Definitely!"

Son of a gun! Years back the Old Timer had told us that a DXer gets out as early as he can so there will be nothing to interfere with the important things to be done. But here was another story. The Local looked at us, we looked at the Local, and we both had to laugh. But this was a serious matter to the friend, so in proper respect we laughed seriously.

"What was that question you had when you came up the hill?" we asked the Local, and he gave it to us again. But now we knew the answer.

"A DXer is probably reaching the limits," we said, "when he loses interest in reading the advertisements of new gear and visiting the local radio stores to check the gear. When he starts thinking that his tower is high enough or that he has worked all DX necessary." We paused to think a bit, and the Local eventually asked, "Is that all?"

77 Coleman Dr., San Rafael, CA 94901

The WPX Program

Mixed

1262 W5ASP 1264 WA4WIN
1263 JE2PMC

S.S.B.

1870 HK6IMU

CW

2421 YU2RR 2423 JA1KWC
2422 KD2JC

VPX

250 F11ACZ

Endorsements

Mixed: 450 NQ6E. 500 NQ6E. 550 NQ6E, W5EW, KS3F, 600 NQ6E. 650 VE7EIK. 700 VE7EIK. 750 VE3NBE, VE7EIK. 850 AB90. 900 I1EEW. 950 KS0Z, N2CIC, NE6I. 1250 K2QLG. 1450 KL7AF. 1600 W1NG. 1650 W1NG. 1700 W1NG. 1750 N7TT, I2PHN, W1NG. 1800 IW0HN, W1NG. 1850 I2PHN, W1NG. 1900 I2PHN, W1NG. 1950 I2PHN. 2000 I2PHN. 2050 I2PHN. 2100 I2PHN.

S.S.B.: 350 KS7T, K3ZPG. 400 KS7T. 450 KS7T. 500 KD9OT, KS7T. 550 KS7T. 600 KS7T. 650 NE6I. 800 KK5P. 850 VK3SM, N2CIC, AB90. 1200 W1NG, KL7AF. 1250 W1NG. 1300 W1NG. 1350 W1NG. 1400 W1NG. 1500 N7TT. 1700 I2PHN. 1750 I2PHN. 1800 I2PHN. 1850 I2PHN. 1900 I2PHN. 1950 I2PHN. 2000 I2PHN. 2050 I2PHN. 2250 I0AMU. 2300 I0AMU.

C.W.: 350 KS7T, KD2JC, DK6NP. 400 KS7T, KD2JC, DK6NP. 450 KS7T, DK6NP. 500 KS7T, DK6NP. 550 KS7T, JA1QJZ, LA9XG, DK6NP. 600 KS7T, DK6NP. 650 I0FIC, DK6NP. 700 DK6NP, NE6I. 750 DK6NP, PY2RRG. 800 JA7FFN, DK6NP. 850 DK6NP. 900 DK6NP. 950 G3HB, DK6NP. 1000 G3HB, DK6NP. 1050 W1NG, DK6NP. 1100 W1NG, DK6NP. 1150 W1NG, DK6NP. 1200 W1NG, JE1JKL. 1250 JE1JKL. 1300 JE1JKL. 1350 N7TT. 2100 WA2HZR. 2100 WA2HZR.

10 Meters: I2UIY, DL9JI
15 Meters: I2UIY, I1EEW
20 Meters: I2UIY
40 Meters: I2UIY
80 Meters: KS7T, I2UIY
160 Meters: I2UIY

Asia: I2UIY
Africa: KS7T, I2UIY
No. America: I2UIY
So. America: KS7T, I2UIY
Europe: I2UIY
Oceania: I2UIY, PY2DBU

Award of Excellence Holders: ZL3GQ, W4BQY, I0JX, WA1JMP, K0JN, W4VQ, KF20, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QM, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SM0DJZ, DK5AD, WD9IC, W3ARK, LA7JO, VK4SS, K6JG, N4MM, I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO.

Award of Excellence Holders with 160 Meter Endorsement: N4NX, 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, LU3YL/W4, I4EAT, VE7WJ, W9NUF.

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.

No, it wasn't. But there are a lot of things in DXing—the friends, the listening on the bands, the recollection of the good and great days of DXing, whenever they might have been—and the more we thought of it, the more we realized that we had difficulty in recalling a true-blue DXer who ever got too old for DXing. Some may



Here is Pat, N0ZO, at his operating position of 5H3ZO in Dar ES Salaam. Pat has been looking for a 160 meter permit to put the low band on the air from Tanzania. (DK7PE photo)

lose the fire and intensity of their early years, but they never lose the interest. How could they?

After a bit the Local prepared to depart. "Anything I might tell my friend the next time I see him?" he asked, and we had to think things over. It did seem that with all the emphasis on planning and little on action, the friend would always be a spectator and never a participant. But that does happen. So we told the Local that we remembered Earl Hinz sometimes calling as he piloted his boat down the channel.

"Always sail before sunset," was what Earl would call. It at first took us a bit of time to understand what he meant. Now we wonder why, it being so obviously clear.

Always sail before sunset. You sure won't after.

Don Riebhoff, K7ZZ/CT4AT

Last fall Don Riebhoff was in the CQ WW CW Test signing CT4AT and, setting what he thought was a new European record for an 80 meter score in that effort, he was making plans to try to set 40 meters afire this year. In January Don was killed in a head-on vehicle crash. If you worked DX during the last two decades, and especially in the late sixties and early seventies when there was much activity in Southeast Asia, you will remember Don Riebhoff.

Back in 1968 Don was in Thailand, then a country where operation by amateurs was not allowed. However, it was determined that the Thai officials would look the other way if Americans were involved, but any local Thai would be at risk if they had anything to do with amateur radio. Don put HS3DR on the air, but at the same time he worked to get participation by the locals. He worked to get support for the Radio Amateur Society of Thailand. The efforts bore fruit, the national society joined the IARU, and a comprehensive radio law, long sought by the amateurs in Thailand, is expected to be enacted this year.

Don was also in Vietnam and Cambodia, being part of Chester's group at XV5AC. In Vietnam the problem for amateur radio was the U.S. military, which wanted to use the frequencies for tactical military communications. Don was not a bit backward in protesting to further the protection of the amateur frequencies, this even involving getting into a shouting match with a U.S. General in charge of communications. Eventually Chester, Don, and a number

of others got the U.S. Ambassador interested in the matter, and with Don's expertise and knowledge of the official channels back in Washington, it was possible to get Vietnam removed from the FCC's banned list.

Don also operated in Kampuchea (Cambodia) and was on the 1973 Spratly effort when 1S1A was signed. This trip was made with N5TP, W4EVG (Chester), WB4UZZ, and Scott, K4J-. As Don Miller had been the first reputed Spratly operation, the uproar over his activities had not faded, and the crew on the 1973 effort was concerned whether 1S1A might be an acceptable callsign for DXCC credit. A phone call to Bob White at the ARRL DXCC Desk brought a roaring response. "I don't care what damn call they use just so long as they can prove that they were there!" So there would be no doubt, Don recorded everything from day one with his trusty Super-8 camera.

In the sudden evacuation from SEAsia, Don tried to get Vong, XU1AA, to take a space on an outgoing flight. Vong, a graduate of the University of Kansas, was the Cambodian local director of amateur radio and an enthusiastic operator. When Vong would not leave, Don took a briefcase of money to Vong's house in the hope it might be of some help. It was not, and Vong was shot by the invaders a few days later when they took over the country.

For Don's efforts during the last days before the fall of Saigon, the U.S. Ambassador to South Vietnam, John Gunther Dean, insisted on personally writing Don's personnel evaluation, something almost unheard of, Don being rather far down the list and a member of the embassy's communication crew.

After Southeast Asia Don served in his assignment as a communication maintenance specialist, going to Czechoslovakia, Iraq, and finally to his last assignment in Portugal. We last saw Don a few years back when he was at the Monterey language school prior to going to Portugal.

There are many DXers who have something to tell about Don Riebhoff, his operating ability, his sometimes disregard for his personal safety, his always evident high spirits and willing-

The WAZ Program

20 Meter Phone

593 JA1NKA 594 K4ICH

20 Meter CW

254 N6FT

All Band WAZ

SSB

3073 V85HG 3075 N9BMS
3074 KE0DV

Phone/CW

6045 DL2KBS 6049 K5MC
6046 AA6G 6050 W5MCH
6047 VE6CB 6051 OK1DIL
6048 GM3UCI

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (39 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Haljsman, 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 February 1, 1987

All 200 zones worked:

126. DF9ZP	131. SP7KTE
127. Assigned	132. W3GG
128. HK3DDD	133. DL8AN
129. W6GO	134. G3GIQ
130. F6BEE	135. LA9GV

The top 12 contenders for 5 Band WAZ are:

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

400 Stations have met the 150 Zone level.

ness to enjoy the good things. To some friends in the last year of so he at times talked of retiring and living permanently in Portugal on the thousand acres overlooking the Atlantic. But always aware of other possibilities, he had also purchased a spot for an antenna farm in the Virginia mountains and a spot along the Washington coast.

Among the calls Don signed were 3W8D, XV5AC, XU1DX, EA8YI, and CT4AT. Years back we were convinced that Don was not only a top DXer but also a very fascinating and talented person. It might at times have shown in what was reported about him.

Golden Jubilee DX Award

It did not take long for this 50th Anniversary DXCC Award to be claimed. The award was announced last September, the action to start at 0000Z on January 1st. The first four certificates were issued on January 5th. Two applications were delivered on Saturday, January 3rd, and two others came in the following Monday. The official date on all four is January 5th. There will be no certificate number on this Golden Jubilee Award.

You might answer some question on how long it takes to work DXCC. You can figure out that these four did it rather quickly. Jay O'Brien, W6GO, worked his hundred countries in 48 hours and 42 minutes. Should you have forgotten, for this award you do not have to submit QSLs, only a certification on the authenticity of the log entries. The four receiving the Golden Jubilee DX Award certificate dated January 5th are K1MM, AA2Z, K6AAW, and W6GO.

Nauru

Remember Ed De Young, KH6GLU? If you do, you've been around the track a couple of times. Back in the sixties Ed was active in the Pacific. In addition to KH6GLU, he also signed FW8DY, VR3DY, and others in the '67 to '74 period. Then he went out to Australia, living in the Cairns area and recently in the Adelaide area. Down under he has signed VK4LX, VK8XX, and VK5AXX. In a bit of time, if not already, you should be hearing Ed signing C2-Nauru.

He has been appointed Director of Telecommunications for Nauru and will be there at least two years and possibly four. Ed expected to be on the island in March and was making plans to be active for the CQ WW WPX SSB



How do you tell a DXer? You look for shining eyes, alert expressions, DX gear in the background, and the aura of goodwill and good times. That's how you do it! Check the photo above. There are Lloyd Colvin, W6KG, Iris Colvin, W6QL, visiting in the shack of Rachid, 3B8FP, at Mauritius in the Indian Ocean. You should be able to recognize the Colvins. They are DX! Always!

Test in March. Possible callsigns were C20A or C2A, but that was tentative.

Most DXers know that Nauru is out in the Pacific just west of the International at 166°E and on the equator. A warm spot always. Until Ed arranges for a QSL manager, send your QSL direct to him via the Nauru Amateur Radio Club.

The Colvins

Lloyd and Iris operated from the Seychelles in January, making over 9000 QSOs signing S79KG. They asked the information desk at the Mahe airport to suggest a hotel on the road to the town, and at the recommended one they were surprised to find the 60 foot tower of Carl Reder, VQ9R, who departed Mahe some 10 years back. It even still had the tri-band beam flying.

The Colvins set up operations, trying the VQ9R antenna, but the years had not treated it well. The transmission line was damaged, the rotator was stuck, and the caps on the traps were gone. So they set up their own tribander and their own telescoping mast and did business as usual. They were surprised to find Ian Shephard, G4LJF, also in town and operating as S79LJ.

Where are the Colvins these days? You can be sure that they were at the International DX Convention in California in April and later at the Dayton Hamvention. These two remarkable DXers will be visiting around the country a bit, even spending a bit of time at the home QTH, the one with the big antenna on the westside of Interstate 80 at the boundary between Richmond and Berkeley in California. If you have a chance to meet them, don't hesitate. They are DXers and always looking to meet other DXers either in person or on the air. And you may wait a long time to meet another couple who will have worked so much DX from so many DXCC countries. Absolutely remarkable!

Thailand

With the Radio Amateur Society of Thailand continuing to work to end the restrictions on amateur activity, the Thai PTT has agreed to allow RAST members to operate from the station of RAST V.P. Youngyuth Naphasub, HS1DS. Possibly they will be able to use their own callsigns. There will be activity allowed Friday, Saturday, and Sunday every week until there is an examination for personal licenses. Nong,



Here is one of the living legends of DXing, Father Marshall D. Moran, 9N1MM, at the operating position at St. Xavier's School outside Kathmandu. If you wonder what was going on, in the foreground is Rudolf Klos, DK7PE, who was visiting and working on a broken relay in Father Moran's transceiver. Over the years it has been mostly 9N1MM for DXers to work to gain Nepal as a DXCC counter. (DK7PE photo)

HS1JN, is working on code classes for the upcoming candidates for licenses.

The Everlasting Sunspot Cycle

With things a bit good and 15 meters open during the Peter I operation, DXers are again looking for the Great Days of DXing. It was thought to be relevant to mention this to the Old Timer and how it appears now that last summer was the bottom.

"How did you know?" we asked, and all we got was a sharp look. Apparently he forgot that back in July he had said that we were at the bottom. His call now appears to have been on target.

The official announcement of when the bottom was reached probably will not be made for some months yet. This will come from those involved in solar studies, the AAVSO group and the Sunspot Index Data Center in Brussels. They are interested in the solar phenomena and not especially what bands will be open. But the monthly mean got down to .8 in June, was 17.8 in July, and was 3.5 in August. It has been higher since. The groups in February were high-latitude groups, these usually an indication that they are from the new cycle.

But as long as things are better, should one worry? Some often do, the feeling being that good news is always welcomed, while bad news should be ignored. This was mentioned to the Old Timer, the trust that many put in the sunspot numbers without taking the time to really understand that mostly what you get is the monthly average and that conditions can and do vary greatly from day to day. When we brought up the matter the Old Timer was hardly listening.

"Remember a couple of years back when you were talking with Dave Palmer?" the Old Timer asked, and we did remember Dave testing all the gear at a local radio shop and talking. "In checking my logs," Dave had said that day, "I don't find any time I can work skip when the Alpha Index is above ten. So I listen to WWV, and if the Alpha Index is above ten. So I listen to WWV, and if the Alpha Index is below ten and the K-index two or lower, I fire up the rig and work DX. When the figures go up, the DX goes out." Obviously, W6PHF is a DXer.

We were getting the point. WWV can give you the DX conditions now; the sunspot count only gives you history. You can also check the

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Total countries are now 317. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is \$1.00.

CW

ON4QX 316	W2FXA 312	N4KG 305	W9RY 293	I8WY 281
W9DWQ 316	W6ID 311	AB4H 304	K8LJG 292	K2OWE 281
W6PT 316	K4XO 311	W0IZ 303	N5DX 291	K7ZR 280
K4CEB 316	DL3RK 310	WA8DXA 302	WA4JTJ 290	I5XIM 280
N4JF 316	SM6CST 310	YU2TW 301	W1WLV 289	W2LZX 280
K9MM 315	AA6AA 309	I3OBO 301	W4BV 289	W9NUF 280
N4PN 315	DL8CM 309	W6SN 300	N8MC 288	HB9AFI 279
DL7AA 315	W9BW 309	WB4RUA 300	WD9IC 288	IT9QDS 279
N6AV 315	N4MM 308	W0SR 300	W0HZ 287	WA4DAN 278
W3GRS 314	DL1PM 308	W7CNL 299	WA2HZR 286	DL1QT 277
W8KPL 314	K1MEM 308	K3FN 298	NN4Q 286	W9SC 277
K6LEB 314	OK1MP 308	K3UA 298	YU1HA 286	KA3R 276
K6JG 314	W4OEL 307	K9IW 298	K4CXY 283	W1WAI 276
N6CW 313	SM3EVR 307	EA2IA 298	W6YQ 282	K4SE 275
K9AB 313	W1NG 306	DJ7CX 297	G2GM 282	N4AH 275
K6EC 312	K9QVB 306	WD9IX 296	JH1VRQ 282	KQ9W 275
W4BQY 312	K8PYD 305	N5FW 294	K1VHS 281	K9BWQ 275

SSB

K2FL 316	K5OVC 313	KB5FU 306	WA0TKJ 299	W4UW 288
W4EEE 316	YU1AB 313	K8CMO 306	I6PLN 299	KE4HX 288
K6WR 316	VE7WJ 313	EA1QF 305	KC8EU 299	OK1AWZ 288
W4UG 316	F2MO 312	NA5W 305	KA8T 299	I8KCI 288
W6EUF 316	K8PYD 312	KZ8Y 305	DJ7CX 298	KI3L 287
VE3MR 316	W0SD 312	NS7Z 305	K9SM 298	EA3KW 287
DL9OH 316	K9RF 312	XE1OX 305	I8LEL 298	AB9E 287
N4JF 316	K4MQG 312	K3UA 305	JH4PRU 298	W5LLU 287
I0ZV 316	N4MM 312	I8KCI 305	K8ZZU 298	K2JF 287
KD8VM 316	I8ACB 312	K8VFF 305	EA9IE 298	G3XTT 287
I0AMU 316	W9SS 312	W6SN 305	XE1NI 298	N8BJQ 286
F9RM 316	N2SS 312	W8IMZ 304	I1POR 298	N3ARK 286
TI2HP 316	LA7JO 312	XE1J 304	KB3OQ 298	K9MNT 285
KS2I 316	OE2EGL 312	VE7HP 304	K5DUT 297	KB5RF 285
YV1KZ 316	K4XO 312	W4UNP 304	HP1JC 297	KD8V 284
I8AA 316	LU3YL 312	W6NLG 304	YU7KV 297	WB3HAZ 283
DJ9ZB 316	K6EC 311	NY5L 304	K3LUE 297	VE3MV 283
W3GRS 315	W4SSU 311	I4EAT 304	WB3GPR 296	IN3ANE 283
VE3MJ 315	I4LCK 311	VE7DX 304	KQ9W 296	AE5B 282
4Z4DX 315	W0SR 311	XE1KS 303	KB3KV 296	CT1UA 282
W9DWQ 315	K9BWQ 311	W2LZX 303	W4BQY 296	KC8YM 282
W9JT 315	K6XP 311	WB3DNA 303	W9OKL 296	AI9R 282
ZL1AGO 315	K9AB 311	KB0U 303	I0SGF 296	TG9EP 282
W4NKI 315	W1LQQ 311	K0GT 303	K7LAY 295	N1ALR 282
VE2WY 315	W7FP 311	VE7DX 303	W0IYR 295	K4JLD 282
K6YRA 315	N6OC 311	K1MEM 302	KK0C 295	K9TI 280
W3AZD 315	DL6KG 311	N5FG 302	KA9ABC 295	ZL1BOQ 280
XE1AE 315	IV3YRN 310	W6FET 302	VE3XO 295	G4FAM 280
VE3GMT 315	DK2BL 310	W2FGY 302	I8ZTE 294	KU9Z 280
ZL3NS 315	AA6AA 310	K9HQM 302	WD0BNC 294	VE6PW 280
I8YRK 315	W8JXM 310	WA4DAN 302	I5BDE 294	KS0Z 280
VE1YX 315	WA4JTJ 310	I3OBO 302	WD8PUG 294	KB5DN 279
W4DPS 315	9H4G 310	K9UAA 302	WB3CQN 294	EA6DE 279
I4ZSQ 315	N4PN 309	NJ2C 302	K4SE 293	JH8NYK 279
OK1MP 315	K1UO 309	KP4EQF 302	KC8JH 293	KX5V 279
ZS6LW 315	W6DN 309	AI8M 302	AI5I 293	K4BYK 278
I8KDB 315	W7OM 309	WB4UBD 302	K4LR 293	I5EFO 278
W9BW 315	ZL1BIL 309	N5FW 302	W9NUF 293	VE3IUE 278
N4WF 314	WD9IX 309	I5EFO 302	AG9S 293	KB8O 278
OZ3SK 314	SM4CTT 309	WB4NDX 301	WA4LOF 292	KG9N 278
K9MM 314	VK4VC 308	WA3HUP 301	AC0A 292	G4ADD 278
YV5DFI 314	YV5AIP 308	VE3FJE 301	I2MOP 292	WB0UFL 277
K6JG 314	N6AV 308	W8ILC/QRPP 301	VE3FEA 292	W4PTT 277
CT1FL 314	W2CC 308	W9RY 301	VP9CP 292	KB0SY 277
OZ5EV 314	AI8S 308	YU2TW 301	W8LKG 292	I8XTX 277
W2SUA 314	N4KG 308	N4CRU 301	XE1OW 292	N0AMI 276
W0SFU 314	K8NA 308	KZ0C 301	K1VHS 292	N7ASL 276
W0YDB 314	WA4WTG 308	N8BKF 301	W0ULU 292	WA6DTG 276
OE3WWB 314	W1NG 308	KZ2P 301	SV1JG 292	WA4OPW 276
VE3XN 314	G4CHP 308	KE3A 301	WA2FKF 292	AI9U 276
YS1RRD 314	KU9I 308	WT4T 301	VE3IPR 291	KC2RS 276
N7RO 314	VE4SK 307	NN4Q 301	N5AWS 291	WA9IVU 276
K8LJG 314	WB1DQC 307	W4OHZ 300	WB6GFJ 291	K0HQW 276
W3GG 314	I0MBX 307	I5EFO 300	W4JFE 291	AB9O 276
I2LLD 314	KV2S 307	K9QVB 300	W6MFC 291	I8INW 275
K9AB 314	WB8MGQ 307	KB9KD 300	K2JLA 291	WB1EAZ 275
K9LKA 313	KB9OC 307	VE4AT 300	DU9RG 291	VE7BSM 275
ON5KL 313	KB8DB 307	WZ4I 300	VE3CKP 290	K8NWD 275
EA2IA 313	VK3JF 307	I2ZGC 300	KB2HK 290	G4GED 275
W8ILC 313	K9IW 306	K2JLA 300	KD5ZM 290	VE5FX 275
EA4LH 313	KR9O 306	W6BCO 300	VE3DLR 290	XE1MDX 275
OZ8BZ 313	N4KE 306	WA2MID 300	JA5PUL 289	KC2FC 275
N6AW 313	WA0DCQ 306	NW5K 300	W9TA 289	N2CIC 275
W8PCA 313	VE3MRS 306	JH1VRQ 300	K8ZZU 289	

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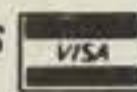


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Total number of active countries is 316. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement 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.

beacons at 14.1 MHz which start sending on the hour, each sending for one minute in turn with decreasing power during the transmission. You can learn a bit about what is open by listening there to the beacon stations all around the world. The beacons are on the hour, WWV at 18 minutes after.

So what do you do? You talk about the sunspot cycle—is it up or down—but you listen to WWV and the beacons at 14.1 MHz. What you learn from these sources is "now" information and you work DX now, with last month's report on sunspot conditions back then. Actually, it is quite simple, come to think of it. It is the explanation that brings difficulty.

Novice/Tech Changes

Effective March 21st, the FCC approved the Novice and Technician changes proposed in Docket 86-161. These are often referred to as the "Novice Enhancement" program, and the 10 meter, 220 MHz, and 1270 MHz bands are affected.

With the changes, Novices and Techs may operate 28.1 MHz to 28.3 MHz using CW or digital modes. From 28.3 to 28.5 MHz they may use CW, digital, or voice modes with a limit of 200 watts for these class licensees. Novices may use 222.10 MHz to 223.91 MHz for all authorized emissions with a limit of 25 watts. From 1270 to 1295 MHz Novices may use up to 5 watts with all authorized emissions. No amateur station at which the control operator or station licensee holds a Novice license shall be in repeater, auxiliary, or beacon operation. There are other parts of the docket, these mostly referring to license changes, the present Novices and Techs being grandfathered into the new privileges. Full details should be available by now, but the above gives the main points, should you be curious about some new activity.

VK1-Prefix

John Clare, VK1CJ, is the incoming QSL Manager for the VK1-Bureau, and John would like to make known that there are strange

things found these days, some of them VK1 calls.

It might be a team operation, two or more operators. The calls consistently showing are VK1A, VK1B, VK1C, VK1D, VK1E, VK1F, VK1QAV, and VK1GDW. Also heard is VK1AA, which is an official government callsign. This appears to be Tasmania Slim, always using CW, and has never been heard in Tasmania-VK1-land. Also being heard are VN1A, VN1B, etc., these notable because there are no Australian amateur callsigns with a single letter suffix. On 40/SSB VK1ZZZ has been heard, but in Australia the "Z" callsigns are not licensed for HF bands. Heck! You might even run across VK1M/m, which belongs in the above list.

There are not many amateurs in Tasmania. Possibly if things do not improve, there will be as many of the Slim family as the true-blue VK1s. Should you have a clue as to where mail might be addressed to anyone using the above callsigns, drop a line to John Clare, VK1CJ, GPO Box 2000, Canberra ACT 2601, Australia. John indicates he has prepared a special QSL for them. All he needs is the route to deliver it.

A Lot of DX Notes

The FCC has taken a position that it does not have the legal authority to determine who might be, and who might not be, a valid and legitimate amateur radio frequency coordinator. This came as a result of attempts by some groups, individuals, or councils to gain official recognition of their efforts. This came after an exchange of correspondence involving the Mo-Kan Council in the Kansas City area and the state coordinators for Missouri and Kansas. In other instances the FCC has indicated that amateurs within a given area had the right to name their own coordinator, that recognition by local or regional amateurs of the coordinator in their area is pertinent. Likewise, the refusal of a state or regional coordinator to recognize a local coordinator is prima facie evidence that that coordinator does not have the support of a majority in his area.

Does this sound clear? It hardly is, and if you are involved in any repeater frequencies or such coordinated efforts, it might be well to watch the developments. Litigation is possible along the line, confusion definitely as well as loud cries of who is noble and who is not and who might be the most deserving of them all. You might even find yourself involved in elections to name your local, area, or state coordinating group.

A USSR Artic Net meets at 14150 or 14180 kHz at 1500Z. Net control is UA1MU.

The Diamond Jubilee ARRL Convention in 1989 had been set for Las Vegas, but some problems developed and they are again looking for a site. The 1988 convention will be in Portland. Application for the 1989 convention has been extended to the 1st of June.

This is the 25th anniversary of the Liberia Radio Amateur Association, and you might have already noted some of the activities to celebrate the occasion. First, you might have caught the 5L-prefix during the year, also an additional suffix /25 to be used during special events and contests to mark the anniversary. There is a special Liberian postage stamp and the Worked All Liberia Award for working each of the nine Liberian counties. The number in the call denotes the county. There will be a special DX Contest on Liberian Independence Day, July 26th, and several clubs have the special BSJ suffix for the scouting Jamboree-on-

the-Air event. That should cover the highlights. If you need more information drop a line to Jim DeLoach, EL2GA, American Embassy ATO, APO New York 09155. Jim is also the secretary of the Liberian Radio Amateurs Association.

With the solar cycle looking up, it might be time to think about the low bands, which generally are at their best at the bottom of the cycle and hardly anything exciting at the top. One-sixty has been good in recent months, W4ZR noting that he worked 3Y2GV, KH9AC, TF3SU, and UA1OT/Franz Josef during one active period a month or so back. Also 80 has been good with Jim Smith and W5KNE coming through nicely to the east coast during their Cocos-Keeling operation. Jim, VK9JS, was supposed to stop for a week's operation at Christmas on the home flight, while W5KNE continued on to home and the "QRX DX Bulletin." Anyhow, if you are working for any multi-band awards, this may be the time to fill out the low ones.

The Peter I crew drew a lot of praise, though even with all the good work there were some who did not work the effort. It was an expensive effort, and the LA DX Group was still wondering after the conclusion of the operation how the finances would work out. There was also some indication coming out that the group believed that Bouvet was a good possibility and that it might be targeted for next year if all needed things fall into place. Though the operation is now some months past, keep in mind that contributions to this or any effort forwarded through the Northern California DX Foundation are, the foundation states, deductible under current regulations. The NCDXF support for Peter I was the biggest commitment the foundation ever made.

If you are working for any of the European awards, ones such as WAE or the DARC other awards, you can use a US checkpoint to facilitate the handling of the cards and thus eliminating the necessity of sending those valuable QSLs overseas. Ralph M. Hirsch, K1RH, will check the cards for you. He is the USA/Canadian checkpoint. If you need information on the awards or the application forms, send a #10 SASE with \$1.00 to Ralph and he will supply more paper, country lists, and forms than you might have thought possible (Ralph Hirsch, K1RH, 172 Newton Road, Woodbridge, Connecticut 06525).

Red Stillman, W6AE, is the new president of the Southern California DX Club; Ed Brown, N6OU, the vice-president; Al Almeida, N6JZ, the treasurer; and the durable Hugh Allen, W6MFC, the Secretary.

Ted Millen, 9M8EN, is leaving Sarawak and might be showing from VS6 about this time. Ted completed his two year contract there in Miri in January. Though Ted is leaving, he notes that the 9M8 prefix will still be available, 9M8GH is active from Kuching, and 9M8PV shows on the SEAnet occasionally, and he indicated that he may check into W7PHO's Family Hour on Saturdays (US), which is Sunday (Sarawak). There is also a recent 9M8 operating from Bintulu, his operating not known yet with any distinctive pattern. G4RZQ has the logs for 9M8EN's operation. Ted managed to clear up most of his 9M8 QSLing before departure, either via the bureau or by other routes. 9M8EN appearances on the W7PHO net are QSLed by KA6V/7, Joanie Branson. Ted feels that the W7PHO action puts the consistently best signal into SEAsia and especially from 2300Z to 0100Z.

The FCC is looking for comments on a proposal for callsigns to be issued by the private

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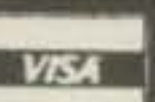
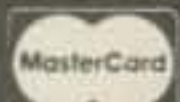
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sector. A Special Call Sign Coordinator (SCSC) would be appointed to issue one or more supplemental callsigns at the request of a licensee. The SCSC would be nonprofit but could recover administrative costs. Deadline for comment is April 23rd, reply comments by May 22nd.

7Q7LW has returned to Malawi and is often around 7002-7012 kHz from 0400Z. 5H3ZO has a 160 antenna flying and says he has permission to operate. VK0GC, Graeme, and VK0DS, Doug, are on MacQuarie and expect to be active during their tour there. QSL both to VK9NS. Jack Sproat, ex-YB0, is now in JY-Jordan.

You probably will have the full details on the Peter I effort by the Norwegians by this time. These are always interesting tales to hear, especially for DXers. Some of the happenings are sometimes surprising. In a similar effort a decade or so back, a sub-Antarctic effort was discovered at the last moment to be planning to use a dipole in a needed country effort. To remedy the problem, a TH6DXX was airlifted from the states to the departure point. The effort was only at this DX spot for a short period, the only shelter a 10x10 foot cabin. The TH6DXX was never used. If you have ever assembled a TH6DXX, you might understand why. If you ever want to qualify as the most ingenious DXer of the year, attempt to assemble your TH6DXX in a similar space.

When the question was asked why such a complex beam was shipped, the reply was crisp: "Because we wanted to send the best, dummy!" That should show you. Always do your DXpeditioning planning carefully.

73, Cass, WA6AUD

QSL Information

Bernie McClenny, WB3JRU, wants to close the logs on a number of DX operations. If you need a QSL for A4XJO, KV4/WB3JRU, P41C, PJ2CC, or TA2FM, hasten your QSL (w/SASE) to the correct address, which is Bernie McClenny, 8809 Willow Wood Way, Jessup, Maryland 20794.

Due to change of QTH, the CBA is incorrect for the manager of 8R1Z or TA2C. But if you go to Carol Shrader, WI4K, Box 5614, Virginia Beach, Virginia 23455, you will be on the fast track to a quick QSL, providing you send SASE, of course.

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VK9LM to DJ5CQ
VK9YS to VK9NS
VK9XS to VK9NS
VK8DA to VK9NS
VK8GC to VK9NS
XF4DX to K9AJ
YN3EO to Y32KE
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ZF2KE to K9QVB
ZF2HM to K9QVB
ZY8ZSA to PY1BYY
ZY8ZSB to PY1BYY
3Y2GV to LA6VM
3Y1EE to LA6VM
8P6A to K1COW
8P6RE to KC3EK
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VQ9HW to Wally Watts, Box 8-27, FPO San Francisco 96685-1800
ZB4BAHV to ZB2BU, Box 292, Gibraltar
SABA to Wieslaw Ziolkowski, Box 253, Wroclaw 2, Poland
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A LOOK AT THE WORLD AROUND US

Mini-30 Corrections Plus a Closer Look at Novice Enhancement

One of the most favorable aspects of this *CQ* column is continuously reflected in its flexibility to discuss various areas of interest and timely happenings in the world of amateur radio. This month's column will take a closer look at some rather vague points of our recently authorized Novice Enhancement program. The "why" of this discussion should be rather obvious. There are potentially 80,000 Novices plus 70,000 ten meter "grandfathered in" Technician class amateurs now looking toward "seasoned" licensees like you and me, asking typical questions we've taken for granted. Our world has become more refined and sophisticated and our "helping Elmer" attitude is needed now more than ever before. Suddenly Novices and Technicians are presented with new equipment advertisements and new frequency allocation charts and are told to "have at it." But where is that desperately needed information on selecting and setting up a new rig and antenna; on cabling, grounding, operating techniques, band idiosyncrasies, and much more? A new era Novice book (not another license manual or technical handbook, but an understandable "how to" guide) is definitely needed.

Yesterday I experienced my first genuine telephone pile-up while trying to get through to an amateur radio dealer. I should have tried harder. Ten meter whips are getting scarce. Amateur families are reported buying talkies in groups of threes and fours. Manufacturers are also swamped with orders, mailboxes are filling with new gear fliers, local area swap circles are going like crazy, and the full impact hasn't yet hit! Amateur radio is rebounding as never before. Lack of a silverplated invitation is no excuse for missing the action. I believe in amateur radio and today's Novices.

Overview

The previous batch of Novice operating privileges consisted of CW-only activity within the 80, 40, 15, and 10 meter band. Foreign broadcast QRM was a way of life, friends "bugged" you about tinkering with old-time keys, and DX was only a dream. Anyone surviving that "purgatory" warrants being commended (and maybe given a new set of ears). Maybe

that's why many Novices never seriously got on the air.

Today is a fresh new slate. Voice privileges have been added on three of our hottest bands: 1.2 GHz, 220 MHz, and 10 meters. That means you can enjoy handheld talkie action, mobiling with VHF rigs, home station DXing, HF mobiling, portable or vacation HF operating. The possibilities are endless.

Due to their wide bandwidth or massive number of channels and generally local range (40 to 150 miles), the 1.2 GHz and 220 MHz bands can be continuously "reused" around the country. Fifty thousand (50,000) active Novices with VHF rigs spread throughout 50 states also assures you'll find plenty of action wherever you travel. "Direct" activities may prove equally as attractive as or more attractive than repeaters. Japan is a good example of that situation. With two million amateurs they don't even need repeaters. They simply enjoy exchanging thoughts with friends while in their areas. The emergency benefits are obviously invaluable.

Ten meter SSB activities are even more exciting. We are presently on the upswing of a brand new 11-year sunspot cycle. During a couple of hours last weekend, for example, I worked a half dozen foreign countries on 10 meters SSB while using a 90 watt transceiver and a basic antenna. Signals were great—almost VHF FM quality with no QRM. That's the beauty of 10 meters—narrow "skip areas" and a low-power haven. A New England amateur can talk with Newfoundland while an Alabama chap can talk with South America (both on the same frequency), and each may not hear the other. If you can hear stations on 10, they can usually hear you. Nice.

That's enough general information for this brief column. Now let's take a closer look at how you set up a station and enjoy operating the three new bands!

1.2 GHz: A Fascinating Band

Don't underestimate this unique and promising amateur band because of its frequency. Some of today's most popular activities are happening in the high UHF and low microwave ranges. Cellular telephones on 900 MHz (.9 GHz) and satellite TV on 3.7 GHz are two prime examples of that situation.

The 1.2 GHz amateur band is filled with wide-open spaces and unrealized special

attractions. It's a modern pioneering amateur's paradise. As mentioned previously, the band's line-of-sight propagation makes it "reusable" for direct FM and SSB communications every 60 to 100 miles. But look closer. It's also line-of-sight to the moon, stars, and amateur satellites! Moonbounce and radio astronomy are two fascinating areas of pursuit both now and later, and a super new OSCAR satellite featuring worldwide communications via its 1.2 GHz/mode-L transponder is slated for launch within 12 months. A Technician or higher class license may be required for satellite operations, so now might also be a prime time to consider upgrading. Meanwhile, summer is the ideal time for trying 1.2 GHz mountaintopping and *CQ's* World-Wide VHF WPX Contests.

Basic mountaintopping is tremendous operating fun. Simply take your talkie and/or mobile rig to the highest point near your area and test your DX capabilities. One such place in the south is Lookout Mountain, Tennessee. On a clear day one can see seven states from atop its Point Park. Other interesting places to operate 1.2 GHz include flat sandy beaches and across large lakes. Who'll be the first Novice to work 10 states on 1.2 GHz? Twenty states?

The easiest way to get rolling on 1.2 GHz is obviously with a handheld talkie. Merely change its battery pack, snap on its antenna, and start scanning for action. Local area repeater councils, ham clubs, and the ARRL will probably "work up" a nationally coordinated bandplan for activities during the time this column is being printed. Check with local friends, clubs, and amateur radio gear dealers to learn the exact 1.2 GHz frequencies to monitor for action. They'll probably be public knowledge by late April. Ditto 220 MHz activity.

When transmitting with a 1.2 GHz talkie, avoid positioning it where the ducky antenna is directly in line with your eyes. Hold the unit like you'd hold a telephone and let its antenna "angle back" past your ears. Your eyes are your most sensitive and exposed area, and RF energy emanates from antennas. One or two watts probably won't do any harm (research is still incomplete), but tilting a talkie during use also doesn't do any harm (like using auto seat belts, although you're not expecting an accident). External speaker/mikes are also attractive items.

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Installation and operation of 1.2 GHz mobile and fixed station gear is similar to that of 220 MHz equipment. We'll thus include that information in the following discussion.

220 MHz: The Popular Band

As this column is being written, both Novices and higher class licensees are purchasing 220 MHz (or 1 1/4 meter band) talkies and mobile rigs in vast numbers. The overall consensus is that every amateur should enjoy the benefits of their own 220 MHz unit—a logical thought, especially during group activities and emergencies. Across the country 220 MHz/1 1/4 meter FM repeaters are also quite popular, but double check their input and output frequencies before diving into the action. It's quite possible their output/repeated signals may fall outside your authorized operating allocations (220.10 to 223.91 MHz as of this February writing). Rest assured, however, that you can listen on any frequency quite legally. Listening and learning is the best way to get rolling in repeater activities without "looking like" a newcomer.

The genuine fun of FM activities will take shape after local groups coordinate frequencies, leave their rigs continuously monitoring, and even post their active frequencies in local stores and near highway signs (a popular practice in Florida). Later you can add tone decoders for "beeping" others, switching on drive and patio lights from your talkie or car, etc.

The main differences between the 1.2 GHz and 220 MHz bands are their amount of activity and range. Two-twenty is a somewhat busy band; it's roughly one-third as crowded as the well-known 2 meter band. Its range is roughly the same as 2 meters—typically 75 to 125 miles, depending on terrain. Although its popularity is growing quite rapidly, 1.2 GHz is probably one-sixth as crowded as 220 MHz. More and more 1.2 GHz repeaters are hitting the airwaves each day. The typical range of 1.2 GHz signals is 40 to 90 miles. This band is more terrain-sensitive. Trees and other foliage absorb 1.2 GHz signals more than 220 MHz signals. Are you starting to get the idea? Wish we had room for a full-book story, but maybe this brief intro-glimpse helps.

Installing a 1.2 GHz or 220 MHz mobile (or fixed) rig is relatively easy. However, every bit of attention to special details will repay you tenfold later. Always try to connect your unit's power cord directly to the car's battery rather than using a cigarette lighter adapter or fuse block connector. Your transceiver will appreciate that "full voltage," your auto's wiring will not overheat, ignition noise will be less, and memories will retain their information after you leave the car.

My own installation methods are quick and simple because I'm always in a hurry. I point the car toward the sun, raise the

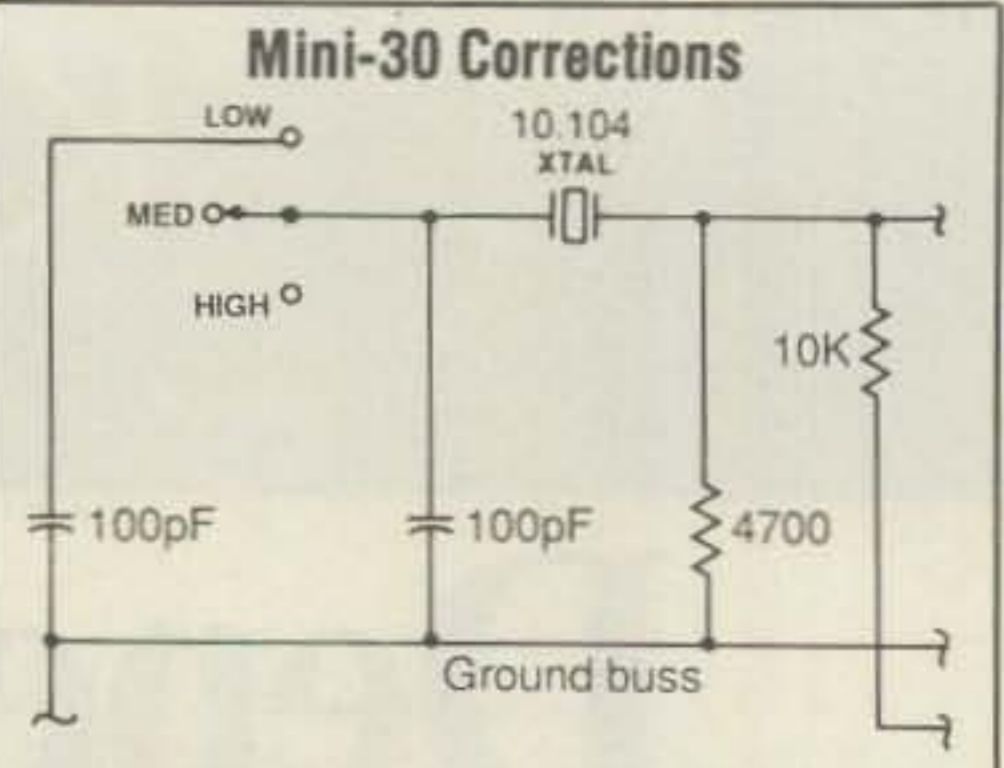


Fig. 1—Mini-30 transceiver schematic corrections. (Only "trouble area" is shown for simplicity.)

Well, gang, the law of numbers seems to catch up with all of us at one time or another. Gremlins crept into the printing of my Mini-30 transceiver's schematic on page 64 of the February 1987 issue of CQ, and this column is the most logical place to include those corrections. Please refer to the original schematic (in February's issue) and the "corrections" mini diagram in this issue's fig. 1.

The schematic problems are confined to the frequency switch area. The 100 pFd disk capacitor between the crystal's "right side" and ground should be moved to the crystal's "left side" (wiper of switch). The frequency switch's "high" position should also connect to the ground buss. Now visualize what's happening. Switching to "low" series connects two 100 pFd capacitors from the crystal to ground: 10.102 MHz. Switching to "medium" series connects only one 100 pFd capacitor to ground: 10.103 MHz. Switching to "high" connects the crystal directly to ground: 10.104 MHz. Get the idea?

Additional clarifications: Small coax cable is used from the 2N2222's collector to a 50 pFd capacitor located at gate 1 of the 40763. This provides local oscillator injection for the receiver.

T1 and T2 are Amidon T-50-2 toroids (available from Amidon Associates, 12033 Otsego Street, North Hollywood, CA 91607). They are wound using number 22 or 24 enamel wire. Remember to scrape off the enamel insulation on wire ends before soldering.

The T/R switching diodes are common 1N914 type. The Mini-30 matches 50 ohm loads and works great with dipoles or verticals. Any 12 volt battery pack will work fine.

Please, gang, include SASEs when writing magazine authors for information. Understand our mail stack is often quite tall and we're trying to help you in every way possible. Good luck and 73, Dave, K4TWJ.

hood, then lie across the floorboard looking for "daylight" through a loose firewall hole. Few manufacturers produce a perfect car, so spotting a hole is easy. Next, I wind two or three turns of the transceiver's power cord around a 2 or 3 inch diameter toroid to prevent RF energy from "sneaking out" and making its way toward computer and electronic fuel injection systems under the hood. After positioning the toroid near the rig's rear plug and securing it with tape, I tape the ca-

CIRCLE 34 ON READER SERVICE CARD

ble's "battery end" to a screwdriver, pass it through the firewall's hole, reach under the hood, and retrieve the wire. After winding a couple more turns around a second toroid (same large size), the cable is cut to length and connected to the battery. Toroids also act as efficient ignition noise suppressors.

My VHF antenna installations are equally simple. I merely use through-glass Avantis (check CQ ads and dealers for details). Merely mount their "in car box" and "outside whip" on the rear glass using supplied double-sided tape. Finally, borrow a good VHF SWR meter and adjust the Avanti's tuning screw for a minimum reading. These same ideas hold merit for home setups. Remember also that all equipment cabinets should be connected to a good earth ground.

Finally, ask a friend to meet you on a particular (and quiet) frequency and check the completed setup for "bugs" and range. If you can trust the chap, you might even briefly swap cars to hear how your own rig sounds. I remember my Novice days when an older boy ran into my friend's shack, grabbed the mike, and started yelling "come back in my car." Back through the speaker came "we're now on Highway 78 headed to Atlanta. We'll call you next week!"

10 Meters: The Band for DX!

If you've ever dreamed of talking with amateurs in far-away places and really

working DX, you'll love 10 meters. When it's hot, it's hot, and you can literally work the world with a "barefoot" 100 watt transceiver and basic antenna. Such great times are "headed our way" during the next seven years. We're moving closer to great 10 meter DXing each day as sunspot counts continue their slow increase. Summer and fall of 1987 should prove quite exciting DX times on 10 meters. The year 1988 will be better, 1989 will be great, and 1990 will be a blowout! Good DXing techniques are a book within themselves (a few years ago, I wrote *Secrets of DXing* (TAB book #1259). Maybe you can find a copy at CQ's bookstore or directly from TAB Books, Blue Ridge Summit, PA 17214. Two prime notes: strive for the cleanest and most beautiful sounding transmit audio possible, and listen to "cues" from the DX stations. Create an on-the-air image that reflects favorable character, someone you would be proud to know if you were "listening in." DX stations might work arrogant stations to clear a frequency so they can hear, but such rude stations seldom receive a QSL. The DX stations always "call the shots." Once again, the keynote is plenty of listening. Think of it as a hunt. Keep plugging. There are well over 100 countries active on 10 meters. If you can hear them and you have a decent antenna, you can work them.

Setting up a 10 meter fixed or mobile

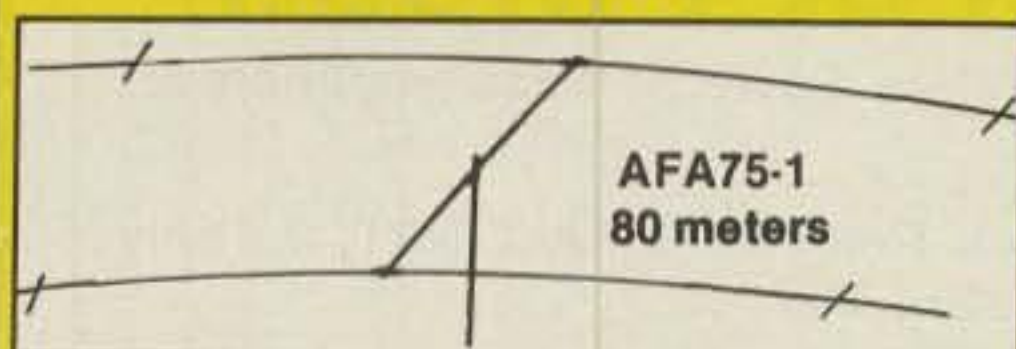
station basically follows the same guidelines discussed under VHF stations. Outdoor/car antennas will be larger and their transmission lines will be longer. Always use new, high-grade coax cables. Old cables "leak" signals and RF like a rotted garden hose. Remember those two toroids I suggested for power cables on VHF mobile rigs? Add two more on 10 meter mobile coax cables—one near the antenna/PL259 connector and one near the base of the mobile whip. They minimize RF radiation from the coax shield while reducing noise pickup. Remember to ensure your car's bumper is grounded to the car's frame. After installation, connect an ohmmeter between your PL259's shield and the car's frame. It should read less than 10 ohms. Finally, **don't try learning how to operate mobile while driving in traffic** (my own shortcoming). Let your XYL drive while you enjoy hamming.

Conclusion

Attempting to fully describe the fascinating new world open to today's Novice via this brief article is obviously impossible. We do trust, however, that this overview has provided getting started insight you'll find useful. During this month (and hopefully future months) I'll be listening and operating within Novice allocations on 10 meters SSB. Hopefully, we'll cross paths. Good luck, and welcome aboard!

73, Dave, K4TWJ

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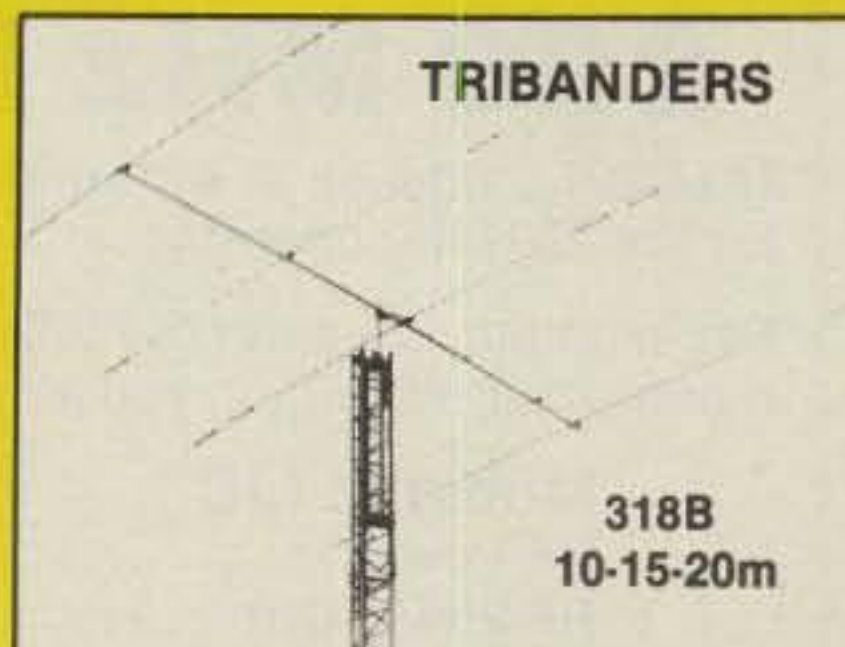
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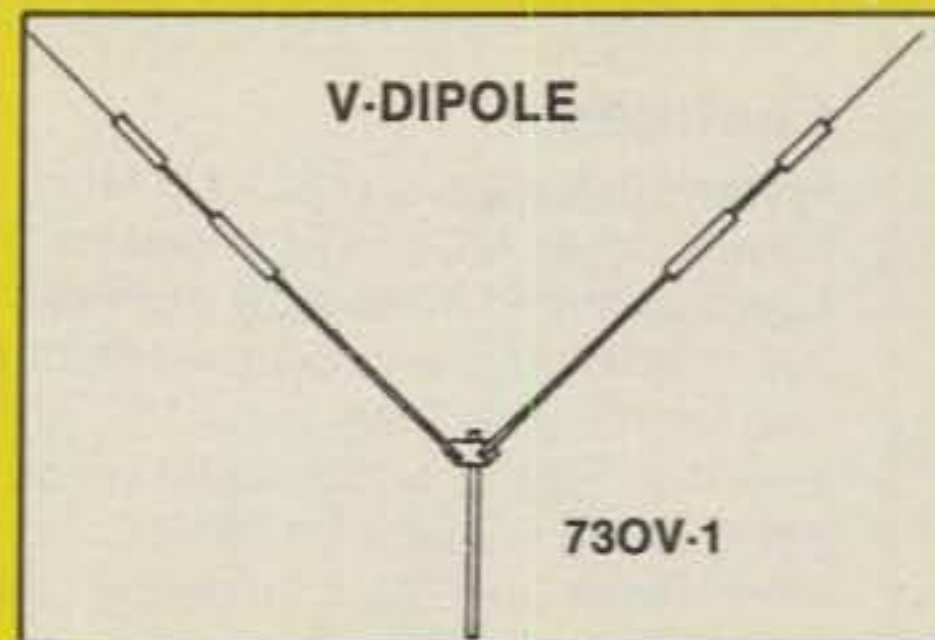


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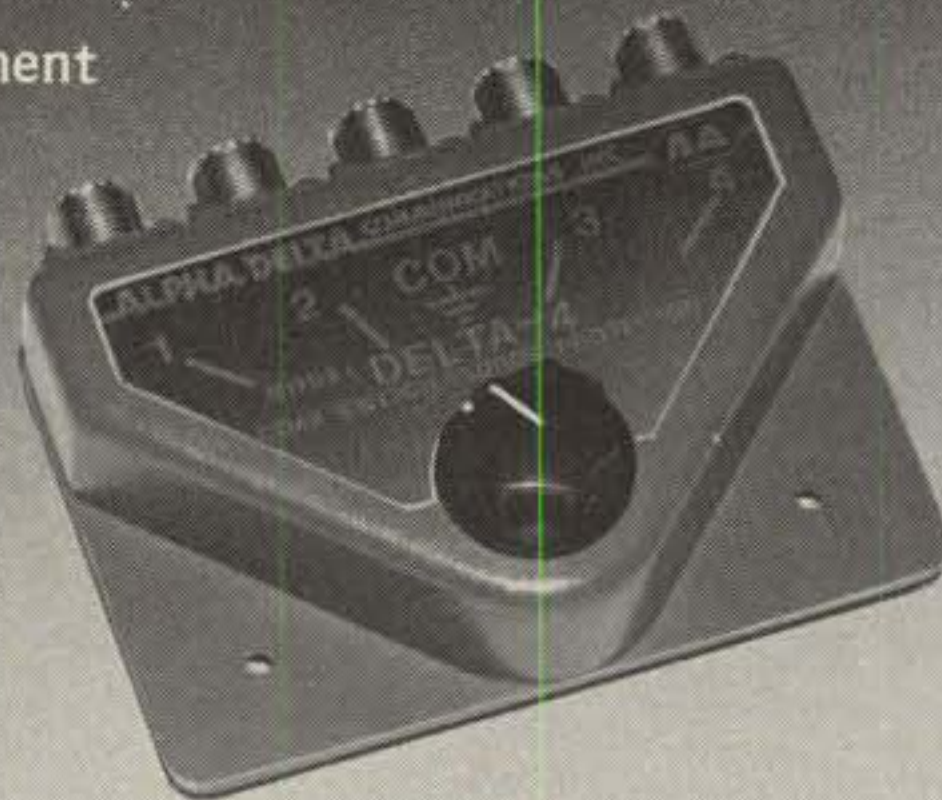
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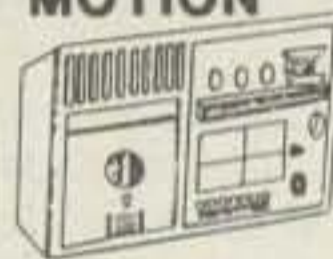
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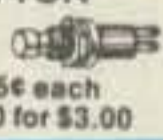
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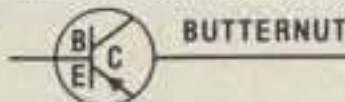
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WANTED: Cushcraft 22SK stacking kit, ICOM HM-14, Kenwood DM-81, Mirage B3016, MP-2, Palomar RX-100. K0MK 218-865-6541.

WANTED: DX-20, SX-28, and HQ-150. Q.R. Galbraith, K5TVC, 4303 Kingsway, Farmington, NM 87401.

ANTIQUe BEEHIVE INSULATORS at \$1.00 each, replacement power transformers new inquire, electrolytics multiple canned at \$3.00 each, 50 year collection vacuum tubes low low prices. Levy, 101 East Driftwood #44, Fredericksburg, TX 78624 (512-997-2534).

NEEDED: ICOM IC-SP2 speaker and YAESU SP-101PB/277PB speaker, Charles T. Huth, 229 Melmore St., Tiffin, OH 44883.

WANTED: Allied AX-190 RCVR working or not. For Sale: MFJ-841 2mt Handheld Meter, new \$30. EICO 720/730, \$50.00. You ship. KA1INX, 603-895-9878.

MFJ-941D TUNER, new, \$60. HAM-M Rotor/Control Box, \$60. W1WAI, 22 Saxony Dr., Sudbury, MA 01776.

WANTED: Battery tray for Wilson T-140 55SM 2M HT. J. Brogden, W3VDL, 6020 Lebanon Drive, Falls Church, VA 22041.

R.F. Power Meter .01-12.4 GHz, Narda 8444 \$95, Klystron power supply \$30. K6KZT, 2255 Alexander, Los Osos, CA 93402.

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H*A*R*K-Radio Archives basic-gear bulletin. For youth, elderly, & low incomes. Electronic Avocations, 2308 Garfield #304, Minneapolis, MN 55405.

YAESU FT-208R, receive only, transmit needs work, \$75.00. Yaesu car adapter/charger, input 13.8V, output 18.8V, 1A, \$25.00. Leather case, \$20.00. All for \$100.00. You ship. Joseph Schwartz, 11 Windham Loop, Staten Island, NY 10314 (Tel. 718-698-8069).

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WANTED: Yaesu TC-2 2M converter, TC-6 6M converter, and ICOM IC-SP2 speaker. Charles T. Huth, 229 Melmore St., Tiffin, OH 44883.

WANTED: Yaesu FRG9600, Sony ICF-2010, Yaesu FT-23R. Sell/Trade: Kenwood TH-41AT + access. Larry Taylor, 3602 Gemina #1A, San Angelo, TX 76903 (915-653-0544).

WANTED: Tailtwister T2X Rotor, Unadilla 6m Lo-Pass "Inter-filter," Mirage A1015 6m Amp, ICOM AG-20, Andrews 44AN or 44AU Heliac connector, K0MK, 218-865-6541.

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NEED: Manual for a Heath GR-78 all-band receiver. Borrow or purchase. WA4JUO, G. Stewart Tyler, 801 Normandy Dr., Suffolk, VA 23434.

WANTED: McIntosh Tube-type audio equipment. Marcus Frisch, WA9IXP, Box 385, Elm Grove, WI 53122-0385 (414-545-5237).

WANTED: U. S. Callbook which lists by NAME rather than call. Also want one each following tubes: 14GF7, 3A3C, 10JTB, N4ZB, 1420 Mount Vernon Drive, Holiday, FL 33590.

WANTED: Drake MN2700 Antenna Tuner. Call 509-534-7750, Betsy, KE7PL.

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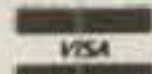
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