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Amateur Radio

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SEPTEMBER 1984 \$2.00

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CQ

**Results of the
1983 CQ WW DX
Phone Contest**



THE RADIO AMATEUR'S JOURNAL

KENWOOD

...pacesetter in amateur radio

TS-930S "DX-traordinary"

TS-930S

We call it "DX-traordinary" because the TS-930S has now become the favorite rig of the serious contester! Its superior capability for full break-in split-frequency operation, the speed and convenience with which its eight memory channels can be accessed, its unsurpassed receiver dynamic range and its remarkable ability to select the desired signal during periods of heavy QRM, utilizing VBT, Slope tuning, IF Notch filtering, and tuneable audio filtering, have all combined to make this the rig that gives you the EXTRA EDGE!

The TS-930S is loaded with all the special features that you always wanted in an HF transceiver. Full coverage of the 160 through 10 meter bands, including the new WARC frequencies, (easily modified for HF MARS), plus a general coverage receiver that can tune any frequency from 150 kHz to 30 MHz. Operation in the SSB, CW, FSK, and AM modes, with selectable full or semi CW break-in. All solid-state, with 250 watts PEP input on SSB,

CW, FSK, and 80 watts input on AM. SWR/power meter. Triple final protection circuits plus two cooling fans built-in. 10-Hz step synthesized frequency control. Available with optional automatic antenna tuner built-in, another industry first! Dual digital VFO's. Eight memory channels that store both frequency and band information, with internal battery back-up, (batteries not supplied). Dual mode adjustable noise blankers, especially effective in eliminating "woodpecker" type interference. SSB IF slope tuning, for maximum rejection of interference. CW variable bandwidth, with pitch and side-tone control. IF notch filter. Tuneable audio peaking filter. Unique six digit white fluorescent tube digital display is easy-on-the-eyes during those long contests. RF speech processor, for higher average "talk-power." SSB monitor circuit. 4-step RF attenuator. VOX. 100-kHz marker. AC power supply built-in, 120, 220, or 240 VAC.

TS-930S Optional Accessories:

AT-930 automatic antenna tuner, SP-930 external speaker, with selectable audio filters, YG-455C-1 (500 Hz), YG-455CN-1 (250 Hz), YK-88C-1 (500 Hz) CW filter, YK-88A-1 (6 kHz) AM filter, all plug-in type. SO-1 commercial stability TCXO, MC-60A deluxe desk microphone, MC-80 and MC-85 communications microphones, MC-42S mobile hand microphone, TL-922A linear amplifier (not for CW QSK), SM-220 station monitor, PC-1A phone patch, SW-2000 SWR/power meter, 160 ~ 6 meter, SW100A SWR/power/volt meter 160-2m HS-4, HS-5, HS-6, and HS-7 headphones.

Isn't it about time you stepped into the winner's circle?

More information on the TS-930S is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.



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



KENWOOD

pacesetter in amateur radio

TS-430S "Digital DX-terity!"

TS-430S

Digital DX-terity...that outstanding attribute built into every KENWOOD TS-430S that lets you QSY from band to band, frequency to frequency, and from mode to mode with the speed and ease that will give you a dominant position in DX operations.

KENWOOD'S TS-430S, a revolutionary, ultra-compact, HF transceiver has already won the hearts of radio Amateurs the world over. It covers 160-10 meters, including the new WARC bands (easily modified for HF MARS). Its high dynamic range receiver tunes from 150 kHz-30 MHz. It utilizes an innovative UP conversion PLL circuit for superior frequency stability and accuracy. Two digital VFO's allow fast split-frequency operations. A choice of USB, LSB, CW, or AM, with FM optional, are at the operators fingertips. All Solid-state technology permits inputs of 250 watts PEP on SSB, 200 watts DC on CW, 120 watts on FM (optional), or 60 watts on AM. Final amplifier protection circuits and a cooling fan are built-in.

Eight memories store frequency, mode, and band data, with Lithium battery memory back-up. Memory scan and programmable automatic band scan help speed up operations. An IF shift circuit, a tuneable notch filter, and a Narrow-Wide switch for IF filter selection help eliminate QRM. It has a built-in speech processor. A fluorescent tube digital display makes tuning easy and fast. An all-mode squelch circuit, a noise blanker, and an RF attenuator control help clean up the signal. And there's a VOX circuit, plus semi-break-in, with side-tone. All-in-all, it just could be that the expression "Digital DX-terity" is a bit of an understatement.

TS-430S Optional Accessories:

In typical KENWOOD fashion, there are plenty of optional accessories for this great HF transceiver. There is a special power supply, the PS-430. An external speaker, the SP-430, is also available. And the MB-430 mounting bracket is available for mobile operation. The

AT-250 automatic antenna tuner was designed primarily with the TS-430S in mind, and for those who prefer to "roll their own," the AT-130 antenna tuner is available. The FM-430 FM unit is available for FM operations. The YK-88C (500 Hz) or YK-88CN (270 Hz) CW filters, the YK-88SN SSB filter, and the YK-88A AM filter may be easily installed for serious DX-ing. An MC-60A deluxe desk microphone, MC-80 and MC-85 communications microphones, an MC-42S mobile hand mic., and an MC-55 8-pin mobile microphone, are available, depending on your requirements. TL-922A linear amplifier (not for CW QSK), SM-220 station monitor, PC-1A phone patch, SW-2000 SWR/power meter 160~6 meter, SW100A SWR/power/volt meter 160-2m, HS-4, HS-5, HS-6, HS-7 headphones, are also available.

More information on the TS-430S is available from authorized dealers of Trio-Kenwood Communications, 1111 West Walnut Street, Compton, California 90220.



Specifications and prices are subject to change without notice or obligation



ICOM Mobiles

World's Most Compact Mobiles VHF/UHF/220MHz



IC-47A
440MHz
25 Watts

IC-37A
220MHz
25 Watts

IC-27A
2 Meter
25 Watts

ICOM presents three ultra compact mobiles...the IC-27A 2-meter, the IC-37A 220MHz and the IC-47A 440MHz. The smallest mobiles available, the IC-27A/37A/47A series measure only 5 1/2 inches wide by 1 1/2 inches high by 7 inches deep. Yet, they contain an internal speaker making them fully self-contained and easy to mount.

25 Watts. In such an incredibly small package, the IC-27A/37A/47A are able to provide 25 watts of output power.



Internal Speaker

32 PL Frequencies. The IC-27A/37A/47A come complete with 32 PL frequencies ready to go. Each PL frequency may be selected by the main tuning knob and stored into memory for easy access along with frequency.

9 Memories. The IC-27A/37A/47A have 9 memories available to store receive frequency, transmit offset, offset direction, and PL tone. Memories are backed up by a lithium backup battery, which will store memories for up to seven years.

Speech Synthesizer. As an added plus, the IC-27A/37A/47A feature an optional speech synthesizer to verbally announce

the receiver frequency of the transceiver through the simple push of a button. This allows the operator to hear which frequency he is operating on without looking at the transceiver.

Scanning. The IC-27A/37A/47A series has a scanning system which allows scanning of memories or scanning of the band.

Priority Scan. Priority may be selected to be either a memory channel or a VFO channel. By using sampling techniques, the operator can determine if a frequency which he wants to use is free or busy.

Microphone. Each IC-27A/37A/47A comes complete

with a microphone with a 16-button pad for access to your favorite repeater or for dialing through an autopatch.

Stacking Mobile

Mounts for the IC-27A/37A/47A make a small complete station for 1 to 3 bands. Each band is full featured and fully operational even when another band is in use.

The ICOM IC-27A/37A/47A provide superb performance in the mobile radio environment. See them at your local ICOM dealer.



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The Radio Amateur's Journal



ON THE COVER: Bob Kujawski, WA2V DX, is shown striving to pull out that last multiplier for a big contest score. Photo by Larry Mulvehill, WB2ZPI.

SEPTEMBER 1984

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Zero Bias

AN EDITORIAL

Just where to begin is the problem. There was so much to see and do in relatively so little time that everything was compressed. It amounted to about 17 days of being "on the road."

The odyssey started on June 14, when Dick and I flew to Atlanta for the Atlanta Hamfest. Jack met us at the airport, as he had driven down with his wife, Ruth, for a mini-vacation with their son, Howard, who lives in Charlotte. Ruth stayed in Charlotte and Jack continued on to Atlanta. Carl Dane, W1FXK, was again pressed into service, and he flew in from El Paso to help out at the CQ booth. CQ staffers Karl Thurber, W8FX, and Dave Ingram, W4TWJ, came by to say hello and to meet a lot of their readers. The fleamarket was outside as usual, and the Georgia sun was unmerciful even early in the morning. It was hot out there! I don't know how the sellers and buyers managed to stay out there all day. We urged the powers that be to let the fleamarket contingent use part of the unused Civic Center area next year, as the facilities are beautiful and well air-conditioned.

The gang at the CQ booth was kept quite busy all weekend, and shame on you if you were in the area and didn't show up. Hamfests, in particular, and other local amateur radio activities are an integral part of the service. It's our chance to shine for the public. Many of the people who attend well-publicized hamfests are not amateurs. They perhaps are curious and hopefully interested in amateur radio—interested enough to find out first hand just what we look like and what we do. It's their chance to see the latest equipment, ask the myriad of questions, and "test the waters" to see if this is an area in which they can see themselves spending time and money.

Hamfests are also a chance for the newcomer to check out many of the same things, including the local club or clubs. How well does your club stack up in attracting new members or in offering help and guidance? For the eternally convinced and the "everything's gone to hell since '37" group, it's even a chance to complain to a lot of new people. There is really something for everyone to enjoy at a hamfest.

Dick and I flew back to New York on Sunday afternoon. The next two days were spent putting the finishing touches on the August issue and packing for the next stage of the odyssey. On Wednesday morning I flew to Washington, D.C. to attend the annual AFCEA Amateur Radio Luncheon. Our own Ted Cohen, N4XX, hosts this event, which attracts amateurs from within the electronics industry and government who are attending this con-

vention. Each year I am privileged to be asked to sit at the dais and to address the group, and this year my remarks were especially short, as I had to leave before the luncheon concluded. No, the food was very good as usual and the company was quite interesting and enjoyable. It was just that I had to catch another plane.

That morning I had flown from LaGuardia Airport in New York to National in D.C., and in the afternoon I was hurrying to get from National to JFK Airport back in New York. Dick met me at JFK with my luggage, and I checked in for my flight to Zurich, Switzerland. We spent the hour or so before my flight going over the details of the trip.

After an all-night flight I arrived in Zurich at 10 a.m. and rented a car for my drive to Germany. Driving is the first unique experience in Europe. It's not the speed limit (where you can find one) that is different; it's the means of getting from one place to another. You have to know the cities and towns between where you are and where you want to go. The signs just indicate cities, towns, and villages, not numbers as we are used to them.

I followed the signs to Konstanze and

took the ferry across Lake Constance (if you are Swiss, Bodensee if you are German) to Meersburg. This is the shorter of two ferry paths across the lake, and it gives you a chance to drive along the other shore to reach the object of this trek, Friedrichshafen. Friedrichshafen is not only a very pretty port city, it is the home of the *Graf-Zeppelin* and the famous 803 foot *Hindenburg*. On this day in late June the city became a hotbed of amateur radio, as the Dayton of Europe, Ham Radio

(Continued page 110)

Alf Sommer, DJ2UT, is shown telling folks about his antennas.



A quick shot of the Zeppelin Museum. It's worth a visit.



Bob Cushman, WA1QFY, and his wife, Christa, are shown at their booth.

The Frech Verlag booth. Wolfgang Krauss (center) was my host.





Announces:

A User-Friendly Software Package
Designed For Easy Operation of Morse,
Baudot, ASCII, and AMTOR. A Feature-
Packed Program

MBA-TOR™

MAIN MENU SCREEN

hh:mm:ss

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- T. AMTOR
- U. AUTO AMTOR
- X. AUTO CALL
- C. COMMANDS
- O. OPTIONS

Now Available for the Commodore 64 Computer in Two Versions.
MBA-TOR 64 Software Package Only, at \$119.95 Suggested Retail.
MAP-64/2 Software with Self-Contained Interface \$239.95 Retail.

Just Look At Some Of The Features:

- CW receive and transmit at 5 to 99 wpm, auto speed track on receive.
- 7 bit ASCII, receive and transmit at 110, 150 or 300 bauds.
- 5 bit Baudot, receive and transmit at 60, 67, 75, 100 or 132 wpm.
- TOR, receive and transmit ARQ (Mode A) or FEC (Mode B) and listen.
- Beacon and WRU system, includes QRG check before XMT, won't QRM.
- Message forwarding system, AUTO-AMTOR still functions in this mode.
- Selects command menu.
- Selects options menu.

OPTIONS MENU SCREEN

hh:mm:ss

- I. CALLSIGN ??????
- S. SELCALL ?????
- T. ARQ TIMEOUT 30
- U. USOS ON
- M. MORSE FILL (BT) OFF
- R. RTTY SYNC (NUL) OFF
- A. AUDIO FEEDBACK OFF
- C. AUTO CR ON
- L. AUTO LF ON
- B. BEACON RECORD OFF
- W. WRAP-AROUND ON
- K. CW BREAK-IN OFF
- O. OUTPUT MODE WORD

- 24-hour clock, shows time in hours, minutes and seconds.
- Allows entry of your callsign for auto operations.
- Derived from your callsign automatically, can be changed.
- Sets ARQ phasing calls from 1 to 99 seconds.
- Unshift on space, toggles on or off.
- Transmits Morse idle character during breaks in KBD activity.
- Transmits RTTY idle character during breaks in KBD activity.
- Produces click in monitor audio when any key is pressed.
- Sends carriage return the first space after 65 characters.
- Sends a line feed after each carriage return.
- Allows the beacon to be recorded to the QSO buffer for logging.
- Sends CR/LF if there is a space in the last 5 positions on the line.
- Automatic transmit/receive switching during QSO.
- Transmit in word mode (text sent on space) or character mode.

COMMAND MENU SCREEN

hh:mm:ss

- L. LOAD
- E. EDIT
- M. MOVE
- S. SAVE
- X. SET XMT BUFFER SIZE
- C. SET COLOR
- T. SET TIME

- + Break-in buffer on all modes, toggle QSO buffer on or off.
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SANTEC LS-202A SINGLE-SIDEBAND & FM 2-METER HANDHELD TRANSCEIVER



Single-sideband really works in nonrepeater situations and has over 5 times the battery life per battery charge according to the engineers who developed the LS-202A. The slide-on, locking battery pack can contain either Ni-Cd 'AA' cells or 'AA' alkaline-type batteries, or a special higher voltage Ni-Cd pack can be purchased as an option. The special VXO and RIT circuits add flexibility to the 5 kHz step synthesizer to provide continuous tuning for Upper or Lower SSB. High (2.5 W PEP) or Low (0.5 W PEP) is selectable by a switch. Lighted receive 'S-Meter' with Transmit battery level display and thumb-wheel switch lighting make using the LS-202A more comfortable.

FM mode is still the FUN MODE to many people, and the LS-202A works all the repeater frequencies from 144 to 148 MHz with the normal ± 600 kHz offset. Good, crisp audio comes from the internal mic, and there is the capability of using an external speaker mic of the popular variety.

Santec and SSB simply just got better. See one today at your Santec dealer.



Technical Talk

SPECIFICATIONS SSB/FM	
Freq. Range	144.000-147.995 MHz
Synthesizer	5 kHz Steps + VXO
Modes	USB (A3J), LSB (A3J), FM
Voltage Range	6-12 VDC
Current Drain	30 mA RX Standby 750 mA TX Peak
Power Output	2.5 W PEP (9 V) 3.5 W PEP (10.8 V)
Receiver	2.4 kHz (-6 dB) SSB
Bandwidth	15 kHz (-6 dB) FM
Sensitivity	0.25 μ V (12 dB S/N) SINAD
IF Frequencies	10.695 MHz SSB, 10.695 MHz and 0.455 MHz FM
Spurious	-60 dB

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KDK STACKS UP!

Quality Value Performance

KDK presents THREE NEW MODELS to join the FM-2033. Now ONLY KDK has One model for each of the amateur bands from 50 MHz to 440 MHz. The FM-6033 for 50 MHz is an FM radio for the 6-meter FM enthusiast. The FM-4033 is the 220 MHz radio just about everybody has been waiting for, and the FM-7033 is the 440 MHz UHF band model. All of these fine radios are models of simplicity of operation. One-hand single-knob tuning and memory recall provide the most convenient method of operating FM mobile. All models have automatic recall of the repeater offset from memory, subaudible tone encoders standard, small size for easy mounting (but big enough to be comfortable to use). The KDK FM-2033 (2M) and FM-4033 (220 MHz) are both a full 25 watts output. The FM-6033 (6M) and FM-7033 (440 MHz) are 10+ watts output. KDK radios are the most value-packed line of FM mobiles around. See your local KDK dealer and compare price and performance. You will be very glad you bought a KDK.



MAXPAC STACK



220 MHz - 25W

NOW ALL KDK MODELS HAVE THE ENCOMM TWO-YEAR EXTENDED SERVICE PERIOD IN ADDITION TO THE 90-DAY LIMITED WARRANTY.

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AMPS • PREAMPS • COUPLERS

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The THL line of amplifiers, pre-amps, antenna couplers and transceivers provides a broad line of solutions to help solve life's problems of needing "just a little more." Whatever it might be, look to THL helpful products to aid in solving the problem. THL can make your signal stronger, your receiving better and can make your HF transmitter happier with the match to the antenna. THL amplifies to a level of 160 Watts on VHF and 90 Watts on UHF. Using THL amplifiers, handy radios can talk like mobiles with low power input models which provide 30, 100 or 160 Watts of output. Models for 10-14 Watts input power or 25 Watt output mobiles are available.

The THL line of antenna couplers provides fine quality hand crafted antenna matching networks for both low power applications and larger power amplifiers running the legal limit. The THL antenna coupler series has full features like built-in antenna switching for changing antennas or by-passing the coupler and an accurate V.S.W.R./power output indicator on all models. Sturdy construction and honestly rated components and capabilities make the THL series of tuners your best choice.

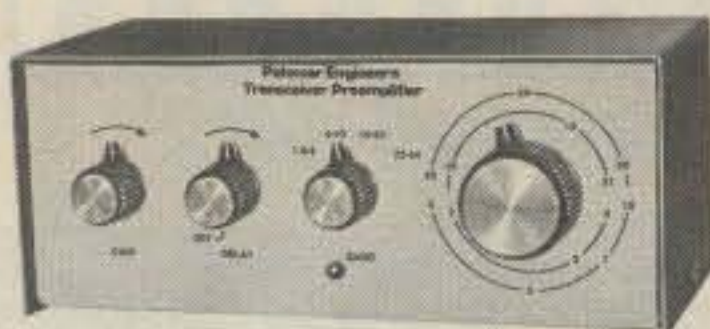
THL has introduced a unique 440 MHz handheld product, the MICRO-7 utility transceiver. This transceiver can be on the air for less than you would ever guess. THL now has 1 dB GAS-FET pre-amplifier for the 2 m and the 70 cm bands. See your THL dealer for details.

Put The Helpful Line to work helping you. Drop us a QSL type card with your name and address for a full catalog of THL products and specifications.



Bottom row: HL-160V25 25W in 150W out 2m • HL-160V - 3 or 10W in for 160W out 2m • HL-90U 10W in 90W out UHF • HC-2000 2KW antenna tuner • Second Row: HL-110 3 or 10W in 100W out 2m • HL-82V 10 in 80W out 2m • HL-45U 10W in 45W out UHF • HC-400 200W antenna tuner and VSWR Power Meter • Third Row: HL-30V economy HT amp 3W in 30W out 2m • HL-32V 3W in 15 or 30W out 2m SSB or FM portables • HL-20U .2 or 3W in 20W out UHF • HC-200 the Economy-With-Quality HF antenna tuner. An HRA2 GAS-FET preamp sits atop the HC-200 • Also shown is the MICRO-7 Utility UHF transceiver and headset.

**DON'T WAIT ANY
LONGER TO PULL OUT
WEAK, RARE DX!**



Can't hear the weak ones when conditions are bad? Receiver lacks sensitivity on 20, 15, or 10? Get the world-famous Palomar preamplifier. Continuously tuneable from 160 to 6 meters, it gives 20 db extra gain and a low noise figure to bring out those weak signals. Reduces image and spurious responses too.

A unique RF sensing circuit automatically bypasses the preamplifier during transmit. The bypass handles 350 watts - just right for transceivers. Use a linear? Put the preamp between your rig and the linear.

Panel controls give continuous adjustment of gain and back-to-receive time.

Also available for SWL's: the receive-only preamplifier that was found best by World Radio TV Handbook.

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**Model P-310X
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**Model P-312X
(12-v DC for mobile)
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**Model P-308
(SWL receive only AC model)
\$129.95**

**Model P-305
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Our Readers Say:



Calling The Olympics

Editor, CQ:

Having the only California 1984 Olympic commemorative vehicle license plates with this call, I thought it might be of some interest to your publication. Your office was recently contacted, and I was requested to mail a photograph of my call plates to CQ magazine. Thank you for your interest. Your publication is tops in the Ham Fraternity.

Dr. Robert G. Soltys, WA6CTX
Whittier, CA

Readers Respond To NABER Article

Editor, CQ:

Thank you for running the article about the NABER Technician Certification Program in the July 1984 issue of CQ. We received telephone calls from your readers requesting applications for the program's "grandfather" phase. We appreciate your support of the program.

More than 24,000 commercial license holders have requested certification through the NABER program, and the requests continue. Certainly, the large subscription base of CQ readers has helped news about our program to reach a large number of people in addition to those who had applied after reading one of the many land mobile publications which ran information about the program. As the program continues, we will keep you abreast of its developments.

Mark C. Huey
Asst. Director, Information & Publications
National Assoc. of Business and
Educational Radio (NABER)

Thanks For Your Support

Editor, CQ:

We, the QCWA Convention Prize Committee, want to thank you and CQ magazine for sending two one-year subscriptions to the magazine to be used as prizes at our convention. Your generosity is most appreciated. As previously stated your donation will be noted in the Convention Program and mentioned at the time

of the drawing. Again, thank you very much. Registrations are already coming in and we anticipate a very good turnout. Many of our members plan to stay over for the New England Division Convention in Boxboro, Mass., the following weekend (September 28-30). Perhaps we might run into you at one convention or the other.

Blanche Randles, W4GXZ
QCWA Convention Prize Committee
Stoddard, NH

Living In The Past?

Editor, CQ:

The rejection of "No-Code" is a backward step. In this era, when it is possible to buy or build simple straightforward keyboards that can be used in the same way that one uses a typewriter, which will send out its signal in the form of Morse code, to insist on Morse Code is equivalent to asking everyone who operates a teletype machine to learn to read the holes in the paper transmission tape. In the days when cars were still called horseless carriages, automobile drivers had to be mechanics. Once upon a time also, all accountants had to write with a beautiful copperplate script, and all pharmacists had to understand Latin so they could fill doctors' prescriptions. This is all very charming, but it is in the past.

Insistence on the redundant and the obsolete will serve only to keep the ranks of radio amateurs small. While this will give some people the satisfaction of belonging to a small (and shrinking) elite group, it serves very badly the cause of amateur radio, of science, and ultimately of America. Many eminent scientists first became interested in science because of amateur radio, and indeed because of your excellent magazine. What we need is *more people* involved and interested. I believe, for example, that it would be a good thing if more "Computer Hackers" got involved in amateur radio and had to follow regulations, observe technical discipline, and interact with older people. Many "computer hackers" are very, very creative and inventive individuals, but operating in a milieu where they do not have to observe discipline and heed regulations, they yield to temptation and disrupt the system, carry out mischievous acts, and even commit computer crimes.

I sincerely hope that very soon the question of "No-Code" will be reconsidered and that "No-Code" entry into the exciting and satisfying field of ham radio will be allowed.

C. Alexander Brown
Ottawa, Ontario, Canada

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- **Special Event Station From Kickapoo Nation** - The 37th Street DX Assoc. of Topeka, Kansas, will operate from the Kickapoo Nation near Horton, Kansas. Operation will be on 10-80 meters s.s.b., c.w., and RTTY from 1500Z until 0300Z Sept. 1-2 and 2-3. On phone and RTTY the call will be "CQ Kickapoo," on c.w. "CQ KP." Participating stations will sign their own callsign. Usual special-event station frequencies will be used. For a QSL send s.a.s.e. (3 IRC's for DX) to John G. Wallis, WB0YJT, 3605 Humbolt St., Topeka, KS 66605.
- **KA1BB From Waterford, CT** - The Tri-City ARC will operate KA1BB from the Waterford, CT I-95 weigh station to promote safe holiday auto travel. Mobile operators are encouraged to call. Operation will be from 1700Z Sept. 1 through 1700Z Sept. 3 on 14.295 and 7.245 phone and 7.130 c.w. Talk-in on f.m. 146.52 direct. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 08340.
- **DARA VEC Licensing Exam Schedule** - The following are the dates for exams given by the Dayton ARA for Sept. Exams are given by appointment only. An s.a.s.e. and completed form 610 with a copy of license attached must be received by the deadlines given by the contact persons listed herein. Exam date Oct. 13; place Toledo, OH, 610 deadline Sept. 15; contact person Eimer Zieroff, KU8B, 2614 106 St., Toledo, OH 43611 (phone 419-729-5245). Exam date Oct. 20; place Albion, MI; deadline Sept. 17; contact Barry A. Pojack, AI8D, P.O. Box 2, Pleasant Lake, MI 49272 (phone 517-769-2003).
- **West Alabama ARS Special Event** - KE4TN will operate from the campus of the University of Alabama from 1300Z to 2400Z on Sept. 8. Phone will be the bottom 25 kHz on the General 40-10 meter phone band; Novices on the bottom 25 kHz of the Novice band. A certificate is being offered for \$1 and a large s.a.s.e. to the West Alabama ARS, P.O. Box 1741, Tuscaloosa, AL 35403.
- **OK Corral, AZ Special Event** - KB7KZ and the Old Pueblo Radio Club will operate from 1500 UTC, Sept. 1, through 2200 UTC, Sept. 3, on c.w. and s.s.b. from the OK Corral, Tombstone, AZ. Frequencies: s.s.b. 28680, 21380, 14280, 7280; c.w. 21130, 7130. A certificate will be awarded. Send a large (8 1/2" x 11") s.a.s.e. (40 cents postage) to KB7KZ, P.O. Box 36032, Tucson, AZ 85740.
- **WB3FIZ Commemorative Call** - Montgomery County, Pennsylvania is celebrating its 200th birthday. The commemorative call will be WB3FIZ on Sept. 8. Frequencies: 28.600, 21.380, 14.295, 7.280, 3.980; 2 meters 145.19/144.59, and 146.52 simplex; c.w. 60 kHz up from band edge. QSL large s.a.s.e. for commemorative certificate. Time Friday night Zulu time Sept. 8 for 24 hrs.
- **W3GV From Erie, PA** - The Radio Association of Erie, PA, will operate on Sept. 8 and 9 from 1200Z to 0100Z on Saturday and from 1200Z to 2100Z on Sunday on 7.235 and 14.235 MHz (phone) and 7.090 and 14.090 MHz (c.w./RTTY). Special QSL for s.a.s.e. via W3GV, 4572 Southern Dr., Erie, PA 16506 or the W3 QSL bureau for DX stations.
- **Iowa City ARC's W0JV** - The Iowa City ARC will operate W0JV Sunday, Sept. 9 from 1800Z to 2200Z up 20 kHz on General class c.w. and phone bands to commemorate their 50th anniversary as an ARRL Affiliated Club. QSL via Box 4, Iowa City, IA 52241.
- **N.A. Teleconference Radio Net** - On Sept. 14 at 7:30 p.m. CDT Bob Heil, K9EID, will discuss microphone equalization for radio communications. TRN can be heard over 180 gateway stations, mostly v.h.f. repeaters, across North America. For a list of stations check the CompuServe "Hamnet" X10 Database or write to Honeywell ARC, Mail Station MN26-4201, Honeywell Inc., Honeywell Plaza, Minneapolis, MN 55408.
- **DXpedition to Cedar Island** - The McHenry County Wireless Assoc. will sponsor the 2nd annual DXpedition to Cedar Island (Fox Lake, IL) on Sept. 15. Operation will begin at 1000 CDT on 40 and 15 meters in the lower 20 kHz of the phone portion of 40 and 15. QSL will be supplied for all confirmed contacts. Contact K9GDI, 24837 N. River Shore Dr., Cary, IL 60013.
- **Marshall County ARC 15 Meter Day** - The Marshall County ARC will hold 15 Meter Day on Sept. 15. You must work three club members anywhere on the band for a certificate. Time: 1400 to 0200Z. S.a.s.e. to P.O. Box 453, Benton, KY 42025.
- **Special Event Station W4BOC** - The Alford Memorial Radio Club of Stone Mountain, GA, will sponsor its first annual PIG OUT on Sept. 22 from 0400 to 2200Z from Flowery Branch, GA, Town Park, on Lake Lanier. S.s.b. phone and c.w. 10 kHz above the bottom of General portion of 80-10 meter bands. Novice: 7130 and 21,150, ± 10 kHz. QSL cards and certificates will be issued. Send s.a.s.e. and info to Alford Memorial Radio Club, P.O. Box 1282, Stone Mountain, GA 30086.
- **KC2Q From Monmouth County, NJ** - Ocean Monmouth ARC will operate KC2Q from 1600Z on Sept. 22 until 1600Z Sept. 23 from the Guglielmo Marconi Memorial Tower on 3.965, 7.265, 14.265, 21.365, 28.565. QSL by s.a.s.e. or certificate and QSL for \$1.00 to KN2B, 18 Gardners Lane, Manasquan, NJ 08736.
- **Mountain State Award** - The Logan County ARC will hold its fourth annual "Mountain State Award" expedition from 1600 UTC Sept. 22 until 0200 UTC Sept. 23. Call will be W8VEN. Phone frequencies will be approximately 25 kHz from the low end of the General phone 80 and 40 meter bands. Certificate will be awarded to all contacts submitting a QSL and legal-size s.a.s.e. to W8VEN, P.O. Box 320, Stollings, WV 25646.
- **East Lyme, CT** - Amateur Radio of Southeast Connecticut will operate Novice Sprint Special station KA1LDB from the Finish Line of the East Lyme Marathon, a qualifying race for the Boston Marathon. Operation will be from 1300Z to 1800Z on Sept. 30 on 7.130 and 21.130 MHz. QSL via Tri-City ARC, P.O. Box 686, Groton, CT 06340.

● **The following hamfests, fleamarkets, etc., are slated for September:**

- Sept. 1-2, **Shelby ARC Hamfest**, Cleveland County Fairgrounds, east of Shelby, NC. Contact SARC, P.O. Box 2206, Shelby, NC 28150.
- Sept. 7-8, **Ham-O-Rama and Computerfest**, Erie County Fairgrounds, south of Buffalo, NY. Contact Nelson Oldfield, 126 Greenway Blvd., Cheektowaga, NY 14225.
- Sept. 8, **Uniontown ARC Gabfest**, Uniontown, PA. Contact John T. Cermak, WB3DOD, P.O. Box 433, Republic, PA 15475, or call 412-246-2870.
- Sept. 8, **Windsor Hamfest**, Windsor, ME. Contact Don Hanson, N1AZH, RFD #2, Box 3678, Greene, ME 04236, or call 207-946-7557.
- Sept. 8, **Grant County ARC Hamfest**, Marion, IN. Contact Jim Allman, WD9EOI, 1108 Spencer Ave., Marion, IN 46952 (s.a.s.e.).
- Sept. 8-9, **CEN TEX Hamfest '84**, San Angelo, TX. Contact CEN TEX Hamfest, P.O. Box 3751, San Angelo, TX 76902, or call 915-655-2329.
- Sept. 9, **CQ Radio Club Hamfest**, Torrington, CT. Contact CQ Radio Club, K1BCI, P.O. Box 692, Torrington, CT 06790.
- Sept. 9, **Butler Hamfest**, Roe Airport, Butler, PA. Contact Dan Metrick, WA3GDS, 131 Reiger Road, Butler, PA 16001, or call 412-283-1719.
- Sept. 9, **Ozark ARC Congress and Swapfest**, Joplin, MO. Contact Ozarks ARS, Box 327, Aurora, MO 65605.
- Sept. 9, **Shawnee ARA Hamfest**, Carterville, IL. Contact W9ERI at 618-457-7586.
- Sept. 15, **Grand Rapids ARA Swap and Shop**, Grand Rapids, MI. Contact Grand Rapids ARA, P.O. Box 1248, Grand Rapids, MI 49501.
- Sept. 15, **Sonoma County Radio Amateurs Fleamarket**, Sebastopol, CA. Contact SCRA, Box 116, Santa Rosa, CA 95404.
- Sept. 15, **W9DXCC Convention**, Glen Ellyn, IL. Contact Howard Huntington, K9KM, 65 South Burr Oak Dr., Lake Zurich, IL 60047.
- Sept. 15-16, **Peoria Superfest '84**, Peoria, IL. Contact Superfest '84, P.O. Box 3461, Peoria, IL 61614 (s.a.s.e.).
- Sept. 15-16, **Hospitality Hamfest**, Mobile, AL. Contact Porter Chambers, KI4FE, 3320 Emelye Dr., Mobile, AL 36609.
- Sept. 16, **L'anse Creuse ARC Swap and Shop**, Mt. Clemens, MI. Contact Maurice Schietecatte, N8CEU, 15835 Touraine Ct., Mt. Clemens, MI 48044 (s.a.s.e.), or call 313-286-1843.
- Sept. 16, **Cincinnati Hamfest**, Stricker's Grove, west of Venice, OH. Contact Lillian Abbott, K8CKI, 317 Greenwell Rd., Cincinnati, OH 45238.
- Sept. 16, **Skyview Radio Society Hamfest**, New Kensington, PA. Contact Skyview Radio Society, Turkey Ridge Rd., New Kensington, PA 15068.
- Sept. 22-23, **Walla Walla Valley Hamfest**, Walla Walla, WA. Contact W7DP, P.O. Box 321, Walla Walla, WA 99362.
- Sept. 22-23, **Tornado Alley Hamfest**, Wichita Falls, TX. Contact Wichita ARS, P.O. Box 4363, Wichita Falls, TX 76308.
- Sept. 22-23, **Radio Expo '84**, Grayslake, IL. Contact Radio Expo '84, Box 1532, Evanston, IL 60204 (s.a.s.e.), or call 312-582-6923.
- Sept. 23, **Lanierland ARC Hamfest**, Gainesville, GA. Contact Phil Loveless, KC4UC, 3574 Thompson Bend, Gainesville, GA 30506, or call 404-532-9160.
- Sept. 23, **Wichita Hamfest**, Wichita, KS. Contact Norm Tramba, WA0HWH, 340 South First, Clearwater, KS 67026, or call 316-584-6425.
- Sept. 23, **Natchaug ARA Fleamarket**, Willimantic, CT. Contact Ed Sadeski, KA1HR, 49 Circle Dr., Willimantic, CT 06226, or call 203-456-7029 after 4 p.m.
- Sept. 23, **Adrian ARC Hamfest**, Adrian, MI. Contact Adrian ARC, P.O. Box 26, Adrian, MI 49221.
- Sept. 23, **Candlewood ARA Fleamarket**, Danbury, CT. Contact George, KC2QF, at 914-533-2758.
- Sept. 29, **Elmira International Hamfest**, Chemung County Fairgrounds, Elmira, NY. Contact Elmira ARA, 340 West Ave., Horseheads, NY 14845.
- Sept. 29-30, **Great Lakes Division Convention**, Kentucky Fair and Exposition Center, Louisville, KY. Contact Greater Louisville Hamfest Assoc., P.O. Box 34444, Louisville, KY 40232.

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David Talley, W2PF, a pioneer in amateur radio.

David Talley, W2PF

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BY THEODORE J. COHEN*, N4XX

David Talley, W2PF, began his radio career in 1915 at the tender age of 12. Since that time he has distinguished himself as a radio amateur, professional engineer, and Army officer. A charter member of the Radio Club of Brooklyn, he also helped to organize the Hudson Division of the ARRL and the Quarter Century Wireless Association. As a professional engineer, he was with the Bell System for 23 years, ITT for 13 years, and GTE for 9 years. Dave played a key role in the development of Army Amateur Radio System nets, and was active in recruiting radio operators and elec-

tronic technicians in the years just prior to WW II. He was also active in the European theatre from 1940 to 1945, and as a result of his accomplishments he was promoted to Colonel. The author of numerous books on telephone switching systems, Dave currently works as a telecommunications consultant, something that still allows him time for his favorite hobby: amateur radio. Dave has one son, Edward Talley, W2IVA, and makes his home in Bal Harbour, FL. When he's not on the air or consulting for clients around the country, Dave can usually be found playing a mean game of golf or shuffle-board. It is with great pleasure that we now present our exclusive interview with one of amateur radio's true pioneers, Mr. David Talley, W2PF.

CQ: Dave, you got started quite early in amateur radio, around 1915. What was it that first interested you in "wireless"?

Talley: I seem to recall reading a book on "wireless telegraphy" while a student at P.S. 152 in Brooklyn, New York. Then at my urging, for my 12th birthday my father bought me a wireless receiving set made by Electro Importing Company in New York. I still remember how it looked. It had a two-slide tuning coil, a small paper condenser—now termed a fixed capacitor—and a galena crystal detector mounted on a varnished wooden board. There were binding posts for connecting the aerial and a pair of headphones. I wasted no time in erecting an outside aerial with the 100 foot coil of copper wire that was furnished with the set

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and in connecting a ground wire to the nearby cold-water pipe in my room.

By adjusting the sliders on the tuning coil, I was able to receive wireless telegraph signals from the Brooklyn Navy Yard, NAH, shore stations WCG and WSE, and ships entering and leaving New York Harbor. With the sliders at one end of the tuning coil I also heard signals that I later recognized as nearby amateur radio stations. I immediately devoted my spare time to learning the International Morse code and to listening to these wireless telegraph signals for code practice. Within a short time I was able to copy over five words per minute.

CQ: Tell us a little about your first station. Where did you get the plans to build your equipment and antenna?

Talley: My first wireless station was comprised of the receiving set and antenna system that I just described and a 1 inch spark coil transmitter. By reading pertinent articles in *QST* and *Electrical Experimenter* magazines, I gained sufficient knowledge to scrounge and purchase, when necessary, the needed parts for my initial spark transmitter. They included a zinc spark gap and a large glass jar which I coated inside and out with tin foil to form a Leyden condenser. My power supply at first consisted of six dry cells of the No. 6 large type. They were subsequently replaced by a 6 volt automobile storage battery.

It may be of interest to your readers to know prior to World War I it was not necessary to obtain an amateur radio station license from the Department of Commerce if your transmissions did not cross your state's boundaries and if you were more than five nautical miles from a Navy Radio Station. Thus, I was able to use my initials, "DT," for my callsign in those days.

CQ: What type of on-the-air activities interested you the most?

Talley: In those early days of wireless, my main interest was to receive distant-land stations and ships at sea. This also served to increase my code speed. In this connection, I was fortunate to have my primitive wireless station heard by other stations in Brooklyn. My first QSO was with 2B0, Melvin A. McIntre (*W2BO, now deceased—ed.*) who lived about a half mile away. I remember making tests with him in order to adjust the spark gap and vibrator of my 1 inch spark coil for maximum signals in his receiver. W2BO was using a 1 kilowatt transformer and a rotary spark set.

CQ: As I understand it, you received your first amateur operator's license at the Navy Yard in Brooklyn, New York in 1917. Was an examination required?

Talley: Yes. I distinctly recall that a school friend, Howard Blower, W2AX (*now deceased—ed.*) and I went to the Brooklyn Navy Yard one day in March 1917 to take the amateur radio operator's license exam. First I had to pass the five words-per-minute code test. It was sent by hand-key by the CPO examiner. Then, I showed my Morse code skill by sending a long sentence on a buzzer-connected key. Next came the written test, which included drawing schematic diagrams of my receiving set and the spark transmitter. We both passed and received our amateur radio operator's license issued by the Department of Commerce.

However, because of the pending war situation, the Department of Commerce had stopped issuing amateur radio station licenses and call letters that month. Thus, I did

not receive my original 2PF call until December 1919, when amateur radio operations were again permitted. Currently, I hold the amateur Extra Class license, which was initially issued to me in March 1952.

CQ: What kind of equipment did you have in your station in 1919?

Talley: I first used the same equipment that I had when my station was closed down in April 1917. Then I was able to buy some modern wireless equipment as surplus military items from WW I. Included were vacuum tubes, high-voltage transformers, mica transmitting capacitors, copper wire for antennas, and so forth. Thus, my radio station soon became a modern spark installation for that period. In 1921-1923 I had a Grebe CR-3 regenerative receiver, two-stage audio-frequency amplifier, and a pair of Western Electric Co. headphones. The spark transmitter, which was installed in the basement, consisted of a 1/2 kw Packard high-voltage transformer, a 0.004 mFd Dubilier mica capacitor, an enclosed synchronous rotary spark gap, and a brass ribbon oscillation transformer for tuning to the 200 meter band authorized for amateur radio stations.

The antenna had four wires on 6 foot spreaders made of wood. It was about 50 feet long to a tree in an adjacent lot. It had a four-wire cage lead-in to the basement window. The Grebe CR-3 receiver contained three variometers and a deForest audio detector. A 6 volt automobile storage battery was the power source for the receiver, plus 15 flashlight batteries to give 22.5 volts for the plate supply. The spark transmitter in the basement was remote controlled from my receiving location on the second floor of the house by telegraph sounders used as relays; one was for turning the power on and off, and the other was used as a keying relay.

CQ: How long was it before c.w. appeared on the scene?

Talley: I remember reading about using vacuum tubes to generate radio frequencies for "continuous wave" transmissions when I was experimenting with my spark set in the 1915-1917 period. However, it was not until 1920-1921 that I, and no doubt many other radio amateurs, seriously thought about using c.w. in place of spark for communications. This was due to the availability of the "J" receiving tube and the "E" 5 watt transmitting tube in amateur circles. These tubes had been manufactured by the Western Electric Company for the Navy during WW I. Also around that time, the new Radio Corporation of America began making their UV-202 (5 watt—*ed.*) and the UV-203 (50 watt—*ed.*) tubes.

I built my first c.w. transmitter in 1922, employing a 50 watt tube. For the plate supply I used a transformer to furnish about 1000 volts a.c. The resultant raw tone gave a very broad signal, although not as broad as my spark set. Subsequently I made tests with amateur stations, many of which were several hundred miles distant, of reception of my spark versus my c.w. signals. In every case my 50 watt c.w. signal was superior to my 1/2 kw spark emissions. Therefore, I sold my spark equipment and built a d.c. plate supply to improve my c.w. transmitter.

CQ: Dave, what led you to undertake a telecommunications career, especially in telephone switching, when you joined the Bell System in 1922?

Talley: I believe that my intense interest in

"Having an amateur radio operator's license, I think, was instrumental in my getting that job (with the New York Telephone Company)."

amateur radio, and the knowledge that I had gained from my radio construction and operating experiences, motivated me towards a career in telecommunications. Consequently, in the fall of 1922 when I learned that New York Telephone Company was replacing their manual switchboards with the newly developed machine-switching dial system, I made inquiries. The Western Electric Company was looking for electrical testers for this project, so I applied for this position. Having an amateur radio operator's license, I think, was instrumental in my getting that job.

"Yes, I did meet a considerable number of the famous pioneers, engineers, inventors, and entrepreneurs who made possible our present era of telecommunications . . . the following names come to mind: H.P. Maxim, Major Edwin Armstrong, David Sarnoff, and Dr. Lee De Forest."

CQ: Starting as you did in the early days of radio, you must have met a number of the people who laid the foundation for modern-day telecommunications. Who were some of these people, and what do you remember most about them?

Talley: Yes, Ted, I did meet a considerable number of the famous pioneers, engineers, inventors, and entrepreneurs who made possible our present era of telecommunications. I met many of them at the IRE and AIEE meetings and conventions in New York, Washington, D.C., and other localities. A number of them were also radio amateurs whom I encountered at national and local ARRL conventions. The following names come to mind, although not necessarily in order of their prominence: H. P. Maxim, Major Edwin H. Armstrong, Prof. Alan Hazeltine, Arthur A. Collins, Dr. Alfred Goldsmith, David Sarnoff, Dr. Lee deForest, Fred M. Link, Allen B. DuMont, John F. Rider, Paul Godley, Alfred H. Grebe, Harold H. Beverage, and Lloyd Espenschied.

I first met Major Armstrong when he demonstrated his "super-regenerative" receiver at the meeting of The Radio Club of America held at Columbia University, New York, in 1922. I also attended his presentation of "frequency modulation" before the IRE and The Radio Club of America meeting held in New York on November 5, 1935. I saw Major Armstrong less than a month before his untimely death in January 1954; it was a meeting of The Radio Club of America, and we sat at the same table.

CQ: When the Army Amateur Radio System, or AARS, was organized in 1926, you were made Radio Aide to the Signal Officer of the Second Corps Area, and then commissioned a 1st Lieutenant in the Signal Corps Reserve. What

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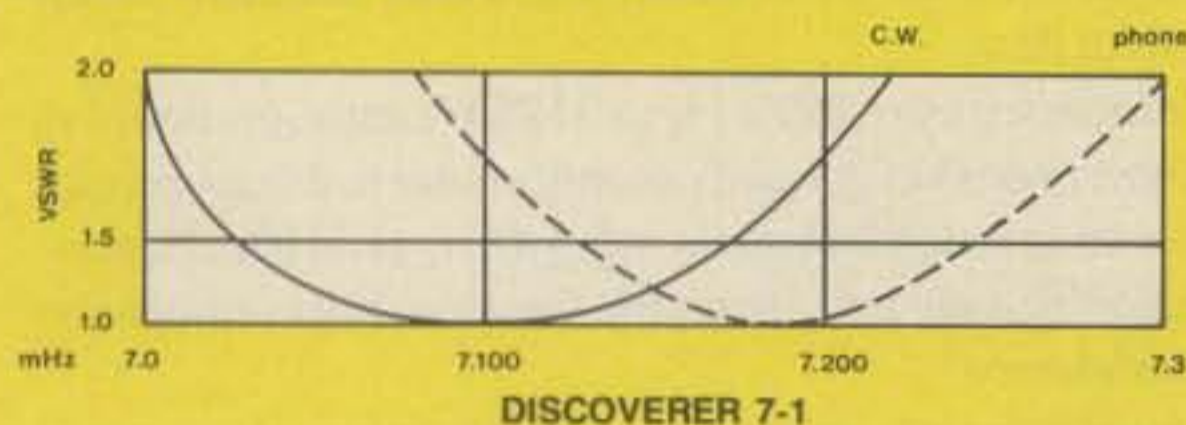
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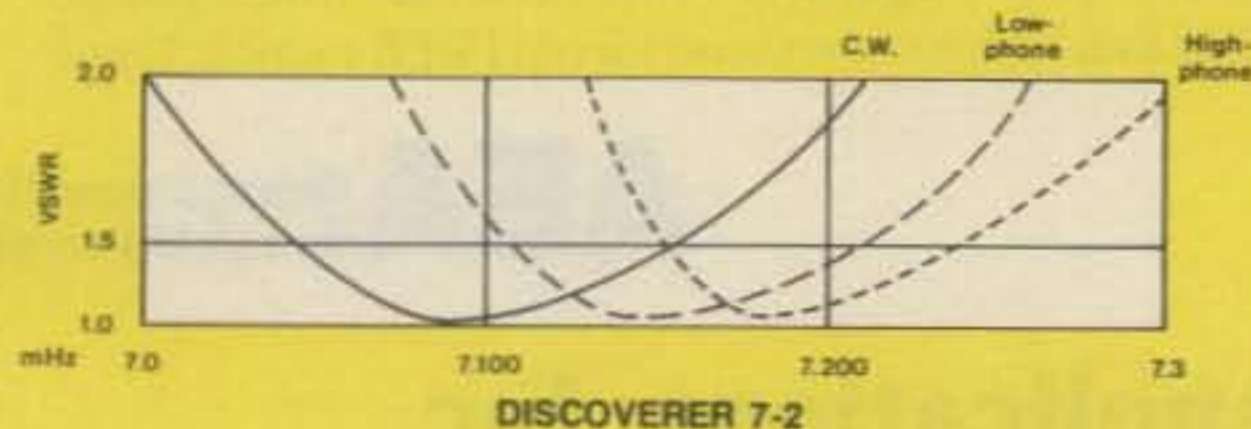
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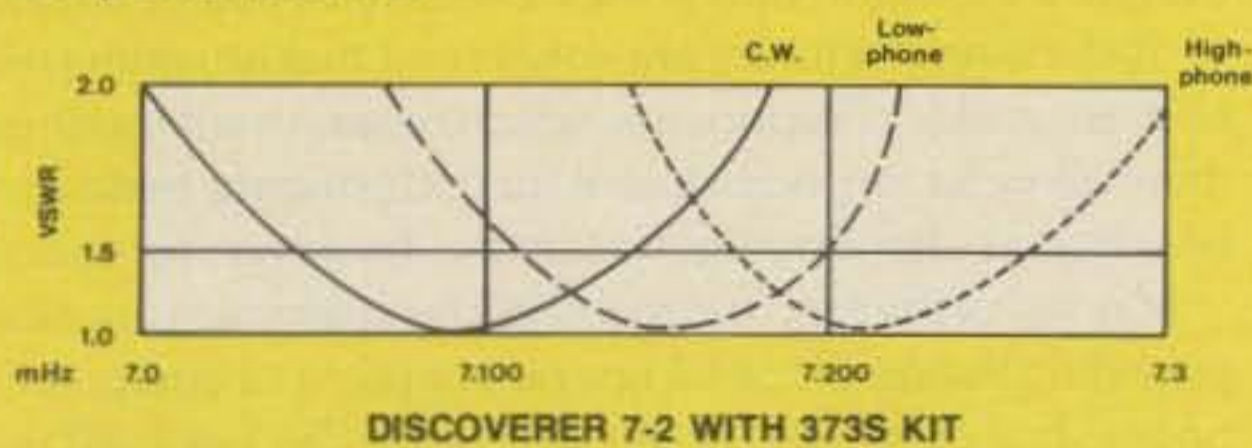
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"I first met Major Armstrong when he demonstrated his super-regenerative receiver at . . . Columbia University, New York, in 1922."

motivated you to take this Signal Corps Reserve position, and what were your duties?
Talley: I was always interested in military matters. I had read a good deal about the important land and naval battles of WW I. This research indicated a great need for modern, reliable radio communications equipment and trained radio operators for effective national defense. Therefore, I was pleased about this opportunity to be an officer in the Signal Corps Reserve of the Army. My initial duties were to interest licensed amateur radio operators residing within the Second Corps Area (*New York, New Jersey, and Delaware—ed.*) to join the AARS as civilian volunteers. In this connection, I attended meetings of amateur radio clubs and ARRL functions to explain the voluntary aspects of the AARS program. I also publicized the AARS in my over-the-air contacts with other amateur stations. Likewise, I helped to organize the new AARS members into state and district nets, and arranged for their training in Army radio procedures and message handling.

"I soon realized the great importance of an engineering education; not only did I need it to understand the theory and operation of (various pieces of) equipment, but also to prepare myself for forthcoming advancements in the electronics and radio communications fields."

CQ: You went to college in the 20s and 30s and received an electrical engineering degree from the Polytechnic Institute of Brooklyn (*now Polytechnic Institute of New York—ed.*). Why did you go back to school?

Talley: Soon after starting to work for the telephone company, I realized the great importance of an engineering education; not only did I need it to understand the theory and operation of dial switching equipment, but also, I wanted to prepare myself for forthcoming advancements in the electronics and radio communications fields. I learned that the Polytechnic Institute of Brooklyn was one of the few engineering colleges in New York that had evening sessions with courses leading to a degree in electrical engineering. It was located in downtown Brooklyn, near my office. Therefore, I enrolled as a student in its evening session. I worked during the day and attended classes at Brooklyn Poly three to four nights a week. In 1935 I graduated with a degree in electrical engineering.

CQ: What with your job at Bell, your active Army Reserve work, and your college studies, was there still time for amateur radio in the 1920s and '30s?

Talley: Oh, yes! I was very active in amateur radio during those years. I kept in touch with developments in vacuum tubes, radio equip-

ment, and related test instruments. This enabled me to continually update my station, W2PF, to incorporate the latest technological advancements. With respect to amateur radio matters, I was one of the founders of the Radio Club of Brooklyn in 1920. I served as treasurer and also held other offices in this club prior to WW II. Likewise, I assisted in the organization of the Hudson Division of the ARRL in 1925. It was comprised, as it still is, of the area of the 2nd Radio District of the Department of Commerce at that time. The late Dr. Lawrence J. Dunn, W2CLA, was the first Hudson Division Director of the ARRL. He also became the first Chief Radio Aide of the AARS from 1929 to 1934, and then from 1940 to December 1941.

During the period prior to WW II, I participated in arranging meetings for the Radio Club of Brooklyn, the annual conventions of the Hudson Division ARRL, and the AARS. In this connection I recall arranging for amateur radio meetings to be held on a monthly basis at the old Army Building, 39 Whitehall St., New York. These meetings included discussions and demonstrations of radio equipment and techniques, as well as information about the Army Amateur Radio System. They also were sponsored by the ARRL Hudson Division.

CQ: Just prior to WW II you were activated by the Army, and you served in the Signal Corps until the end of the war. What were your main areas of responsibility during that period?

Talley: In September 1940 I was promoted to Major in the Signal Corps Reserve, and the following month I was ordered to active duty by the War Department (*now Department of the Army—ed.*). I was assigned to the staff of the Chief Signal Officer in Washington, D.C., which included a total of 19 officers, including myself. My initial assignment was a Liaison Officer, AARS, to administer the approximately 2,000 members of the Army Amateur Radio System and to expand its activities in view of the war in Europe. When amateur radio and AARS operations were closed down right after December 7, 1941, there were over 4,000 AARS members. Most of them had sent in a questionnaire with details of their radio operating and technical experiences, education, and availability for possible active service. This data subsequently was most useful in obtaining qualified personnel for radio operators and technicians in the mobilization of the Signal Corps.

Within a week after Pearl Harbor I was assigned as an assistant Signal Officer to V Corps Headquarters, which was assembling at Fort Dix, New Jersey. In a short time we arrived in a Northern Ireland staging area. In September 1942 I was assigned to the Signal Service of Headquarters European Theatre of Operations, or ETOUSA, in London. My main responsibilities prior to the D Day invasion in June 1944 included supervision of the maintenance of field radio equipment, such as the v.h.f. f.m. radio sets made by Link Radio Co. and used in many armored cars, jeeps, and tanks. Another of my projects was the procurement, installation, and inspection of material and methods to waterproof the radio sets in jeeps, armored vehicles, and tanks that would be disembarking from landing crafts during the initial landings on D Day. It was essential that the troops involved in these landings be properly trained in the waterproofing techniques. Therefore, a motion-picture showing the correct waterproofing methods in simple scenes and terms, was made by the Signal Corps Pictorial Section at the Pinewood Stu-



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dios outside London. This training film was later shown to the U.S. Army personnel concerned with the problem in the months before D Day. Subsequent to D Day, I again was assigned to the OSS in London. I had known about its clandestine radio operations with agents in France and Belgium when I was temporarily with the OSS in late 1942. I traveled with British MI officers to Paris and other localities to interview agents and recover our field radio equipment. Later I returned to OSS Headquarters in Washington, D.C., in command of a detachment of OSS officers for possible deployment to the Far East.

CQ: Communications technology advanced rapidly between 1940 and 1945. What, in your opinion, Dave, were the most important advances to come out of WW II?

Talley: There were very many advances, and it is difficult to place them in a proper order of importance. Some of them, including a number in which I was involved, are the development of long-range radar, use of the v.h.f. bands for transmitting multiplex telephone channels, use of v.h.f. frequency modulation for improved mobile radio communications, multiplexing telephone channels over cable pairs, utilizing single-sideband radio transmissions in the h.f. spectrum, and coaxial cables for carrying radio-frequency signals. Likewise, improvements in vacuum tubes and related components led to more efficient microwave transmissions and higher power radio transmitters.

CQ: Like many, you resumed your amateur radio work in 1946 at W2PF in Brooklyn, New

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York. What kinds of activities interested you the most in the post-war years?

Talley: First, I bought new radio equipment because I had disposed of my pre-war station in 1940 before leaving for active duty. Since I had used Collins equipment, I purchased the new Collins Radio Company 75A1 receiver and the 32V1 transmitter for my initial post-war station. I discarded the Army surplus radio items. This was before the advent of single-sideband units.

Many returning veterans had been radio operators or had received radio training. Consequently, many became interested in amateur radio, and soon many new call signs were heard on the air. Several old-timers discussed this situation during a 10 meter round table in November 1947. They decided to form an association of amateur radio operators who had been licensed 25 years or longer. Thus, the Quarter Century Wireless Association, QCWA, was born. The first meeting was held on December 5, 1947, with 34 hams present at a restaurant in New York. John DiBlasi, W2FX, was elected President; George T. Droste, W2IN, Vice-President; Leon A. Hansen, W2FIT, Secretary; and myself, Treasurer.

The AARS was not activated after the war because of the formation of the Department of Defense over the three military services. The Military Affiliated Radio System was organized in 1948 to serve as a replacement for the AARS. It also included the Air Force, the Navy, and the Marine Corps. I and many other former AARS members soon joined Army MARS. I am still active as an Army MARS station in the Florida State Net under my MARS call, AAR4PN.

CQ: You also resumed your professional career at that time with International Telephone and Telegraph Corporation. What were the various technologies you worked with in this position?

Talley: When I joined IT&T Corporation (now ITT Corp.—ed.), my initial work involved the engineering and international marketing of the v.h.f. f.m. mobile radio equipment made by Federal Telephone & Radio Corporation, FTR, and the new microwave equipment developed by Federal Telecommunications Laboratories, FTL, for handling multiplex telephone channels. I traveled to Hawaii, Argentina, Brazil, Mexico, Cuba, and Puerto Rico in connection with these activities. ITT owned, or had close relations with, the telephone companies in these countries. This was most helpful in the introduction of these new radio communication techniques.

In the 1950s I was associated with FTL engineers in the installation of the "over-the-horizon" radio station in Cuba. It communicated

with a similar station of the Bell Telephone Laboratories near Homestead, Florida. This was the first use of the "over-the-horizon" technology for transmitting television from the U.S. to Cuba. It worked quite well and was used primarily for the televising of baseball games in the U.S. to Havana. I believe that this radio circuit lasted until it was replaced by satellite technology.

During the 1950s I also was involved with the installation of the first line-of-sight microwave system for the Puerto Rico Telephone Company. It was installed for the San Juan-Ponce circuit. In addition, I worked on the installation of the initial submarine-repeated telephone cables—one for each transmission direction—laid between the U.S. mainland and Puerto Rico. This cable system included the Time Assignment Speech Interpolation method. It used the time intervals during conversations between two persons for handling other calls. Likewise, I engineered the installation of a ship-to-shore radiotelephone system for the Cuban Telephone Company in Havana.

"Most of my telecommunications consulting work has been for small business entities and entrepreneurs, mainly in the communications and electronics fields."

CQ: Now, of course, you're a private consultant in the telecommunications industry. What are the areas in which you enjoy working the most?

Talley: Most of my telecommunications consulting work has been for small business entities and entrepreneurs mainly in the communications and electronics fields. Many of them had read one or more of my books: *Basic Carrier Telephony*, *Basic Telephone Switching Systems*, and *Basic Electronic Switching for Telephone Systems*. I enjoy working with engineering personnel and executives of such organizations. I like explaining to them, in simplified terms, the intricacies of analog and digital electronic switching systems, and the signaling and transmission functions involved in handling telephone traffic.

If desired, I also analyze the devices or products which they propose to manufacture or market. In this way it is often possible to as-

certain the feasibility of producing a particular device or product for the telecommunications market. I enjoy being able to provide these consulting services.

CQ: Of all the things you've accomplished in your career, of what are you the proudest?

Talley: It is difficult to select the accomplishment of which I am the most proud—not that I have accomplished so many things in my careers. For instance, I am proud that my efforts when serving as the Liaison Officer, AARS, in the Office of the Chief Signal Officer resulted in the growth and increased importance of the Army Amateur Radio System, and that many AARS members who were trained in Army radio procedures subsequently joined the Signal Corps at the start of WW II.

Likewise, I was pleased to receive Patent #2,483,445 in 1949. It was filed in 1946 as the result of my radio engineering work for the FT&R Division of International Telephone & Telegraph Corp. This patent was for a new and improved sequential signaling method to be used in mobile radiotelephone systems.

I also felt very proud when my technical books on telephone switching and transmission subjects, which were published during the past 23 years, became well known in the telecommunications industry. I continuously update and revise them in accordance with advancements in technology.

Furthermore, The Radio Club of America, of which I have been a member since 1949, honored me for my efforts in fostering its growth and elected me a Director Emeritus for Life. This past November the club presented me with its first Henri Busignes Memorial Award "For Significant Contributions to the Advancement of Electronics for the Benefit of Mankind."

CQ: Do you still find time to get on the air? If so, what modes, bands, and activities do you enjoy the most?

Talley: Ted, I certainly try to get on the air as much as possible from W2PF. Normally I operate on the 3.5, 7, 14, and 21 MHz bands during the week. I mainly use s.s.b., but I am also on c.w. for some schedules; I use 2 meter f.m. for local contacts via repeaters or simplex. I mostly enjoy keep schedules with and contacting old friends in amateur radio, military, and telecommunications circles. However, I do continue to try for DX contacts, although I do not engage in contests.

It may be of interest to your readers that I endeavor to keep daily hourly schedules, except weekends, in the "Jumpsuit Net" on the

20 meter band. We meet around 9:00 a.m. east coast time on 14, 220 kHz and on 14, 180 kHz at 4:00 p.m. local time. The "Jumpsuit Net" originated over 25 years ago and initially was made up of QCWA members and other old-timers. Its name refers to the fact that anyone could jump into or out of the net whenever desired during its operation. With the passing years many members moved to California, Florida, Texas, and other places. However, most members still keep in touch via this net. I also maintain the weekly QCWA International Net schedules on 14, 346 kHz on Sunday afternoons.

"My amateur radio connections, colleagues, and associations proved most helpful to my technical writing, engineering, and management work in the telecommunications field."

CQ: Looking back, what part would you say amateur radio has played in your life from a professional as well as a military and recreational standpoint?

Talley: Amateur radio has played a very important part in my life. My initial interest in amateur radio revealed the need for an engineering education for a successful career in communications and electronics. It led me to enroll in the electrical engineering courses at Polytechnic Institute of Brooklyn and to obtain my E.E. degree. Over-the-air contacts with other amateurs and discussions at radio clubs, conventions, and other meetings also served to further increase and broaden my knowledge of radio communications, telephone transmission and switching, and electronics. Furthermore, my amateur radio experience made it possible, through the Army Amateur Radio System, for me to start my military career. In retrospect, my amateur radio connections, colleagues, and associations proved most helpful to my technical writing, engineering, and management work in the telecommunications field. Now in my semi-retirement years I can more appreciate the great recreational value of amateur radio.

"Now, in my semi-retirement years, I can more appreciate the great recreational value of amateur radio."

CQ: Would you recommend a career in communications and electronics for today's young people, and if so, why?

Talley: I definitely would recommend a career in communications and electronics, including computers. The telecommunications art is continually expanding. There is an ever increasing need for competent people to handle the new and improved technologies in telecommunications, and to design circuits, components, and related hardware, as well as computer software. Computer-controlled communications is another expanding technology, with the cellular mobile telephone service providing many opportunities in this field. Therefore, young people with the proper training and experience should have many opportunities for a successful career in telecommunications.

"Young people with the proper training and experience should have many opportunities for a successful career in telecommunications."

CQ: What kind of educational background do you think is required today to succeed in communications and electronics?

Talley: Success in any career usually depends on one's objectives. With respect to the telecommunications field, I believe that for an engineering career a basic engineering education leading to the Bachelor of Science degree in Electrical Engineering or Electronics is the first step. This could be followed by taking courses for an MS degree. In many localities classes for the MS degree can be attended after work or in the evening. In fact, many companies encourage their engineers to participate in such continuing-education programs and to attain advanced degrees.

Furthermore, business management experience and knowledge are also very important for a successful career. Therefore, studying for an MBA degree likewise should be considered as another post-graduate goal. It often can lead to higher financial rewards than does engineering work.

CQ: You've seen amateur radio grow from the early days of spark to today's use of satellites, packet radio, and computers. Where do you see tomorrow's technologies taking us?

Talley: There are too many uncertainties to attempt to prognosticate on amateur radio's future technological operations. I do feel, however, that the technology will continue to grow at an even faster pace than in the past. In this respect I believe that greater use will be made of the v.h.f., u.h.f., and s.h.f. bands for the various communications modes. The wider bandwidths available at u.h.f. and s.h.f. will facilitate computer-to-computer communications and amateur television (ATV) transmissions, to name a few examples. Moreover, it would be feasible to utilize full duplex for voice and data communications on the v.h.f. and u.h.f. bands. This will make obsolete the present half-duplex and simplex methods now used in 2 meter repeater operations. Furthermore, it is anticipated that amateur communication satellites in geosynchronous orbits will provide worldwide DX capabilities on the v.h.f. and u.h.f. bands. These satellites may also supplement existing 2 meter repeaters. Likewise, amateur cellular mobile radiotelephone networks would replace the current 2 meter half-duplex mode of operations and could also extend service areas.

In connection with the above predictions, I foresee digital transmissions soon replacing analog for all communications modes. And integrated amateur communications equipment would afford a wide range of modes and frequency bands. Thus, one transceiver might cover all amateur h.f., v.h.f., and u.h.f. bands, and might provide any desired operating mode, such as c.w., s.s.b., FSK, ATV, and packet radio.

CQ: Technology aside, how does today's amateur differ from the amateur of the 1920s?

Talley: It is well-known that radio amateurs in the 1920s did more building and experimenting than at present. In those days it was neces-



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sary for most of them to design and construct their own receiving and transmitting equipment. This usually involved breadboard-type construction utilizing as few parts as possible, mainly because of financial considerations. A good deal of this work often necessitated building components from raw materials. For instance, I recall cutting aluminum sheets into small triangular sections to make plates for a variable tuning condenser for my c.w. transmitter. For the plate coil of this transmitter I remember winding 1/4 inch copper tubing to form the required coil. In those days most amateurs used the "cut and try" experimental method in building their equipment. Nowadays this method normally is confined to the antenna system.

It should be noted that the average radio amateur in the 1920s was considerably younger than the radio amateur of today. In fact, most were in their teens or early 20s. Moreover, their educational background and general knowledge of electronics were not comparable to our present standards. However, they did learn a lot from constantly building and experimenting with circuits, components, and antennas, as well as by trying out new ideas and methods for improving communications and for working more and more DX.

CQ: Dave, any other comments before we close?

Talley: I want to emphasize that since October 1915 amateur radio has consistently been a most interesting and satisfying avocation for me. In that year my father bought me a wireless receiving set, and I began to learn about wireless telegraphy. I am still thankful to be an amateur radio operator.



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A Resistor Color-Coding Program For The Sinclair ZX-81 and Timex 1000

BY THOMAS M. HART*, AD1B

One of the easiest ways of keeping track of the current concerns and topics of the amateur community is to tune across any of the h.f. bands and listen to QSO's in progress. Filter out the discussions over the myriad of local and national nets as well as the surprising number of conversations extolling the merits of amplitude modulation and concentrate on the remainder. I am amazed at the number of instances in which personal computers are the topic. Even on 80 meters, which I consider to be the most staid and conservative of the major h.f. bands, it is very common to hear discussions on the pro's and con's of Commodores, Apples, Ataris, T.I.'s, and Sinclairs.

Recent literature shows a dramatic increase in the number of articles on computer applications in amateur radio and related areas. All of the amateur publications have presented articles on topics which include computer-controlled RTTY and c.w., as well as various programs for net control, antenna design, DXCC, etc. Specialized newsletters such as QEX and QZX have dealt with specialized computer applications in amateur radio.

It seems that all amateurs should investigate the uses and advantages of computers in order to remain current with the evolution of our hobby. This process has become easier as the price of personal computers has declined to amazingly modest levels, a process that will no doubt continue until the inevitable shakeout of the weaker manufacturers and reduction of competition.

I have chosen the Timex-Sinclair com-

Color	Value Bands 1 & 2	Value Band 3	Value Band 4 (tolerance)
Black	0	x0	-
Brown	1	x10	-
Red	2	x100	-
Orange	3	x1,000	-
Yellow	4	x10,000	-
Green	5	x100,000	-
Blue	6	x1,000,000	-
Violet	7	-	-
Gray	8	-	-
White	9	-	-
Gold	-	+ 10	5%
Silver	-	+ 100	10%
None	-	-	20%

Fig. 1- AD1B's Basic resistor color-coding system.

RESISTOR CODING PROGRAM

ENTER THE COLOR OF THE FIRST BAND FROM THE FOLLOWING LIST:

BLACK	BROWN	RED
ORANGE	YELLOW	GREEN
BLUE	VIOLET	GRAY
WHITE	GOLD	SILVER
NONE		

Fig. 2- Screen requesting data.

puter for my own use because of its rock-bottom price and the opportunity that it offers to anyone who likes to tinker. There have been a large number of articles on Sinclair hardware modifications and amateur software. Add-ons include keyboard, RTTY and c.w. interfaces, backup power supplies, etc.

The program that is presented here is designed to be used in either or both of two ways. You can quickly and accurately

```

RESISTOR CODE
A RESISTOR WITH THE BANDS:
                                BLUE
                                GRAY
                                RED
                                SILVER
HAS A VALUE AND TOLERANCE OF:
                                6.8K OHMS
                                10 PERCENT

```

ENTER **Y/N** TO CONTINUE

Fig. 3- Screen showing results.

ly identify a large number of unknown resistors without reference to handbooks. This is a great help to those of us who are not intimately familiar with the color-coding system. Furthermore, the program can be a learning tool for someone trying to learn the color code. The program can be used to verify problems being solved.

The resistor coding system utilizes 12 colors in order to assign 2 significant figures (bands 1 and 2) that are multiplied by an exponential value of base 10 (third band). Finally, either of two colors is used to indicate the resistor tolerance (fourth band). Fig. 1 shows the basic scheme. Notice that band 3 is consistent with bands 1 and 2. For example, red equals the number "2" in the first 2 bands, while red equals "10²", or 100, in band number 3.

Fig. 2 shows the screen display when the program requests the input of infor-

*32 Westwood Terrace, Westwood, MA 02026

```

1 REM "RESISTOR CODING PROGRAM"
5 CLS

10 PRINT "RESISTOR CODING PROGRAM"

15 LET A$="ENTER THE COLOR OF THE FIRST"

20 LET B$="BAND FROM THE FOLLOWING LIST:"

25 LET C$="BLACK BROWN RED ORANGE YELLOW GREEN BLUE GRAY VIOLET WHITE GOLD SILVER NONE"

30 PRINT "A"
35 PRINT B$
40 PRINT "C"
45 INPUT D$
50 GOSUB 1000
55 LET Z$=D$
60 LET A=D
65 CLS
70 PRINT "SECOND"
75 PRINT B$
80 PRINT "C"
85 INPUT D$
90 GOSUB 1000
95 LET Y$=D$
100 LET B=D
105 CLS
110 PRINT "THIRD"
115 PRINT B$
120 PRINT "C"
125 INPUT D$
130 GOSUB 1000

135 LET X$=D$
140 LET C=D
145 IF C=0 THEN LET E=1
150 IF C=0 THEN LET E$=""
155 IF C=1 THEN LET E=10
160 IF C=1 THEN LET E$="K"
165 IF C=2 THEN LET E=.1
170 IF C=2 THEN LET E$="K"
175 IF C=3 THEN LET E=1
180 IF C=3 THEN LET E$="K"
185 IF C=4 THEN LET E=10
190 IF C=4 THEN LET E$="K"
195 IF C=5 THEN LET E=.1
200 IF C=5 THEN LET E$="M"
205 IF C=6 THEN LET E=1
210 IF C=6 THEN LET E$="M"
215 IF C=7 THEN LET E=10
220 IF C=7 THEN LET E$="M"
225 IF C=8 THEN LET E=100
230 IF C=8 THEN LET E$="M"
235 IF C=9 THEN LET E=1000
240 IF C=9 THEN LET E$="M"
245 CLS

250 PRINT "FOURTH"
255 PRINT B$
260 PRINT "C"
265 INPUT D$
270 GOSUB 1000
275 LET W$=D$
280 LET F=D
285 LET G=(((A*10)+B)*E)
290 CLS

295 PRINT "RESISTOR VALUE"
300 PRINT "RESISTOR CODE"
305 PRINT "RESISTOR VALUE"

310 PRINT "A RESISTOR WITH THE BANDS:"
315 PRINT "Z Y X W"
320 PRINT "HAS A VALUE AND TOLERANCE OF:"
325 PRINT "G E OHMS F PERCENT"
330 PRINT "ENTER Y/N TO CONTINUE"
335 INPUT G$
340 IF G$="Y" THEN GOTO 5
345 CLS
350 STOP

1000 IF D$="BLACK" THEN LET D=0
1005 IF D$="BROWN" THEN LET D=1
1010 IF D$="RED" THEN LET D=2
1015 IF D$="ORANGE" THEN LET D=3
1020 IF D$="YELLOW" THEN LET D=4
1025 IF D$="GREEN" THEN LET D=5
1030 IF D$="BLUE" THEN LET D=6
1035 IF D$="VIOLET" THEN LET D=7
1040 IF D$="GRAY" THEN LET D=8
1045 IF D$="WHITE" THEN LET D=9
1050 IF D$="GOLD" THEN LET D=5
1055 IF D$="SILVER" THEN LET D=10
1060 IF D$="NONE" THEN LET D=20
1065 RETURN

```

Fig. 4—The resistor color-coding program.

mation. The first line changes as the program is run to accommodate successive entries. Fig. 3 shows the screen after the computation has been completed. The program can then be terminated or rerun, to decode another resistor.

Program Notes

Lines 1-25: Introductory material; strings are used to save time and memory for the prompts.

Lines 30-270: Entry of the colors and assignment of values to variables.

Lines 145-245: Determination of multiplier and assignment of code letter ("K" or "M").

Lines 1000-1050: Subroutine to assign value to color input.

Line 285: Computation of resistor value.

Lines 295-325: Screen display.

Lines 330-350: Continue or stop decision.

Note: I have purposely omitted gold and silver in band 3 because they are seldom used. If desired, these can be inserted.

I hope that this resistor coding program will be useful to those with personal computers. Although it is written in the Sinclair version of Basic, it can easily be converted to other versions. For those without personal computers, I hope that this article will help break down resistance to explorations into this exciting area. □

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Some tired band captains of the XE2SI multi-multi team are shown here taking a break from the contest. Left to right are Jim, N6TJ (20); Larry, N6AR (40); Wayne, N6NB (Mr. Portable Tower); Glenn, K6NA (80); and Dick, N6AA (10 and 160). Not shown is the crew of operators who were hard at work in the contest, including N6ND, AA6RX, WA6OTU, XE2SI, and N6XX—and of course, photographer "Tree," N6TR (15).



This year's Stateside single-operator all-band USA winner, Gary Caldwell, WA6VEF, operator of the new USA record-setting station AI6V, shows us the operating position. Well done, Gary.

1983 CQ WORLD-WIDE DX CONTEST PHONE RESULTS

BY LARRY BROCKMAN*, N6AR/4, AND BOB COX**, K3EST

Juan had often travelled up to the top of the hill in the morning with his friends. From where he stood, there was a beautiful view below of the city of Tijuana. He could also see the Pacific Ocean to the west about 2000 feet below and in the distance. It was completely deserted at the top of the hill, with just one small building, a pumphouse that supplied water pressure for the housing communities half-way down the hill. The area was dusty from some grading that had been done recently but a long dirt road led down the hill to civilization. It was sunny this morning and very quiet. The other children who came with Juan were playing in the pumphouse. Juan was hiding from the others around the side of the building. All of a sudden he noticed a cloud of dust on the road. In a few minutes he could see that there were 10 or so cars, vans, and

trucks headed up the hill. Who would disturb his playground at 10 a.m.? Soon the caravan drew close. Juan could see three trailers with long metal structures on them. There were also three vans, and several cars. What could all this be?

It was 1 p.m., and the caravan had stopped and unloaded many strange things from the vehicles. The trailers had been positioned at various places on the hill, and the long metal structures were slowly being erected into towers. Most people in the vans and cars were Americans, but a few of the men were Mexicans whom Juan had seen earlier. They had broken the calm before on Juan's hill with a smaller set of trailers and vehicles. But this—this was like nothing Juan had ever seen before. Large antennas were being hoisted to the top of the 3 towers over 70 feet in the air. Some of these antennas had pieces that were 50 feet long! There were wires being strewn everywhere, gasoline generators, electronic equipment galore, tents, and all kinds of activity.

At 4:30 p.m. three towers stood fully upright with large antennas mounted on

them and wires draped all over the place. The crazy Americans had disappeared into the vans and were shouting into microphones and running all kinds of tests. They didn't seem too friendly when Juan and his friends wandered close to the vans. Then at 5 p.m. the Americans went crazy over their microphones and started writing in a frenzy on pieces of paper while they were talking. It sounded like they were saying the same thing over and over: "5906," "5906." Juan and his friends went home to tell their families about the nuts on the top of the hill.

Yes, indeed, a crew of crazy Americans had set up 5-element Yagis for 10, 15, and 20; a 2-element Yagi on 40; and inverted Vees on 160 and 80 using 3 portable 70 foot towers in just 6 hours. Using generators, they were blessed with a cool kw on all five bands. And now they were hard at work as XE2SI in the 1983 CQ WW Phone Contest. Forty-eight hours later they had amassed 11,000 contacts and over 13 million points. In just 3 hours all antennas and equipment would be disassembled, and they would be back inside the United States. Incredibly, the whole

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Seventeen-year-old Seth Levitas of N2BZQ/4X finished third in the World on 20 meters with a whopping 1.1M.



Fifth World High 15 meter honors were captured by 16-year-old Stessil Zvi, 4X6FR, shown here at the rig.

venture had been planned and carried out with just three weeks of preparation.

This was not an isolated case of devotion to the WW DX Contest. Thousands of miles away teams had set up super stations in Bermuda, the Virgin Islands, Costa Rica, Trinidad, Soviet Georgia, Lord Howe Island, St. Martin, and other places. The Stateside multitude was blessed with lots of fine activity from South America and Africa, as well. All in all, the 1983 CQ WW Phone contest was a smashing success—a continuation of the fine tradition established in the past. Sunspots may decline, but the spirit of the CQ WW Contesters just can't be broken.

The All-Band Results

Two of California's finest operators cleaned up in the all-band category this year. Rich Smith, N6KT, managed 10.7M points at PJ2FR to capture the World High, while Gary Caldwell, WA6VEF, guest operated at AI6V and set a new USA Single Operator record with 3.58M. Ironically, AI6V travelled to Hawaii for a multi-single stint at KH6MD and ended up with a lower score than Gary! It is the first time a W6 has captured the USA high in many years, not to mention stealing the record from John Dorr, K1AR, who finished second this year with 2.5M. The second spot in the World category was hotly contested, with Andy, N2NT, of NP4A narrowly beating out Bill, N1GL, of YV3OS by just 12,000 points out of 8.6M.

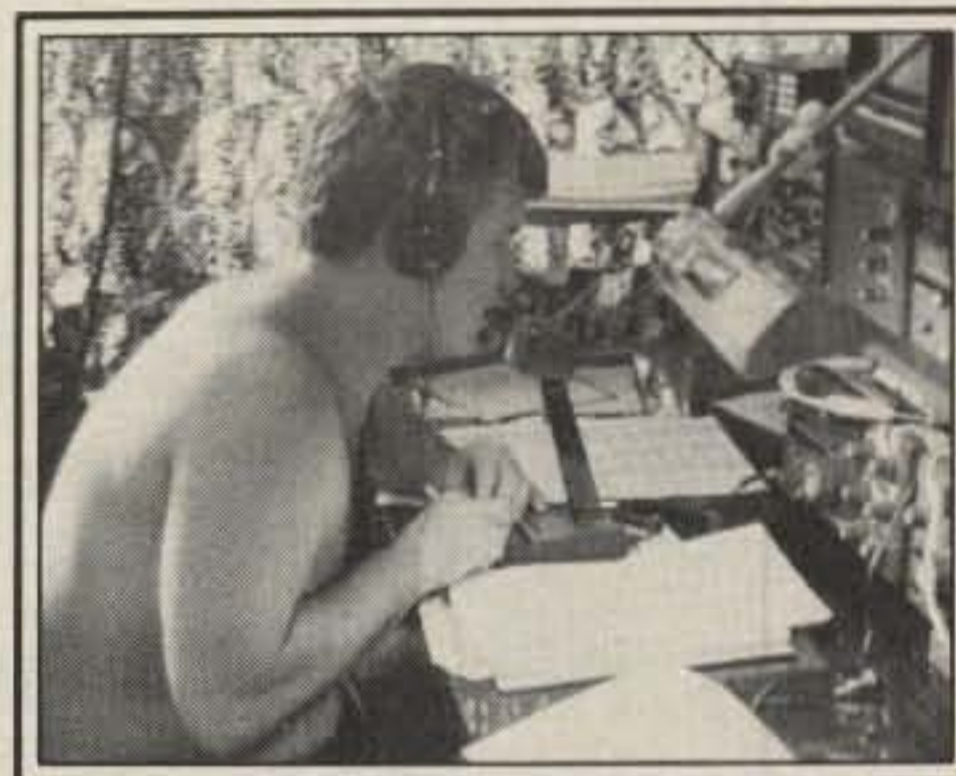
The Frankford Radio Club went back to 9Y4W for an encore of last year's multi-single effort and finished close to their record-setting status of 1982 with 16.2M to run away with this year's top multi-single category. PJ7A was a distant second at 11M. The fellows at Cueta and Mellila, ED9CM, finished third to set a new African multi-single record. State-side, it was KX4S all the way with a whopping 4.2M, over 1M points above the nearest rival, N4ZC.

This was the year for North American multi-multis, with four of the top six slots going to North America's TI1C (24.3M), VP2VDH (19.8M), VP9AD (17.9M), and XE2SI (13.5M). N2AA bested N5AU for the USA multi-multi high spot with 8.3M.

In the QRP category, Mark, AA2Z/1, of the ARRL set a new USA QRP record with a fantastic 509K to lead the World. I5JHW came in second with a fine 436K. It's hard to believe that anyone can manage 600 QSOs with less than 5 watts, but these fellows did it with perseverance and hard work.

Single-Band Results

The big story this year in the single-band category was 160 meters. The low-band crowd shattered most of the existing Continental records with some out-



Phil David, K6DLV, of YB0ARA is shown working down the pileups early in the second day of the contest.



That flurry of elusive activity from HS0HS you heard was due to these gents. Left to right are HS1ALT, HS1ANZ, HS1AHT, HS1AMH, and HS1BG. Loud on 40 meters, there's many a West Coaster who wishes he had spent a little more time listening for North America on 40.

standing performances. UP2BBT, operating portable at UF6V, scored 203,416 points on 160 meters to demolish the old World record by a factor of almost 10! Collecting an incredible 1490 QSOs, 9 zones, and 39 countries, his efforts overshadowed an almost equally stupendous effort by Wally, LZ2CJ, who finished second with 65,870 points, 857 QSOs, 13 zones, and 57 countries to set a new European record. That's right, 57 countries on 160 meters! Additionally, VK6HD and YV3BNJ set new Oceania and South American standards on 160 meters as well. Joe, WA2SPL, set a new USA record with 18K, ahead of Wally, W8LRL, at 15K, but both fine efforts from North America.

On 80 meters Al, YV3AZC, broke his 1982 South American mark with a fine 260K from 4M3AZC for the World High. UW9AF finished second at 222K, a new Asian record, which was previously set way back in 1971 by VE3MR/4X. Jeff, K1ZM, operating at W1ZM, ran away with the USA High with 177K, crushing the '78 standard set by K8LR at W1CF by 70K. California's W6NLZ was second with 76K, including 28 zones.

YV2AMM's big signal on 40 meters made the difference, as he wracked up 501K and took World High. FM7CD (434K) and IO3MAU (355K) finished second and third and set new North American and European Continental marks, respectively. Some of the country totals on 40 meters were truly outstanding at 103 to 104 countries! Larry Pace, N7DD, collected 701 QSOs to capture USA 40 meter honors with a new USA record-high score of 217,830. This was the third USA single-band record for Larry, who now holds 10, 15, and 40 meter USA marks. He was hotly pursued by N6RJ and W6AM (N6AW operating), as the West Coasters used Japanese runs to their advantage.

On 20 meters Mike, ZL1BIL, posted an impressive 1.3M to win it for the World and set a new Oceania Continental standard. Mike also holds the 40 meter Oceania record. Larry Emery, K1UO, took the USA honors and set a new USA record with 727K. Second was Bill, W0ZV, who just hasn't been able to sneak past second place in several years of fine efforts. It's no consolation, Bill, but you were the only station to work all 40 zones on any one band this year, including the big multi-multis.

Fifteen meters continued to be the band with the largest single-band scores this year. Four finished above 1 million. In order, they were KD7P/KH2 at 1.78M (World High), followed by LZ2KTS at 1.37M (New European mark), T32AF at 1.3M, and CX7BY at 1.2M. Tom, N6NI, visited W6YA's hilltop location overlooking the Pacific Ocean and managed to snag the top USA berth with a great 718K. He was trailed by two other West Coast stations, K7JA/6 and KM6B. The Japanese path went well for the West Coasters,



Franz Langner, DJ9ZB, brought us that rare HB0BOE call this year.

as they built up significant leads over the competition in the East.

The top band was a tough one this year, and no new records were set on 10 meters. Ralf, CE6EZ, managed to post 1.25M, overwhelming all other competition for the World High. In the USA arena the W4's took 5 of the top USA 28 MHz spots, as the sunspots made their presence felt. NU4Y topped the field with a fine 142K. Only W6XJ, with some great JA runs, broke into the W4 block, finishing second with 120K.

Activity Highlights

A careful scrutiny of the results will reveal a tremendous increase in activity in the Spanish-speaking segment of the World in the contest this year. The number of EA and CE stations in particular were significantly higher than ever be-

fore. We applaud this great increase in activity. Likewise, the New World countries in Africa are beginning to show some real signs of activity. This kind of improvement in the distribution of contesters is a very welcome trend that all of you can help to extend. Simply publicize the contest to your overseas buddies. Send them some log forms and talk up the contest. It's more fun for all of us when the DX is there and all the zones are active.

A special word of thanks to the contest expeditioners for a job well done. Worthy of special thanks are those who put zone 2 on for us—W8BI/VE2. That was a welcome surprise, indeed. For the last several years we have seen a continual increase in organized contest expeditions, and not just among the W's. This year teams from VK, JA, and Europe travelled to distant places to give the throng a special thrill—some 5 band multipliers. Our thanks to all of you for your fine efforts.

Some Changes

Unfortunately, there are those who insist on taking full advantage of the rules. Believe it or not, one station arranged to retain the allowable three percent duplicates down to the nearest thousandth of a percent. Apparently, our three-for-one penalty isn't adequate. So, in an informal committee meeting at Dayton this year, our committee members voted to in-



Andreas, 5B4LP, has been a welcome addition to the contest during the last couple of years.

crease the penalty to ten to one for all duplicates logged in excess of one percent. After three percent unremoved duplicates are found, the log will be disqualified. Changes were also voted in the three-year trophy repeat rule, reducing the period to two years and offering a special CQ Championship plaque to the repeat winner and the sponsored trophy to the second-place winner, if justified by the returns. We think this change will be a welcome one, since we have had some mail on this issue for some time.

Parting Comments

In next month's issue we will have the results for the WW DX C.W. Contest. Till then, congratulations to all the winners for fantastic efforts. Hope you all will be back for the 1984 fracas.

73, Larry, N6AR/4, and Bob, K3EST

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DX QRM

Luck got the weekend off . . . *AH6EK*. Never heard so many Europeans in the USA phone band . . . *DL7MAE*. This year as *CQ0UA* was the 22nd different prefix used since 1972 . . . *CT1UA*. Excellent conditions on the lower bands . . . *DL8PC*. A lot of hard work and a tough job on 40 meters, but a lot of fun. Really enjoyed the contest . . . *DL8AAE*. Very poor conditions on Saturday . . . *DK2WH*. Looking forward to the next contest with excellent 10 meter conditions—maybe 1990? . . . *DF2RG*. Every time we wanted to switch bands, a young boy scout would have to jump up the lift, climb on the roof, and connect the right antenna . . . *DF0SI*. How can anybody say that 10 meters is dead (30 zones, 95 countries)? . . . *DL6RAI*. Hope to have the best mobile station score . . . *DL4BAH/M*. Thanks to the contest I have 16 new countries . . . *EA7AQY*. The best ham radio contest. Congratulations . . . *EA1CIM*. This is the first time I operated this contest and it was terrific . . . *EA3ENE*. No linear amplifier; only 45 contacts, but I'm happy . . . *EC4BIR*. QRM!!! . . . *EA1BFZ*. No contesting possible from home—TVI . . . *F6BEE*. Always the better contest for me . . . *TO6FNA*. Been QRT for 46 years till March 1983, so this is my first CQ contest . . . *G6QQ*. Wish we could claim some points for all the dupes . . . *G4CNY*. Great fun, but where did 10 meters go! . . . *GM3BCL*. I must rush to get the rig working for the C.W. contest. It blew up after 13 years of operation . . . *GM3SFH*. Please don't laugh at my score. I had to fight QRM, QRN, a wife, a mother, and a one-year-old son . . . *I5OVS*.

Very poor conditions due to heavy aurora . . . *JW5NM*. This is the third year running, and more fun as I get the grip of it . . . *LA8DY*. Top band (160 meters) should be organized into c.w. and phone segments . . . *OH5NQ*. Already started to think about the secret weapon for next year . . . *OZ1IBN*. I hadn't planned to participate, but I got carried away . . . *PA0HIP*. Still working new countries in the CQ WW . . . *PA2TMS*. As usual, only a few hours to spend . . . *SM7TV*. I operated my station with a broken arm . . . *EA5EFR*. Lost the rotor in heavy winds and had to climb the tower in the full storm . . . *SM5GLC*. Had a great time with many fine multipliers . . . *SM0DJZ*. After 5 hours it was evident that we were on the wrong end of the globe. Caused a pleasant family surprise by coming on Sunday and being fresh . . . *OH0BH*. 160 meter band has been significantly different from what it was a few years ago . . . *LZ2CJ*. Never have conditions been so poor to the USA on 20 meters . . . *OH3RF*. Enjoyed working *VE3CVX* for a multiplier, my only VE on 10 meters . . . *YU7AD*. With only 8 JAs and 159 Ws you cannot expect to make a competing score . . . *OH2BAD*. Wanted to buy a land mine for the little hill at 330 degrees . . . *IO8KPV*. Hope to be even more active next year . . . *UK0AMM*. After operating this contest without big beams, we now better understand all you "small pistols" . . . *UK2BAS*. Thank you for the nice contest . . . *UK2GKO*.

Please add 144 MHz to the WW contest. We had good aurora . . . *UK2RDX*. Finished DXCC on 40 meters . . . *UY5XE*. I had poor conditions during the contest. Not too many stations from North and South America coming through . . . *UF6FFF*. Lots of fun being on the other side . . . *3D2ZM (K6ZM)*. The old Swan made it again . . . *5B4LP*. Conditions to the USA on the second day were excellent . . . *VK6HD*. Special call for the Americas Cup win . . . *AX6NSD*. My resolution: to double my score in 1984 . . . *VK1RJ*. Operated from the southernmost spot in the USA . . . *K6SVL/KH6*. QRP DXCC score is now 230 . . . *PY7ZZ*. The band (40 meters) was very noisy. Very poor conditions to Europe . . . *LU8DQ*. Hope to be back in CP land for next year's contest . . . *CP1AT (WB0GFV)*. Not bad for a portable station, eh . . . *XE2SI*. Many European stations could have picked up multipliers by listening instead of calling CQ . . . *KP2AD*. The only German-speaking VP9 on the island . . . *VP9LB*. Magnetic disturbance; 80 percent of the score came in the first 19 hours . . . *AL7H*. Sometimes there were pileups with the S meter at S0 . . . *ZY5EG*. Best behaved pileups I've heard in some time . . . *PP2ZDD*. No doubt, this is "the contest" . . . *CE6EZ*. Mongolia called in a pileup! . . . *EA4LH/CE3*. Big QRM from the Russian machine gun . . . *YV2AMM*.

Tremendous host country and contest . . . *YV3OS (Opr. N1GL)*. Fantastic experience . . . *VP2KBZ (VE3KZ)*. It is difficult for us to have serious entries since our weekend is Thursday/Friday . . . *A71BJ*. The 10 meter pileups were tremendous . . . *VU2GI*. The improved antennas certainly made a difference this year . . . *4X4NJ*. At 3 a.m. I heard an ominous clicking sound outside. A check revealed the gardener clipping the hedge at the base of the tower . . . *TU2NW*. Best 10 meter conditions despite openings only between 06 and 18 local time . . . *ZS6XD*. Quite a thrill working *FR0*, *ZL*, *5N8*, *VP8*, and *OH* on 160 meters . . . *VE1BNN*. Ten meters was dead to Europe, but on one occasion I heard *I6FLD* from the south . . . *VE2AYU*. Called by *9U5JB* out of the blue . . . *VE3CVX*. Lots of DX to be worked on 160 meters this year . . . *VE3MFA*. Two hours after we started we ran out of scotch, so the output went down miserably . . . *EA8ARA*. No solid USA/North American openings.

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No good long path. Will be in there next year. Love it . . . *HZ1AB*. Somehow trying to be heard over the California kw curtain isn't as much fun as from Hawaii as I had expected . . . *KH6MD (Opr. A16V)*. Bah! Band went west at midnight and never came back . . . *KL7BV*. Europe must really be fun from Tuvalu. We only got 4 QSOs with zones 14 and 15 . . . *T2YKC*. After 6 months of careful planning, we were met with bad weather and Murphy staring at us everywhere we turned. See you next year . . . *V30AA*. *FR0FLO* on 160, wow! . . . *VE1DXA*.

U.S.A. QRM

Send awards to the South Americans for their great participation . . . *N2PP*. Working my first ZL on 160! . . . *KS1L*. Very poor amateur operating practices on 160 . . . *KA1SR*. My receiver unable to handle the QRM from two crying boys . . . *WA2LOG*. My neighbor came over with a TVI complaint after the contest! . . . *K3OX*. Thank you, VE's . . . *K1ZM*. New funny-looking short call adds 3 dB . . . *KR1G*. Worked 17 CEs on 10 meters; none last year! . . . *KG1E*. Test your patience to the very limit—try QRP . . . *W6MYH*. Only 6 ops gave me other than 59 . . . *AA2Z/QRP*. Work is beginning to interfere with my hobby . . . *N2VW*. Moved to RI and finished antenna work at 2330Z, just in time . . . *K1NG*. Sleeping too much . . . *N1CQ*. Computer scoring program produced negative score results after the contest . . . *K2ITG*. Balun failure at European peak on 15 meters cost us 200K points . . . *K3TUP*. *W4DR* worked 32 zones and 108 countries on 40 meters . . . *KX4F*. Three transceivers gave their best and went to the final reward in smoke . . . *NG6T*. The Geritol twins doubled last year's score . . . *W6BIP*. What happens when a new station is put under pressure? Murphy, Murphy . . . *KY6I*. Couldn't spend as much time as usual in the contest—got married that weekend . . . *KE6PQ*. We were still putting up the 20 meter Yagi Saturday morning in the snow . . . *KR1R*.

Trying to work the contest with 100 watts is terrible . . . *K6CSL*. Tough conditions on the high bands, but the low bands played well, a preview of coming attractions . . . *N5JB*. The practice of DX stations not signing for extended periods of time still frustrates me no end . . . *W5OB*. New son (7 lb., 13 oz.) on the day before the contest. Only had time for 40 meters between trips to see mom . . . *KE5CV*. CQ contest is well named—band full of stateside CQ DX callers . . . *N4SU*. First contest, great fun and frustration . . . *WA4YLD*. What a horrible year to do 10 meters single band . . . *KF4FN*. My first CQ WW from USA after 18

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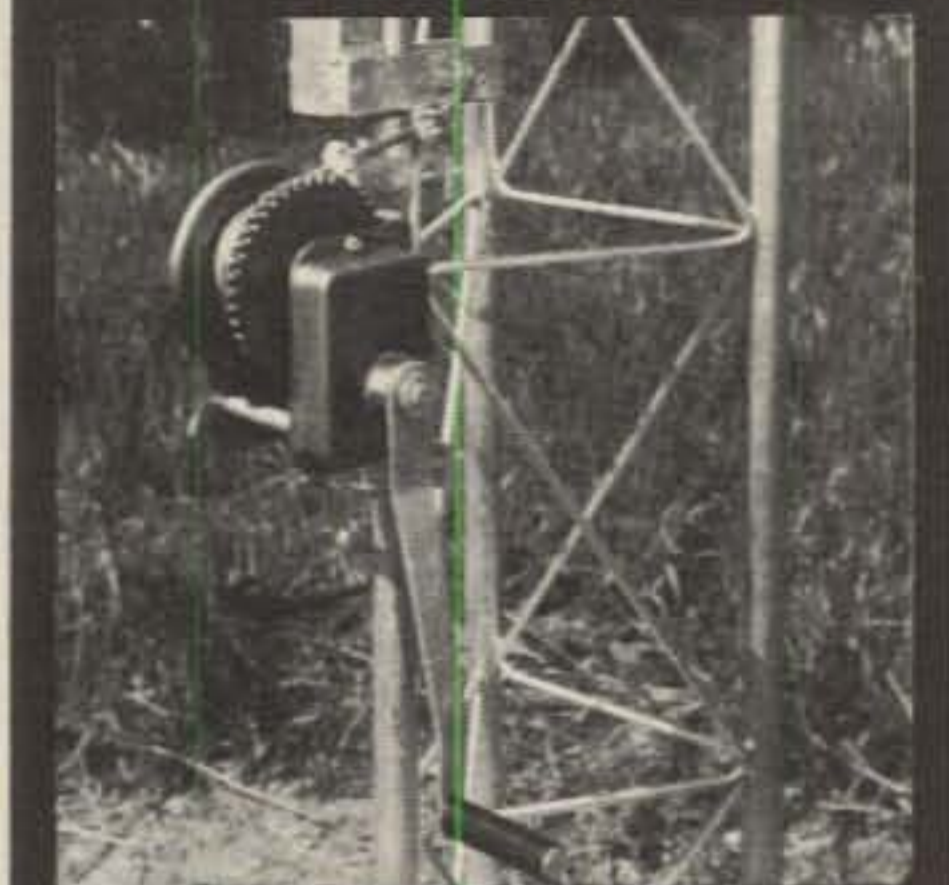
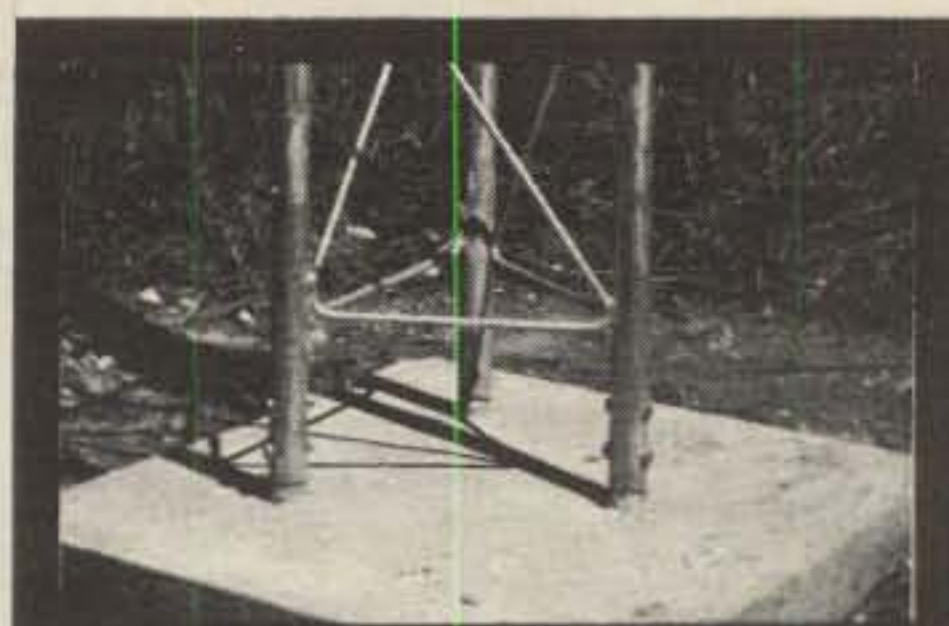
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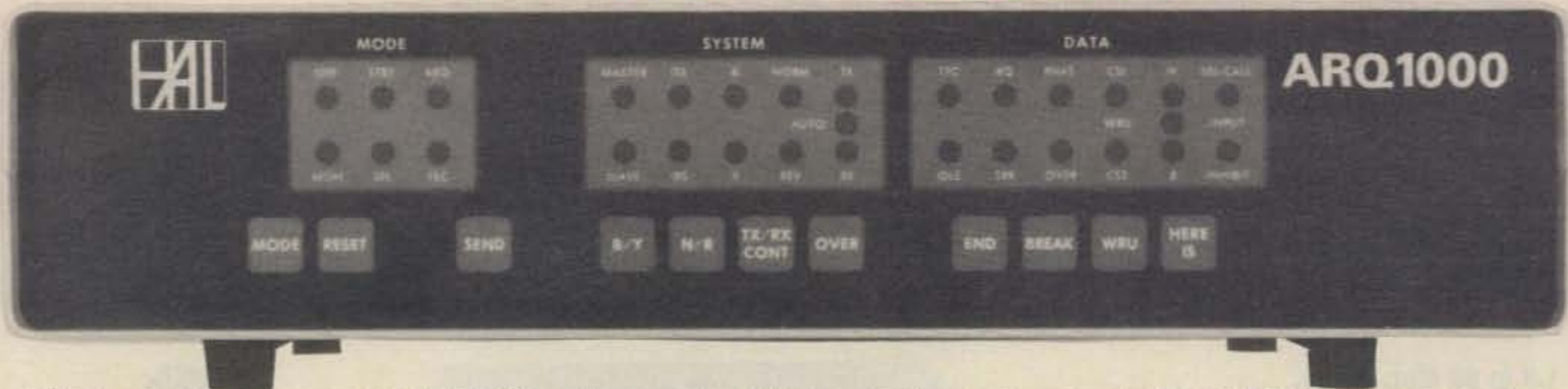
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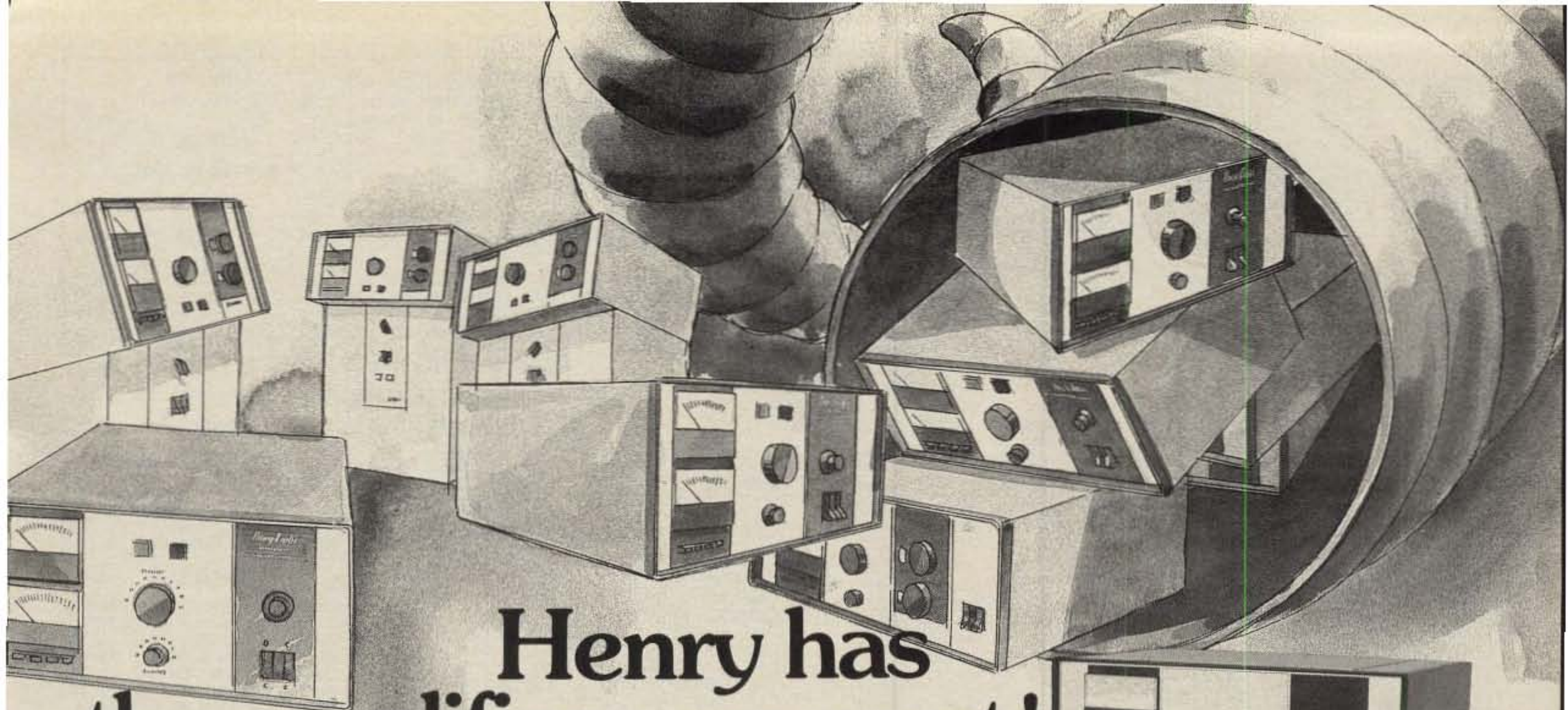
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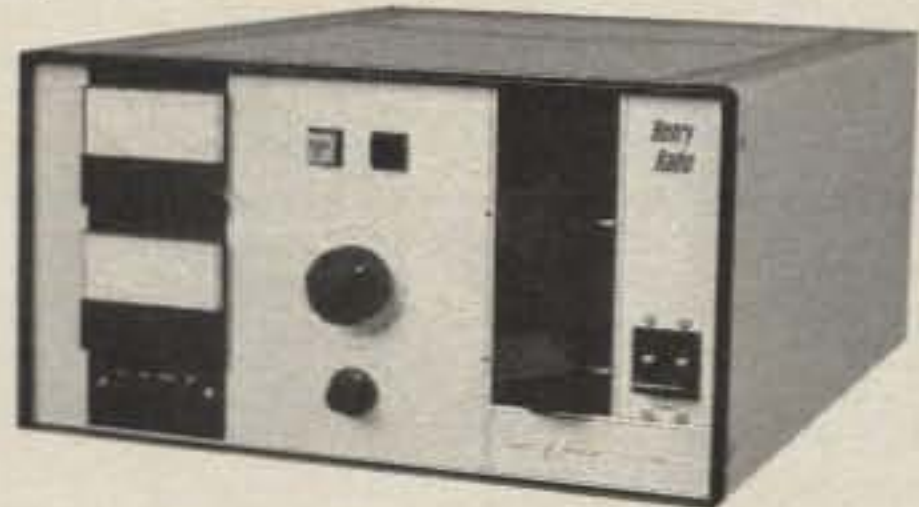
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CIRCLE 60 ON READER SERVICE CARD

The ICOM IC-751 H.F. All-Band Transceiver and General-Coverage Receiver

BY JOHN J. SCHULTZ*, W4FA



The front panel of the IC-751 is very well laid out. One hand can control all of the tuning/memory control functions.

The ICOM-751 would appear, at first glance, to be an updated version of the ICOM 720A. However, it is really much, much more than that, and ICOM is quite justified in giving it a new series designation. In very broad outline, it may resemble the IC-720A, but much of the circuitry is new and different, and it has a host of features not found on the IC-720A.

Table I lists the technical and physical specifications for the IC-751. As a transceiver, it covers all the present and WARC amateur bands with a generous frequency underrun and overrun on all bands except 160 meters. In the general-coverage receive mode it covers all frequencies continuously from 0.1 to 30.0 MHz in 1 MHz bands. It is an all-mode transceiver—s.s.b., c.w., RTTY, f.m., and a.m. Although some of the features of the IC-751 will be covered in more detail later when its operation is described, following are a few highlights.

Transmit Mode:

1. Two-hundred watts input, nominal 100 watts output, on s.s.b., c.w., RTTY, and f.m.; 40 watts output on a.m. Continuously-duty cycle at these power levels using an external power supply.

2. State-of-the-art specifications for har-

monic outputs, spurious, sideband, and carrier suppression, etc.

3. R.f. speech processor usable in both s.s.b. and a.m. modes.

4. Monitor circuit so one can monitor the audio signals after speech processing or side-tone for a c.w. signal.

5. Full or semi break-in operation on c.w.

6. Transmitter incremental tuning (XIT).

7. Full metering to include s.w.r.

Receive Mode:

1. Excellent dynamic range with a switchable preamplifier.

2. I.f. notch filter and passband tuning active in all modes except a.m.

3. Adjustable a.g.c., noise blanker, audio tone control, and RIT.

Frequency Control/Display:

1. Microcomputer-based 10 Hz step digital PLL synthesizer.

2. Six-digit 100 Hz frequency readout with separate readout for XIT/RIT settings. Mode and memory channel displays.

3. Dual A/B v.f.o. systems with full flexibility for crossband and crossmode operation. Digital outputs available for computer control of transceiver frequency functions and for a synthesized voice frequency readout.

4. Thirty-two tunable memories to store modulation mode, amateur band or general-coverage mode, and frequencies. Lithium bat-

tery backup. Full transfer of frequencies between the memories and the v.f.o.'s is provided along with various scanning functions which can be controlled from the transceiver or remotely.

General:

1. Compact size: 115 × 306 × 355 mm at 8.5 kg.

2. A wide variety of options, including external and internal power supplies, special i.f. filters, microphones, etc.

3. Various rear-panel connectors to provide for linear, transverter, and other accessory connections.

Circuitry And Construction

A block diagram of the IC-751 is shown in fig. 1. In the s.s.b. mode the s.s.b. signal is generated at a 9 MHz i.f. frequency, translated to a 70 MHz i.f. using a fixed 61 MHz local oscillator signal, and then this signal is set to the desired operating frequency via mixing with a 10 Hz stepped local oscillator signal variable from approximately 70 to 100 MHz. These frequencies are approximate, and the exact ones are shown in fig. 1. However, the basic idea is that the generated s.s.b. signal is translated up to 70 MHz i.f. and then translated down again to the desired output frequency in the 1.8 to 30.0 MHz range. The 70 MHz i.f. stage can be seen in the approximate top middle of fig. 1. The transmit signal then passes through one of the nine diode-switched bandpass filter stages normally associated with the receive function, through a series of power-amplifier stages, through one of the seven relay-switched low-pass filter stages, and on to a relay for transmit/receive antenna switching.

In the receive mode the whole process basically reverses itself. The received signal goes through one of the nine diode-switched bandpass filter stages, is up-converted to the 70 MHz i.f. by a 70 to 100 MHz local-oscillator signal, and is then translated to the 9 MHz i.f. using a fixed 61 MHz local-oscillator signal. Finally, it is further frequency-translated to 455 kHz and 350 kHz i.f. frequencies. This is done to allow a passband tuning function on s.s.b. using the standard filters supplied and also to allow the introduction of optional filtering at the 9 MHz or 455 kHz i.f. while retaining the passband tuning feature on s.s.b. and c.w. The somewhat involved frequency translation scheme also allows the introduction of a true r.f. (not a.f.) notch-filter circuit.

As one might well imagine, it takes a lot of complex circuitry to carry out the functions so simply described above. Someday probably

*c/o CQ magazine

GENERAL

Number of Semiconductors:

Transistors	105
FET	16
IC (Includes CPU)	51
Diodes	219

Frequency Coverage:

Ham Band	1.8 MHz ~ 2.0MHz
	3.45MHz ~ 4.1MHz
	6.95MHz ~ 7.5MHz
	9.95MHz ~ 10.5MHz
	13.95MHz ~ 14.5MHz
	17.95MHz ~ 18.5MHz
	20.95MHz ~ 21.5MHz
	24.45MHz ~ 25.1MHz
	27.95MHz ~ 30.0MHz

General Cover (Receive Only)

0.1MHz ~ 30.0MHz
Thirty 1MHz Segments (or Continuous)

RIT/XIT Coverage ±9.9KHz

Frequency Control:

CPU based 10Hz step Digital PLL synthesizer.
Independent Transmit-Receive Frequency Available on same band.

Frequency Readout:

6 digit 100Hz readout.

Frequency Stability:

Less than ±200Hz after switch on 1 min to 60 mins, and less than ±30Hz after 1 hour. Less than ±500Hz in the range of 0°C ~ +50°C.

Power Supply Requirements:

DC 13.8V ±15% Negative ground Current drain 20A max. (at 200W input)
AC power supply is available for AC operation.

Antenna Impedance:

50 ohms Unbalanced

Weight:

9.5Kg

Dimensions:

115mm(H) x 306mm(W) x 355mm(D)

TRANSMITTER

RF Power:

SSB (A ₁ J)	200 Watts PEP input
CW (A ₁), RTTY (F ₁)	200 Watts input
FM (F ₃)	200 Watts input
AM (A ₃)	40 Watts output
Continuously Adjustable Output power 10 Watts ~ Max.	

Emission Mode:

A ₃ J	SSB (Upper sideband and Lower sideband)
A ₁	CW
F ₁	RTTY (Frequency Shift Keying)
A ₃	AM
F ₃	FM

Harmonic Output:

More than 40dB below peak power output

Spurious Output:

More than 60dB below peak power output

Carrier Suppression:

More than 40dB below peak power output

Unwanted Sideband:

More than 55dB down at 1000Hz AF input

Microphone:

Impedance 600 ohms
Input Level 12 millivolts typical
Dynamic or Electret Condenser Microphone
(Optional IC-HM12 or IC-SM6 can be used.)

RECEIVER

Receiving System:

SSB, CW, RTTY, AM
Quadruple Conversion Superheterodyne with continuous Bandwidth Control.

FM Triple Conversion Superheterodyne

Receiving Mode:

A₁, A₃J (USB, LSB) F₁ (Output FSK audio signal), A₃, F₃

IF Frequencies:

1st	70.4515MHz
2nd	9.0115MHz (SSB), 9.0106MHz (CW, RTTY) 9.0100MHz (AM, FM)
3rd	455KHz
4th	350KHz (except FM)

with continuous Bandwidth Control

Sensitivity:

SSB, CW, RTTY	0.1 ~ 0.5MHz Less than 0.5µV for 10dB S/N
	0.5 ~ 1.6MHz Less than 1.0µV for 10dB S/N
	1.6 ~ 30MHz Less than 0.15µV for 10dB S/N
AM	0.1 ~ 0.5MHz Less than 3µV for 10dB S/N
	0.5 ~ 1.6MHz Less than 6µV for 10dB S/N
	1.6 ~ 30MHz Less than 1µV for 10dB S/N
FM	1.6 ~ 30MHz Less than 3µV for 12dB SINAD.

Squelch Sensitivity:

1.6 ~ 30MHz Less than 0.3µV

Selectivity:

SSB, CW, RTTY	±1.15KHz (Adjustable to ±0.4KHz Min) at -6dB
	±2.0KHz at -60dB
AM	±1.2KHz at -6dB, ±2.25KHz at -60dB (When Filter switch ON)
	±2.0KHz at -6dB, ±7.5KHz at -60dB
FM	±7.5KHz at -6dB, ±15KHz at -60dB

Notch Filter Attenuation:

More than 45dB

Spurious Response Rejection Ratio:

More than 60dB

Audio Output:

More than 3 Watts

Audio Output Impedance:

8 ohms

Table I—Overall specifications for the IC-751.

even complex transceivers such as the IC-751 will need only a half-dozen IC's. However, at the moment the semiconductor "count" for the IC-751 is over 350 devices. Some idea of the circuitry found in the IC-751 is shown in fig. 2. It shows the board which contains some of the 70 MHz i.f., frequency translation stages, bandpass filter circuits, etc., used in both the transmit and receive modes. Those who are interested can refer back and forth between the IC and transistor stage designations in figs. 1 and 2 to trace out some of the very interesting circuitry (e.g., the J-FET double-balanced mixer stage, Q9 and Q10, and the pre-amplifier stage, Q6 and Q7, used in the receive mode).

As far as construction is concerned, the IC-751 ranks right along with the rest of ICOM gear as being top-notch. The interior view shows a bit of the inside as the top cover was removed. As usual, all of the PC boards are extremely neatly done, interconnecting cables are carefully installed and routed, sensitive circuitry areas are well shielded, and everything is very neat. The boards are marked well enough such that if one wanted to do some elementary servicing using the diagrams sup-

plied with the IC-751 manual, it should not pose any problem. However, it should be recognized that unless one has fine skills and fine equipment, servicing of a unit such as the IC-751 should be left to the experts.

The sophisticated inner contents of the IC-751 are protected by rolled-steel top and bottom covers and a cast front panel. The back panel, as one can see from another photograph, is occupied mainly by the large heatsink. The latter contains an internal fan which exhausts vertically so one only has to provide clearance for the connectors if back space is limited where an IC-751 is installed. The construction would appear to be very appropriate for mobile as well as fixed station operation.

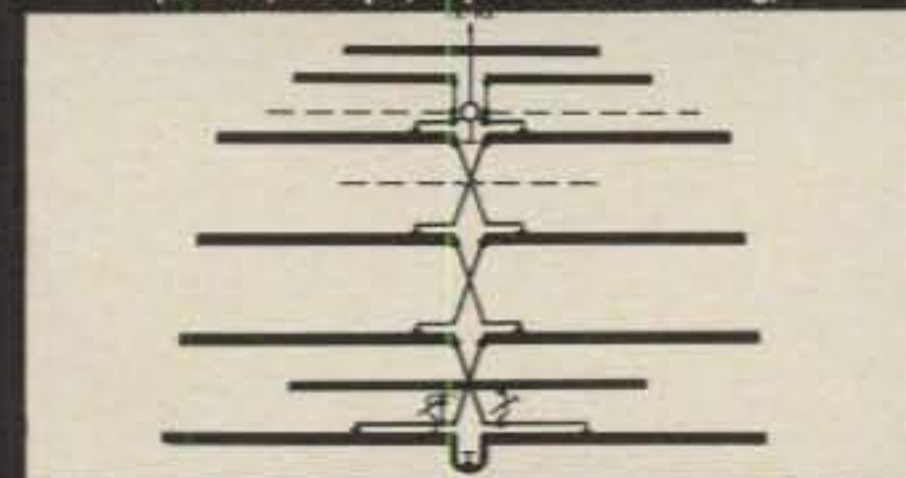
Test Results

To put it concisely, the IC-751 easily meets all of its advertised claims with regard to technical specifications. Some comparisons to the IC-720A, however, really can't be avoided. In the receive mode, the IC-751 exhibits even a lower noise floor than the IC-720A. Microvolt-level signals appear to pop out of an almost totally quiet background, especially on

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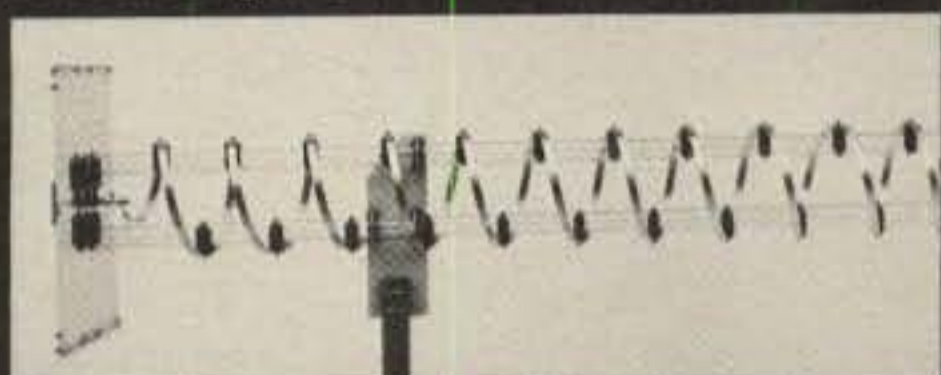
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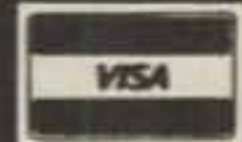
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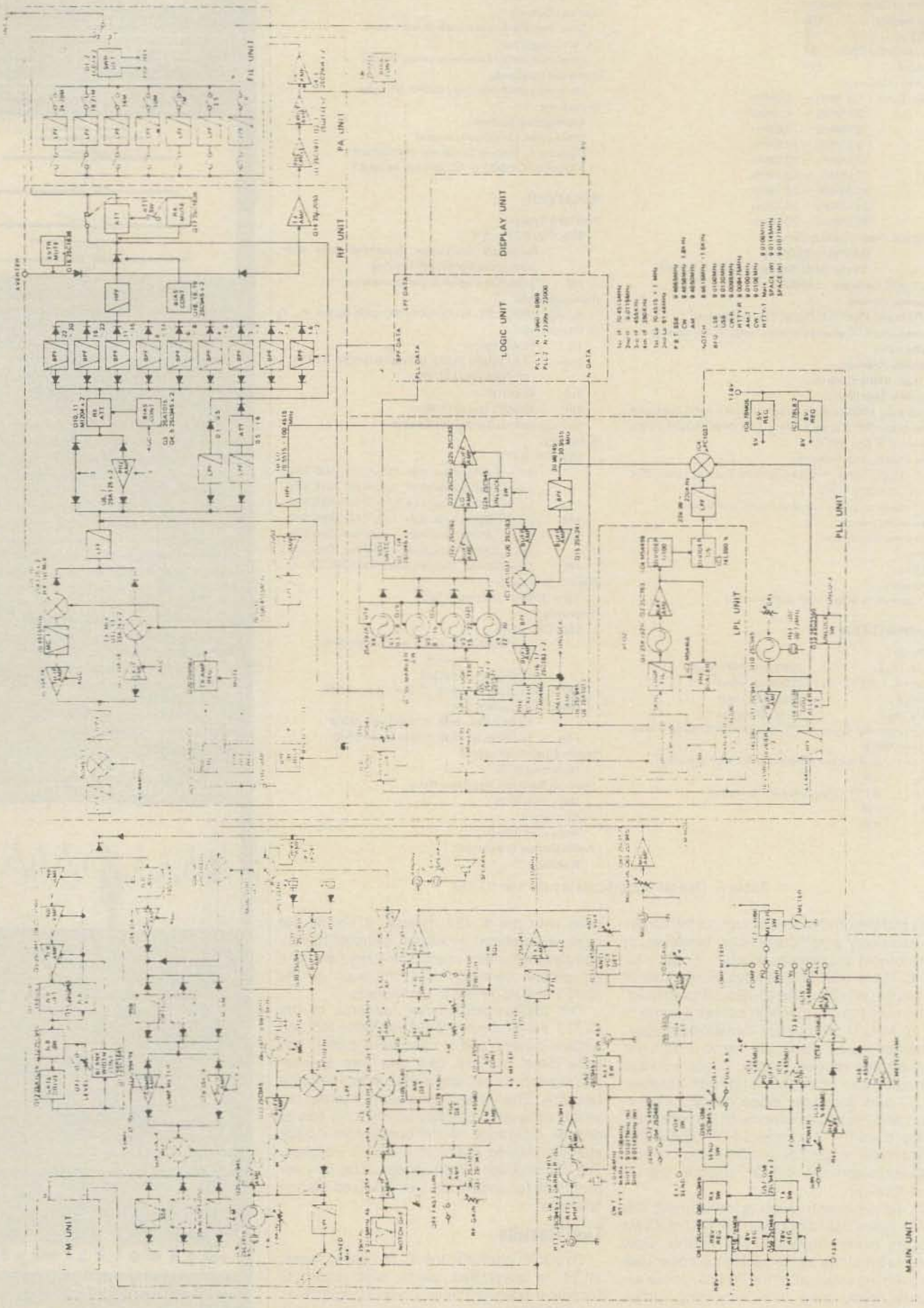


Fig. 1- Block diagram of the IC-751.

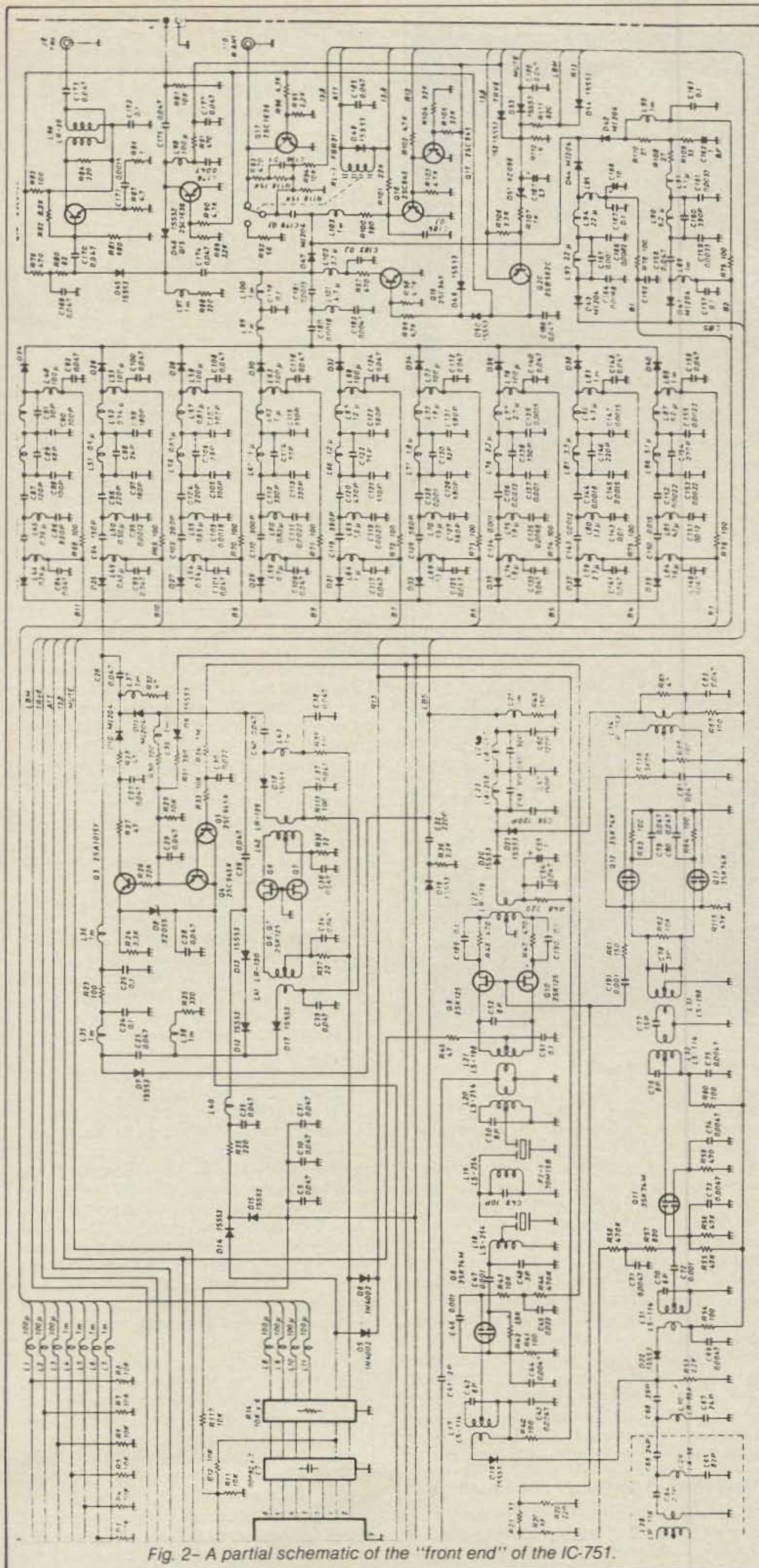


Fig. 2—A partial schematic of the "front end" of the IC-751.

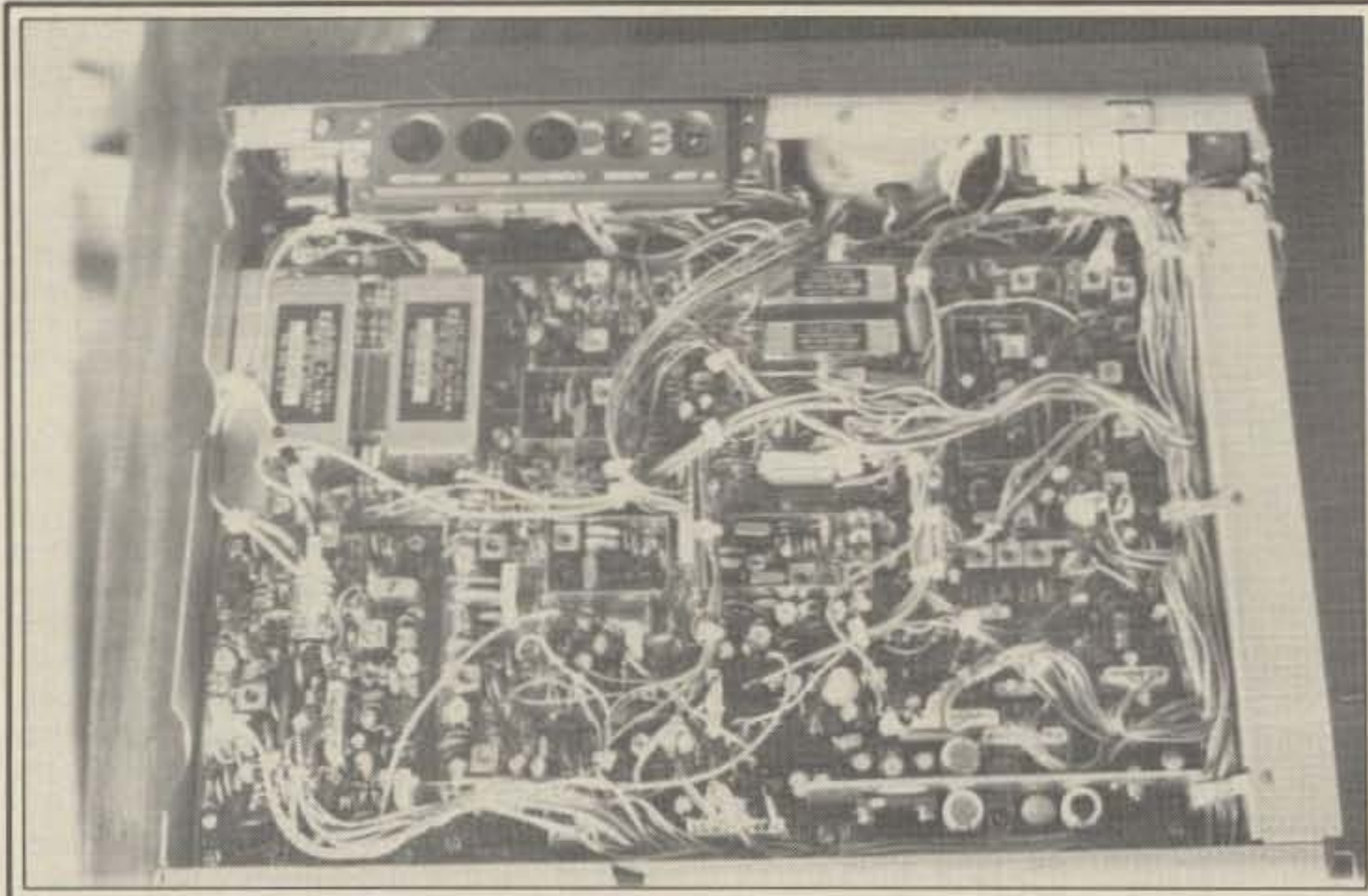
the higher frequency bands, because of the IC-751's noise floor and the inherent lower noise background on those bands. The higher first i.f. used in the IC-751 (70 MHz) as compared to the 39 MHz first i.f. in the IC-720A has eliminated image and spurious responses, for all practical purposes, right up to 30 MHz. Overload and cross-modulation characteristics are better than in the IC-720A. The IMD dynamic range on 20 meters was about 103 dB with a third order intercept of 18 dB for 20 kHz spaced signals.

The digital frequency readout display is far improved. There is no "shot" effect as the digital display changes numbers on the 100 Hz readout anywhere in the 0.1 to 30.0 MHz range. Also, the digital display operates absolutely smoothly as one goes from one MHz range to another full MHz range in the general-coverage receive mode. The tuning is continuous for all practical purposes. One may hear a very slight "click" as different low-pass filters are relay switched for different frequency ranges, but the frequency display remains absolutely stable and correct. The only thing some amateurs may desire is a 10 Hz readout. The circuitry for this may be available in the IC-751, but the frequency display used does not provide the extra digit.

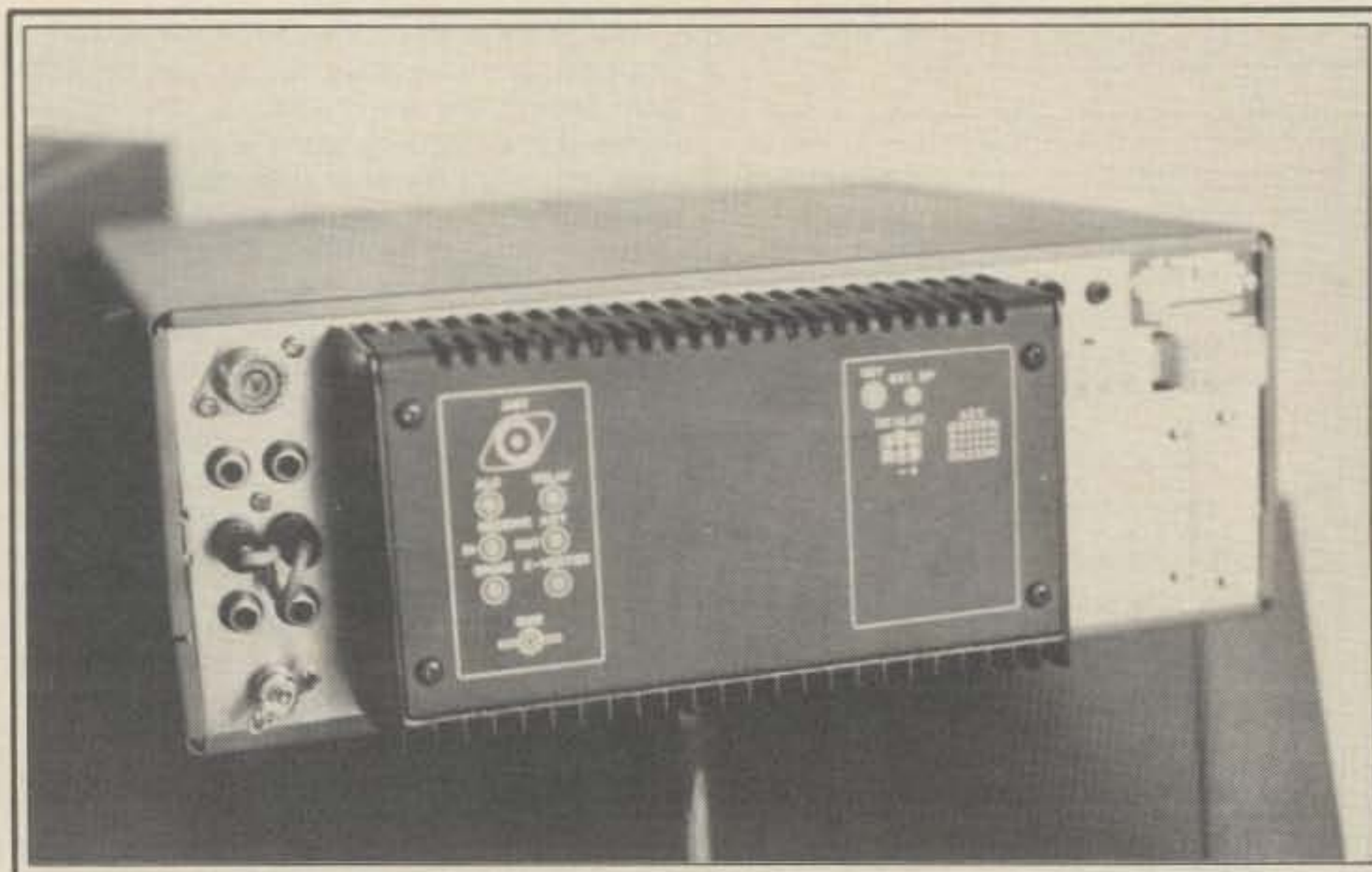
The filters used on the IC-751 are about the sharpest one can imagine. As can be seen from Table I, the standard s.s.b. filter has extreme skirt selectivity with the bandwidth going out to only 4.0 kHz at -60 dB. In fact, contrary to most manufacturers who offer a narrow s.s.b. filter as an option, ICOM offers their FL-70 wide s.s.b. filter as an option (5.0 kHz at -60 dB)! Frankly, the standard filter is excellent for DX, operating on crowded bands, etc., but I can see why the wide filter is being offered for those who would prefer a bit more "brilliance" in the received audio for contacts under armchair conditions. The passband tuning functions very smoothly and with the standard s.s.b. filter will reduce the received bandwidth to about 700-800 Hz at -6 dB, when desired, for better c.w. selectivity. For those who desire sharper c.w. selectivity, ICOM has various optional filters.

Table II shows a summary of the characteristics of the various optional filters. As one can see, there are four optional 9 MHz filters and two optional 455 kHz filters. However, the IC-751 has only two positions for installing additional filters—one for a 9 MHz filter and one for a 455 kHz filter—so one has to choose a desired 9 MHz filter, 455 kHz filter, or combination thereof. A good choice for general use is probably the FL-33 a.m. filter for the 9 MHz i.f. and the FL-52A c.w. filter for the 455 kHz i.f. The use of the standard s.s.b. filter in the a.m. receive mode provides much too harsh-sounding audio for general-coverage receive. The FL-33 provides easy-to-listen-to a.m. sound. The FL-52A c.w. filter is a good choice for all except a dedicated c.w. buff, who might well prefer the sharper FL-53A filter.

The only slightly ambiguous situation that occurs when some of the optional filters are installed is that the filter in/out pushbutton switch changes its functions depending on the mode selected. For instance, if the optional FL-33 a.m. filter and the FL-52A narrow c.w. filter are installed, when the filter switch is in its "off" position, narrow bandwidth is selected on a.m. and wide bandwidth on c.w. as one switches the mode of operation from a.m. to c.w. or vice versa. An operator used to the transceiver will immediately sense which bandwidth is in use as the operating mode is



As is usual for ICOM gear, the interior wiring is a marvel of compactness, yet every PC board can be reached fairly easily.



The back panel of the IC-751 is not full of many connectors, but just about any accessory device (linear, transverter, etc.) can be connected easily.

changed. The situation is also helped somewhat by an LED indicator which illuminates when the filter switch is set to choose the c.w. narrow filter.

The i.f. notch filter is very effective and produces a notch of about -40 to -45 dB at any selected frequency over the i.f. bandwidth. Being an r.f.-type notch filter, it does not seem to have the "touchiness" that one often finds with a.f.-type notching filters. In fact, some transceivers which have a.f. peak/notch filter capabilities have to be operated such that an undesired signal is first "peaked" and then a filter switch turned to "notch" because the tuning is too touchy to notch a frequency directly.

In the transmit mode the power output into a 50 ohm load was very uniform at between 100 and 105 watts on all bands. The front-panel meter which has a **Power Output** scale going from 0 to 100 over about two-thirds of its scale excursion could be used as a direct-reading wattmeter for all practical purposes when the transceiver is worked into a 50 ohm load. IMD

products measured at least -33 dB at 100 watts output on 10 meters. The PA runs very cool, and a built-in cooling fan is provided, although it rarely came on during normal low-duty-cycle s.s.b. or c.w. operation. It will come on automatically if the heatsink temperature reaches 50°C and remains on until the heatsink cools. If the heatsink temperature does not lower, but rises to 90°C , the fan will speed up further, and the PA power output is reduced to no more than 50 watts output.

As with other ICOM h.f. transceivers the microphone input level must be higher than that provided by the usual nonamplified microphone for full modulation. About 12 millivolts across 600 ohms is required. The ICOM microphones have the necessary output level, but other microphones will usually need a pre-amplifier.

Operating Experiences and Impressions

Approaching the IC-751 for the moment as a plain transceiver rather than as one with all sorts of sophisticated features, it is a very

easy transceiver to use. All the controls are clearly marked, and if the **Ham/General** switch is set to **Ham** and the **VFO/M** switch set to **VFO**, one has an all-band transceiver with a dual v.f.o. capability using the **VFO A/B** switch. Either v.f.o. can be used for transmitting and receiving or one for transmitting and one for receiving (half duplex). A v.f.o. frequency transfer switch allows the frequency stored for **VFO A** to be transferred to **VFO B**, or vice versa. Bandswitching is done by the main tuning knob when the **Band** switch next to it is depressed. As the main tuning knob is rotated, the transceiver will step through all the amateur bands in less than one rotation. When one again presses the **Band** switch, one tunes **VFO A** or **B** as selected in the chosen band. The tuning knob covers about 2 kHz per revolution and automatically speeds up to 10 kHz per revolution if the knob is turned rapidly. The tuning knob has a very smooth, weighted feel, and a brake adjustment is provided for individual tastes. If the **TS** button next to the tuning knob is depressed, the tuning speed is increased to 200 kHz per revolution. A dial lock-out switch is provided.

In this manner, one can operate the transceiver in various modes. Both v.f.o.'s can be used in the same band. One can be used to temporarily store a desired frequency, while the other is used to tune around. Crossmode can be used in one band with one v.f.o. set, for example, for c.w. on receive and the other v.f.o. set for s.s.b. on transmit (separate push-buttons provide for setting the s.s.b., c.w., etc., functions). Or, one can operate cross-band with the same or different modes using the two v.f.o.'s. RIT/XIT is available with a ± 9.9 kHz excursion for each. A separate digital display provides a two-digit readout for the RIT/XIT offset. The RIT/XIT tuning knob is a continuously tuning one. About 1 kHz per revolution is covered, so the tuning is very smooth. Pushbuttons provide for the reset of the RIT/XIT to 0.0 kHz when desired.

Once one feels comfortable with the straightforward operation of the IC-751, one can explore some of its more sophisticated frequency control functions. A look at the layout of the luminescent frequency/mode display layout, fig. 3, might be of interest. The display is multicolored with the main frequency readout in white, the frequency offset display in white, and the mode indicators in red or white. Only those functions which are in use are displayed, as explained in fig. 3.

If the **VFO/M** switch on the front panel is pushed such that **MEMO** lights on the display, the main tuning knob now becomes a manual memory-selection dial. As it is rotated, the memo display goes from 01 to 32 in step, and the frequency and mode stored in each memory will be displayed. The frequency will be displayed directly, and one of the mode symbols, f.m. through RTTY on the display, will be illuminated. The **GENE** symbol will come on if the frequency was stored while the unit was in the general receive mode to indicate that the frequency cannot be used for transmission. If one turned to a memory channel stored while the unit was in the amateur-band mode, that stored frequency is immediately available for transceive usage once it is transferred to **VFO A** or **VFO B**. In this manner, the main tuning knob can be used, back and forth, to check the memory channels. Although it is not displayed, the memories also store data as to whether a special narrow filter was used on any stored frequency. Offset tuning that might have been used is not stored. One can stop the



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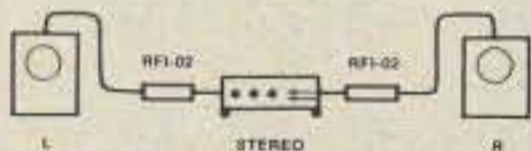
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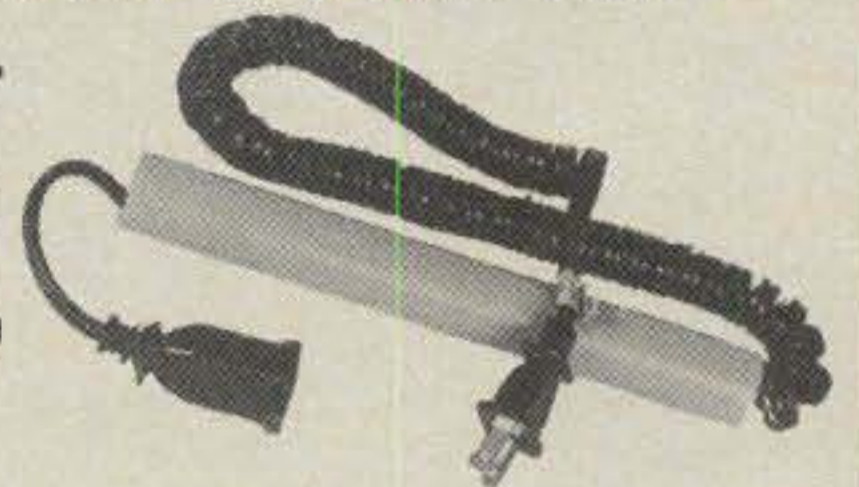
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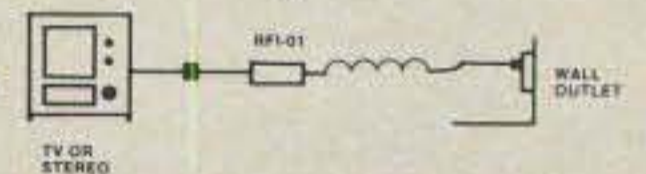
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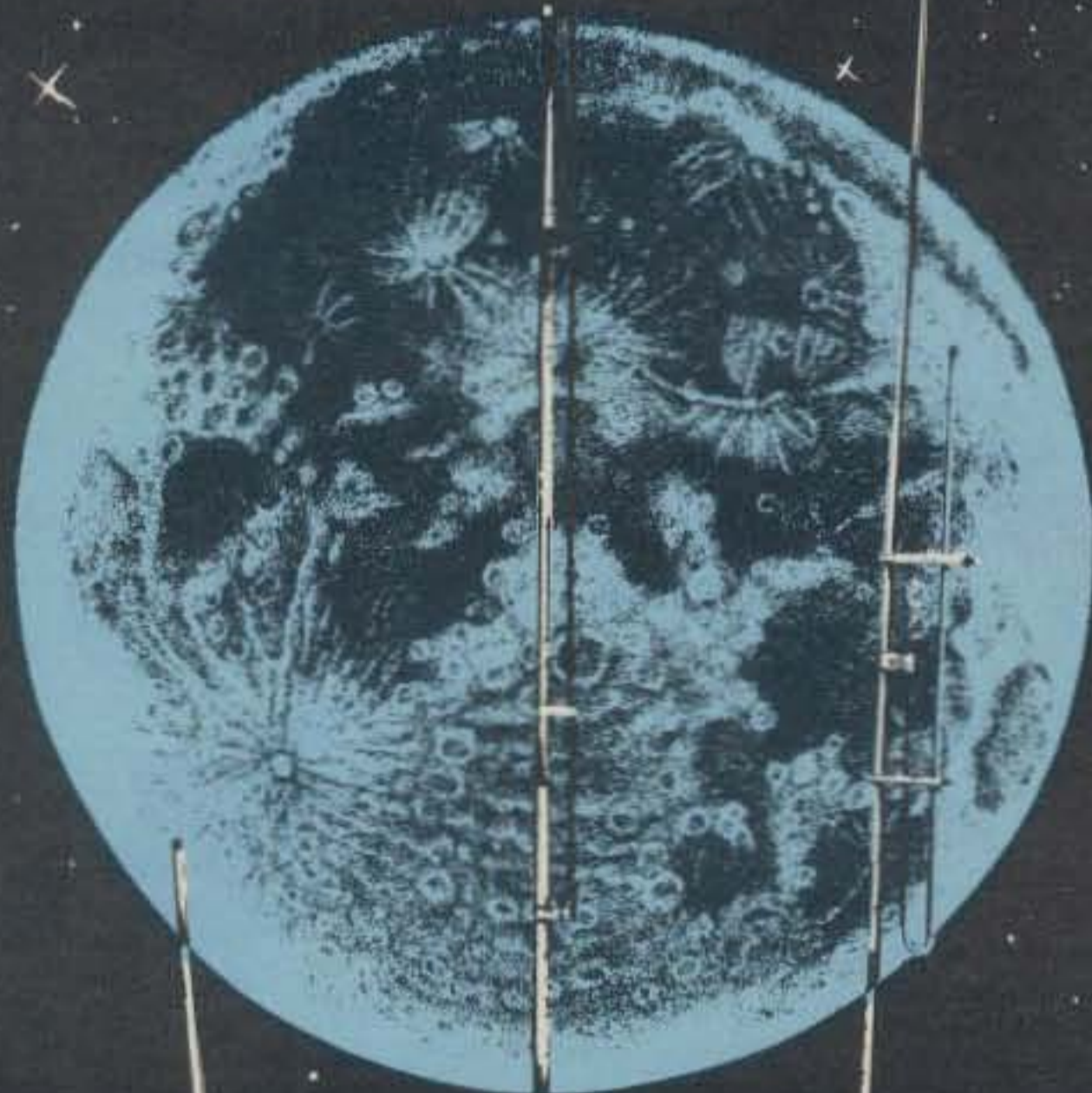
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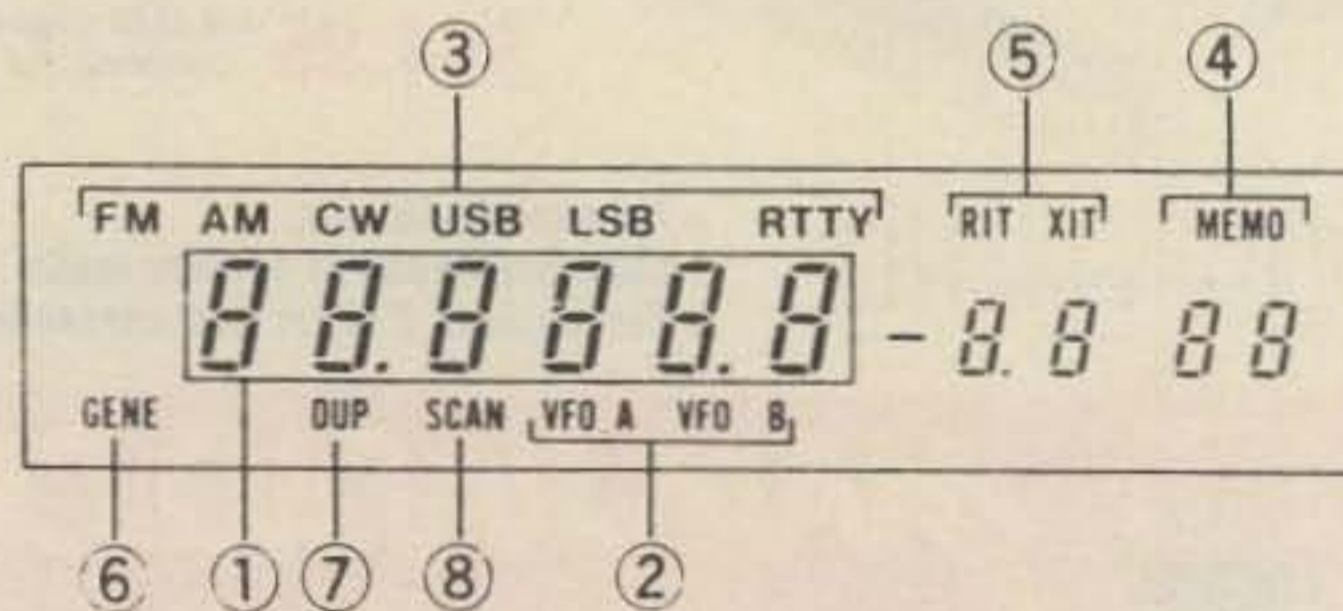
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FL-33	9.0100MHz	±3.0KHz/-6dB, ±10KHz/-60dB	AM
FL-70	9.0115MHz	±1.4KHz/-6dB, ±2.5KHz/-60dB	SSB(Wide)
FL-52A	455.0KHz	±250Hz/-6dB, ±500Hz/-60dB	CW-RTTY
FL-53A	455.0KHz	±125Hz/-6dB, ±240Hz/-60dB	CW-RTTY

Table II— Characteristics of the optional filters available for the IC-751. Only one optional 9 MHz and one optional 455 kHz filter can be installed.

The frequency of the IC-751 is displayed on a luminescent display tube. Since the 1MHz and 1KHz decimal points are displayed, the frequency can easily be read. The frequency indicated is the carrier frequency of each mode in, USB, LSB, CW, AM and FM, and the mark frequency in RTTY.

The FREQUENCY DISPLAY shows not only the operating frequency but also mode, duplex (split frequency) mode, selected VFO or memory channel, RIT/XIT functions and their shifted frequency, and the set is in SCAN mode and in HAM band or GENERAL COVERAGE mode.



- Shows operating frequency in 6 digits between 10MHz and 100Hz.
- Shows selected VFO; VFO A or VFO B.
- Shows operating mode; one of FM, AM, CW, USB, LSB, and RTTY.
- Shows that the set is in the MEMORY CHANNEL MODE or not, and the selected memory channel number. When the set is in the MEMORY CHANNEL MODE, the letters "MEMO" are displayed here.
- Shows that the RIT and XIT are ON or OFF, and their shifted frequency.
When the RIT and/or XIT are ON, the letters "RIT" and/or "XIT" are displayed here.
When both the RIT and XIT are OFF, any letters and shifted frequency are no longer displayed.
- Shows that the set is in the HAM BAND mode or GENERAL COVERAGE mode.
When the set is in the GENERAL COVERAGE mode, the letters "GENE" are shown here.
- Shows that the set is in the DUPLEX (SPLIT FREQUENCY) mode or not. When the set is in the DUPLEX mode, the letters "DUP" are displayed here.
- Shows that the set is in the SCAN mode or not. When the set is in the SCAN mode, the letters "SCAN" are displayed here.

Fig. 3— This extract from the IC-751 manual nicely explains all the data that can be shown on the frequency display.

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Interface II is the unit for the serious amateur. When used with Kantronics software, Interface II gives the sensitivity and versatility asked for by our users. Interface II gives you the following features:

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- RS-232 and TTL level compatible.
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Kantronics Software

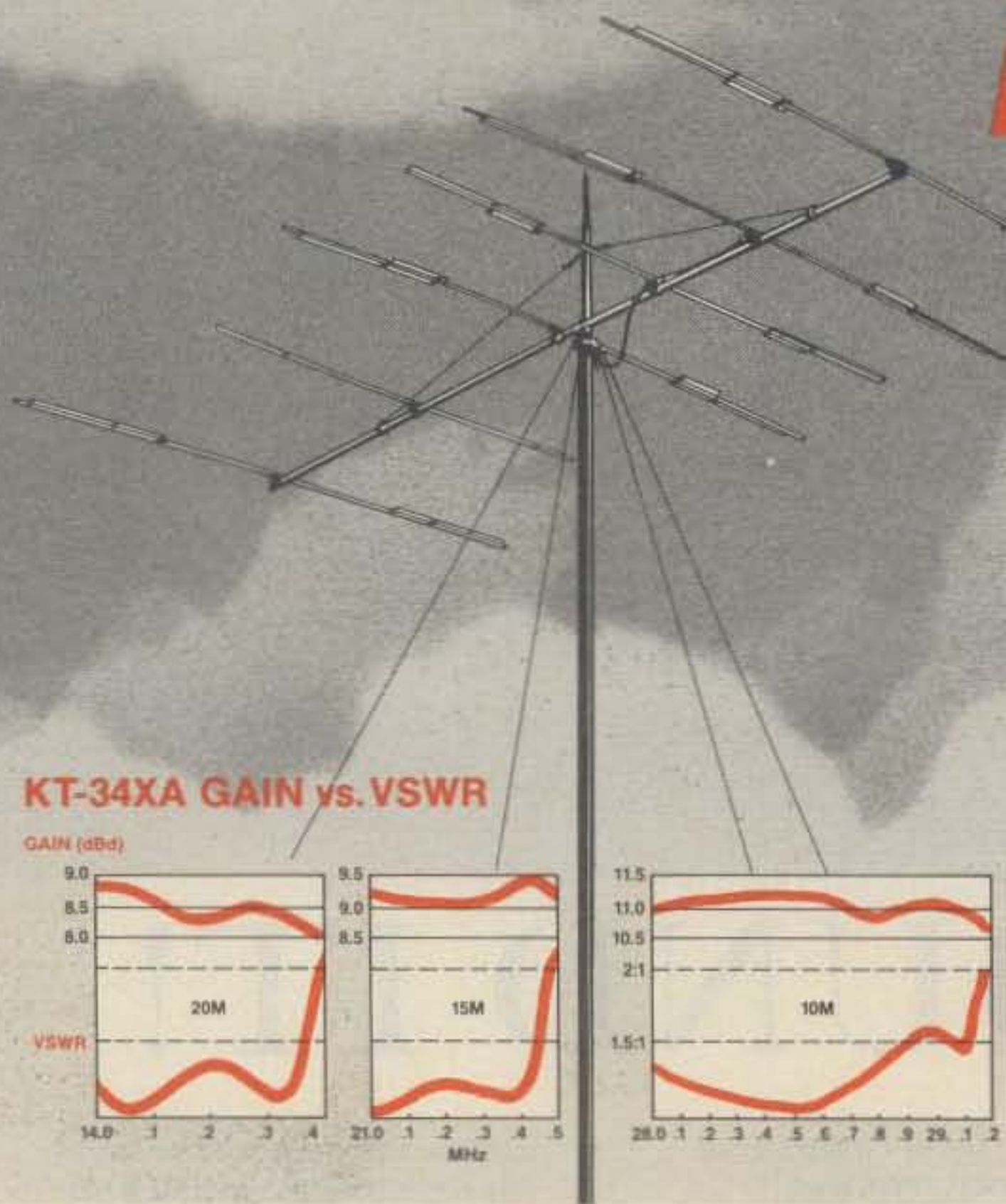
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Atari	•	•	•		
VIC-20	•	•	•	•	•
Comm-64		•	•	•	•
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2KW/ 4/572B Tubes and built-in supply w/tuned input.

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Modes of Operation:	SSB, CW, RTTY, SSTV	Antenna Load VSWR: 2.0 to 1 maximum
Power Requirements:	120 or 240 VAC, 50/60 Hz	ALC Output: Negative polarity, level is rear panel adjustable
RF Drive Requirements:	65 watts minimum, 100 watts nominal, 150 watts max. for 1 kilowatt DC input.	Spurious Outputs: Intermodulation 30 db or more below peak output Harmonic output 40 db or more below peak output
DC Plate Voltage:	2600 volts in SSB mode, 1700 volts in CW mode	Size: 14.7" wide, 6.08" high, 16.6" deep
Duty Cycle:	100% in normal amateur service	Weight: 48 pounds net, amplifier 50 pounds gross, tube carton 5 pounds gross
Input Impedance:	50 Ohms nominal	
Input VSWR:	1.5 to 1 typical	

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CIRCLE 109 ON READER SERVICE CARD

manual memory scan when a signal is heard, or one can set the squelch such that the receive audio only comes on when a signal strong enough to disable the squelch is encountered.

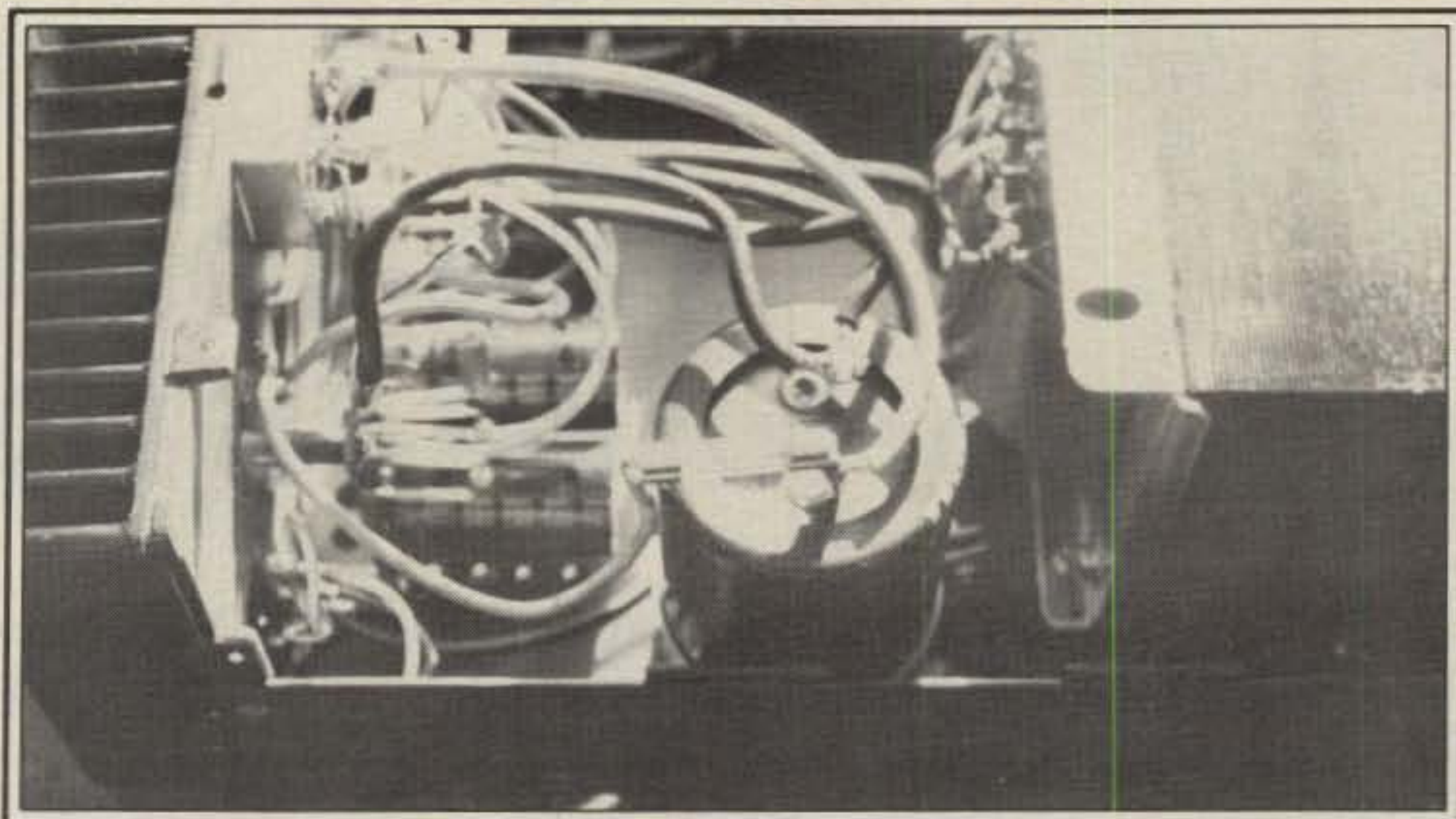
Automatic scanning can also be used. In its simplest form the squelch is not used, and the IC-751 is set to scan all the memory channels in turn. If the squelch is used, scanning will stop momentarily when a strong signal is found and then it will resume unless the **SCAN** button is again depressed to stop the scanning action (it was pressed to initially start the scanning action). If the squelch feature is not used, one has to be pretty quick to hit the **SCAN** button if it is desired to stop the scanning action. Without the squelch being used, the unit scans all 32 channels in 11 odd seconds, and one hardly has time to hear who or what is on a particular memory frequency. It should be a pretty simple matter to internally change the scanning speed. Another scan mode, **Mode S**, is probably more useful in that the scanning action can be set up to scan only those memory channels set up for a particular mode (e.g., s.s.b., c.w., etc.).

Frequency, as opposed to memory scan, can be done between the frequencies stored in memory channels 1 and 2. The scanning speed used for this operation is a very sensible one—about 40 seconds to scan 100 kHz. Therefore, one could scan even a small portion of a c.w. band with good results. When a scanning microphone is used, any displayed frequency can be scanned up or down at the rate of about 80 kHz/60 seconds. The microphone can also be used to scan through the memory channels.

Frequencies can be put into the memory channels basically by one of two ways. All of the control manipulations will not be described here, since they are really only of interest to IC-751 owners. They take a few minutes to learn but are quite straightforward in use. In any case, one can simply transfer a frequency from **VFO A** or **VFO B** to any desired memory channel. One simply gets **VFO A** or **B** on the display, sets up the memory channel to be used, and hits the **WRITE** pushbutton (which causes a simulated static burst instead of a nice beep to be heard in the loudspeaker). Alternatively, one can set the unit to a desired memory channel, press the **DFS** button next to the main tuning knob, and then the memory channel will be tunable like a v.f.o. One can tune it to any desired frequency, even changing bands and modes if desired. If one likes where one ends up, the new setting can be "written" into that memory channel. If one wants to forget about it all, one turns the **DFS** switch off and switches to another memory channel. When one returns to the memory channel that was temporarily tuned, it will still retain its original information.

Because all sorts of flexibility is provided for the transfer of frequency/mode information between the memories and the v.f.o.'s, one tends to forget at times that there are only two operational v.f.o.'s which can exercise both receive and transmit functions. If a frequency stored in a memory channel is to be used for transmit, it must be transferred to **VFO A** or **VFO B**.

After one uses the IC-751 it becomes obvious how extremely well laid out and sized the controls are. This is particularly true of the main tuning control, the RIT/XIT control, and the switches associated with the memory functions. For instance, with one hand on the main tuning control one can easily use a finger to switch to the memory channel mode,



An oddity for ICOM gear: a peek inside the otherwise very well-constructed IC-PS15 power supply shows one fuse soldered in place and hanging in the air. It's a secondary 20 ampere fuse which is hardly likely to blow, but still . . .

change bands, change the tuning rate, write a frequency into memory, switch between v.f.o.'s A and B, and even change the RIT/XIT setting. The rest of the controls/switches are equally well done, with the frequently used controls being well sized in comparison to the infrequently used controls. An example of the former would be the a.f.r.f. gain controls versus the VOX controls. A few infrequently used controls have been placed in a recessed but not covered area on the top of the transceiver. These include the preamplifier/attenuator in/out switch, a marker switch to turn on/off a 10 kHz marker signal, an anti-VOX control, and a monitor-level control.

The IC-751 tested operated smoothly in every aspect. Receive performance met every expectation except in one small area. The noise blanker was very effective against ignition and general pulse-type noise, but didn't help with the "Woodpecker." Transmit performance was excellent, and many fine reports were received concerning the audio both with and without using the speech processor. The frequency control/memory system never came up with a false setting, and although all sorts of "cockpit errors" were made in learning to use it, it never seemed to mind at all. The unit that was tested was used with the IC-PS15 external power supply. The IC-PS35 internal power supply, which measures 194 x 50 x 186 mm, has the same basic specifications, but is rated for a 10 minutes on, 10 minutes off cycle at full (20 ampere) load output.

Instruction Manual

The manual is aimed, first of all, at presenting clear information to the person who wants to use the transceiver and not admire its circuitry. Therefore, many diagrams are devoted to how to set up the transceiver, how to use its normal controls, and particularly, how to use its memory channel/tuning sophistication. Approximately ten very clearly illustrated pages, for instance, are devoted to the latter. Technical information, as was mentioned before, is not completely lacking. Between the block diagram and a large combined board schematic/harness wiring diagram, there is enough information to do basic trouble-shooting and to understand how some simple connections external to a board might have to be changed to accommodate a special accessory. Most amateurs will

find the manual completely satisfactory. A few will be disappointed in that the manual mentions that digital outputs are available for computer control of frequency, and a synthesized voice frequency readout and an optional "interface unit connector" are mentioned but no details are given.

Summary

The IC-751 that was tested over a period of several months found its way from W-land to DJ-land to CN8-land. Although it was handled with the kind care a fine piece of equipment deserves, it couldn't help but endure a few jolts here and there. It performed flawlessly over the entire period. Particularly if the IC-751 is used with an internal power supply, it has to be regarded as the most compact, full-featured transceiver available for either fixed station or portable operation. CQ



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Announcing:

The 1984 CQ World-Wide DX Contest

Phone: October 27-28 & C.W.: November 24-25
Starts 0000 GMT Saturday Ends 2400 GMT Sunday

I. OBJECTIVE: For amateurs around the world to contact other amateurs in as many zones and countries as possible.

II. BANDS: All bands, 1.8 through 28 MHz.

III. TYPE OF COMPETITION:

1. Single Operator (single band and all band). Single operator stations are those at which one person performs all of the operating, logging, and spotting functions. The use of DX spotting nets or any other form of DX alerting assistance places the station in the Multi-Operator category.

2. Multi-Operator (all band operation only).

a. Single Transmitter, only one transmitter and one band permitted during the same time period (defined as 10 minutes). *Exception:* One—and only one—other band may be used during the same time period if—and only if—the station worked is a new multiplier. *Logs found in violation of the ten-minute rule will be automatically reclassified as multi-multi to reflect their actual status.*

b. Multi-Transmitter (no limit to transmitters but only one signal per band permitted).

c. All transmitters must be located within a 500 meter diameter or within the property limits of the station licensee's address, whichever is greater. The antennas must be physically connected by wires to the transmitter.

3. QRPp (single operator only). Power must not exceed 5 watts output. Stations in this category will be competing only with other QRPp stations for awards.

4. Team Contesting. A team consists of any five radio amateurs operating in the single operator category. A person can be on only one team per mode. A team **must operate** from two continents. Competing on a team will not prevent any team member from submitting his personal score for a radio club. A team score will be the sum of all the team member scores. S.S.B. and C.W. teams are totally separate. That is, a member of an S.S.B. team can be on a totally different C.W. team. A list of a team's members must be received by October 15 for S.S.B. and November 15 for C.W. Send the list to CQ, Att: Team Contest, 76 North Broadway, Hicksville, NY 11801 U.S.A. Awards will be given to the top five teams. A list of a team's members' scores plus the total team score must be submitted to CQ by the normal contest log deadlines.

IV. NUMBER EXCHANGE: Phone: RS report plus zone (i.e., 5705). C.W.: RST report plus zone (i.e., 57905).

A station in a zone or country different than that indicated by its call sign is required to sign portable.

V. MULTIPLIER: Two types of multiplier will be used.

1. A multiplier of one (1) for each different zone contacted on each band.

2. A multiplier of one (1) for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The CQ Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards.

VI. POINTS: 1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North American boundaries count two (2) points.

3. Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero (0) point value.

VII. SCORING: All stations: the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

Example: 1000 QSO points \times 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).

VIII. AWARDS: First place certificates will be awarded in each category listed under Sec. III in every participating country and in each call area of the United States, Canada, Asiatic USSR, and Japan.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award *only*. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

All certificates and plaques will be issued to the licensee of the station used.

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- World - QRPp - Adrian Weiss, K8EEG/0
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- *Canada - Jack Baldwin, VE7RG
- Carib./C.A. - Alex M. Kasevich, VP2MM
- Europe - Thomas J. Peruzzi, Jr., W4BVV
- Africa - Gordon Marshall, W6RR
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- S. America - David Novoa, KP4AM

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- World - K2HLB Memorial, No. Jersey DX Assoc.
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196-204	"	BNC connector w/spring	7.95
196-214	"	BNC connector	6.95
196-224	144-UP	BNC conn. adj. angle	7.95
196-814	220-225	BNC connector	6.95

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Model No.	Description	Price
191-210	5/16-32 for old TEMPO	22.95
191-214	BNC connector	19.95
191-219	PL-259 w/M-359 adpt.	22.95
191-810	220-225 5/16-32 for old TEMPO	22.95
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191-940	440-450 5/16-32 for HT-220	22.95
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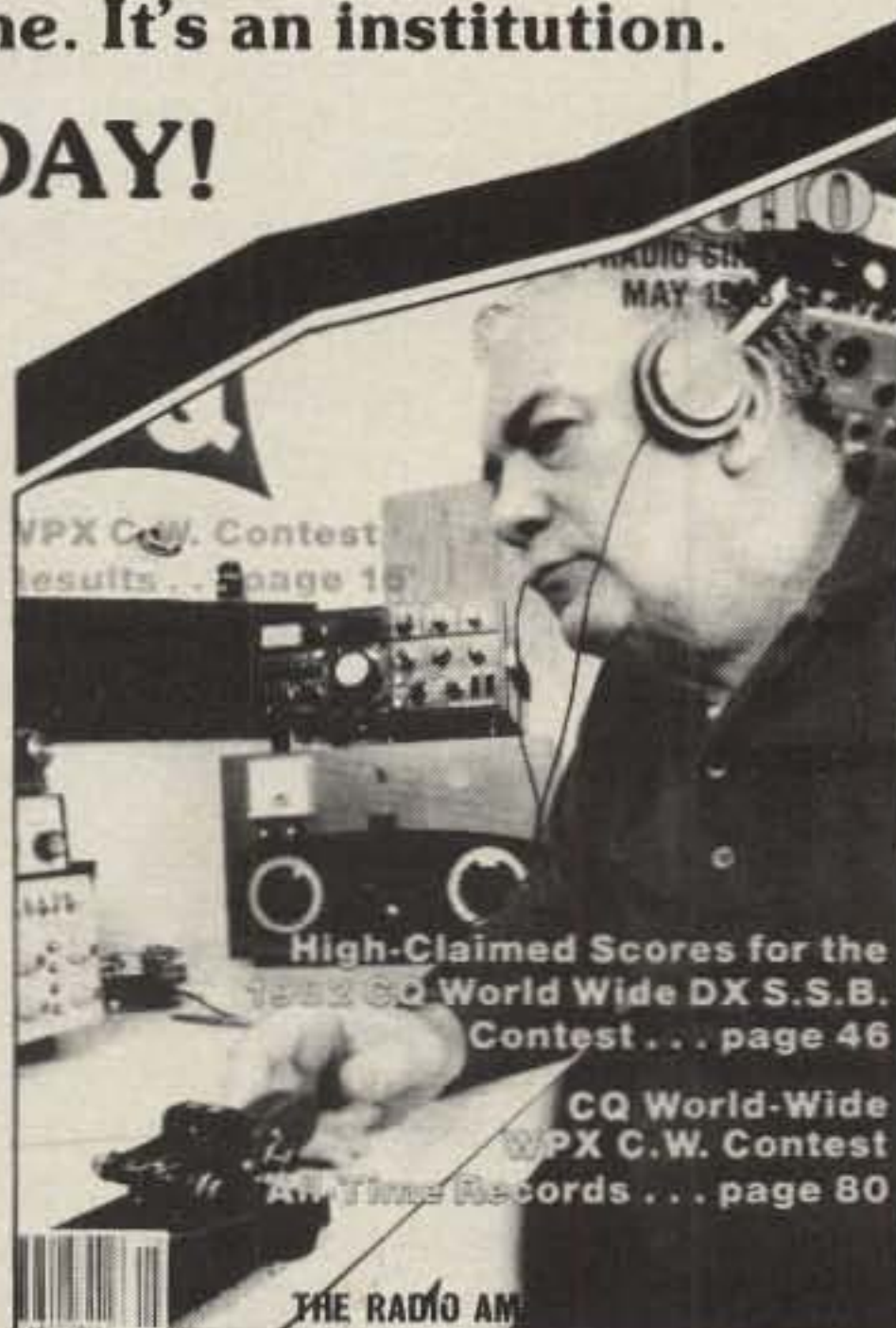
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A station winning a World Trophy will not be considered for a sub-area award. That Trophy will be awarded to the runner-up of that area.

The Canadian and Carib./C.A. awards are for residents *only*.
**A resident is defined as one living in that country with an established Post Office address.

X. CLUB COMPETITION:

1. The club must be a local group and not a national organization.

2. Participation is limited to members operating within a local geographic area defined as within a 275 km radius from center of club area (except for DXpeditions especially organized for operation in the contest).

3. To be listed, a minimum of 3 logs must be received from a club and an officer of the club must submit a list of participating members and their scores, both on phone and c.w.

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.
2. All sent and received exchanges are to be logged.
3. Indicate zone and country multiplier only the FIRST TIME it is worked on each band.

4. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown. The *original* log may be requested by the Contest Committee if further cross-checking of the log is necessary.

5. Use a separate sheet for each band.

6. Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS, and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

7. Sample log and summary sheets and zone maps are available from CQ. A *large* self-addressed envelope with sufficient postage or IRC's must accompany your request.

If official forms are not available, make up your own 80 contacts to the page on 8½" x 11" paper.

8. All entrants are required to submit cross-check sheets for each band on which 200 or more QSO's were made. All other entrants are encouraged to submit cross-check sheets.

9. Duplicate contact penalty: up to 1%—three (3) additional contacts removed; 1% to 3%—ten (10) additional contacts removed; over 3% is grounds for possible disqualification.

10. QRPP stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

XII. DISQUALIFICATION: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive duplicate contacts; unverifiable QSO's; or unverifiable multipliers will be deemed sufficient cause for disqualification. (Incorrectly logged calls will be counted as unverifiable contacts.)

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within 5 years, he will be ineligible for any CQ contest awards for 3 years.

Actions and decisions of the CQ Contest Committee are official and final.

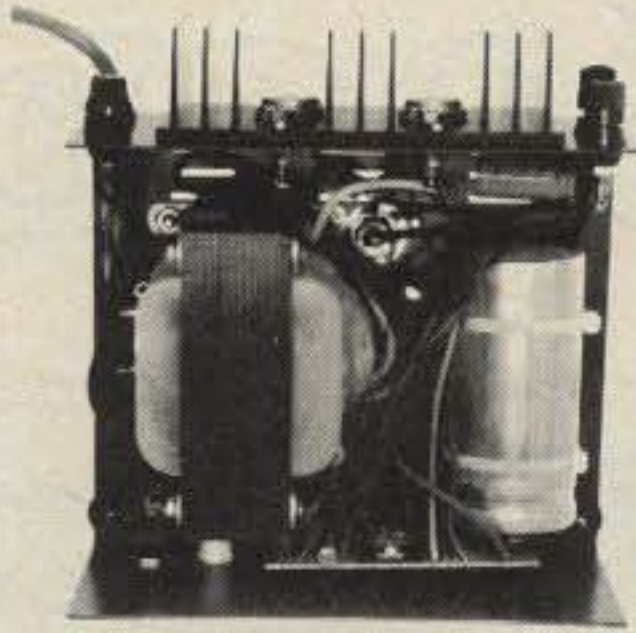
XIII. DEADLINE: All entries must be postmarked NO LATER than December 1, 1984 for the Phone section and January 15, 1985 for the C.W. section. An extension may be given if requested. Indicate phone or c.w. on envelope.

Both phone and C.W. logs should be sent to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

**Except the Gordon Marshall, W6RR, award.

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RS-7A	5	7	3¾ x 6½ x 9	9
RS-10A	7.5	10	4 x 7½ x 10¾	11
RS-12A	9	12	4½ x 8 x 9	13
RS-20A	16	20	5 x 9 x 10½	18
RS-35A	25	35	5 x 11 x 11	27
RS-50A	37	50	6 x 13¾ x 11	46

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VS-35M	25	15	7	35	5 x 11 x 11	29
VS-50M	37	22	10	50	6 x 13¾ x 11	46

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CIRCLE 39 ON READER SERVICE CARD

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A wideband, single-channel a.c. voltmeter (Model 295) that provides high sensitivity voltage measurements down to 100 mv and frequency response from 5 Hz to 1 MHz has been introduced by B&K Precision/Dynascan Corp. Model 295 features 12 full-scale ranges (1 mv to 300 v), large 4 inch meter with 2 voltage scales (dB and dBm), and wide dynamic range (-80 to +50 dB and -80 to +52 dBm), 10 megohms input impedance, and rugged, compact construction. A Relative Reference control feature permits the reference value to be set at any level and allows subsequent measurements to be made without calculation. The low-distortion amplifier used to drive the meter also provides a 600 ohm output, allowing the instrument to serve as a calibrated high-gain preamplifier.

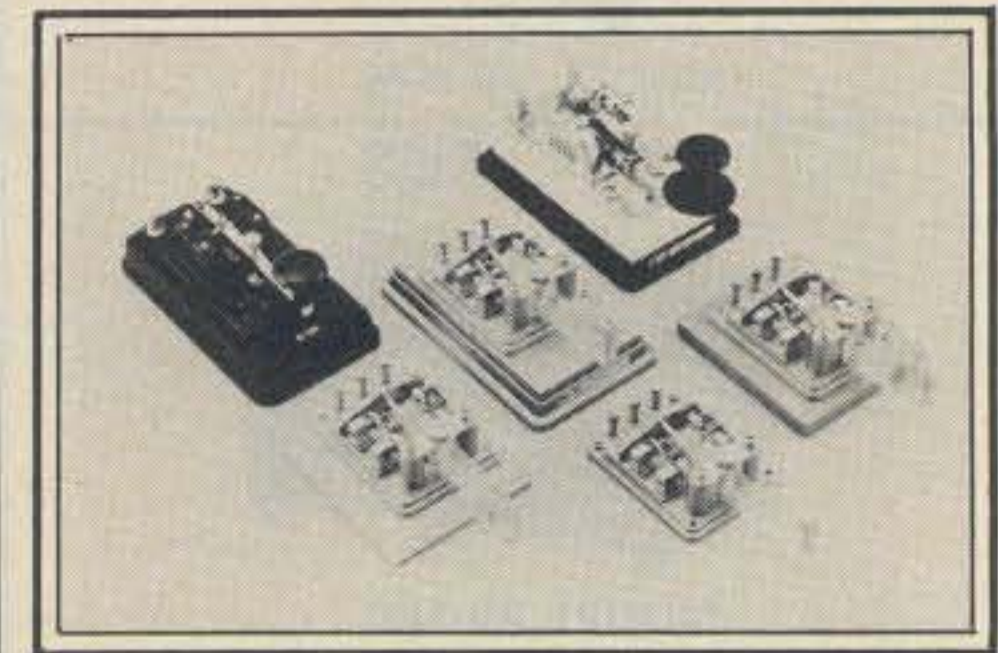


able operation. The unit features up to 50 watts power input, direct frequency read-out, full break-in (QSK), full band coverage (3.5, 7, 10.1, 14, 21, 28.0-28.5 MHz), c.w. and s.s.b. receive, offset receiver tuning, electronically switched S meter, forward power indicator, s.w.r. metered on transmit, instant band change, automatic gain and level control, and more.

For more information on the Century/22, contact Ten-Tec Inc., Highway 411 East, Sevierville, TN 37862, or circle number 103 on the reader service card.

Hi-Mound Hand Keys and Keyer Paddles From Meisel

The Hi-Mound line of iambic keyer paddles and hand keys is being distributed by Meisel Electronics. The paddles feature silvered contacts and full spacing and tension adjustments on all models. Three of the iambic paddles have heavy, slip-resistant bases (one is marble), while the fourth is a paddle assembly which can be mounted on the base of your choice or built into an existing keyer. The hand keys, in addition to retaining their classic look, also have silvered or brass contacts and a unique tension system.



A clear plastic dust cover is included with each key, and all are protected by Hi-Mound's one-year warranty backed by Meisel Electronics. For more information, contact Meisel Electronics, 999 Rahway Ave., Union, NJ 07083, or circle number 105 on the reader service card.



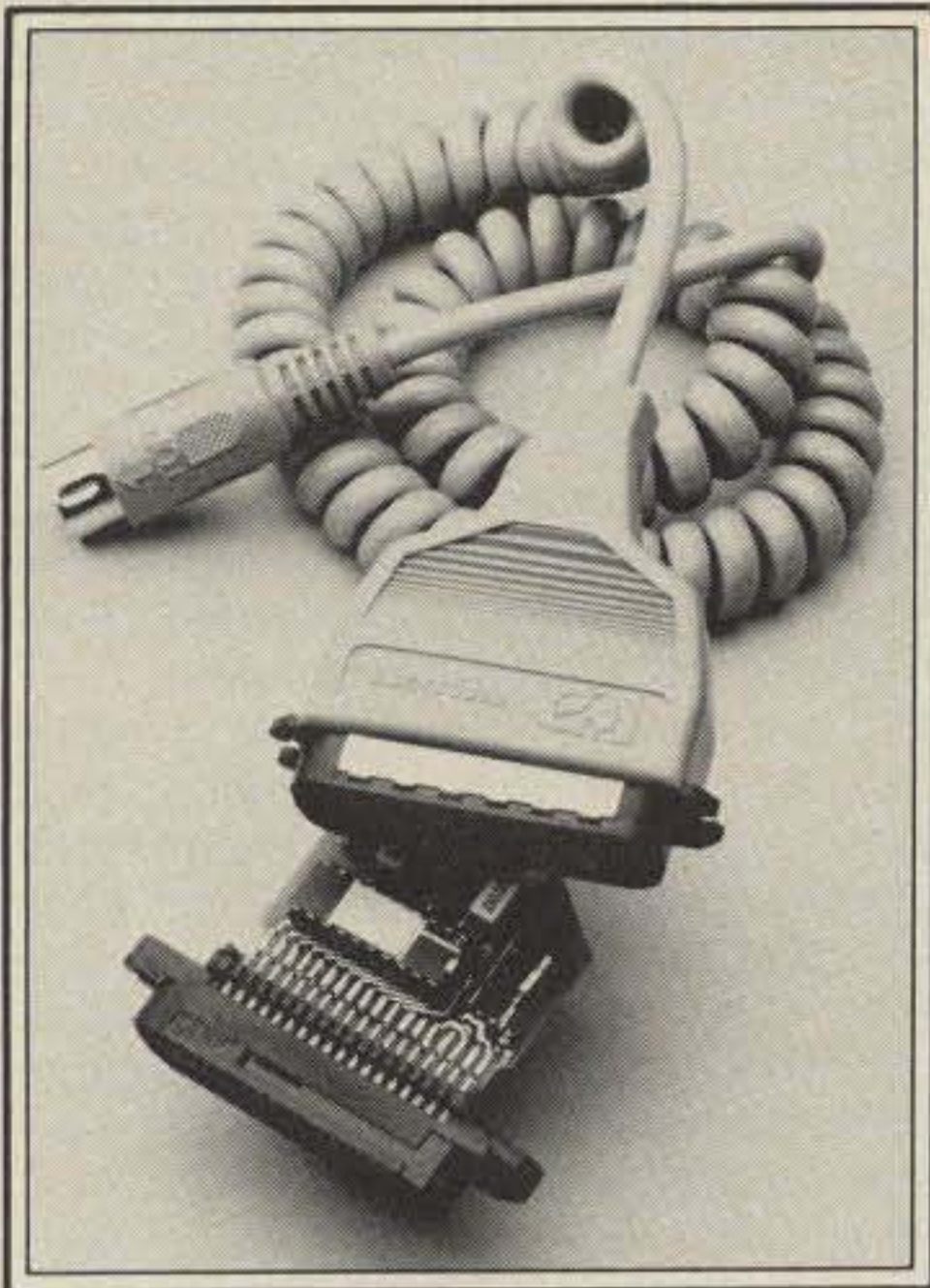
The Model 295 is priced at \$250 and comes with input cable, spare fuse, instruction manual, schematic, and parts list. For more information, contact B&K Precision/Dynascan Corp., 6460 West Cortland St., Chicago, IL 60635, or circle number 104 on the reader service card.

Ten-Tec Century/22 6-Band C.W. Transceiver

Ten-Tec has introduced the Century/22 h.f. c.w.-only transceiver which is suited for beginners as well as established amateurs as a second set for mobile and port-

Computer Accessories C600 Smartline Cable

Computer Accessories Corp. is offering a "smart" cable (with built-in circuitry and software) that lets many popular (parallel) printers work with the Commodore 64 and Vic-20 computer systems. The C600 comes with software (code conversion) utilities built into the cable. These convert Commodore's nonstandard codes into a more standard format; as a result, printers can produce characters exactly as they appear on the screen.



The C600 works with most parallel printers, including models from Anadex, Brother, C. Itoh, Epson, NEC, and others. The cable is available for \$69.95. For more information, contact Computer Accessories Corp., 7696 Formula Place, San Diego, CA 92121, or circle number 101 on the reader service card.

Hildreth Engineering Noise Maker

The Noise Maker was originally conceived to assist those with hearing problems for code as it is usually generated.



This white-noise generator has a keying circuit designed to enable fast, click-free keying. The idea is to spread the energy over a wide audio spectrum expecting enough sound energy within a person's hearing sense capability to enable reception. In addition, it was speculated that

the excitation of "ringing," which may be experienced when one tries to listen to a keyed tone under conditions of a "notched" hearing sense, could be avoided. Also, since the sound energy generated is low within any particular narrow frequency range, one will not be irritated by the high level of any particular tone that may be troublesome. Finally, white noise is a more natural form of sound energy than a pure tone, so it may cause less fatigue. The Noise Maker sells for \$12.95.

To listen to code in the form of white noise from a practice oscillator tape, or from a receiver, Hildreth Engineering has also designed an electronic switch which

enables you to process these devices to drive the Noise Maker. The switch is available for \$7.00. For orders for the Noise Maker and switch add \$2.00 shipping and handling. For more information, contact Hildreth Engineering, P.O. Box 60003, Sunnyvale, CA 94088, or circle number 106 on the reader service card.

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CIRCLE 18 ON READER SERVICE CARD

DESIGN, CONSTRUCTION, FACT, AND EVEN SOME FICTION

Summer Sum-Up

With the lazy days of summer upon us, W8FX treats us to a summer potpourri of topics, including a look at several very interesting electronic and antenna products, and another dip into the mailbag.

In last month's column we touched on a variety of topics which included a mini-forum developed from reader inquiries and correspondence, an examination of two Commodore ham software products from RAK Electronics, and a peek at KC4UG's "Kentronics" software for the Timex/Sinclair personal computers.

This month let's first pick up on some column correspondence which we were not able to include last time. We'll take note of Bearcat's new CompuScan™ scanner and include some software topic updates. We'll also feature the Polar Research series of antenna mounts. First, into the mailbag.

Reading the Mail

Elwood Sipe, K3BLD, wrote to us several months ago. He advised that although he was an avid follower of our column, he had to take pen in hand to register a complaint regarding our computer programs. K3BLD's complaint was not that we discussed computers and computer software in an antennas column, but rather that we seemed to favor one computer over another. Wrote he:

"I bought a TI-99/4A computer before they were removed from the market, because . . . it was a superior piece of electronics. If I had followed other hams in my choice, I would have, perhaps, bought a Commodore 64. However, I have the TI and will use it for RTTY. When the TI came down in price (*for inventory liquidation last fall and winter—ed.*), they sold out fast. I am amazed at the number that were bought by hams. Herein lies my complaint:

"In catering to the Vic-20 and Commodore computers and ignoring the TI owners, you are skipping over a large number of hams, and I suppose it is because you are not aware that there are over 2 million in use . . . I found three in my own neighborhood. I have had some programs converted for me, and find them very useful . . . Thanks for your consideration of my view. I especially ap-

317 Poplar Drive, Millbrook, AL 36054

preciated your treatment of SWR in the February issue."

K3BLD brings up some valid points. While I do, in a sense, cater to the Commodore owner in the column, it is because these are the computers I own. It just isn't practical to have several computers of different makes in the hamshack, and so I must rely on reports of others as to the applications for other brands of computers in the hamshack. As I obtain information on usable hamshack software for the Apple, TI, Radio Shack, IBM, Atari, Timex/Sinclair, and other computers, I'll be happy to pass along this type of information to readers. However, to date, it seems that the lion's share of hamshack software resides in Commodore-equipped shacks; this is unfortunate, because some computers, such as the IBM-PC, Apple IIe, Macintosh, Tandy-Radio Shack 2000, and various other upgrade models have exceptional capabilities that really need to be harnessed for ham applications. Nevertheless, Commodore is now the "low-end" market leader, and thus is bound to be in the lead when it comes to applications software for hams.

We would also like to hear readers' thoughts on the desirability of broadening the column's focus to frequently include topics other than strictly antenna-related themes. Are we on-track with our enlarged scope of coverage, or are we going afield? Let's see what our readers think; drop us a line and tell us your views.

Incidentally, a problem one faces when writing a column for a monthly magazine such as CQ is the considerable "lag time" between the time you write the words for the column, and the day you actually see those words in print. A lot can happen in the meantime, with those supposedly "golden words" turning into "golden goofs": products you discussed may have been cancelled or changed; new and better products may have been introduced; your personal "learning curve" causes you to change your viewpoint on an issue after the column is typeset; and reader correspondence can influence your choice of words. Also, if you thought things change fast in the electronics industry as a whole, it's nothing compared to the speed of changes when you're writing about microcomputers and software!

In this case, it almost seems that no sooner do you set something down on paper, and it's "O.B.E."—military jargon

for "overtaken by events"—and must be changed if you and the magazine are to remain credible.

Changing gears now, we continue to receive a good deal of mail about the "Double Bazooka" antenna, which we described last year in the column. We received several technically oriented letters which convince us that the overall performance claims and reputed wide bandwidth of this type of antenna are illusory. Despite this, we find that there are apparently a large number of hams out there who swear by the antenna. Writes George Weillart, KC0MJ, who uses several versions of this type of antenna:

"I just thought I'd add a little fat to the fire. Enclosed is some information on a type of coax dipole. I have three of these (*distributed capacity dipoles, one each for 15-40-80—ed.*) hanging up in the trees around my house; none are very high. Those on 40 and 80 are made from RG-8 and really work fine. The 15 meter antenna is made from the mini RG-8X cable and also works very well. I don't need a tuner with any of them, and have no RFI problems.

"I also have a bazooka up for 30 meters. The ends are 300 ohm twinline. SWR is 1.2 to 1 over the 30 meter band. I am quite satisfied with this antenna also. I guess that I have had a number of 'lucky quirks,' as my antennas have apparently broadband characteristics."

George kindly enclosed some printed construction details on his "distributed capacity" coaxial dipoles, these were basically Double Bazooka, though they made use of coax sections for the entire flattop, rather than openwire line or twinlead for the outer sections. George's literature cited favorable experimental data by two other users, K7UAE and WA9PIV.

Our last letter for this month is from prospective ham William H. Creagmile, of London, Ontario, Canada. We enjoy letters from beginners, and we sympathize with many of the frustrations which apartment dwellers such as he experienced in trying to set up a hamshack station.

"I am a newcomer to ham radio, and am currently studying for my first ticket . . . I live in an apartment, on the 9th floor, and have just purchased a Kenwood R-2000 receiver. I would like to improve my listening skills . . . however, I am faced with a question to which I have found little in the way of an answer in my reading. Simply, I have to restrict myself to putting up some type of antenna on my balcony.

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QUIT :to end scanning session : Q

ZERO :Zero ALL Count Registers : Z

Main Menu of the CompuScan™ 2100 scanning receiver is shown here. Note the three major keystroke-selected modes of operation. The control microprocessor for the system may reside in one of several home computers; in this case, it's in a Commodore 64 which provides the "smarts." (Photo courtesy Electra Company)

— SEARCH MODE —

Present upper limit frequency 125.000
Present lower limit frequency 118.000
Present search direction is UP

Last search frequency was 118.000

BAND LIMITS

LOW 29-54	HIGH 136-174
AIR 118-136-	UHF 421-512

Press

U : To change upper limit
L : To change lower limit
S : To specify a start frequency
D : To toggle up or down direction
G : To start searching
B : To go to STANDBY mode

Make selection ?

Typical "Search Mode" screen display for the Bearcat CompuScan™ 2100 scanner. The unit offers sophisticated scanning capabilities when used in conjunction with a personal computer for highly "intelligent" control. (Photo courtesy Electra Company)

Could you please provide some advice in the matter... do I need an antenna tuner? If so, which one do you suggest?"

The problem of getting good antenna results, both in transmission and reception, in apartment environs is a difficult one. I speak from experience, having myself begun in ham radio as a Novice in 1954, living in an apartment complex in which antennas of any type were absolutely *verboten*. Unfortunately, a satisfactory receiving antenna may not work satisfactorily for transmission, as the requirements for the latter are considerably more stringent.

For apartment balcony reception, I would suggest a loop antenna and amplifier, such as the Palomar Engineers LA-1, which makes use of several plug-in coils for various v.l.f. through h.f. ranges from 10 kHz to 15 MHz. I have one, and it works nicely, although of course it is designed for indoor operation and is thus not weatherproof. Another good bet is the McKay-Dymek DA-100D amplified whip, which has an active element that can be mounted outdoors on the balcony. MFJ also makes comparable units, or this type of device can represent a "natural" home construction project. A separate antenna tuner usually would not be required for these antennas.

For transmitting, consider a center-loaded mobile whip and mount worked against a counterpoise ground. Some high-rise apartment dwellers, particularly those who are blessed by living on upper floors, have reported good results with such whips, although you should expect efficiency to be poor on the lower bands, such as 80 and 40 meters. Also, obtaining a suitable ground condition may take a good deal of experimentation. Barker & Williamson makes a portable whip antenna (Model 370-10) for 2-40 meters that is designed for window mounting and includes the loading coils, coax feedline, and counterpoise wire in one kit.

To answer another of Bill's questions, an antenna tuner is generally not required with a properly fed coax system. However, if you use singlewire feed, or if you have a coax-fed antenna that has such a high s.w.r. that the impedance presented to the transmitter is out of range, then a coupler may be required. Many manufacturers make suitable couplers, and I suggest you obtain MFJ's catalog. Whether or not you actually purchase one of their couplers, their catalog is excellent in that it is on the order of a "Sears wish book," as it shows examples of many different types of amateur and s.w.l. antenna-tuning devices.

We hope to feature restricted-space antennas in a future column. For the moment, however, I would recommend a particular book that has a number of antenna ideas for those difficult locations. The book is *How to Build Hidden Limited-Space Antennas that Work* by Robert J. Traister, WB4KTC. Look for TAB book #1254, copyright 1981, for \$9.95. Also, peruse some of the very old issues of *QST* from what I refer to as the "golden age of Novicedom"—the 50s and 60s. In that period it seemed that practically every other issue had a "cheap and dirty," low-cost antenna idea for the beginner, and many of these antennas were of the restricted-space type. Often large libraries and well-disposed "Elmers" have these issues.

Something From Betty Bearcat

By the time this appears in print, it's likely that someone will have reviewed Bearcat's new CompuScan™ 2100 scanner radio either in the pages of *CQ* or its sister publication, *Popular Communications*. Either way, Bearcat's revolutionary new scanner is likely to be quite popular in the amateur community.

This marriage of the personal computer and scanner has added a great deal of

flexibility to v.h.f./u.h.f. monitoring situations. The new Bearcat is designed to be operated in conjunction with a personal micro, the first one being the Commodore 64, but versions for other popular personal computers are on tap. The system features an automatic video display which shows detailed information about the "service" being monitored. Each channel can be programmed to display the source and location of a transmission, 10-codes, phone numbers, etc. Whenever a broadcast on that particular channel is monitored, the programmed-in information automatically appears on the screen. For amateurs and scanner enthusiasts, one obvious advantage is the elimination of pages of cumbersome frequency lists. The new \$500-class scanner also offers several breakthroughs in terms of the sophistication of scanning patterns, unmanned operation, control of auxiliary devices such as alarms and tape recorders, and more. Custom, menu-driven software (on diskette or cassette tape) that can be modified by the user to suit his particular needs is provided with the package.

We found it interesting to note that included with the receiver was a broadband, telescoping whip antenna with base, which includes a 20 foot length of RG-58 cable terminated in a BNC connector. The antenna can be maneuvered about a room for best results. However, to do justice to a system such as this, which covers much (though not all) of the 30-512 MHz spectrum, a good broadband outdoor antenna is a must.

For such a scanner we would suggest the Discone. This is a vertically polarized, omnidirectional antenna with extremely broadband characteristics. Its vertical pattern is suitable for groundwave work over several octaves, with fairly uniform gain and feedpoint impedance being obtained over much of the v.h.f. and u.h.f. spectrum. Mechanical construction of

the Discone is not too difficult, and several manufacturers offer Discones. One representative unit is the ANT-6 by Grove Enterprises, which is designed for no-gap scanner work over the range 30- 512 MHz. Bear in mind, too, that although the Discone primarily is considered to be a receiving antenna, it can be used for transmission as well in situations where frequency diversity is required.

For those who would like more information on the CompuScan™ 2100 scanner, it was reviewed by Joe Desposito in the January 1984 issue of *Computers and Electronics*. His article, "Bearcat CompuScan 2100 Scanning Receiver," is on page 48 of that issue.

Software Notes

In the April issue of *CQ* we reviewed the MUFPLLOT propagation program by Base 2 Systems. Principally written for the Commodore 64 computer, the program is now offered for the Apple series of microcomputers. The Apple program has similar capabilities, and it comes with a very complete, 14-page user's manual which contains a good deal of tutorial information on propagation. Also, the 64 version which we examined has been improved and updated. The main change involves allowing the user to change his QTH's latitude and longitude parameters; previously, this information was factory-set and could not be changed by the user,

making it necessary to return the program to the manufacturer for updating when changing location.

David R. Wagner, KB8KK, through his firm Ultra Ham Software, offers several programs for the TRS-80 Models I and III and the Commodore 64 computers. These include Ultraheadings to compute beam headings; Ultraheadings+ for this purpose and to perform a 24-hour MUF calculation as well; and two Morse code practice programs, Ultramorse and Ultramorse1. A custom heading list is also available for those who wish to obtain beam headings tailored for their location but who do not own a personal computer. The latter list shows prefix, country name, heading, distance, zone, and time difference for all of the DXCC countries. The programs range in price from \$12.50 to \$24.50, while the custom heading list is \$4.95. Contact Ultra Ham Software, P.O. Box 119, Macedonia, OH 44056.

Gary Huff, K9AUB, offers several programs for the Commodore 64. These include programs for antenna design, ham math calculations, and logging, as well as a customized beam-heading printout based on the user's latitude and longitude. The antenna program is not an elaborate one, but it allows the constructor to calculate element lengths on 2-4 element Yagis, dipoles, top-fed slopers, verticals, and quads, and it also provides some help in matching. Contact Huff Electronics, P.O. Box 1112, Springfield, IL 62705.

Also for the Commodore 64 are several offerings from Harv Nelson, KA9KUH, P.O. Box 736, Stevens Point, WI 54481. Harv has developed an inexpensive, 7K disk-based "Log & QSL" program which allows one to store about 1900 QSO records on a single 5 inch disk, and to print out QSL cards for individual QSOs or within a range of user-specified dates. At this writing, he also has developed a novel and timesaving "QSL Bureau" program which provides addresses of, and prints out labels for, worldwide QSL bureaus. Harv stresses that he is not a professional programmer, but rather he is an active DXer and award collector, and that these programs grew out of those which he originally developed to serve his own needs.

Wrap-Up

We've reached the end of our ribbon, so to speak, for this month's Antennas column. In it we have again opened the mailbag and taken note of the sophisticated Bearcat CompuScan™ 2100 scanner. We also provided an update to our ongoing software topics.

Next month? More antenna and antenna-related topics you'll surely find interesting. Keep the cards and letters coming, too, and let us know what you'd like to see featured in your column. See you then.

73, Karl, W8FX

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You say you have no room for a shack? Where there is a will there is a way.

Stack Your Shack!

BY PHIL HARRISON*, KA0NAU

The arrival of my Novice license was quickly followed by the arrival of boxes of amateur equipment, which I initially set up on a table in our family room. This arrangement was not greeted with great enthusiasm by my XYL, however. Casting about for a suitable shack site, I settled on a closet that housed our stereo equipment and record collection.

The closet was just large enough to accommodate a fair array of rigs, power supplies, filters, etc., all stacked vertically on shelf hangers that are readily available from any hardware store. The shelf hangers provide an open arrangement that allows for good ventilation, since there is plenty of air space behind and around each component.

With advancement to Technician and General class licenses the collection of equipment grew to the stack pictured here, from top to bottom: ICOM 25A, Kantronics Varifilter, ICOM PS-20, ICOM 730, Kantronics Minireader, and ICOM 551D. Antennas are housed in the attic overhead, minimizing the length of transmission cable. The keyer (at right) is a Heath Micromatic.

The main disadvantage of a vertical equipment stack is the lack of table or desk space. While the top of the stereo was sufficient for the keyer and a small note pad, the log had to be juggled on and off my lap. The advantage of locating one's shack in the main living area is that one need not become a hermit to enjoy amateur radio.

Ultimately, a traditional table arrangement will be more appropriate, especially to accommodate any kind of computerized c.w. or RTTY operation. But for that important first year of operation, the vertical stack in the closet did the job just fine, thank you.

KA0NAU's stacked shack.

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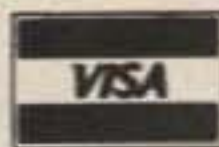
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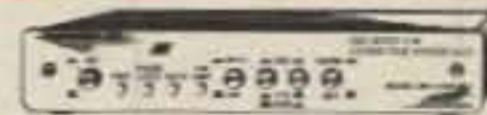
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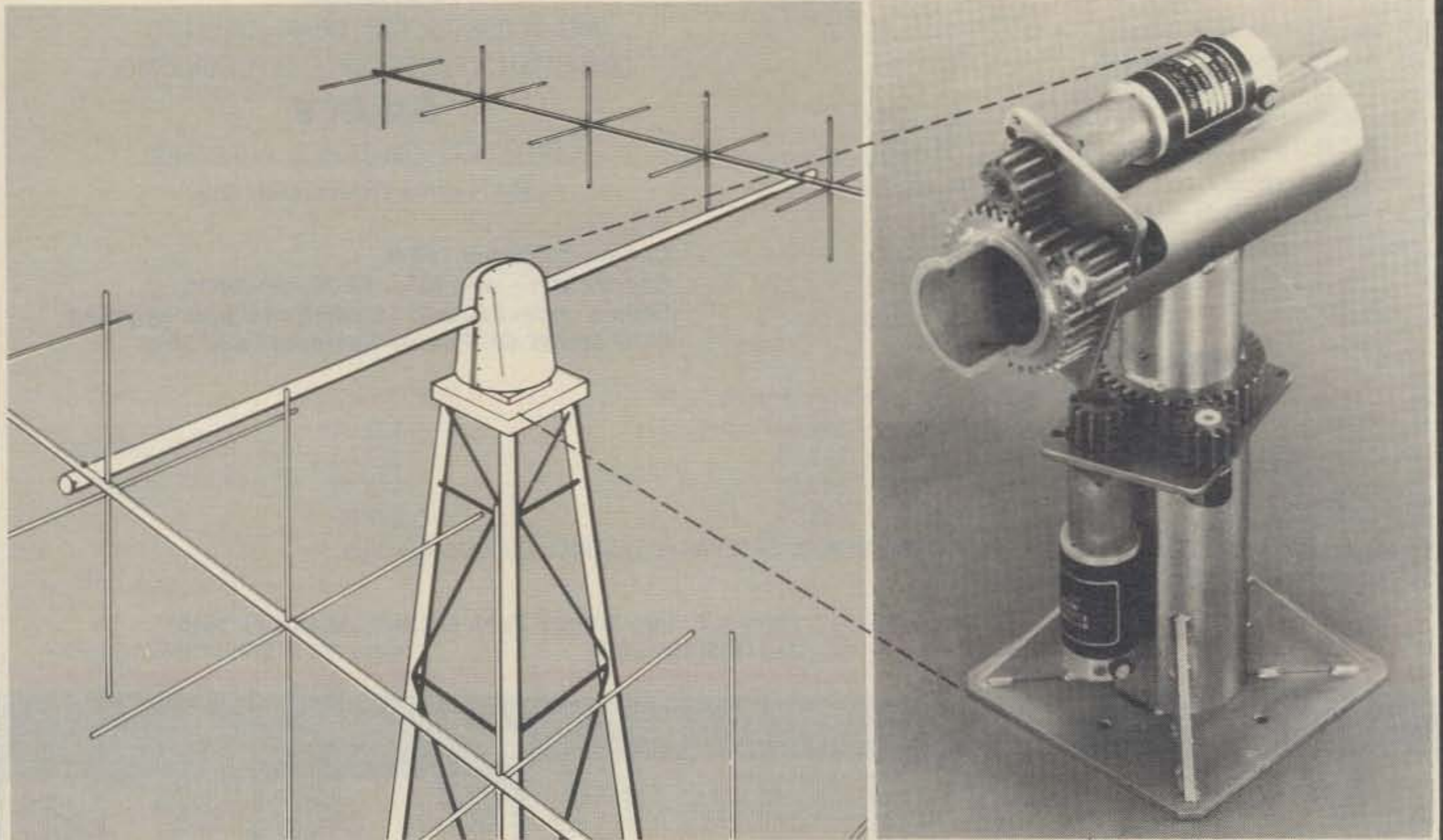
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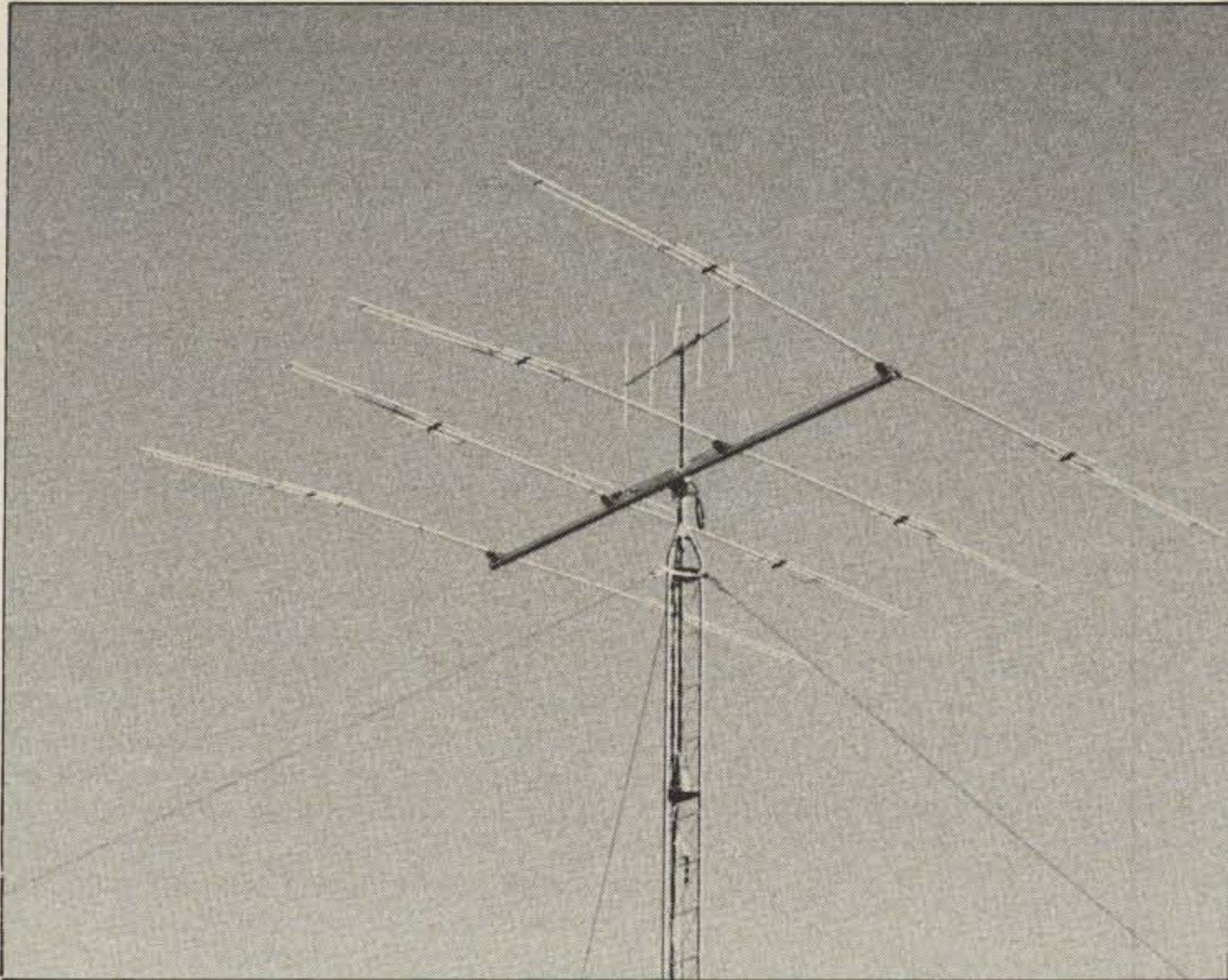
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CQ REVIEWS:

The KT34A and KT34XA KLM Beams

BY LEW MCCOY*, W1ICP



The completed KT34A on top of the tower.

Having had a strong interest in antennas throughout my amateur radio career, I welcomed the chance to do a review of the KLM KT34A and KT34XA beams. I am old enough to have seen the start of tribanding beam antennas, and I have had the opportunity to lecture on the subject on many occasions.

Ed Buchanan, W3DZZ, designed the first triband beam back in the early 1950s. His efforts were described in *QST* at that time. His premise was simple enough: He incorporated coils and capacitors into the driven and parasitic elements to form resonant traps. Thus, he could maintain resonance and a feed impedance common to all three bands—

20, 15, and 10 meters. He manufactured and sold such an antenna at that time. Since W3DZZ's first efforts there have been many other variations devised to make a single-feed, multiband antenna that doesn't require a Transmatch to tune the system. Obviously, some methods are better than others.

Over the years there has been much argument about the merits of tribanders versus monobanders. One of the big problems in multiband systems is that one must make several compromises in order to achieve a "reasonable" tribander. By reasonable I mean an antenna that provides broadbanding (low s.w.r. across any of the three bands), gain comparable to a good monobander, and respectable front-to-side and front-to-back ratios. Until the advent of the KLM tribanders most of the antenna manufacturers used coils in their traps.

The KT34A

Unless traps are well-designed and made of good materials, a triband beam can suffer from excessive losses. One may achieve a triband system with very low v.s.w.r. across the three bands, but at the cost of good performance in other ways. KLM conceived a system using a concept called "linear loading," whereby instead of traps, the elements are folded back on themselves to a slight degree. This, of course, eliminates the coil/capacitor-type trap losses.

Quoting from KLM's manual for the KT-34A, "All four elements work on each band. Ten meters is a full-sized element using a trap formed with a small amount of linear loading (also used to shorten 20 meter section) and an air capacitor. Fifteen meters uses a tuned decoupling stub with another air capacitor and is also a full-sized element. Twenty meters is approximately 75 percent of full size and is defined by the element extending beyond the 15 meter decoupling jumper. Twenty and 15 meters are tuned with very minimal effect on each other. Two driven elements (log cell) with all three resonances are employed to achieve a broadband driven structure which allows almost constant flat v.s.w.r. and performance across each of the three bands. Basic feed impedance is 200 ohms balanced and is transformed to 50 ohms unbalanced with the 4 kw PEP balun (supplied)."

Note that KLM uses the term *linear loading*. Being that this is a product review and the reader should understand all terms used here, I decided to find a definition of linear loading. Although most amateur radio handbooks speak of linear loading on antennas, none of the books say what it means. There may be a definition, but I couldn't find one. So, for the benefit of the reader, let's define linear loading. In many cases we may wish to shorten an antenna from its normal full-size length (or height). A good example is a mobile 80 meter whip. A full-size quarter wavelength would be 65 feet high. One couldn't drive very far with an antenna that high on the bumper! We shorten the antenna down to about 8 feet

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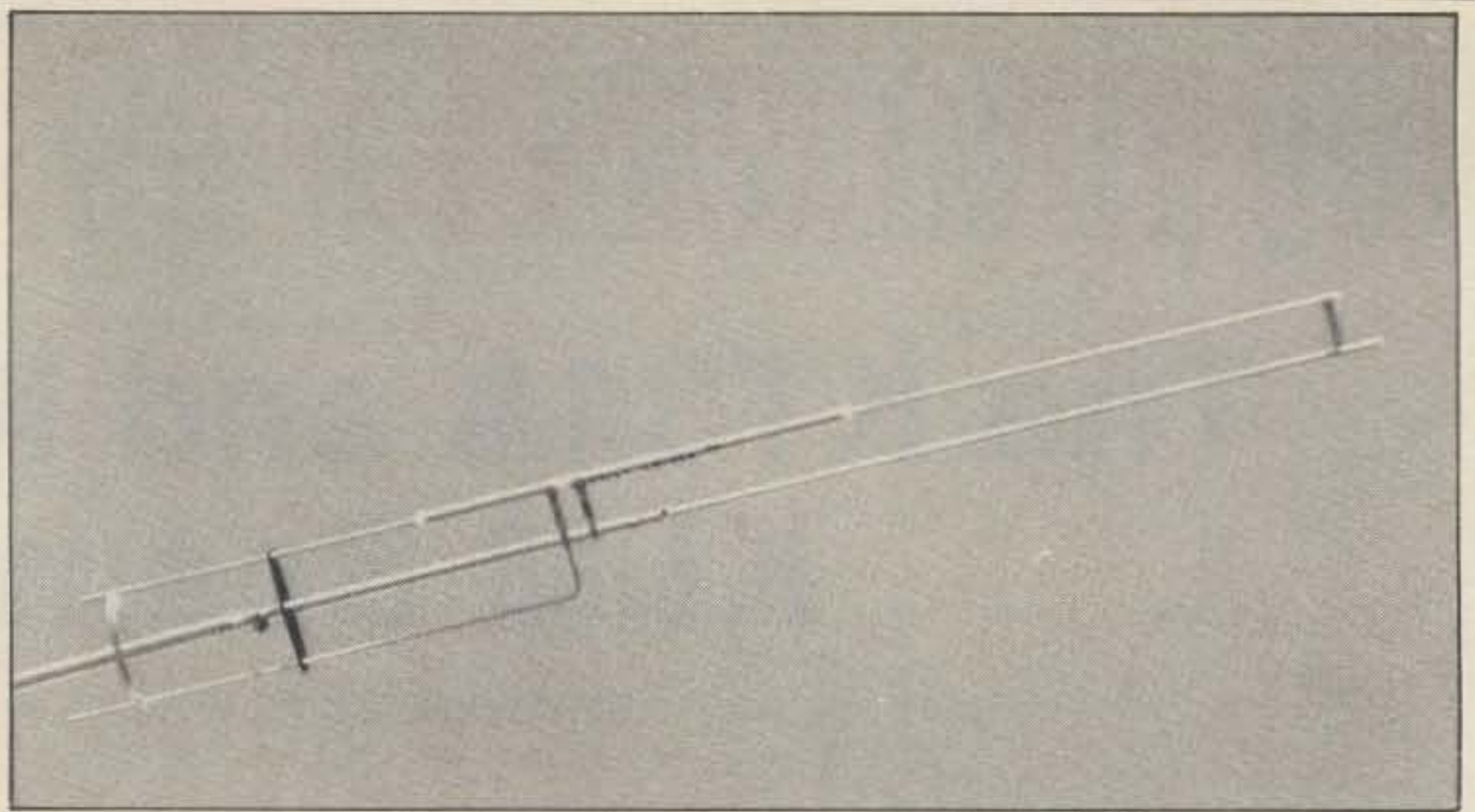
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One of the element's ends showing the linear loading.

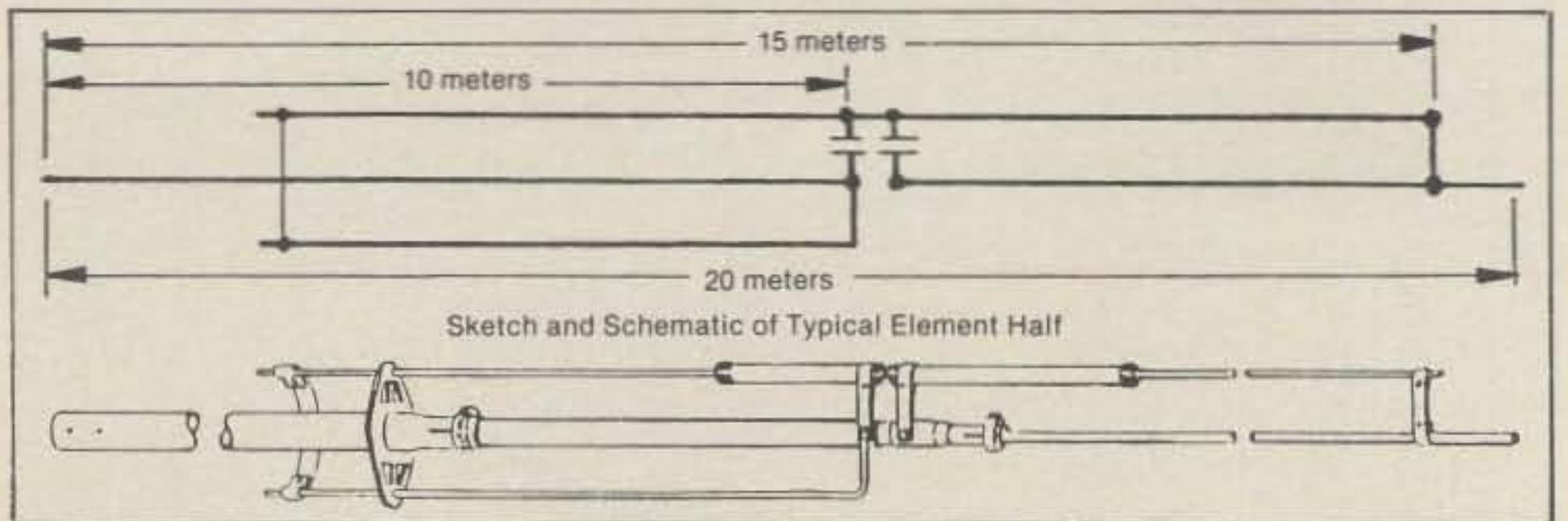


Fig. 1— This drawing from the instruction manual will give the reader some idea of what an element half looks like.

Frequency of operation:	
20M	= 14.0–14.35 MHz
15M	= 21.0–21.45 MHz
10M	= 28.0–29.75 MHz
Elements:	4 on each band
Max element length:	24 feet
Gain:	7 dB over a dipole reference
F/B:	20M–25 dB, 15M–22 dB, 10M–20 dB
F/S:	30 dB or better
Feed impedance:	200 ohms balanced/ 50 ohms with 4:1 balun supplied
Power rating:	4 kw PEP
Wind area:	6 sq. ft.
Wind survival:	100 mph
Turning radius:	15 ft.
Weight:	45 lbs.
Boom length/dia.:	16 ft./3" O.D.
Mounting:	2" mast

Table I— Specifications for the KT34A.

in length by installing a "loading" coil. This type of loading can be thought of as "lumped" loading. As an example (although in actual practice it probably wouldn't be worthwhile), suppose we took our 65 feet and folded it back on itself 3 times to give an overall length of 20-plus feet. This would be called linear loading. KLM folds back non-critical portions of their elements to form the traps and to shorten the antenna. I won't go into the merits of linear versus lumped (coils/capacitors) traps because that would take a long technical dissertation. However, both types have their advantages and disadvantages. I, for one, have always liked linear-loaded antennas.

Fig. 1 shows a sketch of a typical element half. At the top is the electrical circuit and just below is shown how the section actually appears. Table I provides the specifications furnished by KLM. First, let me say I have no way of accurately checking gain figures at my location. To check gain, one needs a good antenna range (and that is very difficult to come by) plus some rather exotic test gear in order to do a worthwhile job. However, KLM rates their beam at 7 dB over a dipole reference, and from my own experience, I would call that an honest estimate. For front-to-back I made several tests and in most cases found that the beam exceeded KLM's figures. The same is true for front-to-side figures.

It took two of us a full day and a half to put the antenna together. We probably could have done it faster, but we wanted to be sure it was done correctly. The instruction manual is quite thorough. Fig. 2 shows the assembly pictorial in the manual, and it should give the reader an idea of how detailed the manual is. Incidentally, I added up the parts, including nuts and bolts, and the number came to 608 components! The aluminum is of excellent quality, and all the tubing went together with no problems. A file was used to clean off the element ends to avoid burrs, but this probably was an unnecessary step. The boom is 3 inches in diameter and comes in three lengths each just under 6 feet (incidentally, the beam is shipped via UPS).

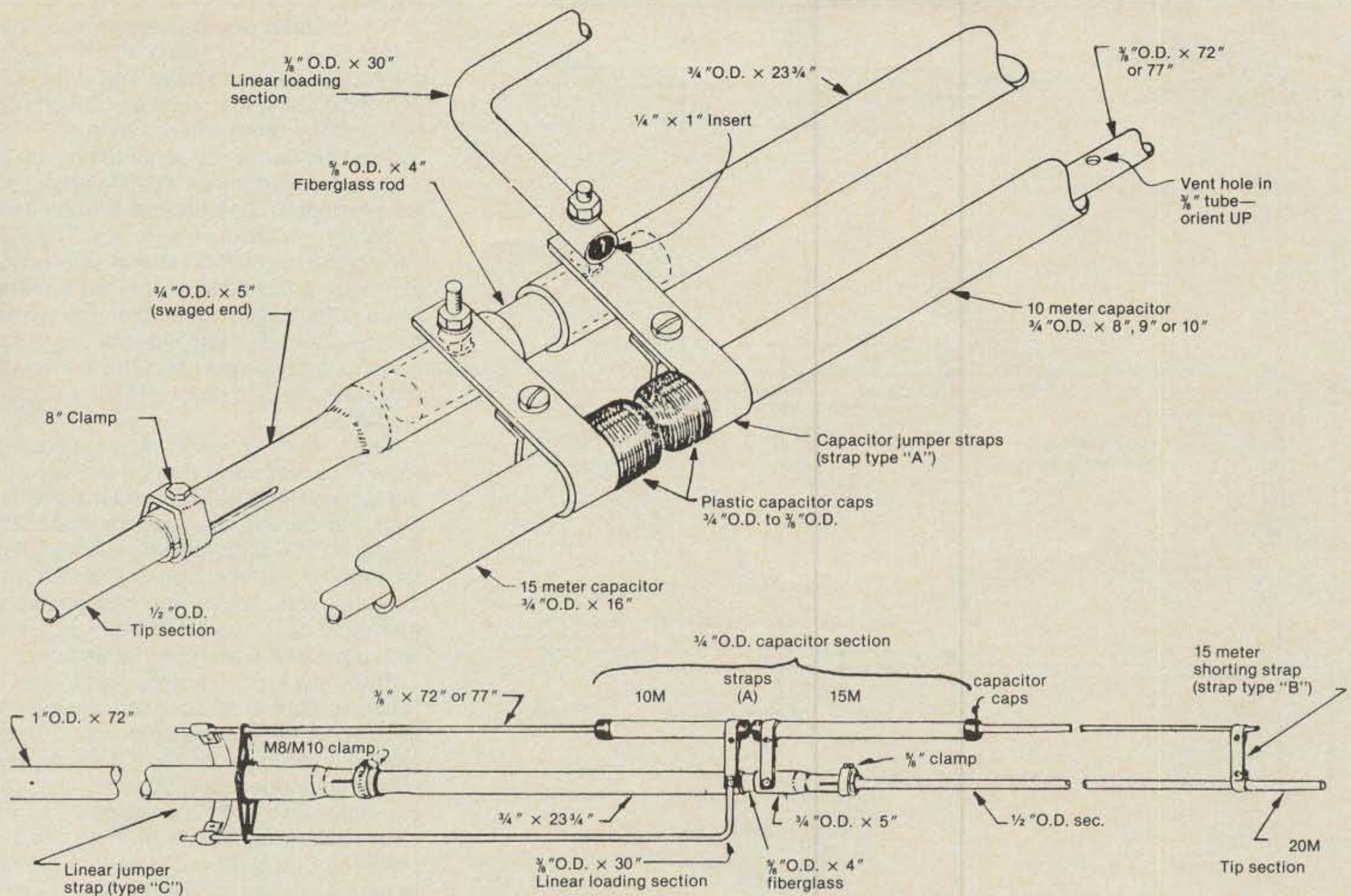


Fig. 2- Here is the element half showing the assembly pictorial.

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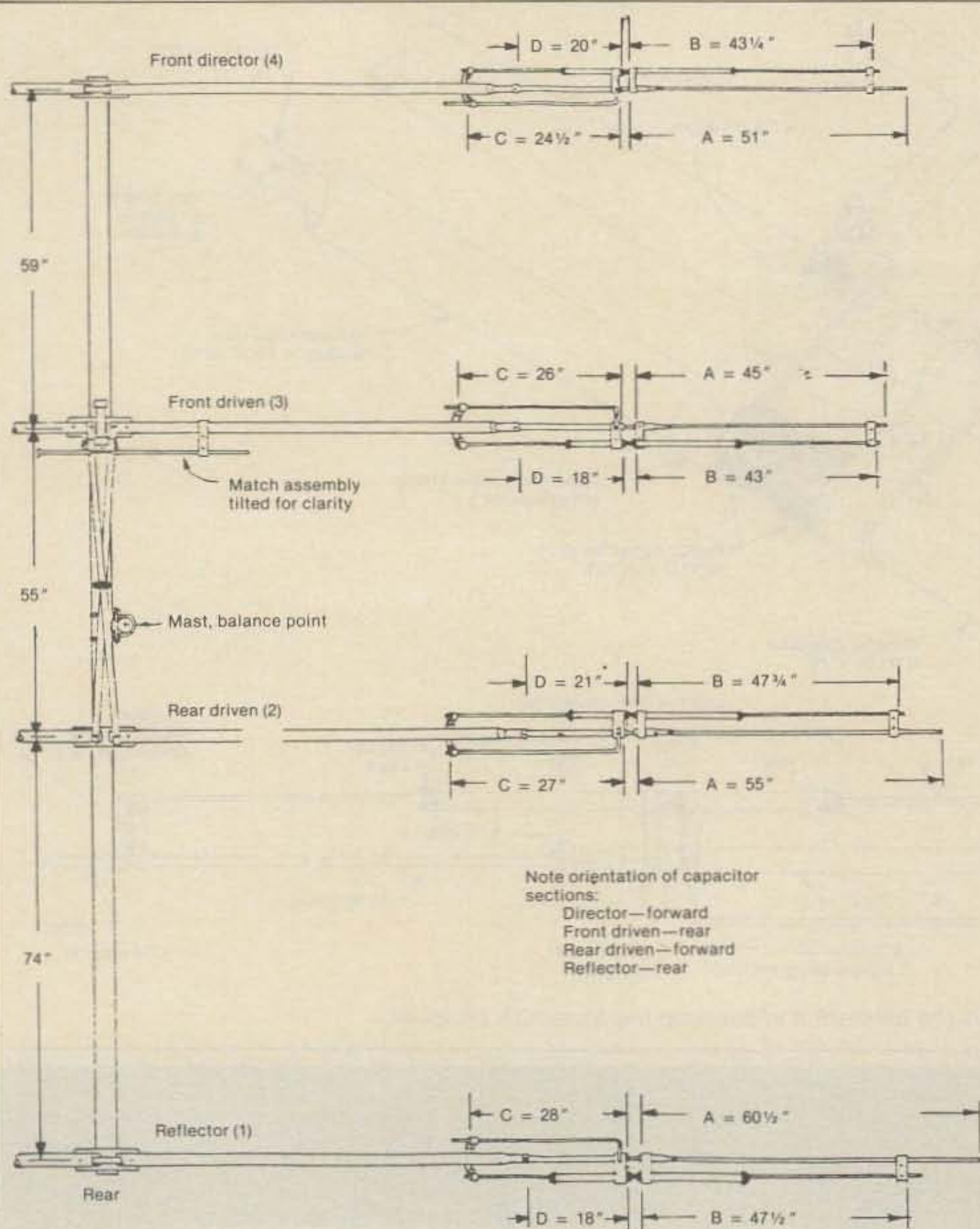
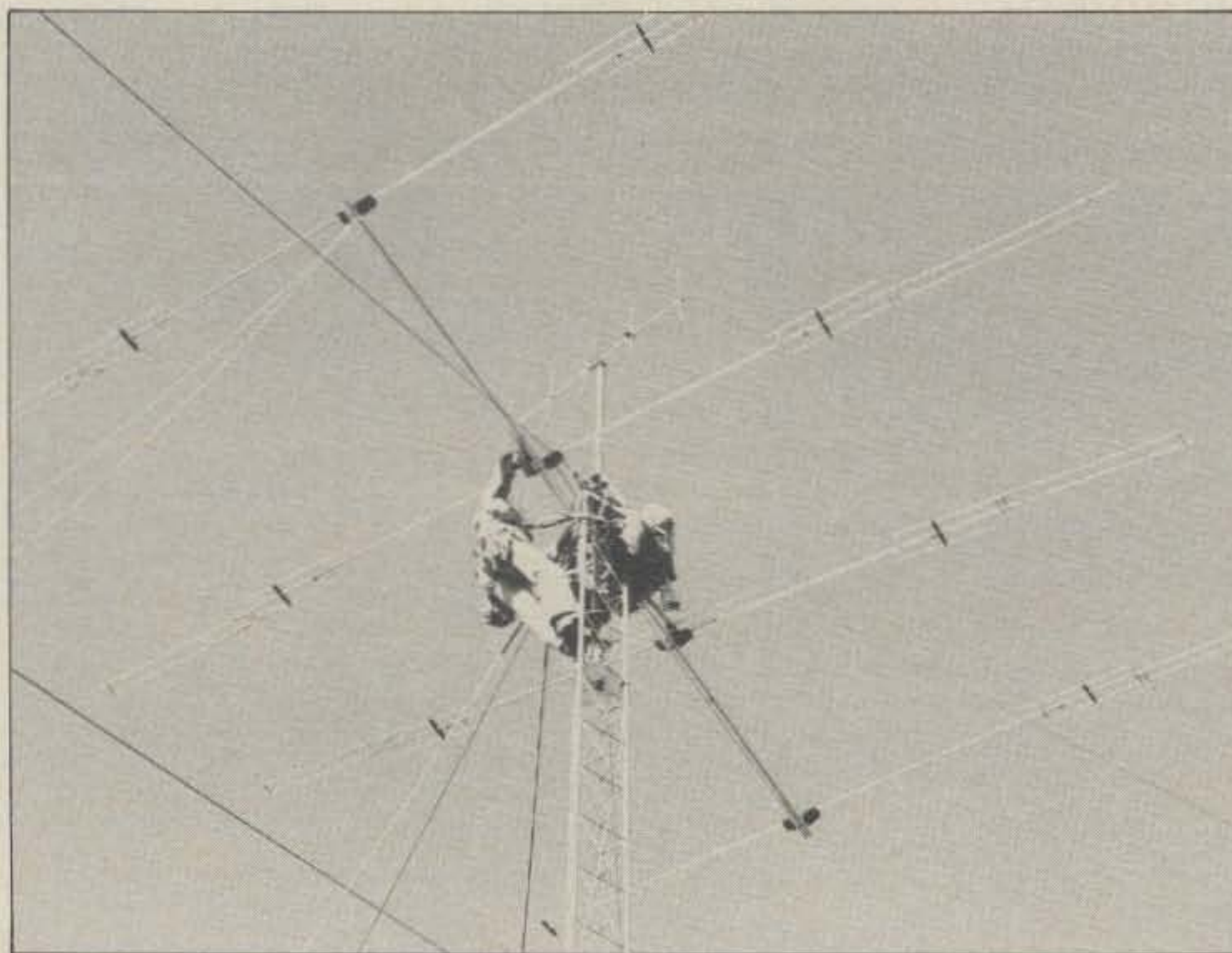


Fig. 3—An overview of one-half of the beam (from the manual).



A couple of the antenna raising crew. We had several more helpers on the ground.

The finished beam consists of 4 elements on a 16 foot boom. Fig. 3 is a dimensions sheet and overview of the KT-34A. Two of the elements are driven (log cell) and the other two are parasitic. For our test the beam was mounted on top of a 50 foot guyed tower. Testing antennas is never easy. They first have to be built and then installed on a tower. The KT-34A, because of the several protruding element traps, has to be treated gingerly when putting (getting) it up on the tower. As you can see from the photos, it required a ground crew plus the fellows on the tower top to get it up without snagging on the guys.

After the antenna was installed, v.s.w.r. curves were run. I must say that the tests on this beam proved to be better than the curves provided by KLM. My tested KT34A antenna was slightly "flatter" on 10 meters. In other words, the antenna was better for broadbanding than KLM said it was. However, I cannot help but make a few comments here.

The v.s.w.r. of an antenna and its ability to be broadbanded depends entirely on the impedance of the antenna. In other words, if the impedance of a beam is 50 ohms, and one uses 50 ohm line, the standing-wave ratio is going to be 1 to 1. That is determined by dividing the impedance of the 50 ohm line into the impedance of the antenna—in our case 50 into 50, or 1 to 1. One hears the term "broadbanding" used a lot, and all this means is trying to keep that 50 ohm antenna feed impedance as close to 50 ohms as possible across the desired band. For example, if the impedance goes from 50 ohms at the band center to 75 ohms at the band ends, the s.w.r. could go as high as 1.5 to 1 (75 divided by 50; the feed line impedance never changes). Now here is the point: Probably the single most important factor controlling the impedance value of an antenna (any antenna) is its height above ground. The distance between the antenna and true earth (earth is the really important reference) is the primary factor in determining the impedance. In other words, if an antenna is installed on a 30 foot tower, the same antenna would have a very different impedance from one on a 50 foot tower. And, the s.w.r. curve across a band would have different ratios for the different heights.

Of course, it would be nice to know exactly how high the antenna that provided the s.w.r. curves used by the manufacturer was. Don't misunderstand. This isn't "earth" shaking information, but it would be nice to know. In my experience I have found that if I can duplicate the exact height that the manufacturer used, my s.w.r. curve will match almost exactly with theirs. Keep in mind that the manufacturer is honest about his figures, but when you buy the antenna and put it up at some other height, you will almost surely have a different s.w.r. curve.

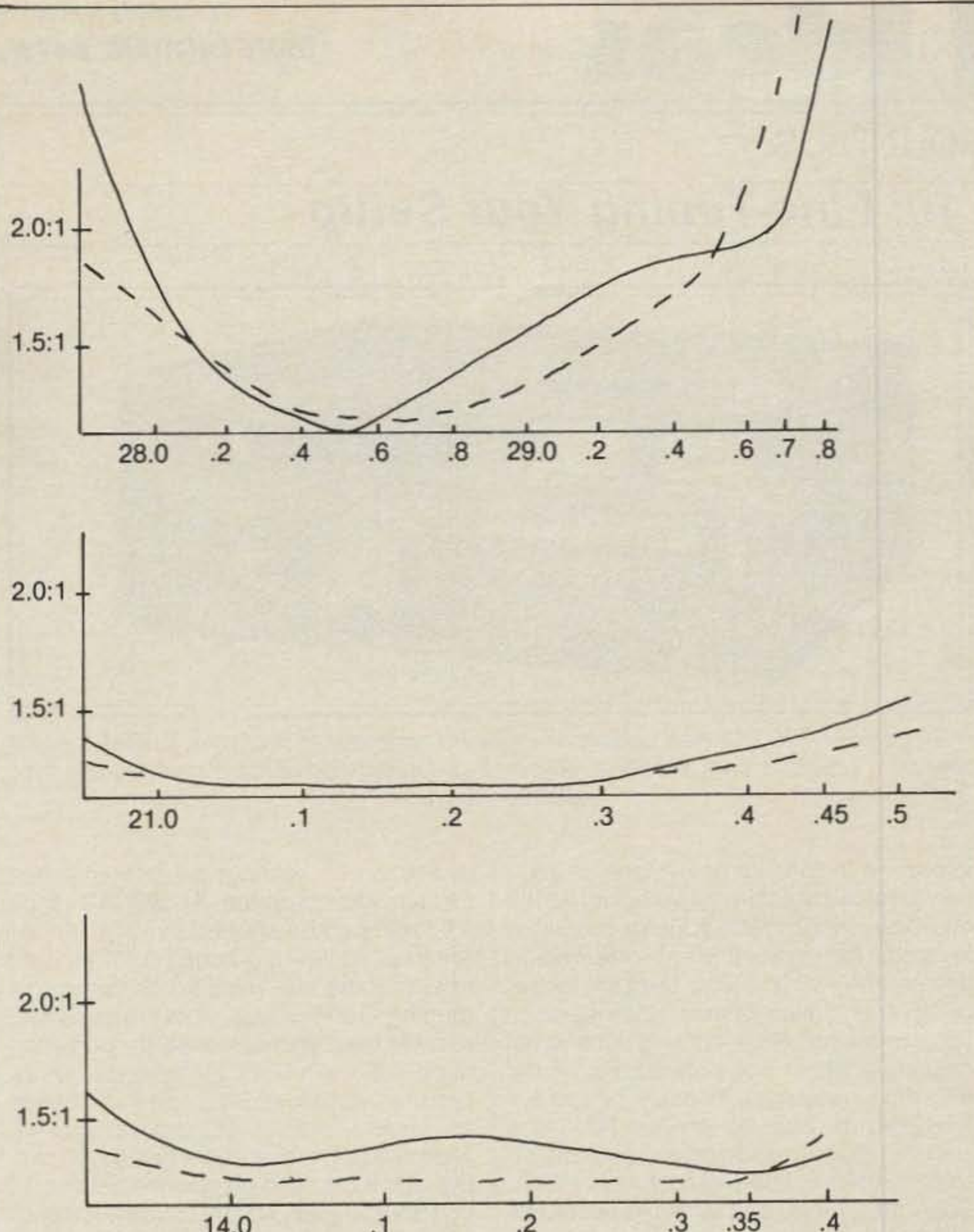


Fig. 4- Standing-wave curves of the KT34A. The solid lines are the KLM curves, and the dashed lines are my checks.

Like I said, however, my curves were slightly better than those of KLM. The KLM curves are shown in fig. 4. This is a good broadbanded beam and would certainly work on all frequencies with modern 50 ohm equipment without resorting to a Transmatch.

General Performance

As I said earlier, without a good antenna range, gain figures are meaningless. However, when one has used and tested literally scores of different antennas, it is fairly easy to come to some sound conclusions. There is no doubt in my mind that the KT34A is a superior performer. After much rotator turning and listening for front-to-back and front-to-side signal drop off, it is easy to say that the antenna is an outstanding beam. Excellent DX reports were received. The KT34A gets a high rating from me.

The KT34XA

The KT34XA is an extension of the KT34A in that a longer boom and two more parasitic elements have been added. This consists of one tribanded element and one 10 meter element. In essence, this ups the gain to about 9 dB on 20 and 15 and 11 dB on 10. The overall boom length is 32 feet.

The boom addition provides an overall length of 24 feet 8 inches. An overhead guy line is provided to support the longer boom. Wind area for the KT34XA is about 9 square feet versus 6 feet for the 34A. The power-handling capability is the same as that of the KT34A—4 kw PEP. Weight of the KT34A is 45 pounds, and the XA is about 25 pounds heavier.

Price of the KT34A is in the \$300 category and the KT34XA is about \$470. The antennas are manufactured by KLM, P.O. Box 816, Morgan Hill, CA 95037 (telephone 408-779-7363).

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MRF433	13W	14.50	32.00
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MRF449	30W	12.00	27.00
MRF449A	30W	11.00	25.00
MRF450	50W	12.00	27.00
MRF450A	50W	12.00	27.00
MRF453	60W	15.00	33.00
MRF453A	60W	15.00	33.00
MRF454	80W	16.00	35.00
MRF454A	80W	16.00	35.00
MRF455	60W	12.00	27.00
MRF455A	60W	12.00	27.00
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MRF237	1W	2.50	—
MRF238	30W	12.00	—
MRF239	30W	15.00	—
MRF240	40W	16.00	—
MRF245	80W	25.00	59.00
MRF247	80W	25.00	59.00
MRF260	5W	6.00	—
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A LOOK AT THE WORLD AROUND US

OSCAR 10: Fine-Tuning Your Setup

Last month's column featured an introduction to OSCAR 10 and basic details on joining that exciting satellite activity. Our discussion was straightforward and hopefully understandable by all regardless of technical background. If our intentions were achieved, you were at least inspired to tune in those "new era" operations in the 145.800 to 145.950 MHz range of 2 meters. The uniqueness of hearing JAs, VKs, and PYs, and other DX rolling through on our most popular v.h.f. band is paralleled only by the ability to contact those stations while using 10 to 30 watts of power and a 6 foot long antenna. In fact, I'm writing this month's column soon after working several DX stations while using two portable transceivers and break-down antennas. These futuristic capabilities in our opinion are destined to become more popular when present sunspot activity reaches a minimum.

As a further means of orientating you in the right direction with OSCAR 10, this month's column will delve into some specifics of satellite operation. We'll discuss rigs, antennas, station layouts, tracking, and some ideas on successful communications. There's quite a bit of ground to cover, so let's begin with two noteworthy points of interest. First, don't become engrossed in the orbital computation and tracking game to the point of overlooking actual OSCAR 10 communications. Purchase a computer program, a Satellipse, or a Project OSCAR calendar, and then use that information for your operating convenience. Why waste time plotting orbits when the real action is happening on the air! Second, remember that our amateur radio world hosts numerous avenues of pursuit. Don't become obsessed with satellite communications and miss out on h.f. band happenings. Blend your operating pleasures.

OSCAR 10 Gear

Realizing that OSCAR 10 is only the first of several dedicated v.h.f./u.h.f. satellites, we can expect multimode 2 meter and 70 cm rigs to soon reach new heights in popularity. When contemplating a new rig for f.m. and repeater operations, we thus advise looking ahead and including OSCAR capabilities in those plans.

The ability to simultaneously transmit and receive on different bands is vitally



The Yaesu FT-726R 10 watt output, all-mode transceiver. As factory-supplied, the unit operates 2 meters only. Optional 70 cm and duplex modules are user-installed for satellite operation.

important to satellite operations. In addition to letting you hear your signal as it's heard by others, that full duplex operation is useful for signal-strength referencing against the 145.810 MHz beacon, for zeroing other signals, and for antenna-position "tweaking" (tropospheric ducting occasionally alters computerized azimuth/elevation headings). Yaesu's full-duplex FT-726R transceiver and/or Ten-Tec's new 2510 satellite station are two very attractive units capable of such operations. Separate 2 meter and 70 cm transceivers are another logical approach to satellite communications. Popular all-mode 2 meter/70 cm transceivers with "OSCAR appeal" include Kenwood's TR-9130/9500 units; ICOM's IC-290A/490A, IC-251A/451A, and IC-271A/471A units; and Yaesu's FT-480R/780R units. In the often-overlooked category, a few ICOM IC-202 and 402 portable rigs, Yaesu FT-290/FT-490R all-mode portables, and KLM "Echo" transceivers are still sitting in factory-sealed cartons on dealers' shelves or showing in hamfest fleamarkets. All of the previously mentioned rigs can be OSCAR readied with the addition of a good, low-noise 2 meter GaAsFET preamp and a small 70 cm linear amplifier. Operating power for those rigs and the amplifier can usually be "tapped" from 12 volt h.f. rig supplies. My ICOM PS15, for example, powers a 2 meter receiver and 70 cm amplifier. A separate 4 amp supply is used with the 70 cm exciter for voltage stability/load diversity.

One of the most popular rigs heard on OSCAR 10 is Yaesu's new FT-726R 10 watt output, all-mode transceiver. As factory supplied, this unit operates 2 meters only. Optional 70 cm and duplex modules

(a second i.f. section) are user-installed for satellite operation. An OSCAR-ready FT-726R can be spotted by its dual rear antenna connectors: one for 70 cm and one for 2 meters. The FT-726R sports 11 memories which can store transmit and receive frequencies—a worthy consideration for multi-QSO enthusiasts. Other features include an effective noise blanker, speech processor, and variable i.f. width/shift. The unit has a built-in AC supply, and it can also be powered from a 12 volt source (yes, OSCAR mobile is possible using dual "twist" antennas mounted on a camera tripod). Add antennas plus key and mike to this single unit, and you have a complete basic setup.

Another very popular OSCAR 10 rig is Ten-Tec's new 2510 satellite station. This unit features a GaAsFET preamplified 2 to 10 meter converter and 10 watt s.s.b./c.w. 70 cm transmitter in a remote-v.f.o. size cabinet. The unit is used in conjunction with one's existing h.f. transceiver or receiver, thus gaining use of associated memories, noise blanker, i.f. shift, special filters, etc. The 2510's 70 cm transmitter features s.s.b./c.w. operation and continuously variable r.f. output to 10 watts. A particularly appealing aspect of the Ten-Tec rig is its pseudo transceive operation. Once the mated receiver is tuned to the proper frequency, all subsequent tuning can be handled from the 2510's main knob. This cleverly designed rig can be powered by any 12 volt, 4 amp supply.

Assuming the previously mentioned OSCAR rigs are used barefoot with antennas of the 12/13 dB gain category, that basic setup should be capable of fairly good c.w. communications. S.s.b. operations will probably be difficult except

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

when the satellite is moving toward a perigee near your QTH or during QRP days (Mondays). A 70 cm amplifier such as the highly popular Mirage D1010 will shift your setup into the "deluxe" 600 to 800 watt ERP range, providing reliable operation in both s.s.b. and c.w. almost any time OSCAR 10 is above your horizon. When adding a 70 cm amplifier, remember to improve your 2 meter receiving capabilities accordingly and hold your downlinked signal strength below that of the 145.810 MHz beacon.

Station Assembly

Although initially it might seem confusing, setting up an OSCAR 10 station is a relatively simple matter. A flair of Golden Age Radio seems apparent here as newcomers seemingly grope in the dark for vital information. Once past that "unknown," however, station assembly has a surprising air of simplicity. As a beginning, we suggest checking acquired OSCAR gear during some evening chats with local amateurs. That "feel" for rig operation and antenna gain/beamwidth can prove invaluable when communicating via satellite. Now let's consider some of the popularly asked questions regarding OSCAR setups.

The need for using expensive hardline coax to avoid cable losses can be sidestepped by placing satellite antennas close to the rig's location and interconnecting with no more than 20 feet of top-quality RG-8 foam coax. Satellite antenna height isn't significant, provided a clear sky view is possible in general orbit directions. In the United States that view can extend from roughly west through south

to nearly east at 25 to 50 degrees elevation. A slight amount of tree trimming is usually preferred over hardline cable and connector installations, or you can opt for communicating mainly during "clear view" days of each month. Bear in mind that 10 or 20 feet of coax is many wavelengths at 435 MHz (similar to feeding a 20 meter beam with approximately 800 feet of coax). Furthermore, all RG-8 isn't the same quality. If possible, cut a piece and study its internal structure before purchasing any. The center conductor's insulating dielectric can be seen through the loose woven braid of poor coax. There also may be small variations in the dielectric or jacket's symmetry, which can prove lossy. Good coax looks perfectly manufactured, lacks visible flaws, and has maximum shield braid. After routing the coax through its most direct path, cut any excess and carefully solder connectors. Avoid any coax breaks or connecting adapters, or heat loss and/or s.w.r. may be abnormally high. Outside remember that moisture in antenna connections, cable, or connectors can severely attenuate v.h.f./u.h.f. signals. One or two rolls of properly applied Coax Seal are worth five times their cost.

Spacing between 70 cm and 2 meter antennas on their common crossboom isn't critical. However, crosstalk may be noticed if element tips are less than 2 feet apart. We suggest "canting" one antenna slightly so its elements are not parallel with the other antenna, and using a 5 or 6 foot non-metallic crossboom. If you opt for PVC tubing, use the heavy, thickwall type. I used the regular type and antenna weight sag was horrendous.



The Ten-Tec 2510 satellite station contains GaAsFET 2 to 10 meter converter and 70 cm c.w./s.s.b. transmitter in a single cabinet. The unit is used in conjunction with an h.f. transceiver or 10 meter receiver.

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CIRCLE 37 ON READER SERVICE CARD

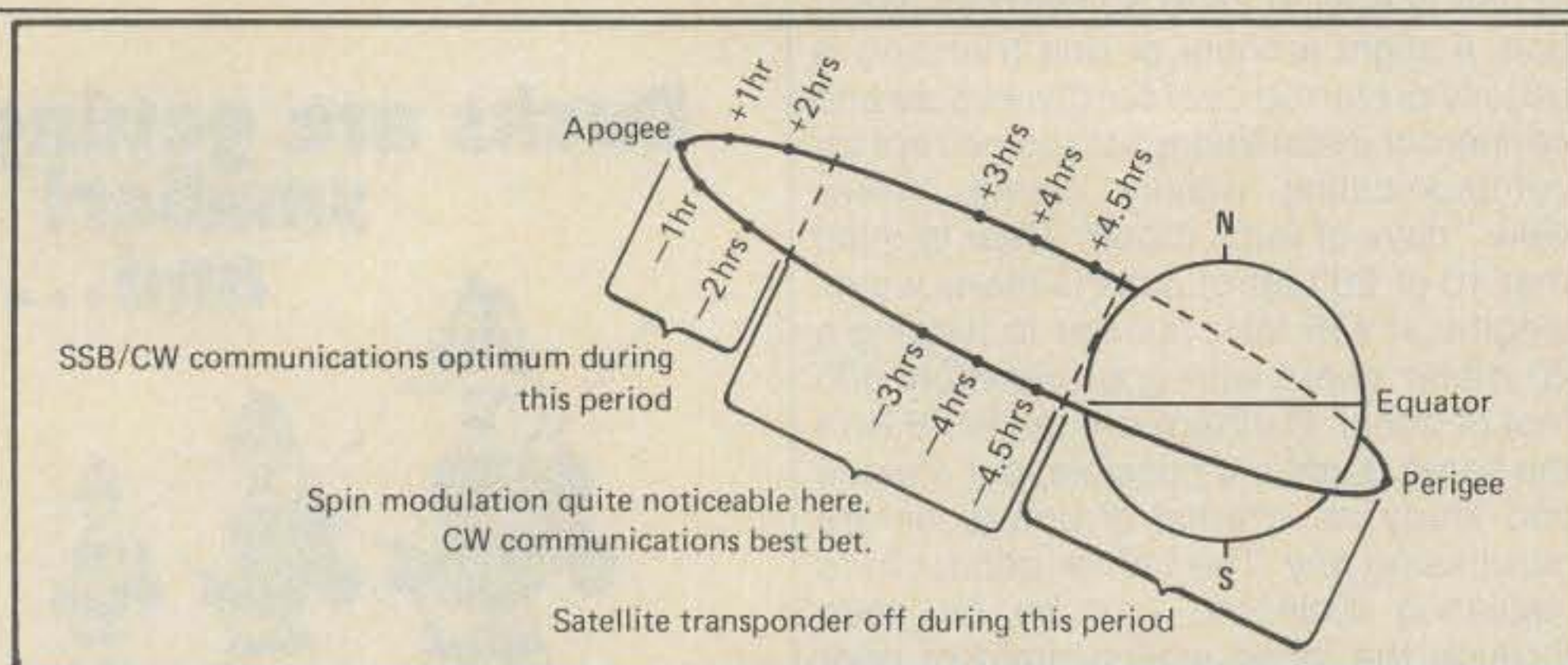


Fig. 1—Communicating successfully via OSCAR 10 is basically a matter of knowing the satellite's position and recognizing the idiosyncracies of its orbit.

Orbital Day	Apogee time	Apogee Latitude	Apogee Longitude	Notes
17	0701 GMT	25.6N	22.0W	Last days of previous cycle. Communications difficult but possible during this period.
18	0610 GMT	25.6N	12.0W	
19	0530 GMT	25.6N	2.6W	
1	1717 GMT	25.6N	178.4W	First days of following cycle. Communications very good during this period.
2	1630 GMT	25.6N	168.0W	

Table 1—This hypothetical chart illustrates how published daily predictions can be used for mental tracking of OSCAR 10. Satellite appears east of U.S. on days 17, 18, and 19; west of U.S. on days 1 and 2. Additional details are in the text.

Antenna-mounted preamps can prove a headache for many satellite newcomers. Their noise figure must be comparable with indoor preamps, or overall system performance is degraded. There are also problems keeping both moisture and r.f. out of those preamps. Personally, I'll go for a near-shack antenna and good indoor preamp any time.

Special Operating Notes

Generally speaking, OSCAR 10 follows what might be dubbed a 19-day Lunar-type cycle. Let's assume, for example, that the satellite's apogee appears west to southwest of your QTH at 50 degrees elevation on a hypothetical "day one" (the optimum position for good communications, I might add). During that week, the apogee direction will shift easterly roughly 10 degrees per day, not on your beam indicator's markings, but on a world globe's longitudes. During the "second week" the satellite's apogee will appear south to southeast of your QTH (communications still fairly good, but getting progressively more difficult). During the "third week," the satellite reaches its maximum eastern position (a difficult angle for most U.S. stations, but good for Europeans). There will be a few days of short access time as the satellite's two daily orbits are situated on the world's sides opposite the United States, and then the satellite will begin its next west-to-east/good-to-difficult cycle.

We should also mention that OSCAR 10's mode-B transponder is switched off during three or four hours of each perigee and during an hour of apogee on weekends. How can you thus determine

the satellite's availability and status? Listen for the 145.810 MHz beacon and activity within the bandpass. If downlinked signals are weak but steady, the satellite is probably near apogee or positioned east of your QTH. If downlinked signals are heavily spin-modulated, the satellite is probably near its perigee range (c.w. communications are noticeably better than s.s.b during this period). If the 145.810 MHz beacon is operational but downlinked signals are not heard, the bird is probably in "perigee cutoff." Listen a couple of hours earlier or later the next day. Follow these notes and you'll soon "know" OSCAR 10 as well as you know 40, 20, or 10 meters (fig. 1).

Tracking Notes

As previously discussed, OSCAR 10's orbit is totally different from those of prior amateur satellites (hence its DX capabilities and Phase III designation). Three variations of tracking concepts were discussed in last month's column, and their use is definitely necessary for becoming familiar with the new satellite. Beyond that point, however, you may find tracking OSCAR 10 surprisingly easy. I'll explain my viewpoint.

OSCAR 10 communications are optimum for ± 3 hours of daily apogee, except when that point occurs near one's far horizons. We only need to know the precise time and position of these apogees. That information isn't presently published in monthly magazines, but must be obtained from Project OSCAR calendars or via a monthly s.a.s.e. from the ARRL if you're a member.

Assuming you secure the above infor-

mation, general tracking begins by pointing antennas in the predicted direction and slightly "tweaking" their position every 45 minutes to 1 hour. Initially directing antennas toward the satellite is the key factor, and blindly hunting that point is easier said than done! The next day's apogee will occur above an earth longitude roughly 10 degrees east of the past day's and approximately 45 minutes earlier in time (those parameters are useful for several days, and then refer back to published calculations). The progression continues until one of the satellite's two daily orbits move out of eastern range and the "other orbit" comes into western range. An example of that concept is shown in Table 1. The latitude calculations refer to degrees "above" or "below" the Equator, and can also be read on a calibrated world globe. This "argument of perigee" varies slightly on a 2½ to 3 year basis. Simply explained, 25.6N should decrease to near zero by 1985 (satellite directly above Equator at whatever orbit's longitude), continue towards 25S by 1986, and then proceed back towards the Equator. Now mental tracking of OSCAR 10 isn't that difficult, is it?

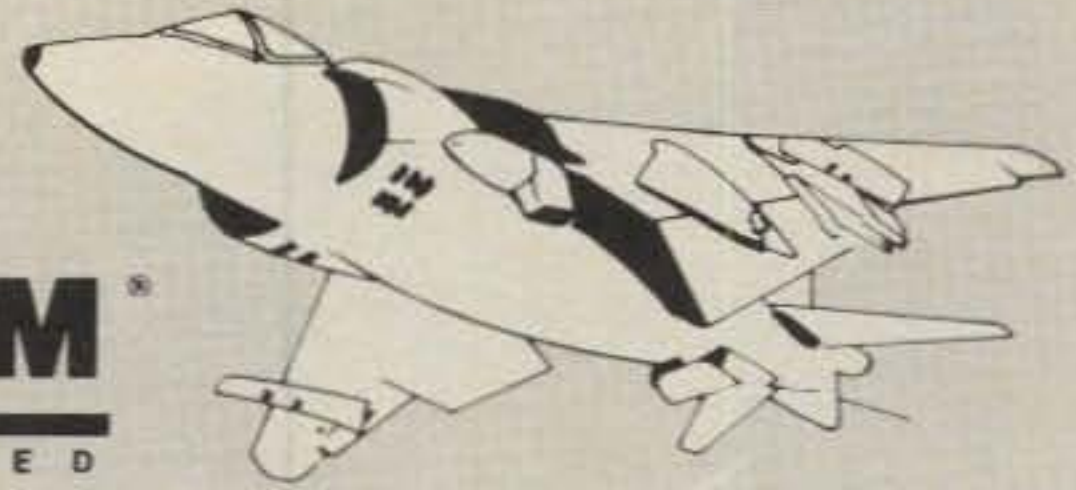
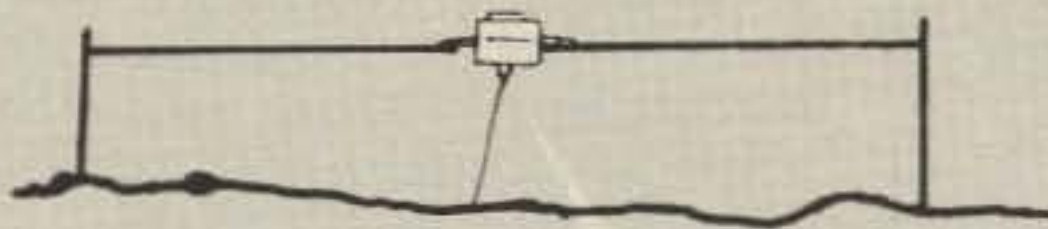
Conclusion

That's the OSCAR 10 story in a nutshell, gang, and we hope you didn't get whiplash trekking through our fast-paced discussion. I must emphasize rereading last month's column for the full story, as many points were mentioned only once. We didn't intentionally omit mode L; column length ran shy. We plan to have more OSCAR information later.

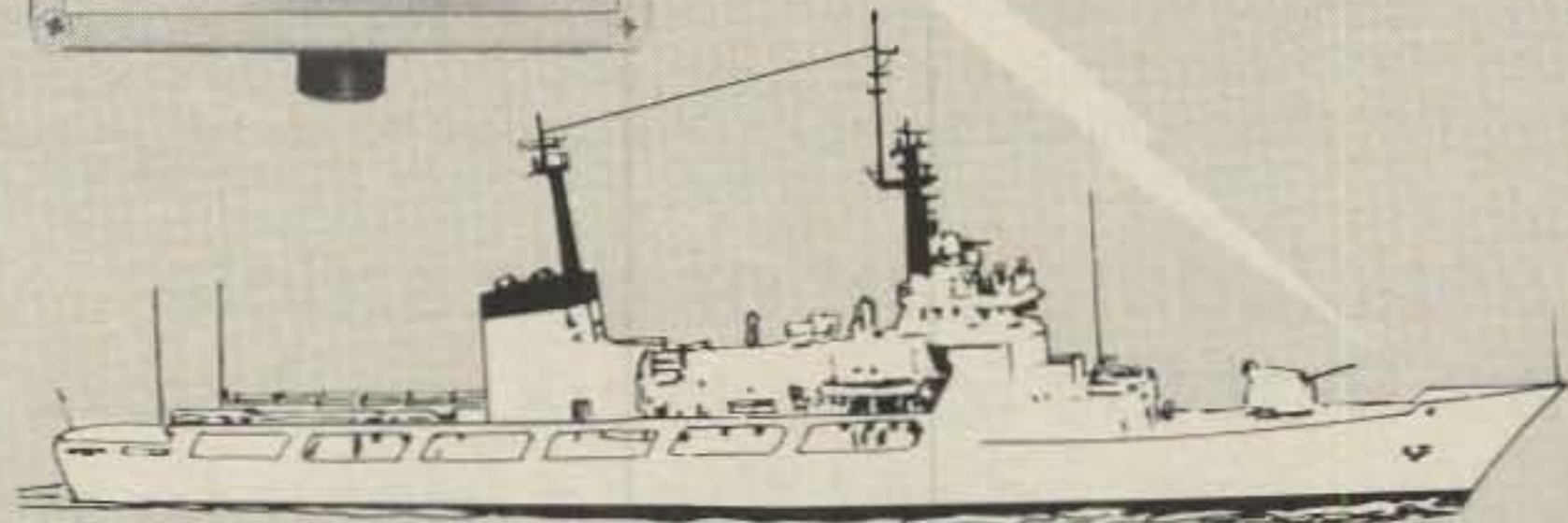
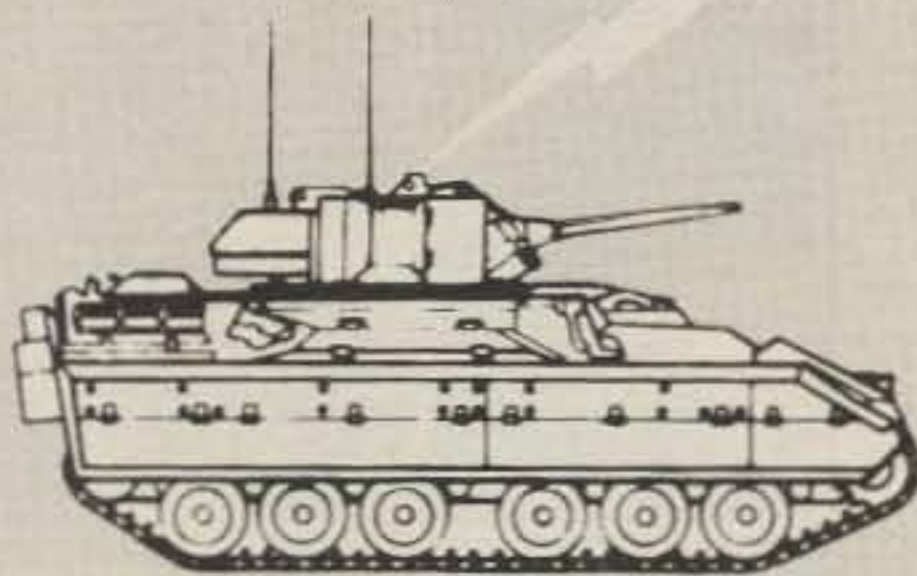
As we've pointed out many times, OSCAR satellites are the communication medium of the future. We've only begun our trek in this exciting direction. It's up to each and every one of us to support this tremendous asset, or it will wither and die from lack of finances. I'm now dead serious in my statements. Whether you're interested or not in satellites, understand the following: OSCAR satellites, both present and future, are possible only through contributions to AMSAT (P.O. Box 27, Washington, D.C. 20044) by amateurs such as yourself. I learned only two days ago that AMSAT is *many* dollars in the hole from the OSCAR 10 flying. If there are to be future satellites, *today's radio amateurs* must rally to support the program (where would 2 meter f.m. be without repeater supporters?). We encourage—no, we urge—you to join AMSAT, to sponsor an orbit, to contribute to a satellite fund, etc. It's an investment in *your future!*

Looking for more basic facts on OSCAR 10? I have the exact book you need in the works, and it should be available from Universal Electronics during coming months. Watch for it!

73, Dave, K4TWJ



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Saturday a.m., stringing the middle element. Here we are in a neighbor's front yard. Four neighbors volunteered their yards, and we used all four! Note the sawhorse with a sign on it in the bottom righthand corner. This kept visitors from parking in the drive.

The concluding part of this article shows that the ideas work, and work well. You can adapt these ideas to your own installation when the time comes.

How To Design A Real Estate Efficient Antenna Farm

Part II – Installation

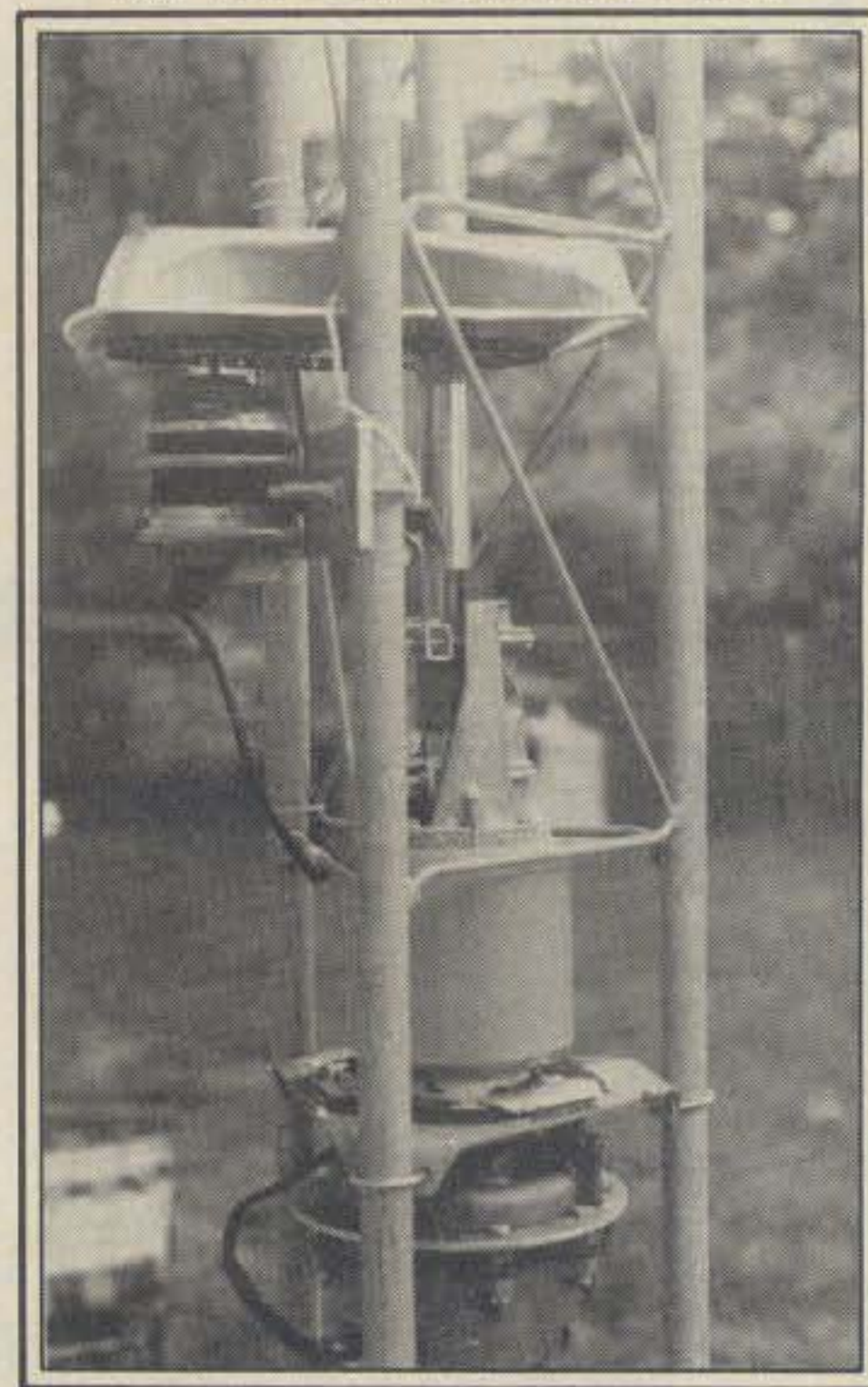
BY MICHAEL JOYCE*, N6ML

Last month we went through the theoretical exercise of antenna planning. All of the right and most of the wrong ways were discussed, and now we take theory and put it into practice. The following is an enviable picture story on how the author (following his own precepts) got to put up the big one.

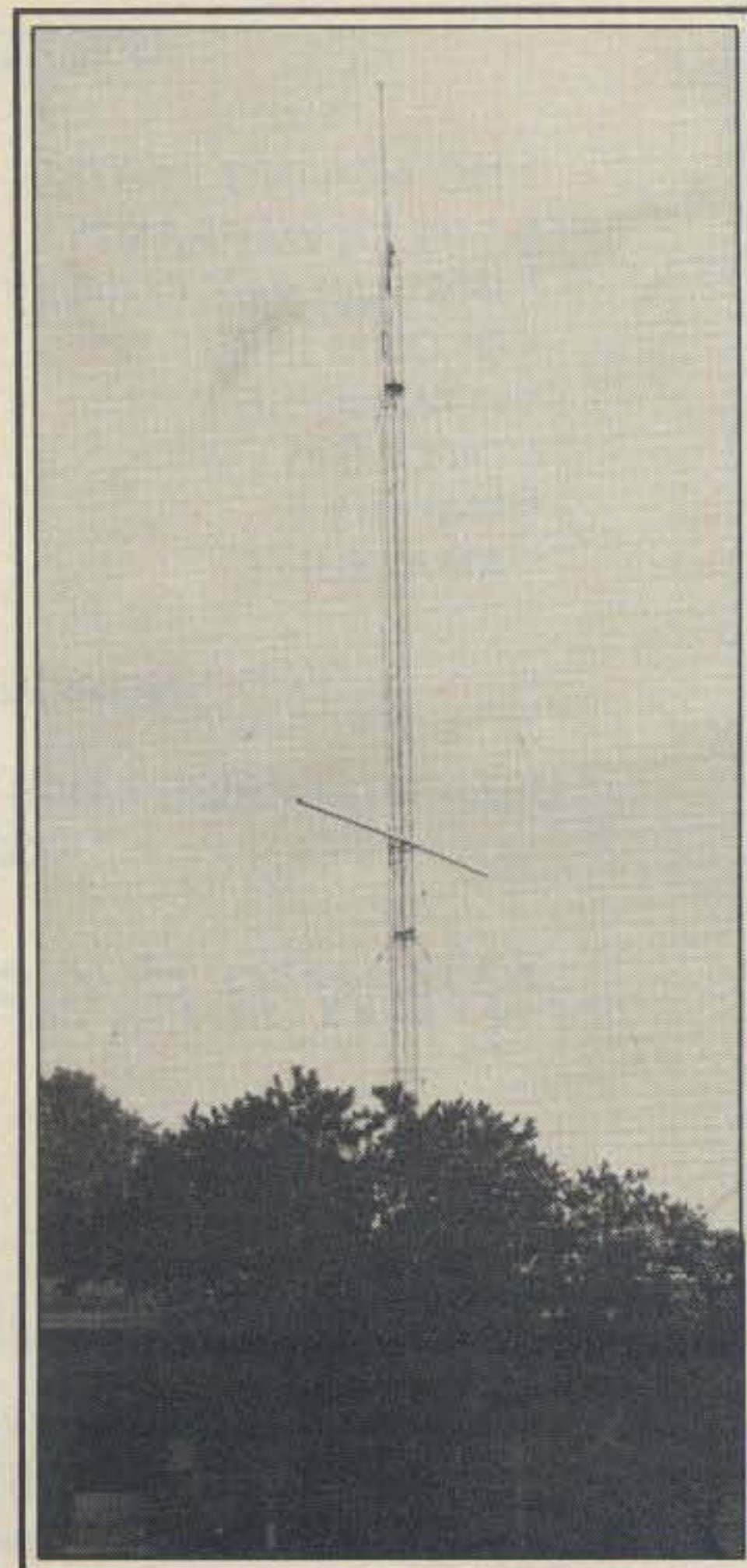
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For years I was content working DX with my tribander at 70 feet and various antennas for the low bands. After the publication of an article I wrote on the design of a station control for the Kenwood '820 Twins, my friend Jack Gachesa, W6SCH, said that I needed a superb antenna to match the station. Being gullible and a bit adventurous, I decided that a 4-band quad with 2 elements on 40 meters, 3 elements on 20 and 15 meters, and 5 elements on 10 meters on a 22 foot boom would fill the bill. That decision was the

This is an example of a special problem: keeping the rain out of the selsyn and prop pitch motor. The solution shown incorporates a bread pan, a sugar canister, a toilet flange, pipe nipple and flange, and the foot from a Ham-M rotator.



The gin pole is installed and the boom is mounted at the 10 meter (33 foot) level. A rope guy has been substituted for the top front guy. Unseen here is the beginning of the erecting of the scaffolding.



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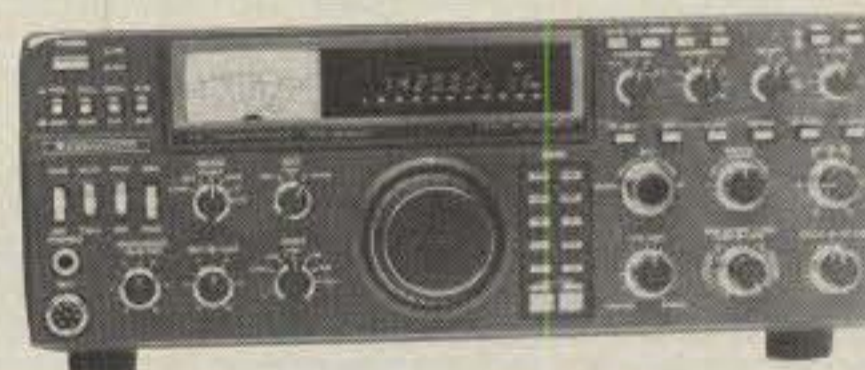


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The scaffolding is erected, and installation commences with the middle element (10 meter first director, 15 and 20 meter driven elements).

Here is a closeup of that installation. Note the elevator rail on the tower.



This shows the installation of the first monster element (10 meter third director, 15 and 20 meter directors, 40 meter driven element). At the opposite end of the boom is a support cable.



Someone called me a slave driver, so I agreed to a break. Someone else yelled "Miller Time," and out came man's best friend carried by a dog!



The scaffolding had to be moved to the other end of the boom. Note that for safety's sake the scaffolding is guyed.

easiest element of this installation. The following description will not detail the usual antenna installation instructions. It instead will attempt to point out some problems, solutions, and above all else, the ultimate in Real Estate Efficiency and Covert PR, and an experience non-amateur neighbors and amateur friends have lovingly never forgotten!

The antenna worked beautifully as can be expected. It is one of the rare treats of amateur radio to operate a 2-element rotary quad on 40 meters. It is an understatement to say that all of the operating pleasure of this antenna could not possibly equal the enjoyment of designing, planning, and directing the installation. My heartfelt thanks go out to my mother-in-law, Mrs. Kathleen Mortara, for the typing; the zany genius of cartoonist Dennis Sammon (Snake City Art); Jim Baker,

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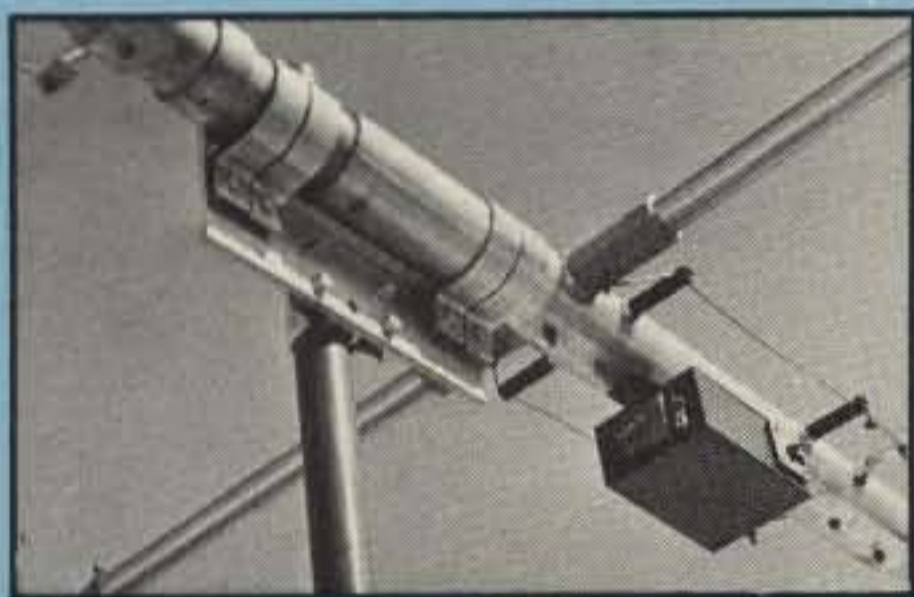


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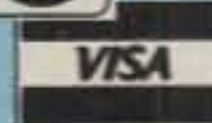
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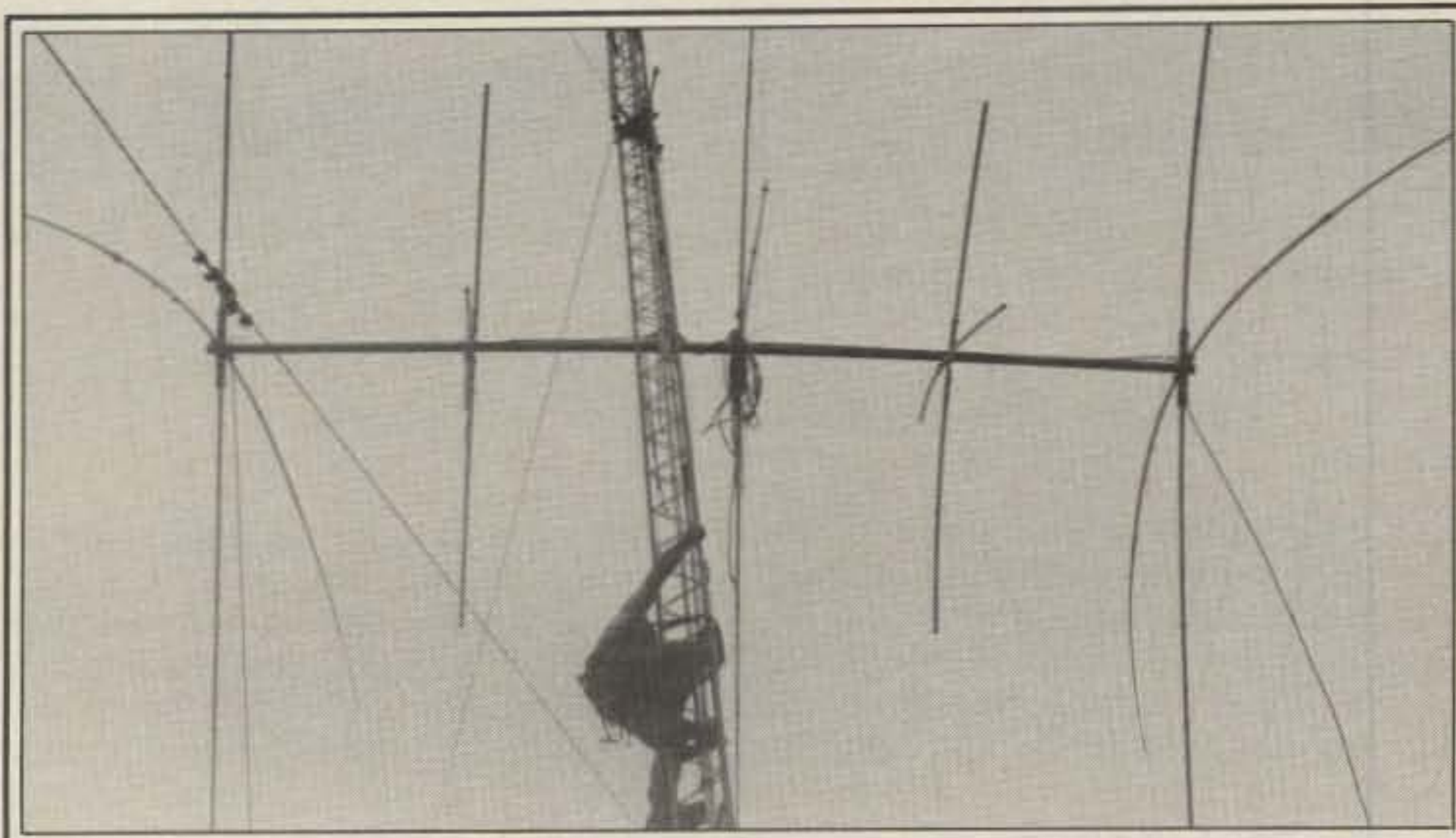
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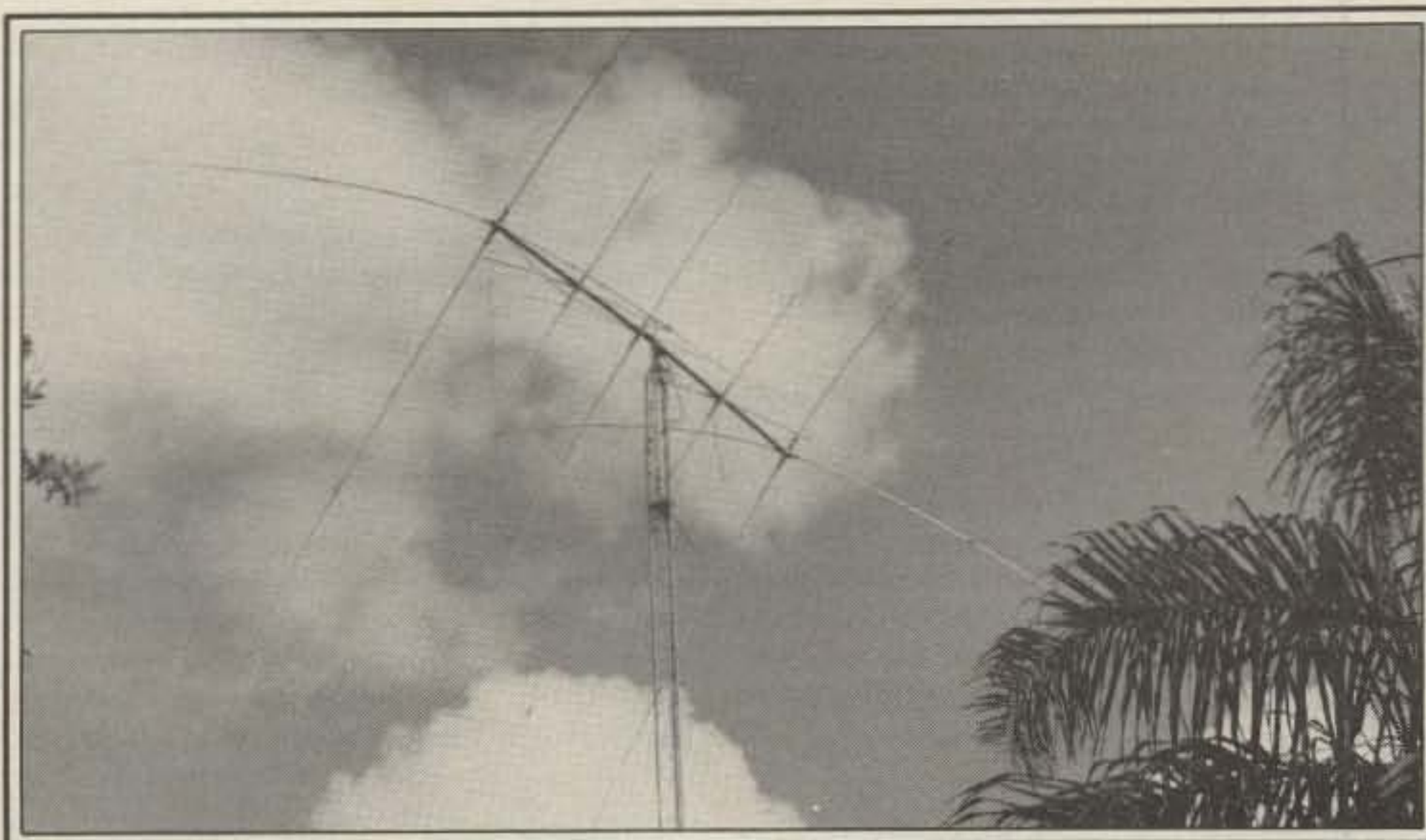
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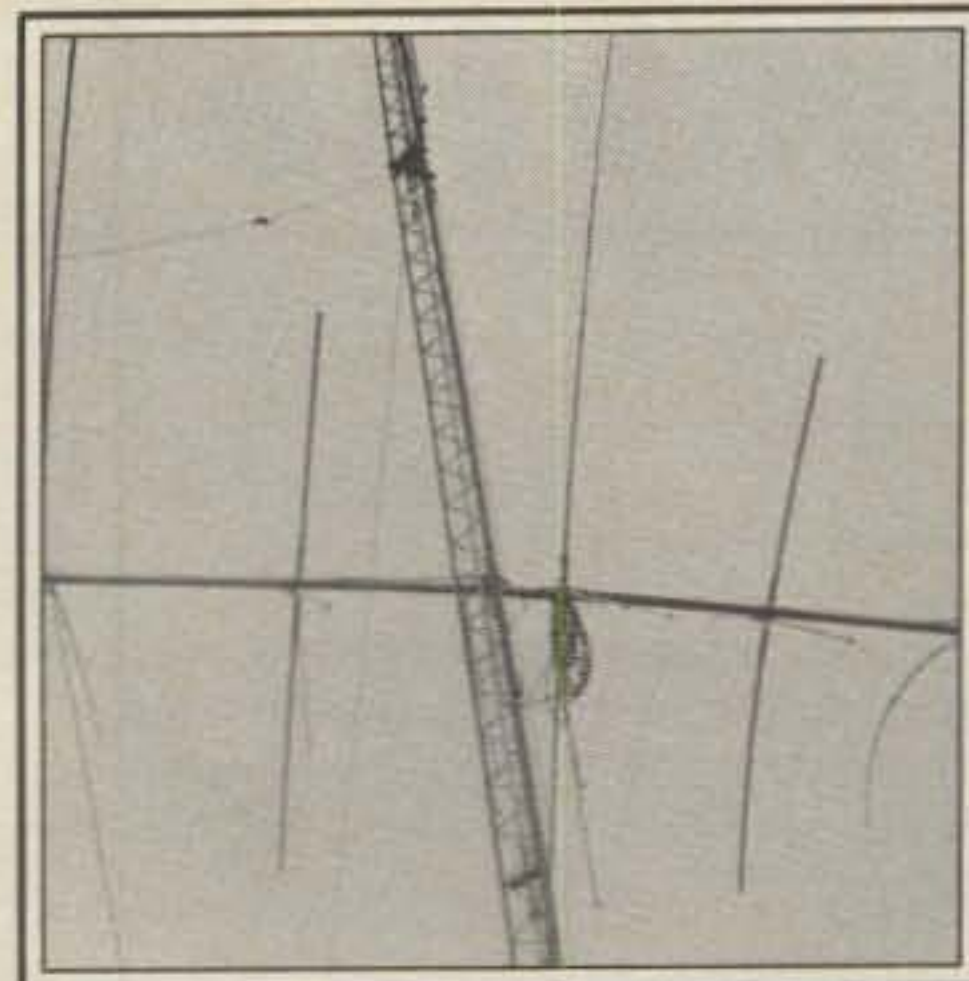
Here are the final two elements being installed. The only way to attempt the acrobatics I performed is with a heavy-duty lineman's belt.



The wind blew the antenna slightly to cause a minor problem with the rail. Note that I am climbing the tower on the side opposite the rail.



The installation complete. It was described as "a face only a mother could love."




On the way up!



At the top at last! The transition from rail to mast is taking place.



Enjoying the fruits of all the labor on 40 meter c.w.

K3TZY, for the photography; Bill Bond, for the fried chicken; Chuck Frost, K4KOD, Jack Gachesa, W6SCH, Joe Lappico, WB4HEB; and neighbors Ed Busch, Tom Lubniewski, Elliot Borden, Bud Jones, Charley Moore (deceased), and Tom Burke. Thanks also go to Art Brittingham for his insistence that "a lot of good will come out of this" and to my dog, Max, the bartender. 

"HOW TO" FOR THE NEWCOMER TO AMATEUR RADIO

Facts for Prospective Novices—Conclusion

This is the concluding part of this two-part article. The first part covered licenses, bands, modes, power, international considerations, and interests. You are urged to read the entire article.

Callsigns

The FCC issues amateur radio station callsigns in a predetermined sequence. Specific types of callsigns are issued to four categories of licensees. As examples, the end of March 1984 FCC records show KB6ETH, N6KIV, KG6GE, and NZ6O as being the latest callsigns issued to California Novice, Technician/General, Advanced, and Extra class licensees. Callsigns are referred to by the number of letters in the prefix (preceding the numeral) and the number of letters in the suffix (following the numeral). KB6ETH is a two-by-three Novice callsign. N6KIV is a one-by-three Technician/General callsign. KG6GE is a two-by-two Advanced callsign. NZ6O is a two-by-one Extra callsign. One does not have to change callsigns when one upgrades to higher class licenses. Consequently, it is not safe to assume that someone using a two-by-three callsign (such as KA6EED) is a Novice. Most amateurs who are lucky enough to receive a good (unique) callsign do not change it as they upgrade. You are allowed to retain a callsign, and it is wise to retain a good one.

Changing callsigns does not invalidate QSL cards being saved toward operating awards. One just has to validate the fact that they held the additional callsign(s) when contacts were made.

Foreign (DX) and domestic (USA) callbooks are arranged in callsign sequences. These alphanumeric listings show the amateur's name and mailing address beside her/his callsign. American (and some DX) listings also show the class of license for each operator.

Many amateurs display their callsigns on automobile license plates, doormats, stationery, belt buckles, jackets, hats, tee shirts, and almost anything else.

Licensing

More than 1,000 American amateur radio clubs conduct amateur radio licensing courses on a regular basis. These courses are also conducted as part of evening school training in some areas. You should be able to locate a course in



This is 24-year-old Louis A. Cruz, KB4JGY, a Miami police officer. He obtained his Novice license in March 1984, and he is getting ready to upgrade. His station includes an ICOM 745 transceiver, a Daiwa automatic antenna tuner, and a Bencher electronic keyer paddle. Louis operates on 10 or 15 meters most of the time, but he prefers 10 meters because it is less crowded.

your vicinity, unless you live in an extremely remote area. A visit to a local amateur radio club or electronics store should allow you to meet someone who can direct you to a licensing course. Courses provide a simple and easy way to learn the material one must know to pass license examinations. Most courses include coverage of equipment and operating information that is essential to prospective amateurs. The single most important thing the newcomer can learn during a licensing course is the correct way to send code with a manual (hand) telegraph key. Those who teach themselves how to use a handkey usually send so poorly that they have to switch to voice operation after they upgrade.

If there is no course available in your area, you may be lucky enough to find a local amateur who will help you get ready to pass the Novice examination and get your initial station ready for use.

There are several license manuals and books you can use to learn the material you must know to pass the FCC written test. Tape cassettes are available to help you learn Morse Code and to increase code reception proficiency to the required five words per minute. If you have a communications receiver, you can use it to gain receiving proficiency by copying

routine code traffic and special on-the-air code practice transmissions.

The five major monthly amateur radio publications are *CQ*, *Ham Radio*, *QST*, *Worldradio*, and *73*. *Worldradio* is a newspaper, and the other four publications are magazines. These publications often contain technical and operating information of interest to amateurs. *CQ* magazine has long been a primary source of information for new amateurs, and it continues to cater to the needs of Novices, as is evidenced by the inclusion of this monthly column. Anyone who wants a free list of Novice columns grouped by subject matter is invited to request it from me; just be sure to enclose your self-addressed, stamped envelope (s.a.s.e.).

Examination

Novice examinations are conducted by volunteer examiners using written tests based on the FCC syllabus for element two. The test material is basic but comprehensive.

The code receiving test is conducted first in the test sequence. The applicant must prove her/his capability to copy the International Morse Code (English language alphabet code) at a rate of at least 5 words per minute, which is 25 letters

per minute. Only alphabet letters (A-Z) are included in the receiving test and the text must be forward-reading (sensible), plain language. The examiner can require the applicant to copy one minute of the five minute test to pass, or can require the applicant to answer correctly at least seven of ten questions based on the five minute code run.

The code sending test is administered by the volunteer examiner after (and if) the applicant has passed the receiving test. This test requires the applicant to use a manual (hand) key and to make a passing run at a speed of at least five words per minute. The sending test includes the letters (A-Z), numbers (1-0), punctuation marks (.,/?), and worksigns (AR, BT, K, SK). A passing run is at least one minute of errorless sending during a five minute test.

The code and written tests are conducted by the same volunteer examiner and in a continuous sequence. The entire test usually requires less than one hour to complete.

Equipment

Experienced amateurs can often obtain extraordinary results when using equipment that is in the junk category. New amateurs should not use poor equipment; they have enough trouble getting good complete contacts while using good equipment. It has been my experience that almost every new amateur who starts operating with junk equipment gets discouraged by poor results and quits amateur radio. Get the best equipment your financial situation will allow.

Transceivers are combined transmitters and receivers. State-of-the-art solid-state transceivers now being sold are much better than transceivers that were on the market just five to seven years ago. It is worth the difference in price to get a modern transceiver.

Transceivers provide several features which make them more popular than the separate receiver and transmitter. All interconnections between the power supply, receiver, and transmitter are wired into the transceiver. The complete antenna/changeover circuit is built into the transceiver, including receiver muting, sidetone oscillator activation (to enable you to hear your code sending while the receiver is muted), and other functions. Offset between receive and transmit modes is automatic and correct.

Separate receivers and transmitters have become rare on the amateur radio equipment market. When I built my first transceiver in 1951 the term transceiver was almost unknown among amateurs, and almost all amateurs used combinations of transmitters and receivers. Just ten years later, transceivers predominated. Most of the modern operators would have a difficult time trying to interconnect and operate a receiver and transmitter.

Building is fun, and I have built a lot of



Beverly Weaver, N6JDG, of Irvine, California, lived in Australia and traveled throughout the South Pacific before settling down in California. She credits her husband (N6VO) with helping her get started in amateur radio. She met him at a football game between Washington State University and UCLA. She is a WSU graduate, and he is a UCLA graduate who remains active in the UCLA sports program. Beverly is a former model and medical representative who now enjoys being a mother and housewife. She particularly enjoys working VK (Australian) amateurs. This couple is awaiting FO callsigns. They expect to operate from Tahiti during the fall of 1984.

amateur equipment. However, I do not advise new amateurs to build the equipment they intend to use in their initial station. Most newcomers do not have the test equipment and the knowledge that are needed to troubleshoot and align such equipment. Get excellent off-the-shelf equipment and use it to upgrade to at least the General class license. If you want to build equipment, do so after becoming a General. There is a lot to be said in favor of homebrewing (building your own) gear and/or building it from kits of known top quality. When you build your own rig, you have a better knowledge of how it functions, you are better able to repair it, and you are justifiably more proud of its on-the-air performance.

Some new amateurs keep initial station costs down by buying low-power (QRP) equipment. I am a QRP enthusiast,

and it is great fun to operate low power. If a Novice intends to operate QRP, she/he should plan to use it primarily on 15 (preferably) or 10 meters with a directive antenna (Yagi-Uda, usually) and a rotator. Novices operating QRP should also have a medium-power (30 to 100 watts) rig for primary use on the 80 and 40 meter bands. A previous Novice article covered Novice QRP operation in detail; it was printed in the May 1981 CQ magazine. Basically, I advise Novices against restricting themselves to low-power operation until after they have upgraded to General. One does not need the allowed 200 watts PEP output, but it is initially preferable to run 30 to 100 watts output as a Novice.

If you decide to start with used equipment, get the newest gear you can afford. The top suppliers permit one to return unwanted used equipment (within a short interval following its purchase), and the full purchase price is applied towards any other equipment. This is a satisfactory arrangement. I have found that a good place to select used equipment is out of a local amateur radio club bulletin (newsletter). It is highly unlikely that any amateur would knowingly sell a bad piece of equipment to another amateur whom she/he expects to see frequently at club events.

Antennas and Other Accessories

The single, most important item you can buy or build to ensure good operating results is a directive and rotatable antenna. The Yagi-Uda (commonly called Yagi) antenna is easy to assemble, requires minimum maintenance, and can provide greatly increased long-range communications capability over a dipole or vertical antenna. Quad and delta loop antennas are also excellent directive antennas, but they are not as popular as Yagi-Udas.

If you must use a dipole antenna on one or more of the bands, get it up as high as possible. The DX capability of a dipole increases significantly as it is raised. When a dipole is close to earth, the fire

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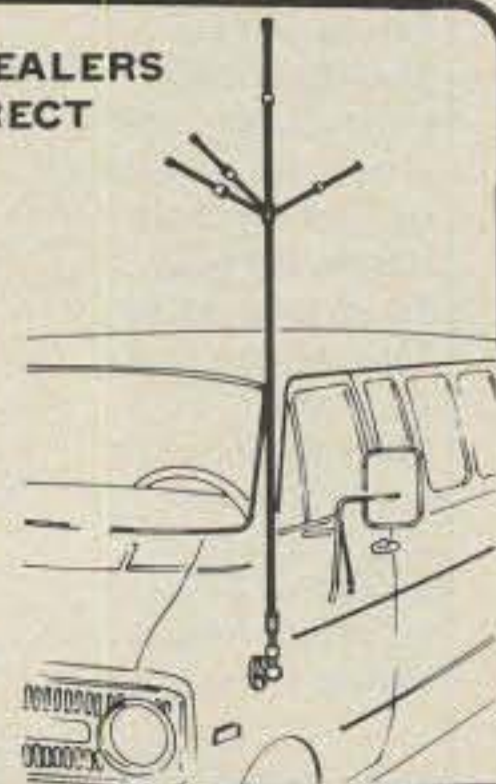
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(transmit/receive) angle is close to vertical, resulting in a very limited effective communications range. The dipole radiation characteristic becomes almost omnidirectional (nondirectional) close to ground. When a dipole is about 1/2 wavelength above ground, it becomes directional (broadside to the wire) and the fire angle drops to about 35 degrees, which provides increased communication range capability. If a dipole is erected 1 wavelength above ground, it develops a second (lower angle) lobe at about 15 degrees, which provides excellent long-range (DX) capability. At this height the fire angle of the top (short-distance communication) lobe becomes about 50 degrees. Simply stated, the same 80 or 40 meter dipole that is just good for 500 to 1,000 miles contacts when it is positioned close to the ground can provide worldwide contacts when it is erected at least 1 wavelength above ground.

The primary attraction of vertical antennas is that they require less horizontal space than any other antenna. The vertical provides reasonably good performance, and it is easy to install. A variation

of the vertical is the groundplane antenna, which provides superior DX capability, but requires much more horizontal mounting space.

The simplest antenna one can erect to provide some degree of operating capability on all four Novice bands is the random-wire antenna, which is often mistakenly referred to as a longwire antenna. An antenna tuner (unbalanced) and a voltage standing-wave ratio (v.s.w.r.) bridge are required to electrically (not physically) adjust the length of the random wire to make it resonant at any desired frequency.

Regardless of which antenna system you erect, the system's performance is related to the effectiveness of the radio-frequency ground system you establish for your station. Grounding is detailed in the September through November 1978 Novice columns. A good ground with a suitable antenna system makes station performance a real plus.

There are many station accessories in addition to antennas. Some of these are the antenna rotator, antenna tuner, electronic keyer, 4-digit 24-hour clock, headphones, operating desk/table, power me-

ter, QSL holder, remote v.f.o. (variable frequency oscillator), and s.w.r. bridge.

Costs

Compared to most of the other hobbies, amateur radio is a relatively inexpensive avocation. The initial licensing involves a few books, code practice material, and a possible donation to help pay course costs. The major expenditure is related to purchasing the equipment and accessories needed to install the initial station. A suitable supply (1,000 or more) of QSL cards is a sizeable beginning expense. Most amateurs subscribe to a couple of monthly publications, and many join local radio clubs and the American Radio Relay League. There are local, national, and international conventions. Station furniture and power bills must also be considered, plus postage costs related to mailing QSL cards and applying for operating certificates.

Conclusion

If you know someone who has expressed an interest in becoming an amateur, you are urged to give her/him an opportunity to read this article. It may contain nothing that you did not already know, but it does provide a lot of introductory information that is useful to prospective amateurs. I know from experience that prospective amateurs have very few simple explanations of amateur radio available to them. Previous Novice columns in CQ contain information that can be used by Novices to improve their station and operating procedures. This month's column is unique because it is not written for the benefit of licensed Novices; it is intended to introduce prospective Novices to the Novice license and the opportunities associated with being a Novice.

73, Bill, W6DDB


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Photographs Wanted

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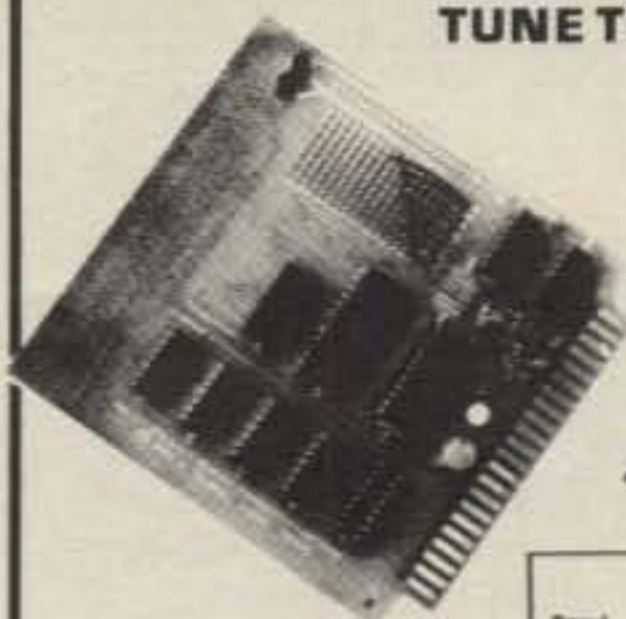
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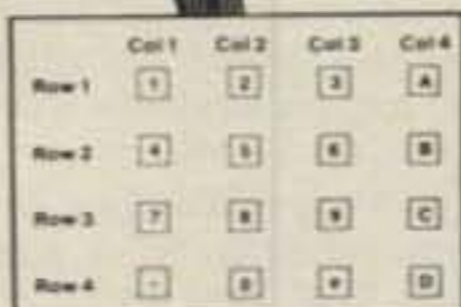
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Amateur Licensing

This column lists the current requirements for obtaining the various Federal Communications Commission (FCC) amateur radio operator licenses. For the absolute latest information, please contact the nearest FCC office or else telephone Dick Bash, KL7IHP at (415) 278-8275.

NOVICE CLASS This is the typical beginning license. The applicant must pass a 5 word per minute (w.p.m.) International Morse Code test and then pass a 20 question written test on basic theory and rules from a properly licensed examiner. The examiner must be an amateur radio operator who holds a General, Advanced, or Extra Class license and meets the requirements specified in 97.31 of the FCC Rules. The examiner will grade the exam on the spot and, if the applicant passes, will complete and forward the applicant's FCC Form 610 to the FCC in Gettysburg, PA. The FCC will then mail the applicant his/her Novice license in about a month. The Novice licensee can only transmit in Morse code on the designated HF Novice Class bands. Legal details are in 97.27 through 97.33 of the FCC's Rules & Regulations. Anyone interested in the Novice Class or in examining a Novice applicant should read these rules.

TECHNICIAN CLASS This license gives the holder Novice Class privileges on the HF bands and full amateur privileges above 30 megahertz (MHz). The exam for the Technician consists of a 70 question written test and a 5 w.p.m. code test unless the applicant has already passed a Novice exam, in which case he/she doesn't have to retake the code test or the 20 Novice Class written questions. The "Tech" license gives you voice, television (fast- or slow-scan), radioteletype (RTTY), and facsimile privileges. It even lets you communicate via the amateur satellites that orbit the Earth!

GENERAL CLASS The General ticket gives you full amateur privileges above 30 MHz (just like the Tech ticket) but also gives you voice, RTTY, slow-scan television (SSTV), and facsimile privileges on the HF bands. You are also given additional frequencies for code. To get a General Class ticket, you must pass a 13 w.p.m. code test and the 70 question written exam mentioned in the previous discussion about the Tech license.

ADVANCED CLASS This license gives you additional HF privileges for voice, etc. If you presently hold a General Class license, you need only to take and pass an additional 50 question written exam.

EXTRA CLASS This is the highest level of license that the FCC currently has for amateur radio operators. This gives you all possible privileges and (if you presently hold an Advanced Class license) requires that you first pass a 20 w.p.m. code test and then pass a 40 question written test. All of the above licenses are valid for 10 years and are renewable.

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NEWS/VIEWS OF ON-THE-AIR COMPETITION

Rules for this year's World-Wide DX Contest, October 27-28 Phone and November 24-25 C.W., will be found in this issue. Be sure to read them, as there have been several changes, including several deletions in the Trophy list. The vacancies, however, have been more than filled by new donors. It is advisable that you give the new list more than a passing glance. Also, as announced last month, there has been the addition of a new category, Team Contesting (similar to that used in the North American Sprint contest). The idea was formulated at the Dayton Hamvention by members of the World-Wide Contest Committee. This category has been included in this year's competition on a trial basis. It will be continued or dropped next year depending on how it is received by this year's participants. *(Personally, I think this category is more suited for inter-club competition than world-wide participation. Your comments and opinions are solicited.)*

Many other changes in the dates, rules, and format of this contest have been proposed, mostly quoting the disadvantages in the scoring when operating from certain areas. This is a world-wide competition, and any changes should be made for the benefit of all areas, not for the benefit of a small minority.

Please note that this year all logs must be sent directly to the CQ office address, not to the individual Contest Directors. Larry Brockman, N6AR, has moved to Florida, and Bob Cox, K3EST, is anticipating a move in the not too distant future.

There will also be a change in the WPX Contest QTH. Steve Bolla, N8BJQ, is also being transferred, so until further notice, anything pertaining to the WPX Contest should also be sent to the CQ office.

Announcement of the New Mexico QSO Party, August 18-19, was received much too late to include it in last month's calendar. Rules were the same as in last year's party. If you participated, send your log to New Mexico QSO Party, P.O. Box 997, Corrales, NM 87048.

Also much too late to give it full coverage was an announcement from the ARI Radio Club of Frattamaggiore commemorating the third centennial of a local music composer, Francesco Durante (1684-1755). This activity runs from July 1st to December 31st, so there is still time to participate. The participation will be on all five bands, 3.5 through 28 MHz, on s.s.b., c.w., and RTTY.

Winners will be judged on (1) DXCC

Calendar of Events

- * Sep. 1 DARC "Corona" 10 M. RTTY
- * Sep. 2 Bulgarian C.W. Contest
- * Sep. 5-6 YLRL "Howdy Days"
- * Sep. 8-9 DARC European SSB Contest
- Sep. 8-10 Four Land QSO Party
- Sep. 15-16 Ohio QSO Party
- Sep. 15-16 SAC C.W. Contest
- Sep. 15-16 CRRL Can-Am Phone Contest
- Sep. 15-17 Kansas State QSO Party
- Sep. 15-17 Washington State QSO Party
- Sep. 16 NA CW "Sprint"
- Sep. 21-23 Maine QSO Party
- Sep. 22-23 SAC S.S.B. Contest
- Sep. 22-23 CRRL Can-Am C.W. Contest
- Sep. 29-30 Delta QSO Party
- Oct. 6-7 GARTG SSTV Contest
- Oct. 6-7 VK/ZL/Oceania Phone Contest
- Oct. 13 GARTG RTTY Contest
- Oct. 13-14 VK/ZL/Oceania CW Contest
- Oct. 13-14 Columbus Day Contest
- Oct. 13-14 ARCI QRP Contest
- Oct. 13-14 Pennsylvania QSO Party
- Oct. 13-15 Rhode Island QSO Party
- Oct. 20-21 CLARA AC/DC Contest
- Oct. 21 Red River DXA "Sprint"
- Oct. 27-28 **CQ WW DX Phone Contest**
- Oct. 31 - Nov. 1 YLRL Anniv. Phone Party
- Nov. 10-11 DARC European RTTY
- Nov. 17-18 QRP Club QSO Party
- Nov. 24-25 **CQ WW DX C.W. Contest**

*Covered last month.

countries worked, (2) at least 10 club members contacted, (3) contacts forming the name "Francesco Durante" using the initial letter of prefixes of different countries worked. (You had better write to the ARI Club for more details.)

Awards sound very impressive: cup, plaque, and medals. A fee of 10 IRCs is requested.

Address all inquiries and logs to: ARI Radio Club, P.O. Box 15, 80027 Frattamaggiore (Napoli), Italy.

The fact that we did receive the above information indicates that they are readers of CQ, so there is no excuse for not sending it in in time.

Deadline for events in December is September 15th and October 15th for the January issue. Sending it to my home address is also to your advantage.

73 for this time, Frank, W1WY

Four Land QSO Party

1800Z Sat. to 0600Z Sun., Sept. 8-9
1300Z Sun. to 0100Z Mon., Sept. 9-10

The Brightleaf ARC is sponsoring this year's party as a memorial to Bob Knapp, W4OMW, who became a Silent Key on June 19th. This is the 14th annual QSO party, and Bob was the driving force be-

hind this popular activity, making the many countries in the eight 4th district states available to county hunters. He will be sorely missed.

The same station may be worked on each band and mode, and again if operating portable or mobile from each county change. Stations in the 4th district may work each other for QSO and multiplier credit.

Exchange: RS(T) and QTH. County and state for 4th district stations; state, VE province, or country for others.

Scoring: 4th call area—One point per QSO. Multiply total QSO points by the number of states, provinces, and DX countries worked.

All others—Two points for each 4th area station worked, times the 4th area states and counties worked (states and counties counted once only). Contacts with club station W4AMC are worth 5 QSO points.

Frequencies: C.W.—3575, 7055, 14070, 21070, 28090. S.S.B.—3940, 7260, 14290, 21360, 28600. Novice—3710, 7110, 21110, 28110.

Awards: Certificates to the top scorers in each state, VE province, and DX country; 2nd and 3rd place awards where warranted. Also county awards to 4th district states, and awards to Novices.

Mail logs within 30 days to the Brightleaf ARC, Att: Mary Knapp, W4UTO, 105 Dupont Circle, Greenville, NC 27834. Include a large s.a.s.e. for copy of the results.

Ohio QSO Party

1400Z Sat. to 0500Z Sun., Sept. 15-16
1300Z to 1900Z Sun., Sept. 16

This year's party is again being sponsored by the Cuyahoga Falls ARC. The same station may be worked on each band and each mode, but limited to 12 hours of operation.

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

Scoring: Two points for each QSO. Contacts with club members are worth 5 points. Work club station W8VPV and earn 25 points (club members will identify themselves).

Multiplier: For Ohio stations: states, provinces, and DX countries. Others use Ohio counties for their multiplier (maximum of 88).

There is also a power bonus. Stations using less than 5 watts output multiply their score by 3, from 5 to 200 watts by 1.5, and over 200 watts no bonus.

Frequencies: C.W.—1805 and 30 kHz

14 Sherwood Road, Stamford, CT 06905

up from low edge of band. S.S.B.—1890, 3900, 7230, 14230, 21360, 28510. Novice—3715, 7115, 21115, 28115. W8VPV will be found near these frequencies.

Awards: Plaques to the top-scoring Ohio and out-of-state station. Certificates to the winners in each Ohio county, state, province, and DX country.

Dupe sheets are required for stations making 200 or more contacts. A summary sheet showing the scoring, etc., and the usual signed declaration are also requested. Include a large s.a.s.e. for a copy of the results.

Mailing deadline is October 1st to: Anthony Luscre, KA8NRC, 4380 N. Norman Dr., Stow, OH 44224.

Kansas State QSO Party

0100Z to 0700Z Sat., Sept. 15
1300Z Sat. to 0700 Sun., Sept. 15-16
1300Z Sun. to 0100Z Mon., Sept. 16-17

This is the third annual party sponsored by the Boeing Employees' ARS of Wichita, Kansas. The same station may be worked on each band and each mode, and Kansas may work in-state stations for QSO and multiplier credit.

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

Scoring: Two points for phone QSOs, three points if on c.w. Kansas stations multiply total QSO points by the sum of different states, VE provinces, and DX countries worked.

Others will use sum of different Kansas counties worked for their multiplier (counted once only, maximum of 105). There is also a bonus multiplier of one for each group of 8 QSOs with the same Kansas county.

Frequencies: C.W.—1805, 3560, 7060, 14060, 21060, 28160. S.S.B.—1815, 3925, 7260, 14280, 21380, 28580. Novice—3725, 7125, 21150, 28160.

Awards: Certificates to the top-scoring station, both single and multi-operator, in each state, VE province, DX country, and Kansas county. Work five club members and you will be eligible for the worked five Kansas Bears Award.

Include a summary sheet and a dupe sheet if your log shows more than 200 contacts. The usual signed declaration is also required. Logs and summary sheets are available; include a large s.a.s.e. with your request to the address below.

Postmark for all entries is October 22nd to: Boeing Employees' ARS, c/o Mike Thornton, WA0TAH, 1645 Lexington, Wichita, KS 67218.

Wash. State QSO Party

0100Z to 0700Z Sat., Sept. 15
1300Z to 0700Z Sat./Sun., Sept. 15-16
1300Z to 0100Z Sun./Mon., Sept. 16-17

This is the 19th annual party sponsored by the Boeing Employees ARS

(BEARS). The same station may be worked on each band and mode for QSO and multiplier credit. Wash. stations may work other in-state stations for QSO points.

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

Scoring: Phone contacts are worth 2 points, c.w. contacts 3 points.

Wash. stations multiply total QSO points by number of states, VE provinces, and DX countries worked. Others use Wash. counties for their multiplier (maximum of 39). There is an additional multiplier of one (1) for each group of 8 contacts with the same Wash. county for non-Wash. stations.

Frequencies: C.W.—1805, 3560, 7060, 14060, 21060, 28160. Phone—1815, 3925, 7260, 14280, 21380, 28580. Novice—3725, 7125, 21150, 28160.

Awards: Certificates to the top scorers, both single and multi-operator, in each state, VE province, DX country, and Wash. county. Additional awards where warranted.

The Worked Five Bears Award is available to anyone working 5 club members before, during, or after the party. The Worked Three Cubs Award is available for working 3 Novice club members.

Include a check sheet with your entry if you made 200 or more contacts. Results will be mailed to all entrants, no s.a.s.e. required.

Mailing deadline is October 17th to: Boeing Employees ARS, Contest Committee, Att: Willes D. Propst, K7RS, 18415 38th Ave. S., Seattle, WA 98188.

(You will note that the format of the Kansas and Washington QSO parties is almost identical. Combining the two into one party with a separate address for each one would be a sensible arrangement.—ed.)

Scandinavian Activity Contest

C.W.: Sept. 15-16 Phone: Sept. 22-23
1500Z Saturday to 1800Z Sunday

It's the world working the Scandinavians in this the 26th SAC. The same station may be worked on each band for QSO and multiplier credit.

The prefixes used in Scandinavia are: LA, LB, LG, LJ (Norway); JW (Svalbard & Bear Is.); JX (Jan Mayen); OF, OG, OH, OI (Finland); OH0 (Aland Is.); OJ0 (Market Reef); OX (Greenland); OY (Faroe Is.); OZ (Denmark); SJ, SK, SL, SM (Sweden); TF (Iceland).

Bands: 3.5, 7, 14, 21, 28 MHz according to IARU band plans; 3560/3600, 3650/3700, 14060/14125, and 14300/14350 kHz should be kept free of contest activity.

Classes: Single operator and multi-operator single transmitter, all band only. Multi-operator must remain on the same band for at least 10 minutes. Also QRP

single operator (maximum of 10 watts output) and s.w.l. (only SAC stations may be logged).

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

Points: European stations score 1 point for each SAC contact. Non-Europeans score 1 point on 14, 21, and 28 MHz, and 3 points on 3.5 and 7 MHz.

Multiplier: Each call area in the above list of SAC countries worked on each band (call areas, not prefixes).

Final Score: The sum of QSO points from all bands times the sum of the multiplier from each band. Scoring for s.w.l.'s same as above.

Awards: Certificates to the winning station in each class, both c.w. and phone, in each country and each U.S.A. call area. QRP stations will be listed in one common list. The non-SAC s.w.l. winner will be awarded. Plaques to the top-scoring station in each continent.

The usual disqualification criteria will be observed. Include a summary sheet and a dupe sheet for logs with more than 200 QSOs, and a signed declaration. Mailing deadline is October 30th to SSA Contest Mgr. Gorgan Granberg, SM6EWB, Rosengatan 76, S-43400 Kungsbacka, Sweden.

CRRL CAN-AM Contest

Phone: Sept. 15-16 C.W.: Sept. 22-23
1800Z Saturday to 1800Z Sunday

This year's CAN-AM Contest is sponsored by the Ontario Contest Club and the Canadian Radio Relay League to increase friendship between American and Canadian amateurs. Use all 6 bands between 1.8 and 28 MHz in the U.S. General portion of each band.

Categories: Single operator, all band, single band, and QRP. And multi-operator, single transmitter.

Single operator stations are limited to 20 hours with one or two rest periods. Multi-operator stations can operate the full 24 hours.

Exchange: RS(T) plus a QSO number starting with 001, and state or province abbreviation (use CN for Caribbean and PC for Pacific U.S. possessions).

Points: U.S. to U.S. and VE to VE QSOs 2 points. U.S. to VE QSOs 3 points.

Multiplier: 50 U.S. states, 2 U.S. possessions (CN & PC), 10 VE provinces, 2 VE territories (NWT & YU), 1 VE island (Sable & St. Paul). Total of 65 per band.

Final Score: Total QSO points times the sum of the multiplier from each band. (Phone and c.w. are separate contests. However, combined score from phone and c.w. will be used for overall competition.)

Awards: Certificates to the winners in each multiplier area on each mode in the single operator category, and to the top five multi stations in each country for combined phone/c.w. scores. There are four trophies for the U.S. and Canadian

1983 All Asian CW Contest Results

North America					
U.S.A.					
*W7QID	1.9	18	*WA2LWT	"	49
*N6RO	3.5	12,300	*N6QR	AB	265,860
*W7DRA	"	50	*N16W	"	208,356
*W6OWQ	7	26,840	*K6XT	"	192,444
WA6VNR	"	16,952	*KB7G	"	132,966
*W7AM	"	12,420	W6BIP	"	63,720
WA7UEC	"	11,568	W6OKK	"	61,835
*K1XM	"	1,479	KE6PQ	"	39,180
KT7G	"	702	*W3GM	"	39,444
*W6SZN	14	25,146	*W1RM	"	38,772
*K1KI	"	10,746	*N5JB	"	34,882
*N4MM	"	8,160	*W8UVZ	"	27,438
*K0UG	"	5,600	*W3VT/4	"	12,432
K7TTZ	"	4,251	KY6L	"	10,797
*WB9MSV	"	4,070	*K9BG	"	10,168
*K3TW	"	3,500	K6CSL	"	5,445
W1END	"	1,920	W3ARK	"	5,406
*W8EX	"	1,647	N6JM	"	5,406
KV9S	"	1,638	*K0OST	"	3,075
WA4MIY	"	1,430	KX7J	"	2,387
*WA0TKJ	"	1,250	W4BV	"	2,065
AA1M	"	576	W4KO	"	1,581
*W5TVX	"	256	N4BU	"	1,100
KA1CBD	"	136	W1APU	"	884
KE6VY	"	132	*KA2BBZ	"	782
W5EIJ	"	49	W4YN	"	336
*K4RZ	21	6,478	W5NR	"	316
*K6OMB	"	4,864	W1OPJ	"	154
*K5BDX	"	3,638	KQ1F	"	84
K6CL	"	984	*W0RSG	M-op	117,920
*N0CKC	"	374	*KW2J	"	888

Canada		Dom. Rep.			
*VE1BNN	14	2,205	*HI8LC	AB	775
VE7IQ	"	672			
VO1CA	"	285	Panama		
*VX1AW	AB	4,048	*HP1AC	AB	5,310

Alaska		Greenland			
*KL7AN	14	456	*OX3OA	AB	6,912

*Certificate winners.

combined scores to the single and multi-operator champions.

QRP is limited to a maximum of 10 watts input.

The usual disqualification rules will be observed. It is suggested you send for official rules, sample log forms, check sheets, and summary sheets. Include a large s.a.s.e. (do not glue U.S. stamps to envelope).

Mailing deadline is 30 days from end of the contest to CRRL CAN-AM Contest, Att: VE3BMV, P.O. Box 65, Don Mills, Ont., Canada M3C 2R6.

North American "Sprint"

C.W.: Sept. 16 S.S.B.: Sept. 23
Sunday 0000Z to 0395Z (Sat. night)

This is the fall edition of the "Sprint" run by the National Contest Journal. Take note that the starting time has been advanced to an hour earlier, but it remains as a 4 hour "Sprint."

North Americans will be contacting other North American stations as well as stations in other countries, single operator only.

Exchange: Call, QSO no., name, and QTH (state, VE province, or country).

Scoring: Multiply total QSOs by the sum of states, VE provinces, and other North

American countries worked for your final score (U.S. and VE not countries; KH6 not a state). There are 8 VE provinces, Maritime and VE2 through VE8.

Frequencies: Three bands only, 3530-3550, 7030-7050, 14030-14050 kHz on c.w., and 3870-3910, 7210-7240, 14260-14290 kHz on s.s.b.

Awards: A trophy to the highest scoring station on each mode. Certificates to the top station in each USA call district, Canada, and other countries. The top 10 scorers, the winning team, and each member of the winning team will also be rewarded.

Team competition is limited to a maximum of 10 operators as a single unit. Pre-contest registration is required for each team at least 24 hours before the start of the "Sprint." W6OAT is the coordinator.

There are other detailed rules, a special QSY rule, etc. I suggest you write to W6OAT or K7GM if you do not have a copy of the National Contest Journal. Entries must be received no later than 30 days after the end of each "Sprint." The c.w. go to: Rusty Epps, W6OAT, 948-H Kiely Blvd., Santa Clara, CA 95051, and the s.s.b. to: Rick Niswander, K7GM, 1914 W. Cortez Circle, Chandler, AZ 85224.

Maine QSO Party

2300Z Fri. to 2259Z Sun., Sept. 21-23

The Portland A.W.A. is again running their QSO party on a busy September weekend. The organizers said they didn't mind it being on a busy weekend, and that they would profit from the activity created by other contests. (*I wonder how it worked out last year—ed.*)

The same station may be worked on c.w., phone, and RTTY on each band. ME stations may contact other ME stations for QSO credit.

Exchange: RS(T), QSO serial number, and QTH. County for Maine; state, VE province, or country for others.

Scoring: Count 1 point for phone contacts, 3 points if on c.w., and 5 points on RTTY. ME stations multiply total by (ME counties + states + provinces + DX countries) worked for their final score.

All others use Maine counties for their multiplier (maximum of 16).

Frequencies: C.W.—1810, and 60 kHz up from low edge on other bands. Phone—1870, 3930, 7280, 14280, 21380, 28580. RTTY—3610, and 90 kHz up on other bands. Novice—3720, 7120, 21120, and 28120.

Awards: Certificates to the top-scoring stations and a trophy to the highest aggregate ME club score (ME stations indicate club affiliation in their logs).

Applications for the Worked All Maine Counties award may also be sent to the address below. Mailing deadline for logs is December 1st to Portland A.W.A., P.O. Box 1605, Portland, ME 04104.

Delta QSO Party

1800Z Sat. to 2400Z Sun., Sept. 29-30
(Rest period 0600Z to 1200Z Sun.)

This is the 15th annual QSO party sponsored by the Delta Div. of the ARRL. Delta stations (Ark., La., Miss., Tenn.) may contact stations both inside and outside their boundaries. Others, only Delta stations. The same station may be worked on each band and each mode, portable and mobiles in each county change.

Exchange: QSO no., RS(T), and QTH. County and state for Delta stations. ARRL section for others.

Scoring: For Delta—Total number of QSO's multiplied by the ARRL sections worked (maximum of 74).

Outside Delta—Total QSO's multiplied by the Delta counties worked (maximum of 316). DX stations may be worked, but for QSO points only.

Frequencies: C.W.—65 kHz up from low end of each band. S.S.B.—3990, 7290, 14290, 21390, 28590. Novice—3725, 7125, 21125, 28125.

Certificate Awards:
A. Achievement: To all stations contacting 5 or more stations in each of the 4 Delta states.

B. Delta: To the 3 highest scoring stations in each of the 4 Delta states; 4th and 5th place awards if warranted.

C. Others: To the highest scoring station in each ARRL section and country; 2nd and 3rd place awards if warranted.

D. Plaques: To the top scorers in and outside the Delta division. Top portable and mobile Delta stations. Highest scoring Delta Club station.

Mailing deadline for logs is October 21st to Butch Magee, KA5MLT, 2120 Belvedere Drive, Jackson, MS 39204.

1983 SAC Contest Results

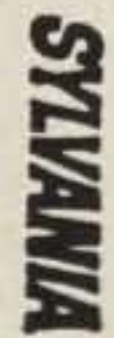
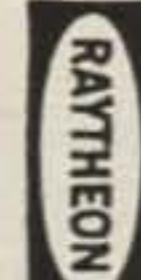
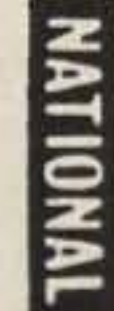
U.S.A. and Canada

C.W.	Phone		
*KA1CLV	1,188	*AG1C	6,150
W1CNU	629	*KA2PHQ	345
W1OPJ	294	*W3GM	5,088
*W2CVW	405	N3GB	4,646
*W3GM	22,862	WA3DMH	589
N3GB	467	*N4MM	8,664
*N4MM	4,056	W4WIJ	1,938
W4KO	874	K4HGG	1,650
*K5BDX	2,370	N4UW	1,440
N5BA	1,176	*W6EUF	1,081
*K6DDO	3,234	AA6EE	56
AA6EE	152	*K7NW	1,265
*K7NW	1,092	W7PQE	595
*K8MFO	8,250	W7TSQ	160
*K9PQG	1,609	*N8II	5,096
*AJ0N	612	K8MFO	4,515
K0HQE	66	W8VEN	80
		*W9SS	4,180
		KA9PDS	77
Multi-Opr.			
*W0RSG	2,015	*AJ0N	2,040
		*KH6IJ	56
*VE6CHW	1,850		
VE3KPH	384	*VE3GCO	2,208
VE3GCO	30	VE6CHW	1,104
		VE8XO	280

*Certificate Winners

W3GM on C.W. and N4MM on Phone were continental plaque winners.

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5AR4	6.24
5C22	165.00
5R4GB	3.85
6AK5	4.91
6AL5	3.86
6AQ5	3.77
6CA7	7.41
6DJ8	2.75
6JG6A	7.53
6JS6C	8.00
6KD6	8.85
6KV6A	6.92
6L6GC	6.93
6LF6	8.85
6LQ6	8.85
6MJ6	8.99
12AT7	3.87
12AU7	3.47
12AX7A	3.48
572B/T160L	49.50
705A	10.00
811A	13.50
813	40.00
829B	40.00
832A	38.00
833A	145.00
866A	9.50
872A	24.00
M-2057	15.00
5670	4.40
5684	33.00
5687	4.00
5751	4.00
5814A	3.70
5879	5.75
5894	65.00
6005	5.25
6146B	8.75
6360	6.50
6528A	75.00
6550A	7.50
6883B	10.00
7360	12.25
7558	7.00
7591A	6.20
7868	6.68
8072	95.00
8417	8.99
8874	210.00
8875	220.00
8877/3CX1500A7	475.00
8908	12.95
8950	11.50
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MRF-454/A	19.95
MRF-455/A	19.95
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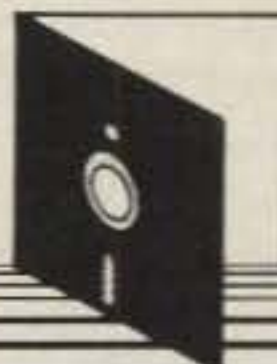
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CIRCLE 15 ON READER SERVICE CARD

THE INS AND OUTS OF THE WASHINGTON SCENE

Commission Denies ARRL Petition on Cable TV Use of Amateur Frequencies

In its meeting of June 1984, and in the matter of RM-4040, the Commission *denied* the ARRL's petition to require that CATV operators vacate channels E (144-150 MHz) and K (222-228 MHz). These channels fall in two portions of the spectrum where operators in the Amateur service have experienced interference from leaky CATV distribution systems. In taking this action, however, the Commission reminded CATV operators that they may not radiate signals in any band, since CATV systems, by definition, are "closed" systems.

The FCC's action on RM-4040 stems, in part, from the belief that CATVI is not sufficiently widespread as to require CATV operators to vacate certain channels. With particular reference to CATVI to amateur operations, for example, the Field Operations Bureau (FOB) received only 105 complaints in fiscal year (FY) 83. Further, Richard Smith, Chief, FOB, projects that his bureau will only receive 104 such complaints in all of FY84. Similarly, alleged complaints of amateur interference to CATV operations totaled 34 in FY83, with only 28 cases projected for FY84.

Denial of the ARRL's petition is also linked by some Washington insiders to concern that approval of the League's request would open the Commission to other petitions for exclusive use of certain frequency bands.

The FCC remains optimistic that interference problems between the CATV and amateur communities can be handled through cooperative actions on the part of both groups. However, it recognizes that accelerated growth in the CATV industry requires the Commission to step up its enforcement activities in this area. Thus, says Smith, the FOB intends to double its efforts to monitor CATV signal leakage in FY85 as compared to its FY84 level of effort.

Amateurs experiencing interference with CATV systems are urged to file reports with the League and the FCC: American Radio League, Attn: CATVI Desk, 225 Main Street, Newington, CT 06111;

and Federal Communications Commission, Attn: Field Operations Bureau, 1919 M St., NW, Washington, DC 20554.

Group W Cable System Offers Students Program of "Vocabulary Enrichment"

While most of the attention given to cases of alleged cable television interference (CATVI) involve amateur 2 meter operations as the "victim," a new twist in CATVI was recently uncovered in the Pasco County (FL) School District. According to reports in both the *Pasco Times* and the *St. Petersburg Times*, Group W cable offerings on its Cinemax channel have been found to blare forth from the two-way radios in the county's school buses. In some cases, says reporter Nancy Wacławek of the *Pasco Times* staff, the students have been treated to the sound tracks of uncensored movies, giving the kids more of an education than their parents bargained for!

The Group W offerings can be heard in 20 to 30 locations around the New Port Richey area, and the district's transportation director, Mike Park, wants Group W to put an end to the problem. David Dea, general manager of Group W in St. Petersburg, was quoted by Wacławek as indicating that "loose connections on the company's cable lines... allow the signal to escape." Group W engineers are now looking into the problem, and Dea promised that a solution would be found.

UoSAT OSCAR 11 Comes Alive

As reported earlier in this column, amateurs worldwide were concerned earlier this year when UO-11 failed to respond to commands from the Surrey (England) control station. The problem was thought to be caused by a cold 2 meter beacon oscillator that produced noise in all three of the command receivers.

Word has now reached us that the spacecraft has responded to a 70 cm command for Surrey, and that the 2 meter beacon (145.825 MHz) is turned 'on.' According to *Amateur Satellite Report* (ASR), AMSAT's newsletter for the amateur space program, the response from UO-11 was the first in 10 weeks, with ini-

tial telemetry showing the bird to be in good health! At this time Surrey plans to keep the 2 meter beacon 'on' while various command options are studied and exercised.

In this regard, recent command difficulties suggest that the satellite's failure may have resulted from a possible temperature-related problem in the command decoder rather than in the 2 meter beacon oscillator. ASR notes that commanding UO-11 is considerably more difficult and intermittent than it should be.

ARRL and AMSAT Propose Additional Amateur Operations From Shuttle Craft

According to *The ARRL Letter*, the League and AMSAT have jointly proposed that Tony England, W0ORE, be permitted to operate an amateur station aboard a shuttle flight scheduled for March 1985. In a letter to NASA Public Affairs Director Frank Johnson, Jr., League President Larry Price, W4RA, and AMSAT President Tom Clark, W3IWI, stressed the value of bringing our youth into direct contact with both the space program and amateur radio, and indicated that the emphasis would be on having England communicate with school club stations.

The proposal for the March '85 mission would have England use 2 meter equipment identical to that used by W5LFL in his history-making operation aboard STS-9. In addition, the letter suggested the use of a 10 meter downlink for carrying received 2 meter audio and SSTV pictures generated within the spacecraft.

Commission To No Longer Provide Examinations After November 1984

Amateurs and would-be amateurs are again reminded that following the Commission-administered exams in November 1984, the FCC will no longer provide examinations for the Morse code or any of the exam elements used in amateur licensing exams. Following the exams to be given in the period November 5-9, those seeking to upgrade their amateur privileges, or to obtain their first amateur license, will have to take their exams from a volunteer who is serving under the

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newly established Volunteer Examination Program.

If you wish to take advantage of the FCC's remaining licensing opportunities, contact your nearest field office of the Field Operations Bureau in Washington, DC, for details.

Revocations Continue For Variety of Reasons

The Commission continues to take action against amateurs who violate its Rules, the latest two cases involving intentional interference and exam cheating.

In a case involving interference to amateur 2 meter operations, the Commission revoked the station license of Randy Ballinger, WB6MMJ, and suspended his General class amateur radio operator license for one year (the remainder of the term). These actions were taken by Acting Chief Administrative Law Judge Thomas B. Fitzpatrick as a result of finding that Ballinger had failed to properly identify his transmission by his FCC-assigned call sign (Sec. 97.84 (a)); had transmitted unidentified radio communications (Sec. 97.123); and had willfully and maliciously interfered with communications in progress (Sec. 97.125). All of the violations took place from Ballinger's residence in La Crescenta, California. Evidence in the case was collected by James M. Lafontaine, an Electronics Engineer at the FCC's Long Beach, CA office.

In another case brought before Fitzpatrick, the Commission cited Vincent J. Beard, N2EDW, of White Plains, NY, with having unauthorized material in his possession during his examination for a General class operator license. The evidence cited by the FCC substantiated the charge, and as a result, the Administrative Law Judge revoked Beard's station license and suspended for term his Technical class amateur radio operator license. Additionally, Beard's application

for a General class operator license was denied. Credit for uncovering the material in Beard's hands goes to Applications Examiner Debra Thomas of the FCC's New York office.

AFCEA Luncheon Again A Success!

The Amateur Radio Luncheon held as part of the Armed Forces Communications and Electronics Association (AFCEA) 38th Annual Convention in Washington, DC again welcomed amateurs from all over the U.S., as well as from France and Italy. Attended by 140 amateurs and their friends, the luncheon saw people from government, industry, and the military enjoy a superb hot dinner, timely comments from many who are deeply involved in various aspects of the Amateur service, and a drawing for an outstanding array of door prizes.

Included in those who commented on the current and future status of amateur radio were Alan Dorhoffer, K2EEK (Editor, CQ), Robert Foosner (Chief, Private Radio Bureau); James McKinney (Chief, Mass Media Bureau); Dr. Robert Powers (Chief Scientist, FCC); Richard Smith (Chief, Field Operations Bureau); Dave Siddall, K3ZJ (Attorney, Library of Congress, and President, Capitol Hill Amateur Radio Society); and Dave Sumner, K1ZZ (General Manager, ARRL, and Editor, QST). Included in the comments were references to cable television interference (CATVI), the no-code license docket and current strength of the Amateur service, amplitude-compandered sideband, packet switching, and recent enforcement activities on the part of the FOB.

Prior to the drawing for prizes, Stu Meyer (W2GHK/Forever) presented \$1500 from the Quarter Century Wireless Association to the Foundation for Amateur Radio, and \$500 from the Radio Club of America to both Capital Tech, College of Engineering Technology and the Foundation for

Amateur Radio. The funds are intended to assist the recipients in furthering their educational scholarship programs.

Door prizes, which included an ICOM handheld transceiver, a Panasonic short-wave receiver, and two EIMAC high-power tubes and sockets, were contributed by the following merchants, corporations, and organizations: CQ magazine, ICOM America, the American Radio Relay League, The Electronic Equipment Bank (Vienna, VA), Varian/ EIMAC Division, and Operations Research, Inc. (ORI).

Finally, your Editor takes this opportunity to thank Col. "Bud" Deem and his AFCEA convention staff for making the arrangements for this year's Amateur Radio Luncheon, and Mary Ellen Stoner of The Electronic Equipment Bank for helping with the luncheon events.

Satellite Television Viewing Acts Introduced Into 98th Congress

Two bills have been introduced into the U.S. Congress which, if passed into law, could have a profound effect on the satellite earth station industry. The bills are:

S. 2437, the "Satellite Viewing Rights Act of 1984, introduced by Senator Barry M. Goldwater (R-AZ);

and H.R. 5176, the "Satellite Television Viewing Rights Act of 1984," introduced by Congressman Albert Gore, Jr. (D-TN), Congressman W. J. "Billy" Tauzin (D-LA), and Congressman Charles Rose (D-NC).

According to the Satellite Television Industry Association (SPACE), the Goldwater bill "reaffirms the right of all home satellite earth station owners to receive and view for private noncommercial purposes unscrambled satellite television signals." The bill further permits the manufacture and distribution of equipment to receive these signals. However, the

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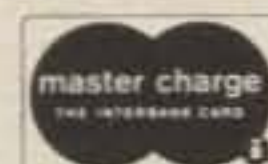
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distribution of use of unauthorized "black boxes" designed to unscramble satellite television signals is prohibited.

The Gore legislation contains much the same provisions, and in general, is designed to foster the availability of television programming transmitted by satellite.

The need for legislation such as that proposed by Messrs. Goldwater and Gore stems from the fact that the Communications Act of 1934 (as amended) is unclear as to the rights of individuals to receive and use—for noncommercial purposes—satellite television programming.

Readers seeking additional information on these bills and an analysis of the bills' provisions may write to Satellite Television Industry Association, Inc., 1920 N St., NW, Suite 510, Washington, DC 20036.

International Amateur Operator License Proposed for Region 2

The Executive Committee of the Inter-American Telecommunications Conference recently addressed resolutions from Chile, Argentina, Peru, and the International Amateur Radio Union (IARU), Region 2, to create either a multi-lateral reciprocal operating agreement or an international amateur radio operator license. To address the proposals, Alberto

Shao, HK3DEU, Secretary of IARU Region 2, was asked to chair a working group on the matter. To date, the working group has drafted a Resolution which approves, in principle, of an international amateur operator license, and which sets as a goal its future implementation.

Engineering Graduates Top 72,000 in 1983

As reported in *IEEE Spectrum*, U.S. colleges and universities graduated more than 72,000 engineers at all levels in 1983, surpassing by 8.2 percent the number graduated in the previous year. According to a report from the Engineering Manpower Commission of the American Association of Engineering Societies (AAES), it marks the eighth consecutive year that the number of B.S. degrees awarded has increased. Increases were also recorded for masters degrees in engineering (up 7.4 percent in 1983 to 19,909 graduates) and for Ph.D.'s (up 4.7 percent to 3023). Interestingly, almost 40 percent of those receiving their Ph.D.'s in engineering were attending school in the U.S. on student visas. Finally, according to the AAES study, women received 13.2 percent of the B.S. degrees awarded in engineering, a significant improvement from the early 1970s, when roughly 1 percent of all engineering graduates were woman.

Graham Magnetics Markets Spray-On R.F.I. Shield

In this day of plastic and plywood cases for electronic home-entertainment equipment, more than a few amateurs and their neighbors have gotten into violent disagreement as to who was responsible for the r.f.i. problems observed. And while this column does not advocate that hams "fix" their neighbors' equipment—a job that rightly belongs with the manufacturer of the entertainment equipment involved—more than a few readers may wish to address their own r.f.i. problems using a spray coating from Graham.

Called COBALOY™ P-212, this coating, according to the manufacturer, has been tested by an independent laboratory to provide 75 dB of shielding effectiveness at 100 MHz (2 mil thick coating). The coating is said to adhere to virtually any plastic, glass, or metal surface, and requires no special equipment or surface preparation for application.

For more information on this and other r.f.i. shield coatings, write to Graham Magnetics Incorporated, Shielding Products Group, 1300 Summit, Suite 500, Ft. Worth, TX 76102.

Your Washington editor thanks W1EFK and WA4WKO for their contributions to this month's column.



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Built-in 4:1 balun. 300W, 50-ohm dummy load. SWR meter and 2 range wattmeter (300W and 30W).

6 position antenna switch on front panel, 12 position air-wound inductor; coax connectors, binding posts, black and beige case. 10 x 3 x 7 in.

MFJ-940B, \$79.95, 300 watts, SWR/Wattmeter, antenna switch on rear. No balun. 8 x 2 x 6 in. eggshell white with walnut grained sides.
 MFJ-945, \$79.95, like MFJ-940B with balun, less antenna switch.
 MDJ-944, \$79.95, like MFJ-940B with balun, antenna switch on front panel, less SWR/Wattmeter.
 Optional mobile bracket for 940B, 945, 944, \$5.00.

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(200 and 2000 watts). Meter light requires 12 VDC. Optional AC adapter MFJ-1312 is available for \$9.95.

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NEWS OF COMMUNICATIONS AROUND THE WORLD

When September comes, can autumn be far behind? It's still hot and muggy in the Gulf coast states, but those of you in New England and along the Canadian border are seeing the first touches of fall on the hillsides, and to an amateur interested in DX awards, fall means the CQ World-Wide DX Contests. The phone contest follows the normal October format, with the c.w. test on schedule in November. See Frank's Contest Calendar column for full details.

If you plan to be active in the contests, now is the time to check out the gear, particularly the antennas for the lower frequency bands. With the sunspot cycle plunging toward its 10-year trough, 80, 40, and 160 meters will be carrying more and more of the load in the contests. See George's Propagation column for the latest predictions.

Those lucky few who plan a DXpedition for one of the contest weekends should also consider publicity. Both W/K/VE and DX stations will need you for a multiplier, and they would like to know your proposed country of operation, callsign, and the frequencies you will be using. Therefore, we encourage you to send information to one or more of the publications listed in the following compilation of DX news sources.

The Latest DX Information How To Obtain It!

Few things are more important to an active DXer than a publication which provides timely coverage of upcoming DXpeditions as well as activities by stations in rare countries. The monthly DX columns by CQ DX Editor Hugh Cassidy, WA6AUD, are a *must*, but the major magazines such as CQ go to press too early to permit up-to-the-minute coverage of DX events. Therefore, you need a short-range bulletin or newsletter to supplement Hugh's column. Here are brief descriptions of some appropriate publications and club bulletins. We suggest that you send a self-addressed, stamped envelope for sample copies of those which sound interesting to you. However, bear in mind that many *club bulletins* only print sufficient copies for their members, and extra copies may or may not be available.

The following listing is in alphabetical order, so the position of a particular source near the top of the list does not constitute an endorsement.

DX'ers Magazine: A typical issue of *DX'ers Magazine* is 20 pages. It is pub-



Fred Laun, K3ZO, is back home in Maryland after an exciting career as HI8XAL, HS3AL, HS1ABD, HS5ABD, XV4AL, LU5HFI, HK3NBB, and K3ZO/HK3. Fred advises that anyone still needing a QSL from HS1ABD can contact him at 5801 Huntland Road, Temple Hills, MD 20748.

lished twice monthly by Gus Browning, W4BPD, the world's most famous DXer. Gus has operated from about 150 countries, many of them exceedingly rare. The magazine begins with a comments page followed by 4 to 5 pages of DX tidbits and about 10 pages of DX heard and worked on the various bands. The back page and cover are devoted to advertising. Subscription rates are \$4.00 per quarter, \$7.50 for 6 months, or \$14.00 per year. The mailing address is P.O. Box Drawer "DX," Cordova, SC 29039.

DX-NL: This is the weekly DX newsletter of D.A.R.C., the German Amateur Radio Club. The format is one page, front and back, written in the English language. Rare stations and DXpeditions are shown on the front page alphabetically by prefix with frequencies and times heard plus QSL information. The front page also contains a calendar showing current operations of importance. The back page contains varying types of information of interest to DXers. *DX-NL* is edited by well-known DXer Walter Geyrhalter, DL3RK. Circulation is handled by Eric Wagner, DL1MD, Flugweg 23, 4444 Bentheim 1, Federal Republic of Germany. The annual subscription fee is 45 DM to Europe, 55 DM by airmail.

DX'PRESS: V.E.R.O.N., the Netherlands Section of the IARU, publishes this weekly DX newspaper in English in the same cover with their *V.H.F. Bulletin*, which is printed in Dutch. *DX'PRESS* is edited by Gerben Menting, PA0GAM, and it includes about four to six pages of DX news arranged alphabetically by country plus QSL information and short articles of general DX interest. Further information may be obtained by sending an s.a.s.e. to PA0GAM at Oldenoert 152, 9351 KT Leek, The Netherlands, or from V.E.R.O.N.

at P.O. Box 1166, 6801 Arnhem, The Netherlands.

DX Report: This bulletin consists of one legal-size (8½" x 14") page of current DX information arranged alphabetically by prefix. It also includes a propagation forecast, QSL information, general DX items, and a contest calendar. It is published biweekly by Alan Leith, VE3FRA (formerly VE1AL), 10 Fairington Crescent, St. Catharines, Ontario, Canada L2N 5W3. Subscription rates are available on request by sending an s.a.s.e.

DX News Sheet: One of the oldest continuously published DX news sources, this bulletin was originated 20 years ago by the well-known English s.w.l. Geoff Watts. Mr. Watts was elected to the CQ DX Hall of Fame for his efforts in promoting DX through the dissemination of information. He has now retired, and information for the bulletin is being compiled by Martin Atherton, G3ZAY, and Don Field, G3XTT, and published weekly by the Radio Society of Great Britain, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, England. The format is a single sheet, front and back, with interesting DXpeditions and rare-country operations arranged alphabetically by prefix on the front page, and information of general interest on the back page. Contact the RSGB for subscription rates.

Long Island DX Bulletin: We first read this venerable bulletin over 20 years ago and have missed very few issues since that time. It is published weekly by Harvey McCoy, W2IYX. The format is a legal-size sheet front and back. The front side lists rare countries alphabetically and shows callsigns, frequencies, dates, times, a propagation forecast, and QSL information for rare and unusual stations. The second side frequently carries photographs of DX interest and short news items regarding specific DX events. An annual subscription of the *LIDX Bulletin* is \$12.00 (domestic). Overseas rates are available on request by writing to the publisher at 109 Willow Avenue, Huntington, NY 11743-0876.

Long Skip: This is the regular publication of the Canadian DX Association (CANDX). It includes DX news and articles of interest to all DXers. The editor is Garry Hammond, VE3GCO, P.O. Box 333, Listowell, Ontario, Canada N4W 3H4. Garry is one of Canada's foremost DXers.

National Contest Journal: The format of this contest-oriented (and DX-oriented) magazine includes 20+ pages of feature articles by top contesters, letters, hints, statistics, claimed scores from major contests, plus "editorial opinion, conjec-

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The WPX Program

Mixed

1104	K6UXO	1106	KA2GMT
1105	KD9J	1107	VE5ADA

S.S.B.

1661	YS9HH	1665	GW4OFO
1662	JA2JVD	1666	JA3AYX
1663	IK5ACO	1667	KS7T
1664	VE2JO		

C.W.

2265	KJ0U	2269	DL1HBT
2266	KD9J	2270	HB9CSA
2267	LA1CCA	2271	KS7T
2268	JA2KVD		

WPNX

220 KA9HKB

Endorsements

Mixed: 450 K6UXO, KD9J, JJ1EEA, 500 KD9J, 11EEW, JJ1EEA, 550 10AOF, YU1NZW, 600 YU1NZW, 650 YU1NZW, NE6I, 700 YU1NZW, 750 JA6GWU, YU1NZW, DL-005/1616978, 800 JA6GWU, YU1NZW, 850 JA6GWU, PY6ABZ, YU1NZW, KS0Z, EA1JO, 900 IS0MVE, PY6ABZ, YU1NZW, AB4D, 950 YU1NZW, AB4D, 1000 YU1NZW, AB4D, 1050 NN4Q, 1100 NN4Q, 1150 NN4Q, 1200 NN4Q, 1400 N7TT, 1450 N7TT, 1750 N2AC.

S.S.B.: 350 IK5ACO, GW4OFO, JA3AYX, 400 IK5ACO, GW4OFO, EA1JO, JA3AYX, 450 NE6I, IK5ACO, JA3AYX, 500 IK5ACO, I2EOW, 550 IK5ACO, 600 IK5ACO, 650 W6YMH, IS0MVE, 700 WO4L, 850 W3GXX, XE1XF, G3YBH, 900 W3GXX, 1000 N2AC, 1050 WF4V, 1100 WF4V, 1150 N7TT, WF4V, 1200 N7TT, WA4OIB, WF4V, 1450 WD8MGO, 1500 WD8MGO.

C.W.: 350 KJ0U, KD9J, W4HYW, DL1HBT, YS9HH, HB9CSA, 400 KJ0U, KD9J, W4HYW, DL1HBT, HB9CSA, 450 KJ0U, W4HYW, NE6I, DL1HBT, HB9CSA, 500 KJ0U, KW9N, 550 KJ0U, W2XQ, 600 W2XQ, 650 N8BM, 700 N8BM, EA1JO, 750 N8BM, 850 KA7T, 900 HP1AC, 1050 N7TT, 1100 N7TT.

10 meters: AF5M, JA3AYX, KS7T.
 15 meters: K6UXO, AF5M, JA6GWU, KS7T.
 20 meters: W2XQ, JA6GWU, KS7T.
 40 meters: W2XQ, KC8YM, AF5M, KS7T.
 80 meters: KS0Z, AF5M.
 160 meters: K2POF, KD9J, KS7T.

Asia: YU1NZW, DL-14687, KS7T.
 Africa: KC8YM.
 No. America: KS0Z, YS9HH, KS7T, JA7FFN, KD9J, W4HYW, YU1NZW.
 Europe: DL-14687, JJ1EEA, LA1CCA, W4HYW, K6UXO, YU1NZW.
 Oceania: KS7T.

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.

ture, rumors, and hearsay" of interest to avid contesters. It is published six times per year by Randall Thompson, K5ZD, 1708 Lake Haven Drive, Irving, TX 75060. Subscription rates are \$8.00 for the U.S., \$9.00 for Mexico and Canada, and \$11.00 for all other countries.

QRZ DX: This four- to six-page publication is considered by many to be the successor to Hugh Cassidy's *West Coast DX Bulletin*. It includes short news reports on interesting DX operations, DX heard and worked on the various bands, QSL information, a DX calendar, a propagation forecast, and a periodic feature called "QRZ Contest," which features contest news. Interesting feature articles on subjects of interest to DXers are also included. *QRZ DX* is published by Bob Winn, W5KNE. Sample issues can be obtained by sending an s.a.s.e. to Bob at P.O. Box 834072, Richardson, TX 75083. Regular subscription rates are \$28 per year to the U.S. and



Jan D. Perkins, N6AW, at the operating position of W6AM during the 1983 CQ World-Wide C.W. Contest. Jan has worked Single Band WAZ on 10, 15, and 20 meters, both c.w. and s.s.b., and has 39 zones confirmed on 40 meters both c.w. and s.s.b. He authored the original *Southern California DX Club Bulletin* article on Tibet, which appeared in the *DX* column of the June issue. Jan is a member of the San Diego DX Club and the CQ Contest Committee.

Canada by first-class mail, and \$50 per year to all other countries by airmail.

The W6GO/K6HHD QSL Manager List: This is an excellent computer listing of over 5,000 DX operators and their QSL Managers. It is published monthly for \$15 per year U.S., \$25 per year overseas, by Jay and Jan O'Brien, P.O. Box 700, Rio Linda, CA 95673. Single copies may be purchased at \$1.75 each (\$2.80 overseas). The purpose of this publication is to be a source of current and accurate information on the easiest way to get rare QSL cards. It supplements the *Callbook* rather than competing with it, but it does give some direct-mail addresses for difficult situations. Helpful special notes are also included. Jay O'Brien, W6GO, was recently voted DXer of the Year by the Northern California DX Club.

DX Club Bulletins

Some of the better club publications which we receive include the following.

The Totem Tabloid: This is the official publication of the Western Washington DX Club, and it is edited monthly by Jack Bock, K7ZR. The W.W. DX Club is believed to be the world's largest local DX organization, and its membership includes famous DXers such as W7OM, W7PHO, K7WA, K7JA, K7LAY, K7UR, and many others. The paper usually runs about eight pages and includes news of club activities, general DX news, editorial comments, and articles on subjects of interest to DXers (such as antennas). *Totem Tabloid* is a club paper, and circulation to nonmembers is restricted. Inquiries may be directed to the club at P.O. Box 224, Mercer Island, WA 98040, with s.a.s.e.

Southern California DX Club Bulletin: The monthly publication of the SCDXC

contains about four pages of club as well as general DX news with the format varying according to the style of the current editor. The present editor is George Morris, W6ABW. Each year the SCDXC teams up with the Northern California DX Club to stage the famous Visalia (formerly Fresno) DX Convention.

The DXer: The monthly newsletter for the Northern California DX Club is circulated to club members only. Coverage includes DX and contest news and DX achievements of members. The club's memorial station, W6TI, broadcasts DX bulletins each Sunday at 1800 GMT, or Monday at 0200 GMT on 14002 kHz. Lyle Meek, N6BLN, edits *The DXer*, and Bob Vallio, W6RGG, is Trustee for W6TI.

Balanced Modulator: This is the monthly publication of the North Florida Amateur Radio Society (NOFARS). Each issue includes a DX section by Pete Nissen, W4PTT. CQ's DX Award Manager, Billy Williams, N4UF, is president of NOFARS and editor of *Balanced Modulator*. The address of the society is P.O. Box 9673, Jacksonville, FL 32208.

Other DX News Sources

The above bulletins and magazines are some of those which include us on their courtesy list. However, there are other worthwhile news sources. These include *Les Nouvelles DX* by F6AJA, 515 Rue de Petit Hem, Bouvignies, 59870 Marchiennes, France; *The DX Bulletin* by K1TN, 306 Vernon Ave., Vernon, CT 06066; the *Westlink Report*, 28197 Robin Ave., Saugus, CA 91350; and the *Japan DX News*, P.O. Box 42, Urama Saitama, 336 Japan.

Getting That Rare QSL—25 Years Later

This interesting account was submitted to CQ by Mike Ludkiewicz, W1DGJ. It illustrates what can happen if you hang in there.

"While preparing a short history of my amateur radio operations, I found a log book from 1959 showing my contact with FQ8AF in what was then called French Equatorial Africa. The QSO had been made on 10 meter a.m. phone, and a note in the log confirmed that a QSL card had been sent directly to Gustave Crauet, Aeronautique Civile, Brazzaville, Moyen-Congo, French Equatorial Africa. However, no response had been received to my request for a card.

"As I have been at the top of the DXCC Honor Roll in both the mixed and phone categories for about 3 years now with a total of 345 countries confirmed, including the deleted countries, I thought it would be a delight to get another new country confirmed. French Equatorial Africa is a deleted country, but contacts made before August 16, 1960 still count for the country total. FQ8 has since been divided into four individual countries:



Mike Ludkiewicz, W1DGJ, of Ludlow, Massachusetts proudly exhibits the FQ8AF QSL card which is the subject of the short article "Getting That Rare QSL—25 Years Later." Mike is a top Honor Roll DXer.

Congo (TN), Gabon (TR), Chad (TT), and the Central African Republic (TL). As a beginning, I looked through the current *Callbook* to see if Gustave Crauet was listed in any of these four countries. The results of this search were negative.

"My second step was a short note to the editor of *QRZ DX* in Richardson, Texas to see if they could help me locate ex-FQ8AF. My request was published in *QRZ DX* in December 1983, and I immediately received a letter from Frank Volk, N5FW (ex-W5HPV), who had also worked FQ8AF in the '50s and was looking for a QSL. Frank advised me that he had been in touch with Gus in 1971 at TU2AF, but had lost the trail.

"Shortly thereafter I received another letter, this one from Don, K8MFO, in Wooster, Ohio. Don was also trying to confirm a 1960 contact with FQ8AF, and he gave me an address in Beauvais, France, which eventually turned out to be the current address for Gus. Don had received a QSL from Gus for a 1972 operation from TT8AC, but he had had no success in securing an FQ8AF card after many tries. I also received an encouraging letter from Rick Dorsch, NE8Z (ex-

The WAZ Program

10 Meter Phone

278 YU7DX

20 Meter Phone

498 N4BAA 500 K6PKO
499 I6VYV 501 EA1BDB

20 Meter C.W.

215 JH1FWN 216 VE3JUG

All Band WAZ

S.S.B.

2854 KB5QV 2857 KB0SY
2855 I2IAU 2858 I6DQE
2856 I2EOW 2859 W8QHG

C.W. and Phone

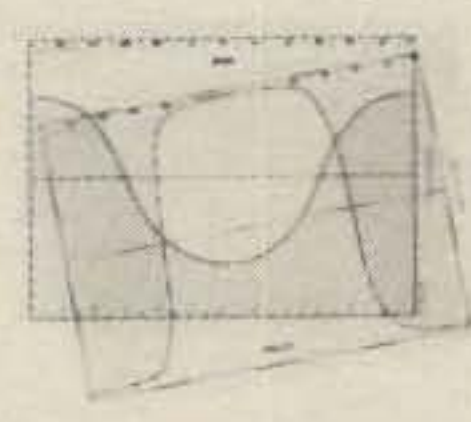
5765 N4BAA 5772 KB8LH
5766 KS1L 5773 K8MN
5767 WD6BLH 5774 DJ5YQ
5768 KF3C 5775 KF2F
5769 W2IBZ 5776 G3BBR
5770 AF9R 5777 DK3QE
5771 JA7DAH 5778 I7PXV

Applications and reprints of the latest rules may be obtained by sending a self addressed stamped envelope (37 cents) size 4 1/2 x 9 1/2 to the WAZ Manager, Leo Haijsman, W4KA, 1044 S.E. 43 Street, Cape Coral, Florida 33904. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all C.Q. awards is \$4.00 for subscribers and \$10 for non-subscribers. In order to qualify for the subscriber rate, please enclose your latest CQ mailing label with your application.

HC1MD/HC5EE). Rick suggested that I contact ex-FQ8HD, who is Ray Robinson, FY7YN, now living in Cayenne, French Guyana. At this point I decided to try writing to other people who might have known Gus in French Equatorial Africa and could help me trace his travels.

"I sent letters to FY7YN, TU2AE, and to TN8AQ in Brazzaville, People's Republic of Congo. I also tried to get any information available from contacts over the air. From F6EWK I learned that Gus has a brother Jean Louis who is F9EP and lives in L'Etang-la-Ville. F6INJ, Pierre in Chatou, contacted Gus's brother for me and confirmed that the address in Beauvais was correct. He also told me the disappointing news that Gus was no longer an active amateur radio operator.

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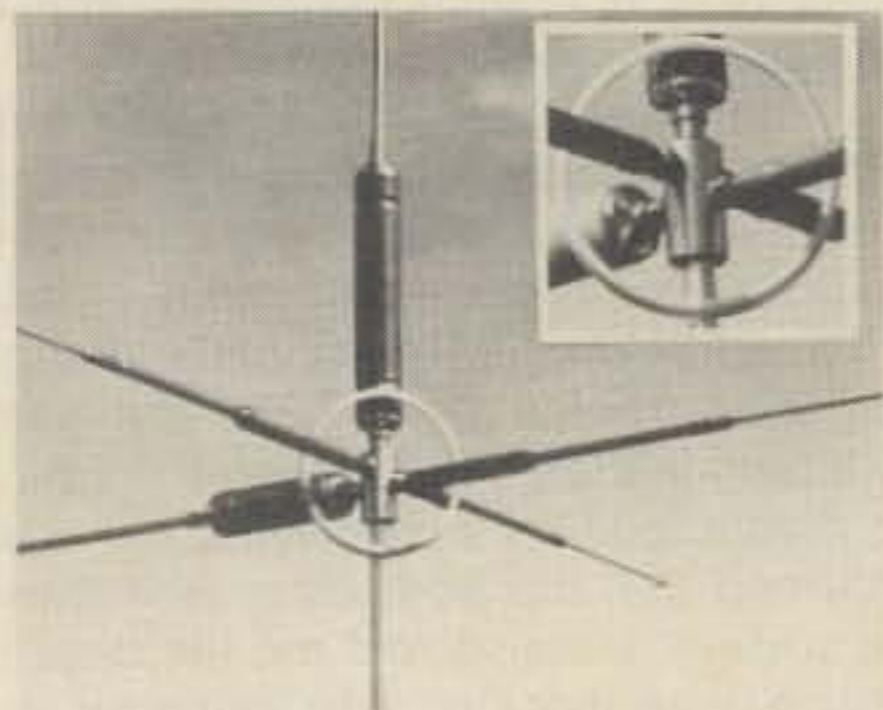
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1337	NU4Y	1341	KZ2W
1338	KS1L	1342	YK1AO
1339	KF3C	1343	GW4BKG

C.W.

615 G4MWI

S.S.B. Endorsements

310	K5OVC/312	275	WD0BNC/294
310	OE3WWB/313	275	KB0SY/277
310	CT1FL/312	200	KF3C/232
310	VE1YX/311	200	YK1AO/200
300	WD8MGQ/304	150	KZ2W/159
300	K9IW/301	3.5/7 MHz	G4GED
275	W0IYR/295	28 MHz	KF3C

C.W. Endorsements

310	K9MM/313	275	W4BV/288
300	DL3RK/308	1.8 MHz	DL3RK
275	K9IW/292	Oscar	WB4RUA

Total number of active countries is 315. 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.

"I then wrote a letter to Gus and explained my need for a card. I also wrote to his brother asking assistance in case Gus did not understand my letter in English. I also thought he might not understand my interest in a confirmation for such an old contact. While waiting for a reply, I also wrote to F6EWM, DL3NBH, F6GQI, F6AIR, F9JQ, F9JL, F2BS, and F9MD to ask for their assistance in obtaining this rare QSL. To whet my appetite, K1DRN sent me a Xerox of an FQ8AF QSL card he had received many years ago. I waited for a reply from Gus.

"Finally, 24 years, 3 months, and 5 days after the contact in December 1959, I received an FQ8AF QSL from Gus. This may not make the *Guinness Book of World Records*, but I must admit that of the 346 countries that I now have confirmed, FQ8AF was the most challenging. My thanks to everyone who helped me confirm another 'new' one.

"*Epilog:* On March 26, 1984 my FQ8AF card was officially accepted by the ARRL."

Cyprus—Is It More Than One Country?

Heading the list of areas for possible new DXCC countries is the island of Cyprus in the eastern Mediterranean, which presently includes three separate areas: North Cyprus, which is occupied by Turkey; South Cyprus, which is predominately Greek; and the areas which are British Sovereign Bases.

In evaluating the possibilities of the north/south split, one must remember



Ron, ZL1AMO, worked about 17,000 stations as ZK9RW from Niue Island. The most common question asked him during the operation was "Where the heck is Niue," hence the T-shirt with that query. (Photo via NA7X)

5 Band WAZ

Standings as of June 1, 1984

All 200 zones worked:

1. ON4UN	27. SM3EVR	53. OK1ADM
2. K4MQG	28. LA5YJ	54. CT1FL
3. SM4CAN	29. DL3RK	55. WA1AER
4. AA6AA	30. N4WJ	56. N4RR
5. W8AH	31. G3MCS	57. UW0MF
6. W6KUT	32. SM5AQD	58. W4DR
7. EA8AK	33. W0MLY	59. OK1MP
8. LA7JO	34. I0RIZ	60. W1NW
9. EA3SF	35. ON5NT	61. OE1ZJ
10. OH1XX	36. OH6JW	62. HB9AHL
11. EA8OZ	37. OK1AWZ	63. HB9AMO
12. W0SD	38. IV3PRK	64. LA6OT
13. K0ZZ	39. DJ6RX	65. UR2QD
14. ON6OS	40. OH3YI	66. UK2RDX
15. OK3TCA	41. I4RYC	67. ZS5LB
16. K6SSS	42. ZL1BIL	68. F6DZU
17. ZL3GQ	43. I4EAT	69. DL4YAH
18. OK3CGP	44. ZL1BQD	70. LA7ZO
19. SM0AJU	45. TG9NX	71. W9ZR
20. OZ3PZ	46. XE1J	72. W1NG
21. I3MAU	47. F5VU	73. VK9NS
22. I2ZGC	48. W3AP	74. N4KG
23. 4Z4DX	49. YO3AC	75. YU7DX
24. N4KE	50. K3TW	76. DL8MAG
25. K5UR	51. XE1OX	77. OK3DG
26. K9AJ	52. VE7IG	

The top 10 contenders for 5 Band WAZ:

1. DK5AD, 199	6. W8VUZ, 198
2. ZL1BOQ, 199	7. LA9GV, 198
3. JA3EMU, 199	8. W6GO, 198
4. N4WW, 199	9. K4CEB, 198
5. K9YRA, 199	10. OK1MG, 198

265 Stations have attained the 150 zone level

THE SCIENCE OF PREDICTING RADIO CONDITIONS

The plateau in solar activity reported in last month's column continues. The Royal Observatory of Belgium reports a monthly mean sunspot number of 75 for May 1984. This results in a 12-month running smoothed sunspot number of 67 centered on November 1983. The solar cycle is based upon smoothed sunspot numbers, which take into account solar activity over a 12-month period.

The present solar cycle has remained relatively constant between May and November 1983. The following are the recorded smoothed numbers for this period: May 71, June 71, July 66, August 66, September 68, October 68, November 67. This plateau should result in a bonus to radio amateurs during the next several months. If solar activity had declined as originally expected, there should have been little likelihood of world-wide DX openings on 10 meters, and there would have been a significant reduction in 15 meter DX openings. As a result of the plateau, solar activity is expected to be high enough this fall and winter to support a large number of DX openings on 10 meters, and 15 meters could be the optimum DX band during much of the daylight period. A smoothed sunspot number in the upper 40's is predicted for September 1984, but the level could be higher if the present plateau should continue.

Propagation conditions on the h.f. bands are generally quite variable during September and early October. On some days conditions will continue much as they were earlier in the summer, but on other days the first signs of wintertime conditions will be noticeable. For this reason, this month's column contains DX Propagation Charts for the one-month period September 15 to October 15 rather than the usual two-month span. This month's column also contains Short-Skip Propagation Charts for September and October.

September Propagation

During September and early October expect a noticeable increase in 10 meter DX openings during the daylight hours. Expect some fairly good openings to the Caribbean and South America, and to the South Pacific area and the southern and central portions of Africa, particularly during the afternoon hours. When conditions are High Normal or better, openings should be possible to most other areas of the world as well.

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for September 1984

Propagation Index	Expected Signal Quality			
	(4)	(3)	(2)	(1)
Above Normal: 2, 13, 21	A	A	B	C
High Normal: 3, 11-12, 18, 22, 28-29	A	B	C	C-D
Low Normal: 1, 4, 8-10, 14, 17, 19-20, 25-27, 30	A-B	B-C	C-D	D-E
Below Normal: 5, 7, 15-16, 23	B-C	C-D	D-E	E
Disturbed: 6, 24	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, excellent (A) on the 2nd, good (B) on the 3rd, good-to-fair (B-C) on the 4th, etc.

A considerable improvement is expected for DX propagation on 15 meters. The band should open for DX shortly after sunrise and remain open until after sundown. Openings should be possible to all areas of the world, with conditions best towards Europe and the northeast before noon, and to the rest of the world during the afternoon hours. Openings towards the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening, particularly when propagation conditions are High Normal or better.

It may be a toss-up between 15 and 20 meters for the best DX band during the hours of daylight in September and early October, but the edge probably will go to 20 meters. Look for the band to open for DX at sunrise and remain open in all directions for a few hours. It should be possible to work into many areas of the world throughout the daylight hours, but look for a peak in DX propagation conditions during the afternoon hours. Twenty meters should remain open for DX during much of the hours of darkness as well. Nighttime conditions will favor openings towards the south and to tropical areas, but some openings will also be possible to

other areas of the world, particularly when conditions are High Normal or better.

Expect an improvement in nighttime DX conditions on 40, 80, and 160 meters during September and early October. This results from the increasing hours of darkness and a seasonal decline in the static level. Forty meters should be best for worldwide DX from the sunset through the sunrise period. Check 80 and 160 meters during the hours of darkness, particularly for an hour or so before local sunrise.

For short-skip propagation during September and early October, use 80 meters during the day for openings shorter than 250 miles, either 80 or 160 meters at night. For distances between 250 and 750 miles try 40 meters during the day and 80 meters at night. For openings between 750 and 1300 miles the best bet should be 20 meters during the day, 40 meters from sundown to midnight, and 80 meters from midnight to sunrise. For openings beyond 1300 miles try either 15 or 20 meters during the day and 40 meters during the hours of darkness. Check 10 meters for some fairly good openings beyond 1300 miles during the afternoon hours, particularly when conditions are High Normal or better.

Equinoctial Propagation

The fall, or autumnal, equinox will occur on September 22. This is the day on which the sun will cross the plane of the earth's equator as it appears to travel from northern to southern skies. On this day the hours of daylight and darkness are equal in length throughout the world. Sunrise should take place at approximately 6 a.m. local time and sunset at about 6 p.m. local time, no matter where you are in the world.

The effects of the equinox on h.f. propagation are felt from about mid-September through early October. During this period the characteristics of the ionosphere are similar over large areas of the world, and this is usually the best time of the year for DX openings between the temperate regions of the northern and southern hemispheres. A similar period occurs during the spring equinox, which is centered on March 21.

Expect considerably more frequent openings from mid-September through early October between the USA and South America, to the South Pacific area and Australasia, to southern Asia, and to southern Africa and Antarctica. Openings to these areas should improve on all bands, but they probably will be most noticeable on 20 and 15 meters during the

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 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.

**CQ Short-Skip Propagation Chart
September & October 1984
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	10-21 (0-1)	08-10 (1) 10-13 (1-2) 13-15 (1-3) 15-16 (1-2) 16-21 (0-1)	08-10 (1) 10-13 (2) 13-15 (3) 15-16 (2-3) 16-17 (1-2) 17-19 (1) 19-21 (1-0)
15	Nil	08-10 (0-1) 10-15 (0-2) 15-21 (0-1)	08-09 (1) 09-10 (1-2) 10-15 (2-4) 15-17 (1-4) 17-18 (1-3) 18-20 (1-2) 20-21 (1) 21-08 (0-1)	08-09(1) 09-10 (2-3) 10-11 (4-3) 11-17 (4) 17-18 (3) 18-19 (2-3) 19-20 (2) 20-21 (1) 21-08 (1-0)
20	12-14 (0-1) 14-16 (0-2) 16-22 (0-1)	08-09 (0-1) 09-10 (0-2) 10-11 (0-3) 11-12 (0-4) 12-14 (1-4) 14-16 (2-4) 16-18 (1-4) 18-19 (1-3) 19-22 (1-2) 22-08 (0-1)	06-08 (1-2) 08-09 (1-3) 09-10 (2-4) 10-11 (3-4) 11-18 (4) 18-19 (3-4) 19-22 (2-3) 22-00 (1-2) 00-06 (1)	06-08 (2) 08-09 (3) 09-14 (4-2) 14-16 (4-3) 16-19 (4) 19-21 (3-4) 21-22 (3) 22-23 (2-3) 23-00 (2) 00-06 (1)

40	08-10 (1-3) 10-12 (2-4) 12-18 (3-4) 18-19 (2-3) 19-21 (1-2) 21-06 (0-1) 06-08 (0-2)	08-10 (3-4) 10-12 (4-3) 12-16 (4-2) 16-18 (4-3) 18-19 (3-4) 19-21 (2-4) 21-23 (1-4) 23-03 (1-3) 03-06 (1-2) 06-08 (2-3)	08-10 (4-2) 10-12 (3-1) 12-16 (2-1) 16-18 (3-2) 18-19 (4-2) 19-20 (4-3) 20-23 (4) 23-03 (3-4) 03-06 (2-3) 06-08 (3-4)	08-10 (2-1) 10-16 (1-0) 16-18 (2-1) 18-19 (2) 19-20 (3) 20-21 (4-3) 21-03 (4) 03-05 (3-4) 05-06 (3) 06-08 (4-3)
80	07-09 (3-4) 09-12 (4) 12-19 (4-3) 19-23 (4) 23-05 (3-4) 05-07 (2-3)	07-09 (4-2) 09-12 (4-1) 12-17 (3-1) 17-19 (3-2) 19-21 (4-3) 21-05 (4) 05-06 (3-4) 06-07 (3)	07-09 (2-1) 09-17 (1-0) 17-19 (2-1) 19-21 (3-2) 21-22 (4-3) 22-04 (4) 04-06 (4-3) 06-07 (3-2)	07-09 (1) 09-17 (0) 17-19 (1) 19-21 (2) 21-22 (3-2) 22-04 (4-3) 04-06 (3-2) 06-07 (2-1)
160	17-19 (1-0) 19-21 (2-1) 21-06 (4) 06-08 (3-2) 08-10 (2-1) 10-12 (1-0)	18-20 (1-0) 20-21 (1) 21-03 (4-3) 03-06 (3-2) 06-08 (2-1) 08-10 (1-0)	20-21 (1-0) 21-23 (3-1) 23-03 (3) 03-06 (2-1) 06-08 (1)	21-23 (1-0) 23-03 (3-2) 03-06 (1) 06-08 (1-0)

**ALASKA
September & October, 1984
Openings Given GMT #**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern States	19-22 (1)	17-19 (1) 19-23 (2) 23-00 (1)	12-15 (1) 18-21 (1) 21-23 (2) 23-01 (3) 01-02 (2) 02-04 (1)	08-12 (1)
Central States	20-00 (1)	17-19 (1) 19-21 (2) 21-23 (3) 23-01 (2) 01-02 (1)	13-22 (1) 22-00 (2) 00-03 (3) 03-04 (2) 04-06 (1)	08-11 (1) 11-13 (2) 13-14 (1) 11-13 (1)*
Western States	20-22 (1) 22-01 (2) 01-02 (1)	18-21 (1) 21-22 (2) 22-00 (4) 00-01 (3) 01-02 (2) 02-03 (1)	16-18 (1) 18-20 (3) 20-00 (2) 00-02 (3) 02-03 (4) 03-04 (3) 04-05 (2) 05-07 (1)	08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)*

**HAWAII
September & October 1984
Openings Given in
Hawaiian Standard Time #**

	10 Meters	15 Meters	20 Meters	40/80 Meters
Eastern States	08-10 (1) 10-13 (2) 13-14 (1)	07-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-16 (1)	11-13 (1) 13-14 (2) 14-18 (3) 18-20 (2) 20-04 (1) 04-07 (2) 07-08 (1)	18-20 (1) 20-22 (2) 22-00 (3) 00-02 (2) 02-03 (1) 10-21 (1)* 21-00 (2)* 00-01 (1)*
Central States	08-10 (1) 10-14 (2) 14-16 (1)	07-10 (1) 10-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	09-13 (1) 13-14 (2) 14-15 (3) 15-18 (4) 18-19 (3) 19-21 (2) 21-04 (1) 04-09 (2)	18-20 (1) 20-22 (2) 22-02 (3) 02-04 (2) 04-05 (1) 19-21 (1)* 21-00 (2)* 00-02 (1)*
Western States	08-09 (1) 09-10 (2) 10-15 (3) 15-16 (2) 16-17 (1)	07-09 (1) 09-10 (2) 10-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-19 (1)	10-12 (2) 12-14 (3) 14-18 (4) 18-20 (3) 20-00 (2) 00-05 (1) 05-06 (2) 06-10 (3)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)* 20-22 (2)* 22-02 (3)* 02-04 (2)* 04-05 (1)*

See explanation in "How To Use Short-Skip Charts" in box at the beginning of this column.
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.
* Indicates best time to listen for 80 Meter openings. Openings on 160 Meters are also likely to occur during those times when 80 Meter openings are shown with a forecast rating of (2), or higher.

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Central & Northern Europe & USSR	Nil	08-09 (1) 09-11 (2) 11-13 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-14 (2) 14-16 (2) 21-23 (1)	20-00 (1) 20-22 (1)*
Eastern Mediteranean & Middle East	Nil	08-09 (1) 09-11 (2) 11-12 (1) 20-22 (1)	06-07 (1) 07-10 (2) 10-13 (1) 13-15 (2) 15-16 (1) 19-20 (1) 20-22 (2) 22-23 (1)	20-23 (1)
Western & Central Africa	11-12 (1) 12-14 (2) 14-15 (1)	08-10 (1) 10-13 (2) 13-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-15 (2) 15-16 (3) 16-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	21-00 (1)
Eastern Africa	11-14 (1)	10-13 (1) 13-16 (2) 16-17 (1)	07-09 (1) 12-15 (1) 15-19 (2) 19-21 (1)	20-22 (1)
Southern Africa	10-13 (1)	07-09 (1) 09-11 (2) 11-13 (3) 13-15 (2) 15-16 (1)	05-07 (1) 07-09 (2) 09-10 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-22 (1) 22-00 (2) 00-01 (1)	19-22 (1)
Central & South Asia	17-19 (1)	08-11 (1) 16-17 (1) 17-19 (2) 19-21 (1)	07-08 (1) 08-11 (2) 11-13 (1) 17-19 (1) 19-21 (2) 21-23 (1)	06-08 (1) 19-21 (1)
Southeast Asia	16-19 (1)	10-11 (1) 11-13 (2) 13-16 (1) 16-18 (2) 18-21 (1)	05-07 (1) 07-09 (3) 09-11 (2) 11-12 (1) 21-23 (1) 23-01 (2) 01-02 (1)	01-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)*
Far East	16-17 (1) 17-18 (2) 18-19 (1)	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-09 (2) 09-10 (4) 10-13 (3) 13-15 (2) 15-20 (1) 20-22 (2) 22-00 (3) 00-01 (2) 01-03 (1)	01-03 (1) 03-07 (2) 07-08 (3) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*

South Pacific & New Zealand	11-13 (1) 13-15 (2) 15-17 (3) 17-19 (2) 19-20 (1)	09-11 (1) 11-13 (3) 13-17 (2) 17-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	13-19 (1) 19-21 (2) 21-23 (3) 23-01 (4) 01-03 (3) 03-05 (2) 05-06 (1) 06-07 (2) 07-09 (3) 09-13 (2)	21-22 (1) 22-23 (2) 23-00 (3) 00-05 (4) 05-07 (3) 07-08 (2) 08-09 (1) 23-02 (1)* 02-06 (2)* 06-07 (1)*
Australasia	14-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 13-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	19-21 (1) 21-23 (2) 23-01 (4) 01-03 (3) 03-04 (2) 04-07 (1) 07-08 (2) 08-10 (3) 10-12 (2) 12-13 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)*
Caribbean, Central America & Northern Countries Of South America	09-10 (1) 10-11 (2) 11-13 (3) 13-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	07-08 (1) 08-10 (3) 10-12 (2) 12-15 (2) 15-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	06-08 (4) 08-10 (3) 10-15 (2) 15-17 (3) 17-23 (4) 23-01 (3) 01-03 (2) 03-05 (1) 05-06 (2)	19-21 (1) 21-02 (3) 02-04 (2) 04-07 (1) 20-22 (1)* 22-03 (2)* 03-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	09-10 (1) 10-12 (2) 12-14 (3) 14-16 (4) 16-17 (3) 17-18 (2)	07-08 (1) 08-09 (2) 09-13 (1) 13-15 (2) 15-16 (3) 16-19 (4) 19-20 (2) 20-21 (1)	06-15 (1) 15-17 (2) 17-19 (3) 19-23 (4) 23-01 (3) 01-06 (2)	21-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)*
McMurdo Sound, Antarctica	14-18 (1)	11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1)	08-10 (1) 17-19 (1) 19-20 (2) 20-23 (3) 23-01 (2) 01-03 (1)	01-03 (1) 03-05 (2) 05-07 (1) 03-06 (1)*

day and on 40 meters at night. These equinoctial-type openings may follow either the *long* or the *short* great-circle path. The best time for these openings should be the twilight periods around sunrise and sunset, but they will occur at other times as well.

V.H.F. Ionospheric Openings

Conditions for transequatorial, or TE-scatter propagation are expected to peak during the equinoctial period. Six meter

openings, and some 2 meter openings as well, should be possible by this propagation mode between the southern tier states and deep South America. The optimum time for TE openings is between 8 and 11 p.m. local time. Openings can last from a few minutes to a few hours, and signals can vary between very weak and moderate, with flutter fading almost always present. While TE propagation favors the southern third of the country, during September some 6 meter openings should be possible from most other areas as well.

Although summertime sporadic-E ionization should fall off considerably during September, an occasional 6 meter short-skip opening may still be possible over distances ranging between approximately 1000 and 1300 miles. The best time to check is before noon and again during the early evening.

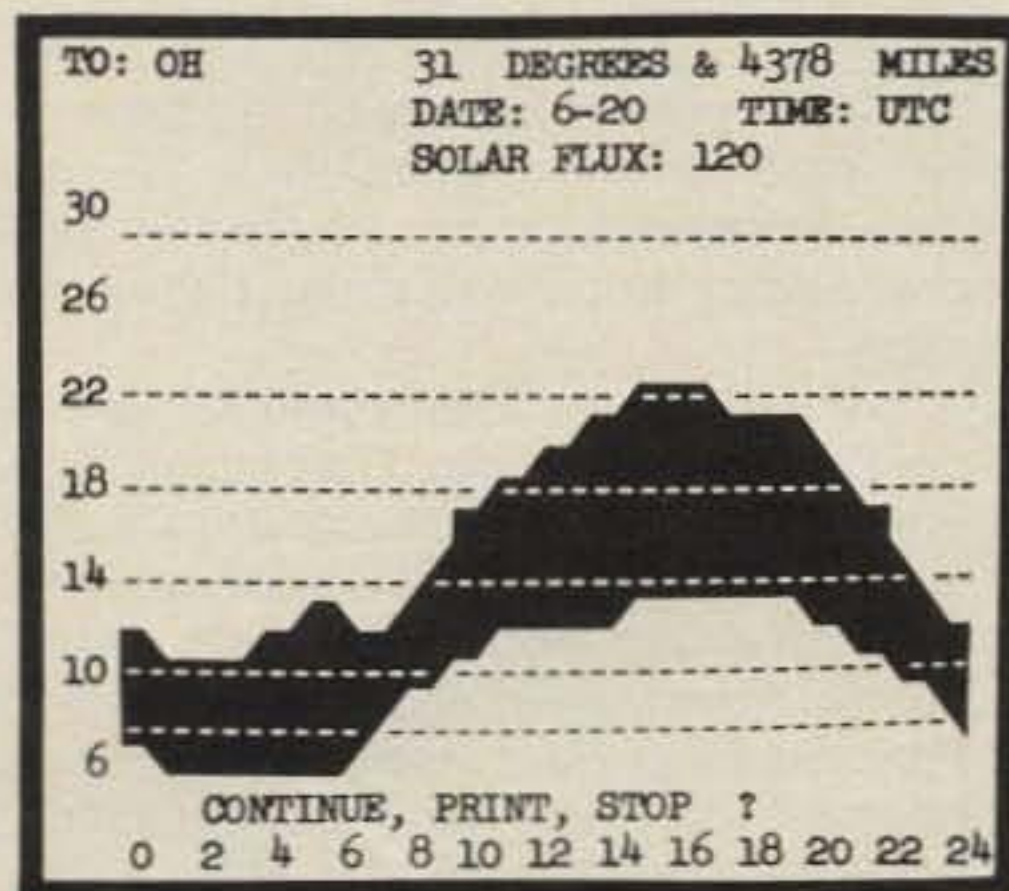
There is usually an *increase* in auroral activity during the equinoctial period, so expect some fairly frequent 6 and 2 meter auroral-type openings during September and early October. The best times for such openings should coincide with periods of radio storminess on the h.f. bands. Check the Last Minute Forecast at the beginning of this column for days during September that are expected to be Below Normal or Disturbed.

No major meteor showers are expected during September, but some minor ones may permit meteor-scatter-type openings on the v.h.f. bands from September 19 through the end of the month.

CQ DX Contest Special 1984

This year's CQ World-Wide DX Contest will be held on the following dates: October 27-28 for the Phone section and November 24-25 for the C.W. section. As during the past 34 years, next month's Propagation column will be devoted to a special, comprehensive forecast which will focus on both sections of the contest.

73, George, W3ASK



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Norm Hansen, W0RAN, of Telex/Hy-Gain is busy setting up the booth.

'84, was to begin the next day. There were large, billboard-type signs up to 40 miles away announcing this annual event to one and all.

Was it exciting? You bet it was! You forget about being tired; there's no time for it. Every hotel for miles around was booked as the 12 to 15 thousand European (and a few American) amateurs gathered for this biggie. There aren't nearly as many hamfests in Europe as there are in the U.S., so each one is a major event. This show was three solid 9 a.m. to 6 p.m. days of concentrated amateur radio. The booths were more formal and elaborate than what is normally seen here, and many were created just for this one show and then discarded.

The exhibit hall was quite large as would be expected, and although a few of the names were familiar, most of the exhibitors featured products not available here. There was some really great, remarkably well-made u.h.f. gear available, fitting the stereotypical image of German precision craftsmanship. Three booths in particular stood out as being truly unique. One was a booth for s.w.l.'s. This was their place to exhibit QSL cards and literature and to gather for the exchange of information.

The DARC, the German equivalent of our ARRL, had various booths set up for different amateur radio interests, but one was surprising in concept and laudatory in how well it worked. They had an approximately 16' x 24' area set up in the middle of the hall. This special area was for young people who were not amateurs, and it was designed not only to hand out literature, but to offer hands-on experience in building little projects. There were a half-dozen or so work areas where young people could get one-on-one help in drilling, soldering, and completing a little project. It clearly showed that there is nothing so mysterious about amateur radio and electronics and that the DARC seems to be actively encouraging these youngsters to become part of our hobby. It was fascinating to watch.

Another large, elaborate booth system belonged to the German equivalent of our FCC. Part of the display featured equipment that they use plus all the literature pertaining to rules and regulations. One



section had three desks set up so that temporary operating licenses could be obtained for Germany, Austria, and Switzerland. These were immediate authorizations offered at no charge. The last area contained test equipment along with highly trained personnel. It was a mini-lab. Equipment purchased in the fleamarket could be brought here and checked on the spot. What a great idea!

Speaking of the fleamarket, it was in the next building, which was reached through a very long passageway. The passageway was taken up with a museum display of electronic equipment related to amateur radio. Part of the passageway also contained an exhibit by the Dornier Radio Club, DF0DOX. The DOX suffix is to commemorate the Dornier aircraft DOX and the 100th birthday of Claude Dornier. The fleamarket had everything you could think of, plus some. There were all the good things you could relate to in any language or culture, including a large stuffed dog holding a drum in its mouth (which was sold by Saturday afternoon).

The attendance was predominantly as you would expect—German. By and large they are "trimmer" than we are, despite the fact that the food and beer of the country are terrific. There were far fewer HTs in evidence (I didn't see any local with more than one) probably due to fewer repeaters. The people are just as avid as, but perhaps a bit more serious about, amateur radio. Judging from the exhibits, they are into OSCAR, RTTY, facsimile, SSTV, and computers in a big way.

On Saturday morning I was invited to attend a ceremony at the mayor's office. Various IARU member society presidents and the mayor spoke words of welcome to the international group. We were entertained by a local orchestra and sampled local wines. It was then back to the exhibit hall and more amateur radio.

Ham Radio '84 had one feature that would seem very hard to duplicate here. Almost everything on display was working. There was one area with table after table of working equipment in various configurations. Amateurs could come and try out things before they made a selection of what to buy.

The Dayton of Europe indeed was similar to our Dayton in that the weather was rainy and a bit cold. Like our Dayton, no one left empty-handed. I picked up a Sharp pocket computer with a "built-in" OSCAR program, and a wonderful example of Swedish craftsmanship, a machined brass telegraph key. No, I'm not a c.w. addict, but the key was beautifully made.

We had CQ on display and for sale at the Frech-Verlag booth. They publish several hundred books on electronics and amateur radio. This past Dayton we hosted them at our booth. There were a number of American companies exhibiting their wares at Ham Radio '84. In alphabetical order they were Bob Cushman, WA1QFY, of Cushcraft; Bill Henry, K9GWT, of HAL; Phil Anderson, W0XI, of Kantronics; Nick Zefferys, W7HPZ, of Nye; and Norm Hansen, W0RAN, of Tel-



ex/Hy-Gain. We did practice our German amongst each other, but amateur radio is indeed a universal language.

Before leaving Friedrichshafen I managed to get to the Zeppelin Museum and take a quick tour of the port. It is a beautiful area, and as I said, the local food is very good and very reasonable. At this point I added a few car window decals and some rolled up posters to my luggage. After all, I was a tourist.

My next stop was to be Barcelona, Spain, to meet with our friends at Boixareu Editores, the co-publishers of the Spanish edition of *CQ*. Instead of driving back to Zurich and flying to Barcelona from there, I decided to drive up to Frankfurt and leave from Frankfurt. This also provided a chance to see some of the country and to make a quick stop to see the city from which my grandfather came, Alzey. In Alzey I found two cousins I didn't know I had and exchanged some family history with one. He is into genealogy, and so at this point I added to my luggage about a pound of paper documenting the family back to 1691.

It was about an hour's drive from Alzey to Frankfurt on the Auto Bahn, the German highway system. This is equivalent to the world's longest runway, as the average speed is 100 m.p.h. There is no speed limit, and so no matter what speed you travel, there is someone trying to pass you at all times.

It was a short flight from Frankfurt to Barcelona, and it was a beautiful sight to come into the city at midday. Barcelona is on the Mediterranean and is backed by a range of mountains. Every conceivable bit of space between the sea and the mountains is utilized. It is a very large city with over 4,000,000 people living there, plus what seemed like an equal number of tourists. I arrived just in time to help celebrate the local air traffic controller, hotel, and restaurant strike.

By American standards the work day is rather long, starting at about 8 a.m.



Lunch is from 2 p.m. to 5 p.m., and then back to work until about 7 or 8 p.m. Dinner is usually at 10 p.m. It makes for a very long day.

There are about 40,000 amateurs in Spain. The recent large increase in the number of amateurs is due to a code-free license. The anomaly of this system is that a large segment of Spanish amateurs do operate on c.w. and have done well in c.w. contests. Their c.w. operating, however, is via computers and automatic readers.

In between meetings Carlos Rausa, EA3DFA, the Director of *CQ Radio Amateur* (as it is called there) took me on a whirlwind tour of the city. If I can remember all that I saw it will be a miracle. I think that I saw everything new in the city—that is, everything built after 1221. There wasn't enough time left over to stop and get more film for my camera. The Executive Director of the magazine, Arturo Gabarnet, EA3CUC, had also been in Friedrichshafen, so we got to compare notes on what we had seen. The Editorial Director, Miguel "Michael" Pluvinet, EA3DUJ, is the worrier of the group. He is the one who is responsible for keeping schedules and making sure that everything is complete for production. Heading up the group is Mr. Boixareu, who manages to keep tabs on everything.

Well, Saturday June 30th came all too quickly, and early in the morning Carlos and Arturo picked me up at my hotel for the ride to the airport. My luggage was much heavier than before, as it was load-



Carlos Rausa, EA3DFA, is the Director of the Spanish *CQ* project.



Miguel "Michael" Pluvinet, EA3DUJ, the Editorial Director of the Spanish edition of *CQ*.

ed with books, magazines, posters, German amateur equipment literature, and a heavy Swedish brass telegraph key. It took an hour to check my luggage, and we said goodbye as I went through the customs door. The plane was about an hour late, and I finally settled in for the seven hour flight back to New York. The return trip turned into quite an experience, as bad weather forced the closing of JFK Airport just as we approached New York. Philadelphia closed just as we tried to get there, and we were diverted to Bangor, Maine. After a few hours at Bangor we flew to Dulles in Washington, D.C., so that we could at least clear customs and finally get off the plane—at 2 a.m. Sunday morning. Thousands of stranded passengers were milling around the airport, and the airlines were trying to put the New York bound passengers on buses to the Amtrak train when JFK finally opened. They mercifully put together a make-shift flight of all the leftover New Yorkers, and we flew to New York at about 4 a.m. Anyway, it was one of the longest days I can remember—door to door, Spain to my home in almost 27 hours.

The next day it was back to work, as the deadline for this issue was approaching. Dick commiserated with me as I tried to keep my eyes open. He and his family were supposed to have made the trip with me, but a week before departure one of his daughters broke a bone in her foot, so their plans had to be changed at the last minute. I'm not sure about Dick and his wife, but I know that his daughters would have liked to see Bangor.

73, Alan, K2EEK

NEWS OF CERTIFICATE AND AWARD COLLECTING

The story of the month as told by Dick is:

Richard F. Torrey, AI1Q All Counties #457, 1-7-84

"If I had known that working and collecting QSLs from all 3076 counties would take as long as it did, I don't think I would ever have started. In retrospect, it's a good thing I didn't know, because I would have missed out on meeting so many nice people.

"I got started in County Hunting when I was trying to finish up WAS on 20 meters. Ed Grogan, (K1ZSI, USA-CA #345) suggested that the County Hunters Net would be a good place to start to get the remaining few states I needed.

"My first contact on the Net was with WB5LBT on June 11, 1981. He was mobile in Mississippi, and I sent him an s.a.s.e. and my QSL card. He and quite a few other amateur radio operators were very kind to me, returning their personal QSL cards. Finally, someone told me about an MRC and how to use it. By the time I finished 20 meter WAS, I was hooked on County Hunting.

"County Hunting soon became an integral part of my life. With very few exceptions, part of every day for the next 2½ years was spent County Hunting. I soon bought a TS-120S and started to put out counties. Fortunately for me, my wife, Pat (WB1EEN), is also a ham, and she gave me much needed support as I crossed off county after county. We occasionally take trips, and we both look forward to giving out counties. I do the driving and talking, and she does the writing and navigating.

"I was first licensed in 1979 as WA1YEV and upgraded to Extra Class in 1979 and changed my call to AI1Q. I've been involved in communications for many years. I served in the United States Coast Guard as an aviation radioman from 1956 to 1960. Upon my discharge, I got a job with IBM and have been there close to 25 years working in Field Service. In 1976 I returned to the USCG Reserve and now serve as a chief radioman doing my duty at NMF (Communications Stations Boston).

"I serve as call captain on our local fire department, and am an emergency medical technician. I collected local fire department memorabilia and have Rockland's first motorized fire engine (my second fire engine), which we drive in parades and bring to musters.

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Dick Torrey, AI1Q, All Counties #457, preparing for a mobile trip.



Dick, AI1Q, portrait of a happy mobile radio operator.

"During the years I have taught many classes in communications to the Boy Scouts with whom I work, and I have introduced others to the fun of ham radio through Novice classes.

"Having recently purchased an IBM PC, I set about writing a program to keep my log and information on County Hunting in a usable form. This program can be used to keep information on contacts, and it will also print out MRC's and list counties left to work, etc. It has proven invaluable in keeping information on cards sent and received. I refine the program from time to time to do more steps in keeping the information for County Hunting. It is also valuable and helpful in writing stories and taking care of correspondence concerning County Hunting.

"Working the counties was enjoyable, and I've started around again. Thanks to everyone for your help, and I will see you on the Net. 73, Dick."

Special Honor Roll All Counties

#475 Jack Norman Brower, WA7NNH
4-26-84

#476 George R. Wells, WB0ODS 5-7-84
Doug Williams, KD9Q, All Counties #248, has added the endorsement for All 20 Meter, All Mobile, All S.S.B. to his award.

Awards Issued

Jack Norman Brower, WA7NNH, finished them all and sent for All Counties #475 All 20 Meter Mobile, S.S.B. dated 4-26-84.

George R. Wells, WB0ODS, completed the last ones and sent for USA-CA 3000 #507 and All Counties #476, all C.W., 5-7-84.

Doug Williams, who holds All Counties #248, 9-10-79, has earned a new endorsement for his award. He has added All 20 Meters, All Mobile, All S.S.B., dated 4-28-84.

Lew J. Milligan, WA4OIB, added another gold seal to his certificate. He has qualified for USA-CA 3000 #505, All S.S.B.

George W. Lee, K5HT, has added USA-CA 2500 #563 to his fine collection.

The Siauliai Radio Club of Lithuania, UK2BAS, has added USA-CA 1000 #844, USA-CA #687, USA-CA 2000 #618, and USA-CA 2500 #565, all endorsed Mixed and all #1 to Lithuania.

Michael J. Sheehan, KB1GN, has claimed USA-CA 500 #1942, USA-CA 1000 #840, USA-CA 1500 #685, and USA-CA 2000 #616, all Mixed.

Wilbur Lewis, K0OJG, sent for USA-CA 2000 #619, Mixed.

Eugene "Gene" Goffriller, OE2EGL, has added USA-CA 2000 #620, #1 to Austria, to his certificate.

Richard Sikora, W9GMV, had earned USA-CA 500 #1944 and USA-CA 1000 #841, All S.S.B.

Colin Pollard, N6UH, sent for USA-CA 500 #1947 and USA-CA 1000 #843, All C.W.

USA-CA 500 certificates went to:
Myron D. "Bud" Weisberg, K2YOF, #1941, 4-20-84, All 6 Meter Phone.

USA-CA Honor Roll

3000	UK2BAS	618	N6UH	843
WA4OIB	K0OJG	619	UK2BAS	844
WA7NNH	OE2EGL	620		
WB0ODS			500	
2500	1500		K2YOF	1941
K5HT	KB1GN	685	KB1GN	1942
WA7NNH	WA7NNH	686	KA4SAX	1943
UK2BAS	UK2BAS	687	W9GMV	1944
			WA7NNH	1945
	1000		WB3DNA	1946
2000	KB1GN	840	N6UH	1947
KB1GN	W9GMV	841	EA8RL	1948
WA7NNH	WA7NNH	842	WD9GYX	1949

Michael J. Sheehan, KB1GN, #1942, 4-21-84, Mixed.

Ira L. Bell, KA4SAX, #1943, 4-21-84, All 20 Meter Mobile, S.S.B.

Richard Sikora, W9GMV, #1944, 4-23-84, All S.S.B.

Jack Brower, WA7NNH, #1945, 4-26-84, All 20 Meter Mobile, S.S.B.

Timothy R. Fanus, WB3DNA, #1946, 4-30-84, Mixed.

Colin E. Pollard, N6UH, #1947, 5-4-84, All C.W.

Juan Socorro Garcia, EA8RL, #1948, 5-5-84, All C.W.

Bill D. Walters, WD9GYX, #1949, 5-10-84, Mixed.

New Awards

The Familia Award. The Familia Award is offered by the Diploma Interests Group and is available to all radio amateurs and s.w.l.'s with the following conditions:

The applicant must prove contacts totalling 100 points after January 1, 1980. Contacts with at least two members of the same family count one point for each contact.

The award is available for contacts in c.w., in mixed modes and bands, and on v.h.f. bands.

No QSLs, only GCR list and fee of 7 DM, \$3.00 U.S., or 10 IRCs. Send to Awards Manager, Heinz Louis, DK4KW, Oberforstbacher Strasse, D-5100 Aachen, Germany.



Familia Award.

DIG-Diplom Zodiak 270. In order to advance the activity on the 144 MHz and 432 MHz band in c.w. and s.s.b., the "Diploma Group" (DIG) offers this award to all licensed radio amateurs and s.w.l.'s. The award is available for contacts (or heard QSOs) from October 1982 to December 1984. The applicant has to prove 50 points with log copy for contacts in the following periods:

- 21/03-20/04 Aries
- 21/04-20/05 Taurus
- 21/05-20/06 Gemini
- 21/06-22/07 Cancer
- 23/07-22/08 Leo
- 24/08-23/09 Virgo
- 24/09-23/10 Libra
- 24/10-22/11 Scorpio
- 23/11-21/12 Sagittarius
- 22/12-20/01 Capricorn
- 21/01-19/02 Aquarius
- 20/02-20/03 Pisces

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For 50 points only c.w. and s.s.b. contacts count as follows: s.s.b. contacts on 144 MHz, 1 point; c.w. contacts on 144 MHz, 2 points; s.s.b. contacts on 432 MHz, 3 points; c.w. contacts on 432 MHz, 4 points.

Contest QSOs do not count. For contacts only on c.w., a c.w. award sticker is available.

Applications must be made on a special form which is available from the awards manager for s.a.e. and 1 IRC. Fee for the basic award is 10 DM, or \$5.00 U.S., or 14 IRCs. Address request for special form and applications for award to: Award Manager, Dieter Weckmann, DF8BQ, Alte Reihe 28, D-2817 Dorverden, West Germany.



CWSP Award.

CWSP Award. The CWSP Award is issued by the Grupo de CW de Sao Paulo (CWSP) for all radio amateurs who have worked 5 different members of the group (c.w. mode only). Only valid contacts after December 15, 1976 may be counted.

Logs: Call (suffix in alphabetical order), date, band, and report. Do not send cards, only a list certified by an official radio club or two other radio amateurs.

Fee: 10 IRCs.

Endorsements: 6 (one for each 10 PY2). Log as above plus 1 IRC.

S.w.l.: Same rules.

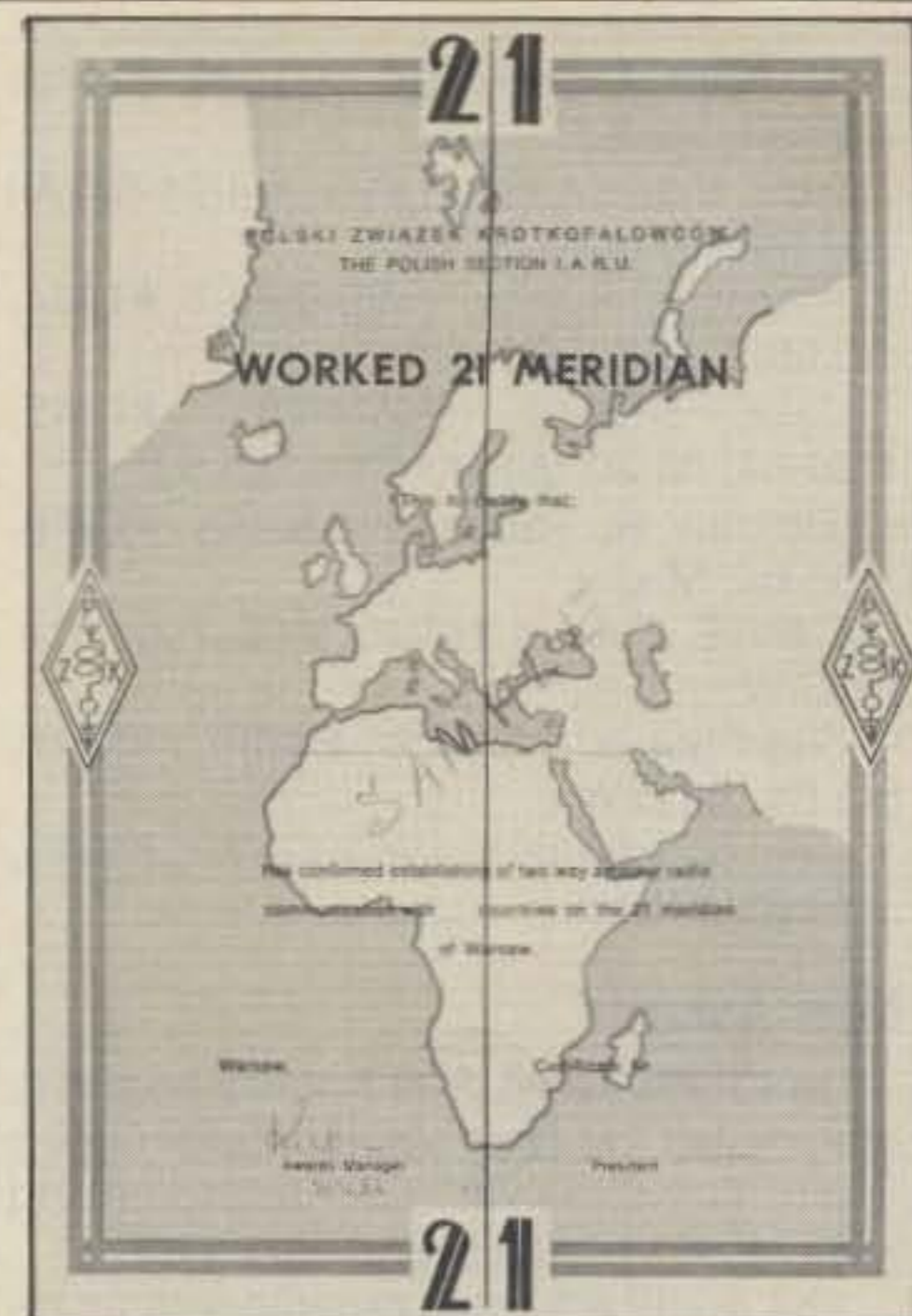


BRCW (Brazil CW Award).

CWSP Members: PY2AA, AC, ACH, ADI, AES, APE, ARX, ASI, ATL, BTR, BWD, BZD, CAR, CJW, CMS, CPU, CZX, DCP, DHP, DML, DRP, DY, EGM, EMM, FEO, FT, FWR, FWT, GCW, GPA, IAP, ICN, IEJ, JN, OE, RAN, RVO, SI, SPA, SUB, SV, SZA, TO, TR, TRD, TUO, UZV, WG, WR, XB, and PY1DG.

BRCW (Brazil CW Award). The BRCW Award is issued by the Grupo de CW de Sao Paulo (CWSP) for any ham radio station who works at least 15 states or territories, including Fernando de Noronha and Trindade Islands from Brazil. Only those who have received the CWSP Award with the six endorsements are eligible. Applications must include the CWSP Award number.

Brazilian States and Territories: PY0 Fernando de Noronha/Trindade Islands;



Worked 21 Meridian Award.

PP1 Espirito Santo; PY1 Rio de Janeiro, PP2 Goais; PY2 Sao Paulo; PY3 Rio Grande do Sul; PY4 Minas Gerais; PP5 Santa Catarina; PY5 Parana; PP6 Sergipe; PY6 Bahia; PP7 Alagoas; PR7 Paraiba; PS7 Rio Grande do Norte; PT7 Ceara; PY7 Pernambuco; PP8 Amazonas; PR8 Maranhao; PS8 Piaui; PT8 Acre; PU8 Amapa; PV8 Roraima; PY8 Para; PY9 Mato Grosso do Sul; PY9 Mato Grosso.

Send application to Grupo de CW de Sao Paulo (CWSP), P.O. Box 15098, 01000 Sao Paulo SP, Brazil, South America.

W-21-M Worked 21st Meridian Awards. This award is issued for working the 16 countries situated on the meridian 21 degrees East: A2, D2, HA, JW, LA, OH, OH0, OK, SM, SP, SV, TL8, TT8, UA2, UP2, UQ2, YO, YU, ZS, ZS3, 5A, 9Q. Send GCR list and fee of 10 IRCs to: Award Manager PZK, Box 320, 00-950 Warszawa, Poland.

Correction: In the April Awards column The Federachi Awards Program, ABCE Award, I wrote, "Prove communications with 100 CE stations in each one of the 80, 40, 20, 15, and 10 meter bands." I should have written, "Prove communications with 1 (One) CE station in each one of the 80, 40, 20, 15, and 10 meter bands." Thanks to CE5CNT for the correction. Please accept my apologies, Roberto!

Notes

In this part of the world the summer holidays are almost finished and the children are preparing to return to school. We look forward to the temperature moderating some and to the fall scenery and harvest season. Best wishes to you in your part of the world.

73, Dorothy, WB9RCY

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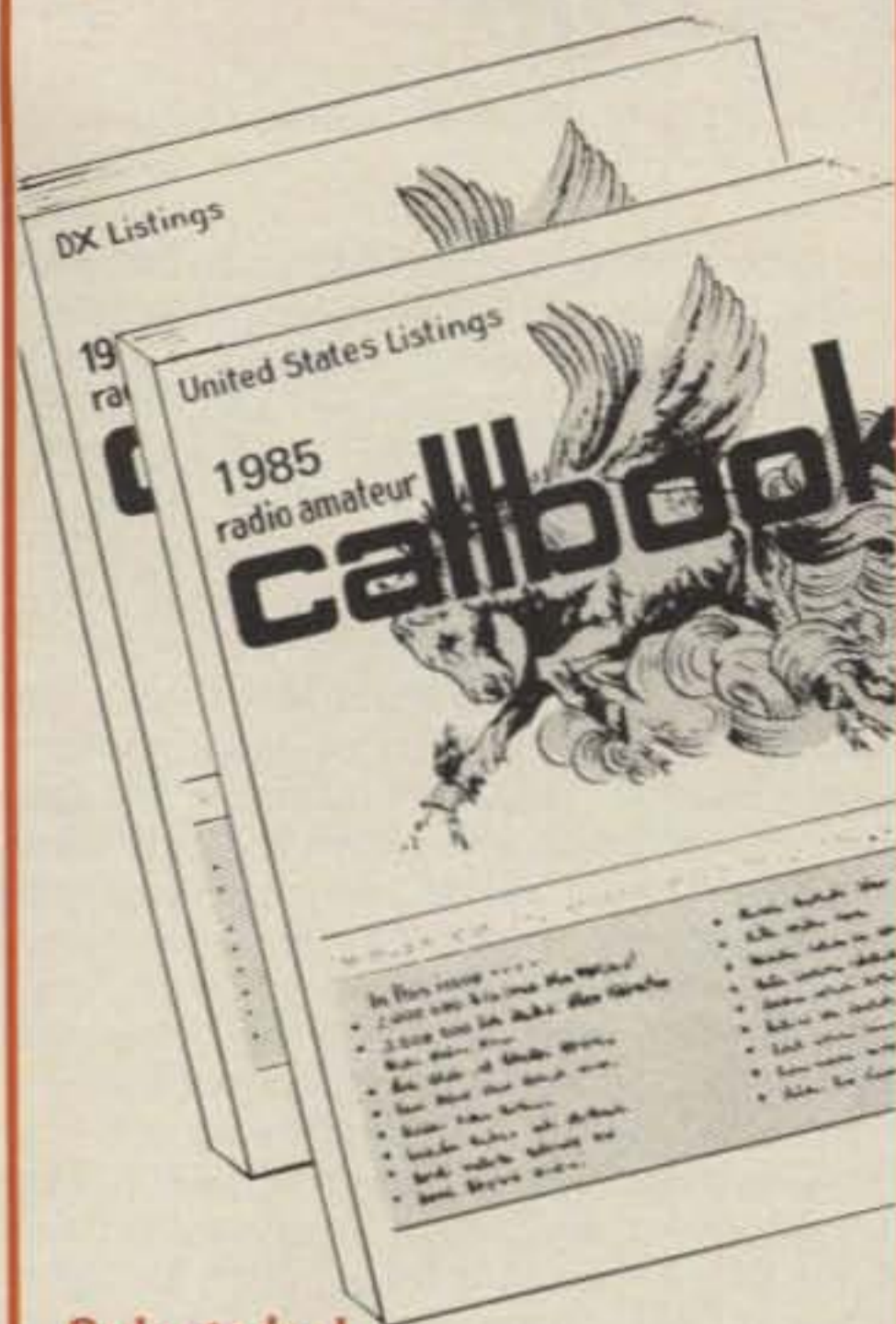
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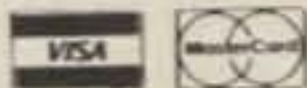
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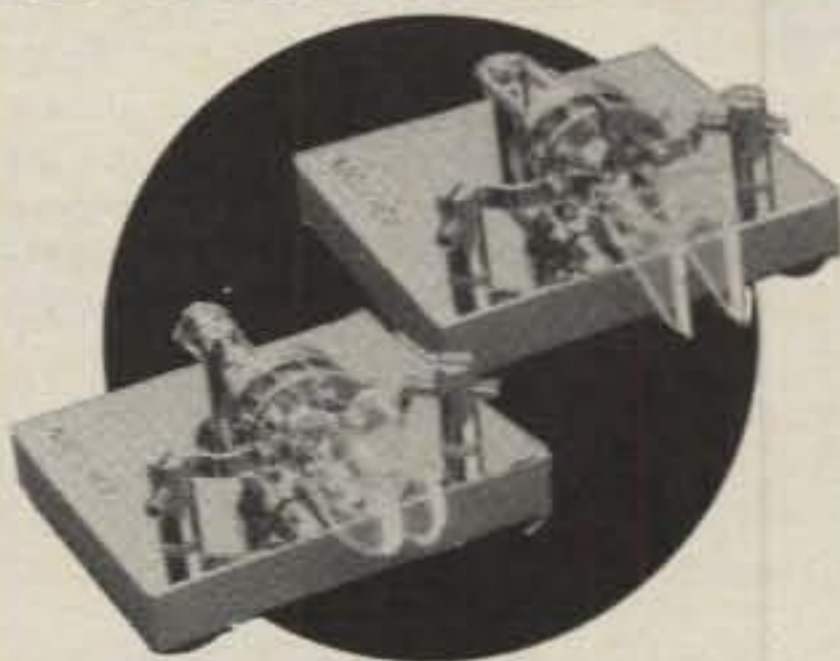
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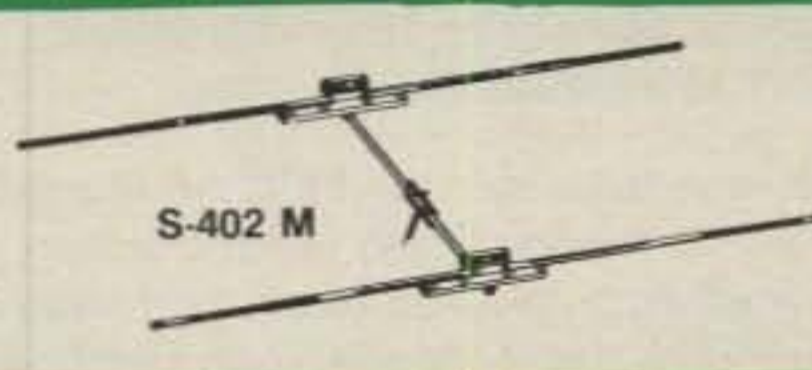
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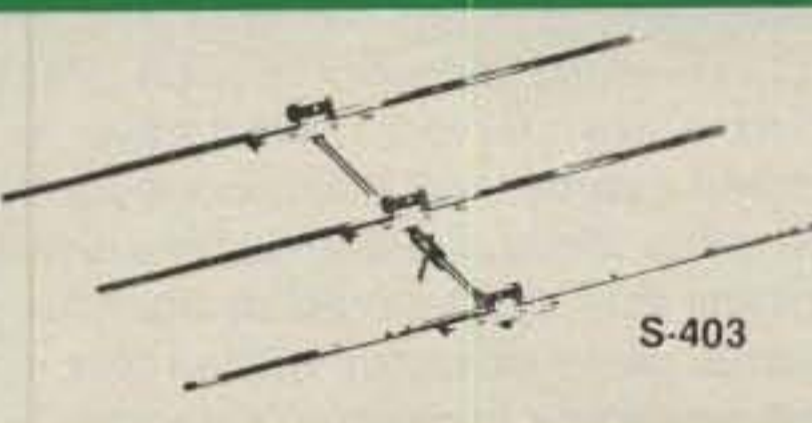
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Ticket Talk

by Dick Bash - KL7IHP

Welcome to the September installment of Ticket Talk, a column devoted to answering questions you may have about the amateur radio listening structure. If you still have questions, please write to me at the address shown below. A reply will be sent to those enclosing a self-addressed, stamped envelope. If you can't wait for an answer, either call me at (415) 278-8275 between 10 a.m. and 6 p.m., Monday through Friday, California time, or call your local FCC Field Office.

Code Tests—A Problem For You?

Every time I get together with a group of amateurs the subject of code tests seems to crop up. For a long time I had fallen into the trap of thinking, "Well, darn it, I had to suffer through it and so do you." After I got into the crazy business of publishing materials for amateurs, it quickly dawned on me that no matter what some high-fangled survey may say to the contrary, there are thousands of amateurs who find no enjoyment at all in code. A heck of a lot of these amateurs either become Novices and let their licenses lapse or become what is popularly called "terminal Techies." I myself was one for almost 10 years! In this month's column I'm going to try to give you some idea of what the current code tests are like, the structure of the material, and a suggestion or three that might help you get past that code test, be it the 13 or 20 w.p.m. test. The 5 w.p.m. test is easy, and there is nothing else to say about it except study for about a week or two using three 20-minute study sessions each day and you'll easily be at 7 w.p.m. A lot of companies, including ours, have tapes available. I will show you what to avoid in tapes. They ain't all good, partner! Some do not meet the FCC specifications; those you should not purchase. The code on those tapes will not be the same as that given by FCC employees or authorized volunteer examiners.

Let's start with the international standards spelled out in CCITT Recommendation R. 140 and adopted in November 1980. For 5 w.p.m. tests the Morse characters are to be sent at 13 w.p.m. and spaced at 5 w.p.m. For all tests each number and punctuation mark shall be counted as two characters.

The modulation rate (in bauds) is said to be equal to the desired code speed in w.p.m. divided by 1.200. For 20 w.p.m. that works out to 16.67 baud if your calculator isn't handy. This formula is based on the standard word "PARIS," which contains 50 so-called *unit intervals* (although our office only can find 43, but Californians never agree with the government, do they?). Each of these "unit intervals" has a specific time length, and its time in milliseconds (ms) is found by dividing 1200 by the number of words per minute. For 20 w.p.m. that comes to 60 ms for each unit interval.

A dit must be equal to one unit interval, and a dah must be equal to three-unit intervals. Thus, at 20 w.p.m. a dit is a tone that lasts 60 ms and a dah lasts 180 ms. Each dit or dah in a character is called an "element," and there

must be a one-unit interval between elements within a character. Between characters there must be a three-unit interval (which is equal to the length of the dah). Between words the FCC wants to see seven-unit intervals. So, again for 20 w.p.m., you'd have a 180 ms space between characters and 420 ms between words. The tolerance permitted in the timing accuracy may vary by $\pm 2\%$.

A critical part of a code test tape is the audio frequency at which the dits and dahs are sent. The CCITT Recommendation R. 140 says they should be no lower than 700 Hertz (Hz) nor higher than 1000 Hz. For you musically inclined types, that means between about treble F and treble B. A little research on your part would reveal what I found: If the same message is sent twice but the first time it's sent at 440 Hz (A over middle C) and the second time it's sent at an audio frequency of 1000 Hz (treble B), a most interesting thing happens. The brain will interpret the higher pitch as *higher speed* even when the message is sent the second time at exactly the same speed as the first. Guess which tone most code tapes use? Between 440 Hz and about 740 Hz (F sharp). Now guess at which tone most code tests are? Right—1000 Hz! It sounds faster but it isn't really. The only companies making code practice tapes that meet these standards are West Radio School (Costa Mesa, CA) and, of course, Bash Educational Services. This isn't intended to be a plug. If any reader makes code tapes and they meet these standards, speak up, because our analysis of the tapes on the market supports the above statement. If you make code tapes and don't meet these standards, then you're cheating the hams who buy your products. Why? You're producing something that is at variance with the exams. That is taboo! I'll be happy to include mention of any other companies who can certify that their tapes meet the above standards.

The Morse code test given at the time of this writing (June 15th) simulates one side of a "typical" c.w. QSO. Common telegraphy abbreviations, Q-signals, and amateur conventions (such as the RST reporting system) are used. Here's the content of a typical 20 w.p.m. test, although it isn't verbatim, so don't memorize it. I'm changing the call signs, etc.

VVV VVV RRR ES TNX FER THE
569 HARRY. UR 589 HR IN SAN
LEANDRO, CALIF WHERE THE
WX IS COOL ES CLEAR ES THE
TEMP IS 69 DEGS. BEVERLEY
IS MY NAME ES I WORK AS A
RECEPTIONIST FER IBM FER
THE PAST 5 YRS. WORK ONLY
40 ES 2 METER BANDS, ES HVE
A DAILY SKED WITH BQ3L IN
WATUSIVILLE. AM RUNNING A
KW FROM MY JS22F TO MY
TRIBANDER UP 18 METERS.

**HVE WORKED 52 STATES, 35
COUNTIES, 7 COUNTRIES.
MUST GO QRT SOON FOR
WORK. HW CPY? KZ2PQG DE
KH5EBV/6 KN AR**

This will give you an idea of the type of material they send. However, *there are several different formats and a multitude of different tests out there.* There is no way to collect them all, so the only solution is to be able to copy the test character for character. Let's face it; all it takes is some effort on your part. I don't like code at all, but I know it isn't impossible to learn to copy 13 w.p.m. honestly, because I did, so there's hope for everyone.

It typically takes a male some 2 to 4 months of **regular** daily practice to get from 5 to 13 w.p.m. To get from 13 to 20 w.p.m. will take a male between 2 to 5 months. Why am I singling out the male half of the population? It isn't to be chauvinistic, by any means. Our research into left/right brain work currently under study in the U.S. and abroad indicates that men *tend* to be left brain learners. That is the side that deals with logic, deductive reasoning, math skills, etc. Females tend (and there are plenty of exceptions) to be right brain learners. That side houses inductive reasoning, communication abilities, etc. The bottom line is that women seem to have an edge with code, which permits them to reach the same code speed as their male counterparts in less time and to reach a higher speed in the same time. Read some of the work by Dr. Roger Sperry at Cal Tech if you're interested in this. The jury is still out on this, but this is what the consensus of the evidence seems to suggest.

Never practice code more than 20 minutes at a sitting. You'll wear yourself out. However, have two to three 20-minute sessions *each day.* At the end of 30 days you will be amazed at your speed. Also, you cannot do it with only code tapes. You really need to get on the air, and work some QSO's. Don't be shy! Get on the Novice class bands and call CQ. Only send as fast as you yourself can copy. If someone comes back to you at 90 miles a minute, don't try to get them to slow down—ignore them! Keep calling until you find some patient soul who'll work with you at a speed with which you can cope. When you send out the CQ, send CQ three times, the letters DE, then your call sign three times, and finally the letter K. Our Novice class book and some of the ARRL's publications contain sample QSO's. Read 'em, mimic them, and you'll be just fine. See the July issue of *CQ* for a listing of the Novice frequencies in this column if you're not familiar with the correct ones. Just be sure you don't transmit more than 200 watts PEP! Turn off that linear!

If you happen to be a VEC reading this, I beg you to instruct your volunteer examiners to p-l-e-a-s-e use a quality tape recorder when they send the code test. It seems that some examiners are related to the Son of Sam and gain some sort of sadistic pleasure in making life rough for the person taking the code test. Hey, anyone taking a code test is as nervous as a cat on the proverbial hot tin roof. If the tape recorder in use yields a lot of wow and flutter, it just makes copying it that much harder. Don't you recall how nervous *you* were when you took your 13 and/or 20 w.p.m. test? Give these hams a break, please. Also, please see that the room in which the code test is given has curtains or drapes and not bare walls. Lastly, Telex makes a unit that has a

tape recorder with several headsets attached to it, which makes giving code tests a piece of cake. Get your examiners to get a unit like this.

Code: That word instills fear, just like the word *shark*. If we must have the darn stuff as a qualification for exams, then you as a ham must become more knowledgeable and more cunning. Try practicing as I have mentioned earlier. Examiners and VEC's, the FCC is finally getting out of the testing business. Now you can demonstrate the way it *should* be done. If you aren't sure, check with Charley and Judy Fry in Dayton. They did a bang-up job when they administered exams at the Dayton Hamvention this year.

As you shop for your practice code tapes, tell your dealer to **only sell you one that meets the CCITT Recommendation R. 140.** This will assure you that your money is being well spent. It will also force other manufacturers of code practice tapes to meet these important standards. As a ham working on passing a code test, you need all the help you can get. Insist on it!

If you are a whiz at computer programming on the popular micros, would you please bang out a program that will allow a user to load the disk, type in the w.p.m. he or she desires, type in the message he or she wants to hear in code, and then have the program generate the code and meet these Morse code standards. Figure out a way for the user to enter the desired frequency and limit the selection to between 700 and 1000 Hz. Now I am reasonably skilled at BASIC programming for business applications, but this is out of my league (no pun intended!). What you need to do is make this program PUBLIC DOMAIN. I'll even help get the listing published at no charge! You could even put out some disk versions of it and sell it dirt cheap. Hams *will* buy it! If you like a challenge, there it is. Ham radio needs these things desperately to progress. Get your program to work on a computer that has a chip to generate tones or, if that isn't feasible, the ham can take the output and run it through some black box oscillator unit such as AEA makes, etc.

The next challenge is to that special reader who is or will soon be in grad school. Do you realize that I have found no one anywhere who ever did research at the graduate level on code? Surely in 1984 there must be better ways of learning code and/or improving speed than what I have seen and discovered so far. Let's apply some of the talent you have and then *find a better way!* If you have the talent, are enrolled or will soon be enrolled in a graduate course of studies at a recognized university anywhere in the world (Americans, wake up!) specializing in a field of learning or hard science, and want some financial help to do a master's thesis on this, *call me!* If you can find a solution, you'll be rich beyond your wildest dreams! Do you realize that the method of teaching this stuff fundamentally hasn't changed since Morse came up with it in the 1840s? I find it impossible to believe that a better solution cannot be found. The military, the numerous alphabet-soup agencies of the government, private industry, and *hundreds of thousands* of hams would put you up for the Nobel prize! Gads, I'm starting to sound like my good friend who's a publisher of a competing magazine, but it's true! Make some magic!

That's it for this month. Code can be mastered and *you* can do it. See you in October. 73 de KL7IHP.

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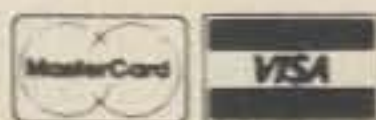
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	HD73	CD45 II	HAM IV
Output Torque	400 in. lbs.	600 in. lbs.	800 in. lbs.
Gears	Plastic and Steel	All Steel	All Steel
Control Box Weight	3.8 lbs.	6.8 lbs.	6.8 lbs.
Rotor Unit Weight	6.5 lbs.	8.5 lbs.	10.5 lbs.
Direction Indicator Potentiometer	Carbon	Precision wire wound	Precision wire wound
Rotation Limiter	Mechanical stop only	Limit switches with mechanical stop	Limit switches with mechanical stop
Braking Power	1600 in. lbs. “Windmilling”	800 in. lbs. “Holding”	5000 in. lbs. “Holding”
Antenna Size Rating	10.7 sq. ft.	8.5 sq. ft.	15 sq. ft.

Wind load rating is an important specification too. Unfortunately, there is no standard method of measurement. For example, a long boom antenna with an unbalanced wind load is a much tougher problem than the calculated square area of the antenna would suggest. So we take a conservative “worst case” approach and rate the CD45 II at 8.5 square feet. Yet, the HD73, a lighter unit, is rated at 10.7 square feet. You be the judge.

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CD45 II—Recommended for a 3 element tribander such as our Explorer 14. Will also manage a medium sized VHF stack and is a good choice for the Azimuth rotator on a good sized satellite system.

HAM IV—A favorite for long boom tribanders such as our TH7DX. Would also be a good choice for an Explorer 14 stacked with a VHF DX antenna or a satellite system.

HAM SP—A modified Ham IV with a special control unit for a blind operator. Single knob directional control system includes a compass rose with braille markings. An audible beep indicates rotator start and stop.



T2X—The well-known Tail Twister manages combinations such as a TH7DX stacked with a small 2 element 40 meter beam. Also a great choice for a substantial VHF “weak signal” array. Of course, the ever popular stack of 3 or 4 element 10, 15, and 20 meter monobanders is a safe match for the T2X.

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HDR300



AR40



CD45 II



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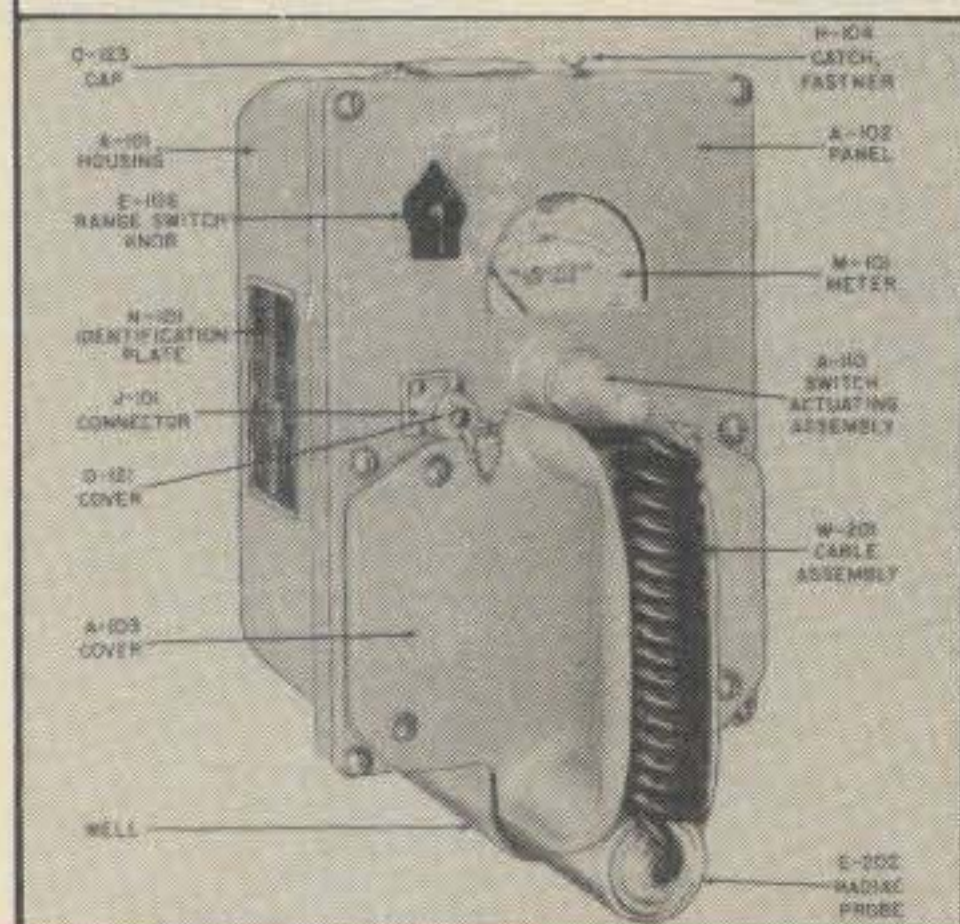
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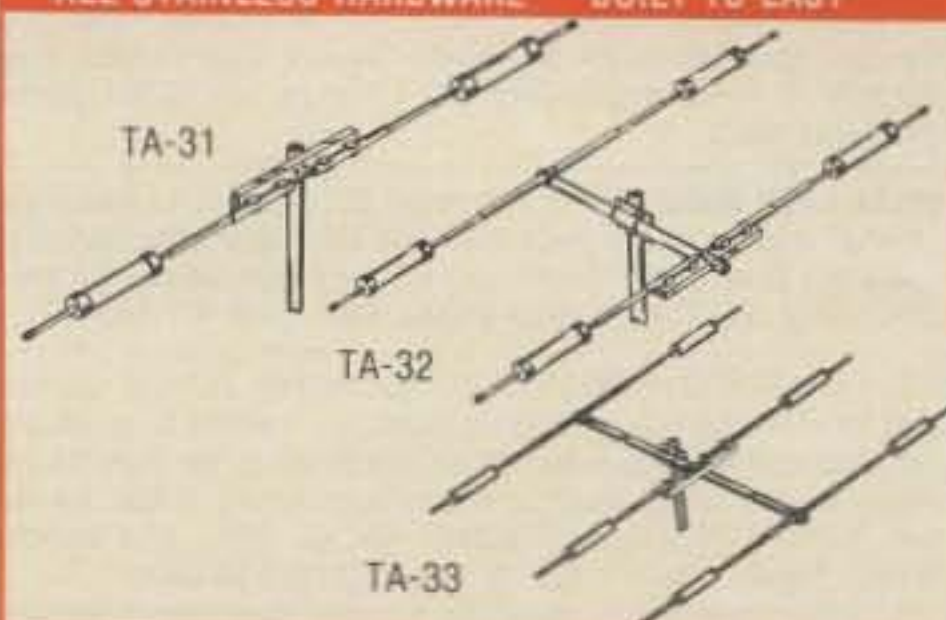
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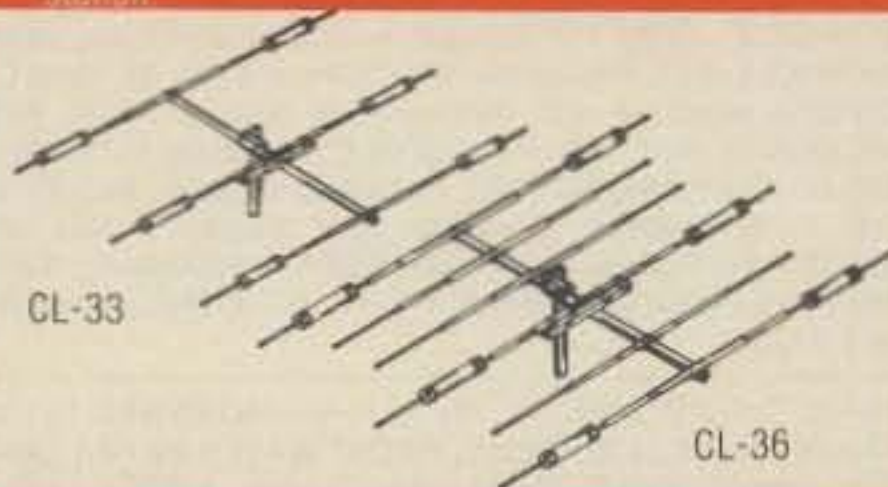
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FT-102 ARO's: You're invited to write or call me. Will share my FT-102 experiences with you in exchange for yours. KA2PSQ (212) 729-0714.

I AM LOOKING FOR MR-2000 Morse receive board for HAL DS2050 KSR. Please write to SV1MO, 34 Mykinon Str., GR17673 Kallithea, GREECE.

FOR SALE: Palomar Engineers RX Noise Bridge. New, \$40. W5IHD, 9739 Ebb, Houston, TX 77089.

OLD CALLBOOKS AND OPERATING MANUALS FOR SALE: PRICES INCLUDE MAILING. 1981 DX and U.S. Callbooks, \$6.00 each. 1979 DX and U.S. Callbooks, \$4.50 each. Winter 1963-64 DX Callbook, \$25.00. Winter 1962-63 DX Callbook, \$30.00. Operating manual for Hallicrafters SR-150 transceiver, \$15.00. Operating manual for Atlas 210X/215X transceivers, \$15.00. Instruction sheet #20 for Ten-Tec PM3 transceiver, \$5.00. K4IIF, P.O. Box 205, Winter Haven, FL 33880, phone (813) 324-4122.

VACATION ANTENNAS: Antenna Supermarket AV-1 Portable Antenna, used one weekend, \$75.00. B&W Portable Whip Antenna, like new, \$35.00. K4IIF, P.O. Box 205, Winter Haven, FL 33880, phone (813) 324-4122.

WANTED: US Callbook Volume 38 Issue 3 Winter 60-61, \$25. K7MF, Rt. 1 Box 114, Vaughn, WA 98394.

WANT 72' E-Z-Way tower; SA1480 coax switch; digital GMT clock; Auto-Mate K5/50 keyer manual; two 8-ohm outdoor speakers. W4EOB, 1412 Winkler Ave., Fort Myers, FL 33901.

SELL: Drake, Heath, etc., reasonable. Sase for price list. Joe Bedlovies, 241 Dover St., Bridgeport, CT 06610.

CLIPPERTON "L" with 10M, \$475; TEN-TEC "Delta" transceivers with noise-blanker installed, \$595; TEN-TEC speech processor \$85. IC255A 2M transceiver, \$225; 3-element 2M quad, \$30; MFJ-949B antenna tuner, \$100. All mint, FOB. L. Basham, 735 Caves Hwy., Cave Junction, OR 97523.

CANADIAN HAMS: Heath HR-1680 rcvr, HS-1661 spkr, HW-8 xcvr, HD-1250 dipper, SA-5010 uMatic Keyer. R. W. Boyd, Box 793 Stn "A," Montreal, P.Q. H3C 2V5, phone (514) 486-9902 after 18:00 hrs.

FOR SALE: Carbon and W.W. Resistors; Pots; Transformers—audio, output, power; other parts (leftover from radio and TV servicing). Phone 212-845-4756. T. Wojciechowski, 101-45 94th St., Ozone Park, NY 11416 (SASE).

SELL: Antique molded mica capacitors, all sizes, voltages, manufacturers. Also collection receiving tubes only \$1.00 each. W5QJT, P.O. Box 13151, El Paso, TX 79913.

WANTED: SWAN 508 VFO, SWAN Mark 11 Linear amp, SWAN VX-2VOX, SWAN DD-76 digital. Will pay reasonable price plus ship private or dealer. JLB, 413 Brazeau Ave., Oconto, WI 54153, phone 414-834-5230.

HAMMARLUND HQ-110C receiver. Very nice condition with manual, \$115. You pay shipping. Chuck, W9VZR, 4627 N. Bartlett, Milwaukee, WI 53211.

CLEANING HOUSE of small items of gear and books and magazines. SASE for list. James R. Shank, 21 Terrace Lane, Elizabethtown, PA 17022.

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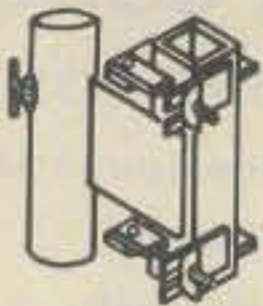
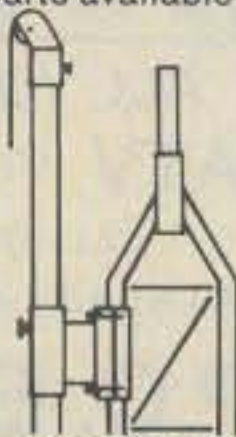
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INSTRUCTOGRAPH WANTED, late model with tapes. Russ Merrill, 15 Middle Street, Oakland, ME 04963, phone 207-465-2254.

DENTRON MLX-250 wanted. Also need 1CP1 scope tube. KBHCZ, Griebel, R1 Lake Pond Rd., Parksville, KY 40464.

FOR SALE: CQ, QST, 73, Ham Radio, Radio & TV, Electronic Servicing, PF Reporter, plus others. 10 cents each plus postage. Send SASE (long envelope) for list. John M. Sulak, WBUMR, R.D. 2 Box 109, Wellsburg, WV 26070.

WANTED: Regency ATC-1 pen cell powered mobile ham band converter; Heath SB640 VFO. WA9VKT, Oliver Zivney, Stronghurst, IL 61480, phone 309-924-1208.

FOR SALE: Sencore CR31 CRT tester and beam builder, mint, \$500 inc. UPS. Hewlett-Packard 4 1/2 x 2 1/2 50831551 CRT tube \$10 inc. UPS. Hundreds of new and old type tubes and misc. telephone equipment. Robert Bradley, 1002 Forest Road, La Grange Park, IL 60525.

APPLE IIe or II + programs for trade. Send me your programs and I'll pay for shipping and disks. N6IMY, Mike Klemens, 3208 Los Prados, San Mateo, CA 94403.

WANTED: Sinclair ZX-81, Timex 1000 PC's in good working condition. Please state price and if PC was kit or factory wired. W.C., KU5AK, Box 33081, San Antonio, TX 78265.

WANTED: 160 meter mobile antenna. WB6USZ, Patrick O'Bryan, 1728 Townley Circle, Simi Valley, CA 93063. Phone (800) 421-1824 X1651, or (213) 615-0311 X1651.

BOUGHT TRIBANDER, have one month old Hy-Gain 103BA-S 3-element 10 meter monobander. \$50 freight paid. K6EID, 8913 Enfield Ave., Northridge, CA 91325.

COLLECTORS: Have Radio Craft/Radio Electronic magazines from 1937 through 1955, almost consecutive. Make offer. W6RFM, 1241 West 13th Avenue, Escondido, CA 92025.

2KVA POWER TRANSFORMER: 120/240V pri, two 16V/63A secs. New, \$50.00 ea. Add shipping, 39 lbs. W. Worley, 305 Hickory Bend, Enterprise, AL 36330, phone (205) 347-5281.

WANTED: Used Drake MN-4 Tuner or Dentron 160-10 Super-Tuner with Balun. WB0RXF, T. Max Beaver, Leola, SD, phone 605-439-3202.

CHECK YOUR JUNK BOX for telegraph keys for my collection. Advise on ID, condx, and cost. Dick Randall, K6ARE, 1263 Lakehurst Rd., Livermore, CA 94550.

WANTED: TM11-856A, TM11-5820-270-10, and MIL-R-12887 manuals. C. T. Huth, 146 Schonhardt St., Tiffin, OH 44883.

MUST SELL: Hallicrafters S-22R, HT-46. National NC-101XA w/spkr. 86 copies QST 1944-1968. 128 copies CQ 1949-1970. 74 copies DX mag. 1961-1964. Magazine list available w/sase. Make offer, buyer ships. W6PBI, P.O. Box 5973, Orange, CA 92667, phone (714) 639-3202.

HEATHKIT HW 101, HP23A, Power Supply, matching speaker, mint condition, new tubes, sacrifice, \$225.00 u-ship. Gary, KA3LNN, 321 E. Northview Ave., New Castle, PA 16105, phone 412-654-6202.

WANTED: Kenwood Spkr/Mic SMC-24 for TR-2400 or circuit for same. KD8LZ, 1813 Greenbriar, Kalamazoo, MI 49008.

MFJ900 ANTENNA TUNER, 200 watt econo tuner. Never used. \$40 postpaid. Bob Craig, K6XZ, 5519 El Encanto Circle, Santa Rosa, CA 95405, phone (707) 539-0316.

WANTED: Junk, non-working Collins 32S3 transmitter, or equivalent, for replacement parts. Nate Williams, W9GXR, 6915 Prairie Drive, Middleton, WI 53562.

WANTED: Manual and/or schematic for SWAN Cygnet 300B. Will buy or pay photocopying and mailing costs. George Brand, WA8SCO, P.O. Box 506, Lewiston, MI 49756.

SELLING BRAND NEW COMPONENTS: TTL, Memory, etc. Excellent prices. SASE for list. N3IK, RD#1, Box 181A, Kunkletown, PA 18058.

AM INTERESTED IN LOCATING OTHERS who lost something when Dentron Radio of Ohio folded. Gary Mitchell, KH8AC, Box 320, Sunol, CA 94586.

WANTED: Heathkit SB-614 Station Monitor. Send price to Frank Moorhead, 3626 So. M St., Tacoma, WA 98408, phone 206-472-0526, W7DWW.

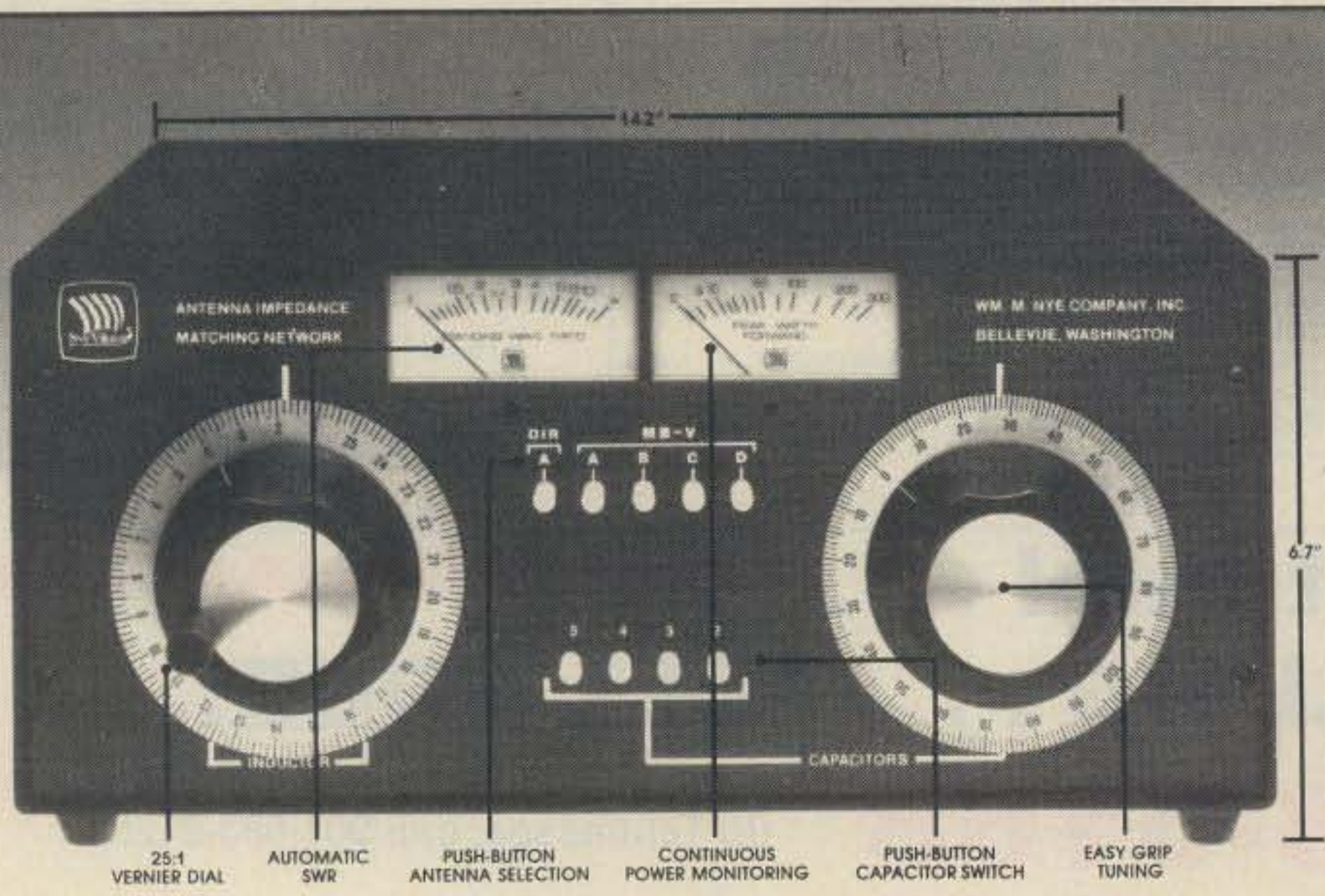
DOES ANYONE HAVE a mint Heath HW-2021 HT that they would like to sell for \$50? N9JZ, 121 Hilton, Elgin, IL 60120.

FOR SALE: Mint Condition Kenwood Twins, T-599D Transmitter and R599D Receiver E/W 2 and 6 Meter converters. Complete with all cables and manuals. \$400, cash and carry. WB3HNC, Palmyra, PA 17078.

WANTED: Schematic/service manual for D&A Phantom 500 linear amplifier (gray cabinet). Robert Merritt, KA4BYP, 2207 Stone St., Opelika, AL 36801.

FOR SALE: Heath HW-101 CW filter, new finals, custom-built full-wave power supply \$300. Regency HR212 load with xtal \$75. Collins F455FA 216712 filter \$35. W9AUO, R3 Box 96, Bloomington, IL 61701.

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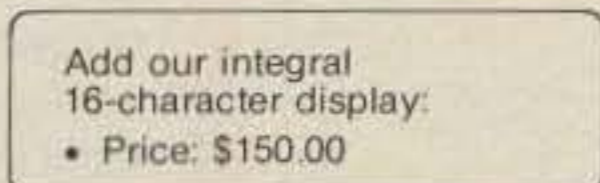
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FOR SALE: Dentron Model MLA-2500 linear amplifier \$475. Kenwood Model TR-9000 2 meter FM all-mode transceiver \$300. Kenwood Model PS-20 regulated 4.5 amp DC power supply \$50. Please call: Wm. Shevtchuk, 1 Lois Ave., Clifton, NJ 07014, phone 201-471-3798.

HALLICRAFTER Power Supply Model P-2000, 115/230 VAC, Estate sale, \$150. Call Paul 1-219-932-2196.

S-LINE KWM-2, 312B5, 30S1. One owner, all cables, manuals, plus many other extras. W3CJL, phone 215-433-4485, \$2650, or best offer.

WANTED: Pictorial and wiring diagrams for HP oscilloscope model 150, also for 152-B amplifier. Send info to Charlie Weiss, 3625 Lochlane, N/L.R., Arkansas 72116.

WANTED: One HV transformer and one fill and bias transformer for Heath SB-220 linear. James Gillespie, K4IYN, 1297 54th St. No., St. Petersburg, FL 33710.

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FOR SALE: Azden 3000 \$150; IC-230 \$100; Midland 13-500C \$75; Lafayette Receiver 6-80 meters \$80; Azden FM-102800 \$150; Swan 350A 10-80 meter built-in AC \$200. Send SASE for more information to ARS, P.O. Box 518, Whitehouse, FL 32220.

WANTED: Timex/Sinclair 1000 accessories and software. Also old hand keys for collection, any type. Heath GH-17 soldering iron and IM-103 line voltage monitor, also automotive load type battery tester and solar panel. Tom Codrington, WB6AWC, 7825 Scotts Valley Road, Lakeport, CA 95453.

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Can't afford \$1000 for a terminal unit? Disappointed with the poor copy from your cheap computer interface? Then the Palomar CI-103 is for you.

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FT-757GX Line Affordable Excellence

GENERAL COVERAGE

Continuous coverage on RX from 500 kHz to 29.99 MHz in 10 Hz steps, with easy modification for MARS TX outside the Ham bands. WARC bands factory installed.

ACCESSORIES FACTORY PACKED

Electronic keyer, 600 Hz CW filter, speech processor, AM and FM units, all-mode squelch, Woodpecker noise blanker, and receiver preamp... all included in the base price, not expensive options!

FULL PERFORMANCE

Full CW QSK, full 100 watts output at 100% duty cycle (SSB/CW/FM), and full microprocessor control with dual VFOs, eight memories with bilateral memory/VFO swap, and personal computer (CAT System) compatibility make the FT-757GX a winner, at home or away.

FT-757GX ACCESSORIES

FP-757GX Switching Power Supply, FP-757HD Heavy Duty Power Supply (for 100% duty cycle operation), FC-757AT Automatic Antenna Tuner with Memory, FAS-1-4R Remote Antenna Selector, SP-102 Speaker with Audio Filters, MD-1B8 Desk Mic, MH-1B8 Hand Mic, FIF-232C Computer Interface Module.

FT-203R Line The Compact Companion

ULTRA-COMPACT DESIGN

Chip components installed by Yaesu's assembly robots significantly reduce circuit board size, resulting in a rugged, reliable transceiver with a weight of only 450g, including the standard FNB-3 battery.

HANDS-FREE VOX

A VOX (voice-actuated transmit) unit is built-in, allowing hands-free operation when the optional YH-2 Headset is used. Ideal for tower work, public safety, or other applications where manual PTT control is inadvisable. Level control provided.

FULL FLEXIBILITY

Built-in S-meter, thumbwheel frequency programming, HI/LOW power switch, busy channel and transmit indicators are standard. DTMF Encoder versions, as well as 220 MHz and 440 MHz lines, are coming soon!

FT-203R ACCESSORIES

FTS-7 CTCSS Module, FBA-5 AA Cell Case, YH-2 Headset, MH-12 Speaker/Mic, FNB-4 High-Capacity Battery, PA-3 Mobile Adapter, MMB-21 Mobile Hanger, NC-15 Quick Charger/AC Adapter, FTT-3 DTMF Keypad.

Next time you're in the market for a better rig, ask about Yaesu. Designed with care and built with pride, your Yaesu will get you through!

Prices and specifications subject to change without notice or obligation.



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CIRCLE 8 ON READER SERVICE CARD

ICOM IC-745

160-10 MTR 100W XCVR / 0.1-30MHz RCVR



The IC-745 represents a major breakthrough in the ham industry...a full featured HF base station transceiver with a combination of standard features found on no other transceiver in its price range.

Compare these exceptional standard features:

- 100KHz - 30MHz Receiver
- 16 Memories
- 100% Transmit Duty Cycle Transmitter with exceptionally low distortion
- IF Shift AND Passband Tuning
- Receiver Preamp
- 10Hz/50Hz/1KHz Tuning Rates with 1MHz band steps
- Adjustable Noise Blanker (width and level)
- Continuously Adjustable AGC with an OFF position
- Full function Metering with a built-in SWR Bridge
- Optional Internal AC Power Supply

CIRCLE 17 ON READER SERVICE CARD



IC-PS30 System Power Supply

IC-SM6 Base Mic

Other Standard Features.

Included as standard are many of the features most asked for by experienced ham radio operators: dual VFO's, RF speech compressor, tunable notch filter, all-mode squelch, program band scan, memory scan (frequency and modes are stored), receiver and transmitter incremental tuning and VOX. ICOM's proven transceiver designs and technology are used in the IC-745 all ham band transceiver which includes SSB, CW, RTTY, AM receive and an optional FM plus a 100KHz to 30MHz general coverage receiver.

ICOM System.

The IC-745 is compatible with ICOM's full line of standard HF accessories.

Accessories available include the IC-PS15 base supply, IC-PS30 system power supply (switching), IC-PS35 internal power supply, the IC-2KL linear amplifier, AT100 automatic antenna tuner, AT500 automatic antenna tuner, HP1 headphones, and HM12 hand or SM6 base microphone.

Options. The EX241 marker and EX242 FM module, plus a wide variety of filters for sharp audio reception are available.

Filter	-6dB Width	Center Freq. MHz
FL45	500 Hz	9.000
FL53A	270 Hz	9.000
FL44A	2.1 KHz	0.455
FL52A	500 Hz	0.455
FL54	250 Hz	0.455

The IC-745 is the only transceiver today that has such features standard...the number of options and accessories available...and such an affordable price.



IC-745 Shown with IC-PS35 Internal Power Supply.



ICOM

The World System