QST

November 1975
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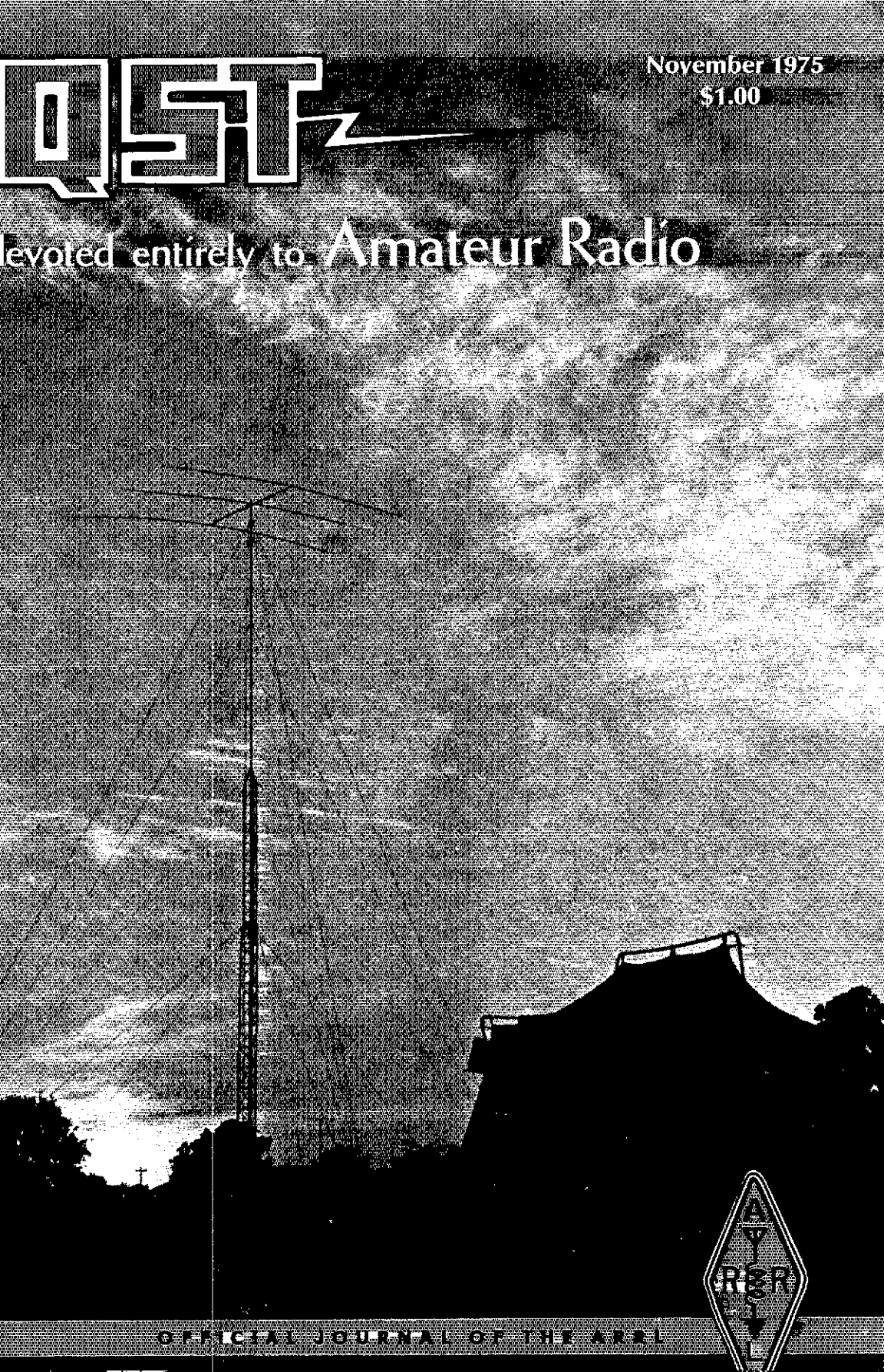
devoted entirely to Amateur Radio



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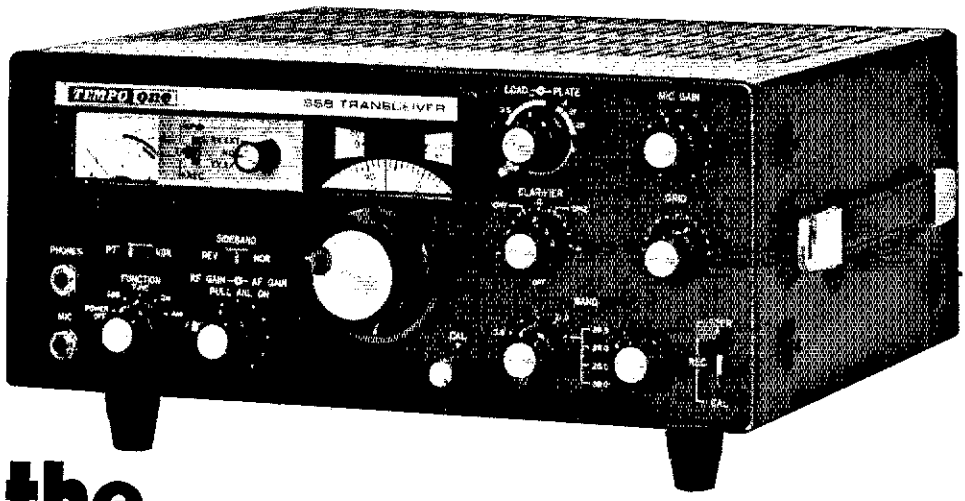

the tempo "ONE"

SSB TRANSCEIVER

. . . a proven name, a proven value. Look at the specifications, look at the price tag, ask any of the thousands of Tempo ONE owners about its reliability . . . and the reason for its unparalleled popularity will be obvious.

SPECIFICATIONS

FREQUENCY RANGE: All amateur bands 80 through 10 meters, in five 500 khz. ranges: 3.5-4 mhz., 7-7.5 mhz., 14-14.5 mhz., 21-21.5 mhz., 28.5-29 mhz. (Crystals optionally available for ranges 28-28.5, 29-29.5, 29.5-30 mhz.)

SOLID STATE VFO: Very stable Colpitts circuit with transistor buffer provides linear tuning over the range 5-5.5 mhz. A passband filter at output is tuned to pass the 5-5.5 mhz. range.

RECEIVER OFFSET TUNING (CLARIFIER): Provides ±5 khz. variation of receiver tuning when switched ON.

DIAL CALIBRATION: Vernier scale marked with one kilohertz divisions. Main tuning dial calibrated 0-500 with 50 khz. points.

FREQUENCY STABILITY: Less than 100 cycles afte warm-up, and less than 100 cycles for plus or minus 109 line voltage change.

MODES OF OPERATION: SSB upper and lowe sideband, CW and AM.

INPUT POWER: 300 watts PEP, 240 watts CW

ANTENNA IMPEDANCE: 50-75 ohms

CARRIER SUPPRESSION: -40 dB or better

SIDEBAND SUPPRESSION: -50 dB at 1000 CPS

THIRD ORDER INTERMODULATION PRODUCTS: -30 dB (PEP)

AF BANDWIDTH: 300-2700 cps

RECEIVER SENSITIVITY: 1/2 μv input S/N 10 dB

AGC: Fast attack slow decay for SSB and CW.

SELECTIVITY: 2.3 khz. (-6 dB), 4 khz. (-60 dB)

IMAGE REJECTION: More than 50 dB.

AUDIO OUTPUT: 1 watt at 10% distortion.

AUDIO OUTPUT IMPEDANCE: 8 ohms and 600 ohms

POWER SUPPLY: Separate AC or DC required. See AC "ONE" and DC "ONE" below.

TUBES AND SEMICONDUCTORS: 16 tubes, 15 diodes, 7 transistors

TEMPO "ONE" TRANSCEIVER	$389.00
AC/ONE POWER SUPPLY	
117/230 volt 50/60 cycle . . .	$99.00
DC/1-A POWER SUPPLY 12 volts DC	$120.00

Prices subject to change without notic

The Tempo line is available at select dealers throughout the U.S.

Henry Radio

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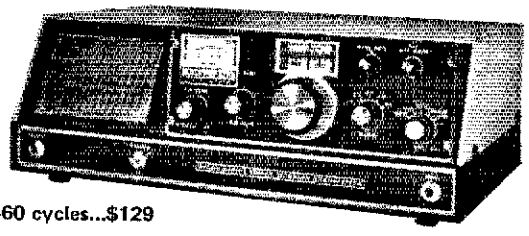

FREQUENCY RANGES, Atlas-210:3700-4050, 7000-7350, 14,000-14,350, 21,100-21,450, and 28,400-29,100 KHz, Model 215 deletes 28,400-29,100 band, and instead covers 1800-2000 KHz.
POWER RATING: 200 watts P.E.P. input and CW input. *On 10 meters the power rating is 120 watts.
PLUG-IN DESIGN, for quick removal from mobile mounting, and insertion into AC Console as illustrated.
PRICE: Model 210 or 215...$599 • AC console, 117V 50-60 cycles...$129 • AC console, 117-230V...$139 • Mobile plug-in kit...$44

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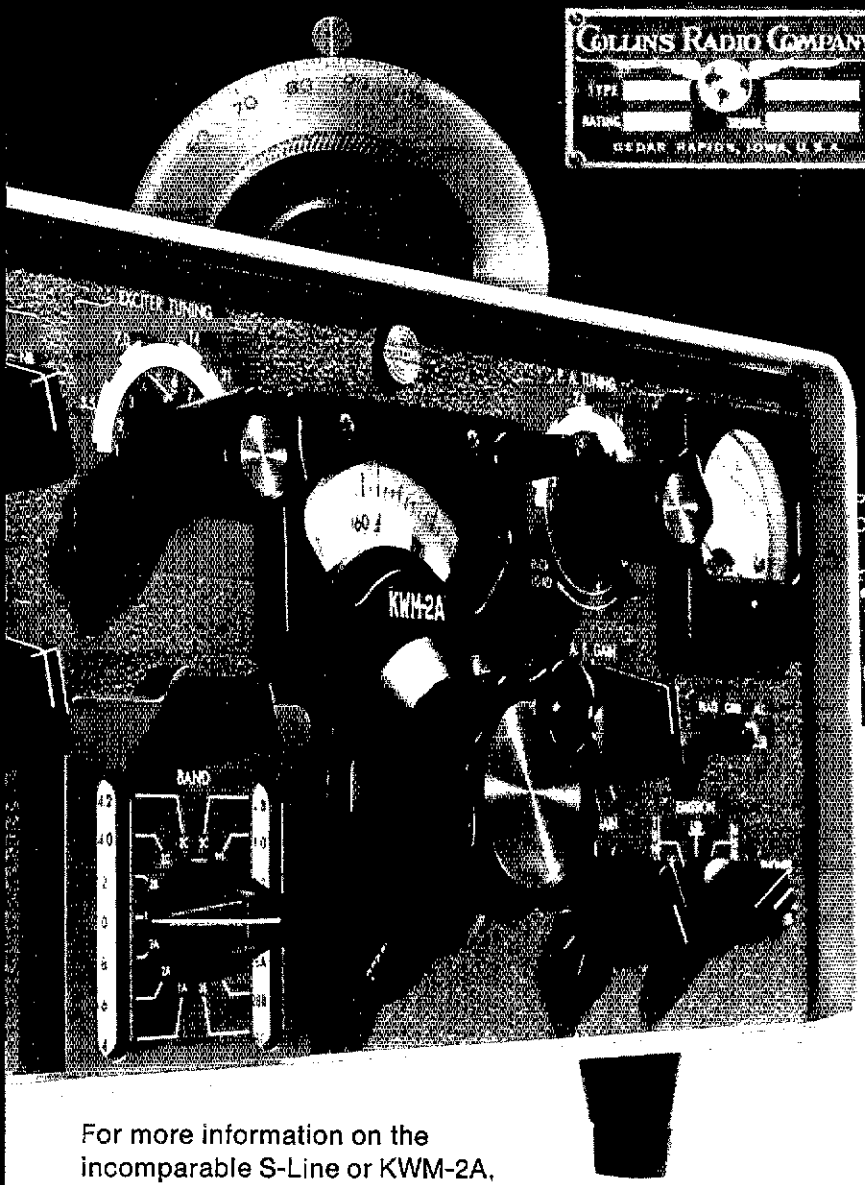

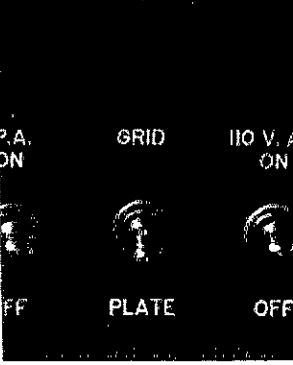

1975

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QST

November 1975

Volume LIX Number 11

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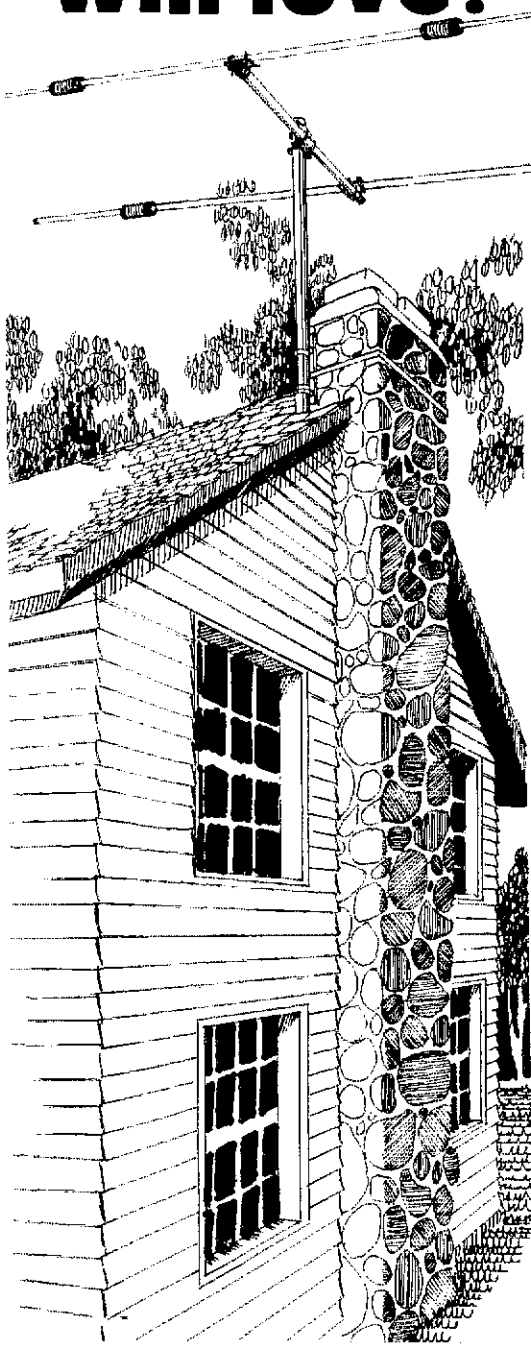
OUR COVER We hope skies were as clear for *your* field day as they were for WA9UMU/9, the Glen Gates Gang. See results page 54.

— CONTENTS —

YES!
There is an antenna that your neighbors will love!



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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each section. Radio club reports are also desired by SCMs for inclusion in *QST*. ARRL Field Organization station appointments are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS, or VHF PAM. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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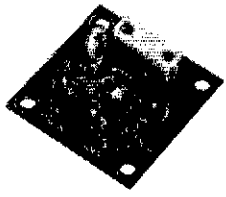

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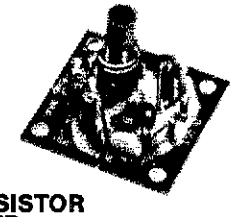

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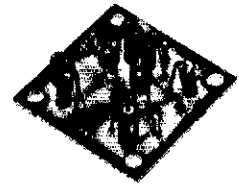

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

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Box 190, Wilson, KS 67490
Vice-Director: Richard W. Pitner . . . . WØFZO
2931 Pierce St., Sioux City, IA 51104

New England Division

JOHN C. SULLIVAN W1HHR
Whitney Road, Columbia, CT 06237
Vice-Director: John F. Lindholm W1DGL
P.O. Box 1695, Bristol, CT 06010

Northwestern Division

ROBERT B. THURSTON* W7PGY
7700 31st Ave., N.E., Seattle, WA 98115
Vice-Director: Dale T. Justice K7WWR
1369 NE Sunrise Lane, Hillsboro, OR 97123

Pacific Division

E.A. "DOC" GMELIN W6ZRJ
10835 Willowbrook Way, Cupertino, CA 95014
Vice-Director: Albert F. Gaetano . . . W6VZT
115 Old Adobe Road, Los Gatos, CA 95030

Roanoke Division

L. PHIL WICKER W4ACV
4821 Hill Top Road, Greensboro, NC 27407
Vice-Director: Donald B. Morris W8JM
1136 Morningstar Lane, Fairmont, WV 26554

Rocky Mountain Division

CHARLES M. COTTERELL . . . . . WØSIN
430 S. Swadley St., Lakewood, CO 80228
Vice-Director: Maurice O. Carpenter . . . KØHRZ
1310 South Tejon St., Denver, CO 80223

Southeastern Division

LARRY E. PRICE W4DQD
P. O. Box 2067, Georgia Southern Branch
Statesboro, GA 30458
Vice-Director: Ted R. Wayne WB4CBP
8250 S.W. 108th St., Miami, FL 33156

Southwestern Division

JOHN R. GRIGGS* W6KW
1273 13th St., Baywood Park, Los Osos,
CA 93402
Vice-Director: Jay A. Holladay W6EJJ
5128 Jessen Dr., La Canada, CA 91011

West Gulf Division

ROY L. ALBRIGHT* W5EYE
107 Rosemary, San Antonio, TX 78209
Vice-Director: Jack D. Gant W5GM
621 Monroe, N.W., Ardmore, OK 73401

* Member Executive Committee

"It Seems to Us..."

GRASSROOTS PUBLICITY

ONE OF the more common complaints that comes into headquarters is, "there isn't enough publicity for amateur radio." The comment these days usually comes from someone who has just read a feature article or news story about CB. We have to ask, "How much is enough?" It is certainly true that for all the questions we all know so well – how to strengthen our position at frequency conferences, how to counter TVI and RFI, and so on – good public relations for amateur radio is essential to our future. It is also true that, compared to other organizations and activities, amateur radio does very well in its exposure in the nation's press media. Moreover, the indications are that a substantial segment of the public holds amateur radio operators – and their emergency communications services – in high regard.

None of which is to say, of course, that we should sit back and be complacent, and in fact, we're not. Last year your board of directors established a new divisional appointment – the Public Relations Assistant. The purpose of this appointment was to tap the professional resources available to us in the membership ranks – in journalism, public relations, advertising, broadcasting – in an organized way. The PRAs are to provide expertise in press relations and to work with clubs and publicity chairmen to generate a flow of good publicity for amateur radio locally. The fifty or so PRAs so far include a number of amateurs who have long been doing a superb job – K8ONA, W2OOJ, WB2FHN, WAØJOG, W1HEO, W8DUV and W4IYT, to name just a few. Now their job has just been formalized. The appointment has also, however, drawn in some highly qualified communicators in areas and localities where we have not previously had representation. And there are still gaps. Ideally, there should be a PRA in every major metropolitan area – every large city with an important newspaper, TV, or radio station. The League directors are anxious to locate qualified people to fill those spots – this is your chance to volunteer yourself or a friend.

The PRA appointment is based on important and established principles of public relations: publicity – i.e., exposure through press and broadcast media – is a basic PR tool; effective publicity is largely local in origin. Editors and broadcast news directors are interested primarily in what is happening in their own locality, their own area of coverage – with the exception only of major news stories. This means that on a day-in day-out basis, grassroots publicity is the very heart of good public relations for amateur radio or any other group; the national organization can provide TV program material, films for community showing, the Publicity Handbook, back-up information, exhibits and occasionally a feature story. But the bulk of the public information job must originate locally at the grassroots.

We can indeed do more for amateur radio PR. One of the best ways is to *support your local PRA*. First make sure you have one; let your director know of qualified people in your area. Then see that he or she is kept posted on what is happening in amateur radio in your town, your club – the newsworthy or unusual things that local amateurs are doing. – *Don Waters*

ARE YOU LICENSED?

- When joining the League or renewing your membership, it is important that you show whether you have an amateur operator license. Please state your call and/or the class of operator license held, so that we may verify your classification.

League Lines . . .

First 6BWAC Won! Tokuro Matsumoto, JA7AO, received 6BWAC endorsement Number 1, on October 2, 1975. The six-band award, authorized by the IARU for contacts after January 1, 1974, has eluded DXers for nearly two years. JA7AO won 5BWAC in July of this year, on 160 and 40-10. A South America contact on 80 was the holdout until this summer for the coveted first six-band award. A hearty congratulations, and who will be number 2?

2-meter WAS? It can't be far away because KØMQS just chalked up his 48th state by working WA7BJU via moonbounce! The feat earned him a special trophy from the National Capital VHF Society -- an award conceived when this would have been a WAS.

Oscar and the Ham, a new videotape about satellite communications produced by the League, has recently been released. Amateurs are urged to contact their local PBS stations and request that they air this fine show, available from Headquarters.

Although postage increases are expected after Christmas, members should be aware that the cost of mailing a post card within the U.S. has recently gone down to seven cents. While the cost of mailing a first class letter is still ten cents, additional ounces are now nine cents rather than ten. Heavy QSLers should take advantage of these rates while they last.

Life Membership continues to grow at a rapid pace; over 700 have been added to the rolls since January 1. The third quarter count shows 8300 either fully paid up, or paying toward Life Membership on the quarterly plan. Write Hq. for an application and full details on Life Membership.

A recent Amsat report shows Oscar 7 Mode B (432 to 146 MHz) translator activity nearly three times as high in Europe as in North America, with West German users actually outnumbering U.S. stations! Code-free vhf licenses are common in Europe, which no doubt accounts for some of the difference; but does this show that European hams are more competent technically than their American counterparts?

Just after October QST went to press we learned that the Canadian Coordinator for Jamboree-on-the-Air is Bob Milks. No change in address: it remains Boy Scouts of Canada, P.O. Box 5151, Stn F, Ottawa, Ontario K2C 3G7.

In connection with propagation research being done by amateurs in Europe, there is interest in having some 50-MHz beacons set up in the United States, to run continuously. FCC authorization has already been obtained for at least one such operation on the 28 MHz band. Wanted -- volunteers to cooperate in such a program by building and maintaining such 50-MHz beacons. If this turns you on, please write ARRL Hq.

"The Virginia Ham" carried a note to the postmaster which read: "If undeliverable, do not return. Instead, open and read. You'll catch a glimpse of the world's most fascinating hobby."

In connection with our National Convention in the Greater Washington area, President Ford said some nice things about radio amateurs. The letter is reproduced in "Happenings" this month.

Ballots for the ARRL director and vice director elections have been mailed to Full Members (and that includes Family Members who have amateur licenses) in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions. If yours hasn't arrived by November 1, please notify headquarters immediately.

Ideas on . . .

2-Meter FM Mobile & Portable Antennas

BY EDWARD P. TILTON,* WIHDQ

BECAUSE it is usually possible to access a local repeater, almost regardless of what one uses for an antenna – or even with *no* antenna, at times – there is a tendency to "let the repeater do the work." Thus it is common to see hand-held units used in cars, often with the ubiquitous "rubber duckie" for an antenna. Even this works much of the time, and when it doesn't the owner's next step may be to increase power, and/or use something in the way of an external whip. But unless the latter is installed properly, the amplifier purchase may leave our fm enthusiast with little more than a lighter pocketbook to show for his trouble. Stepping up the power by 10 dB will not effect any marked increase in the mobile service area, if the new antenna pattern has 15-dB nulls in it.

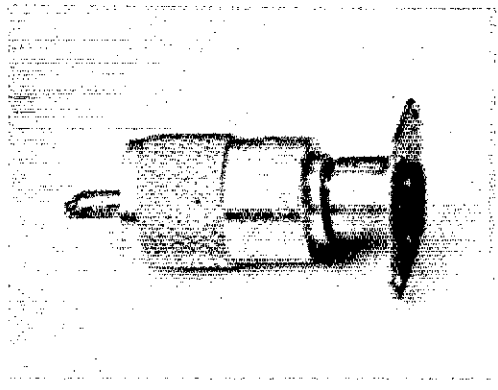
Going to a "gain" antenna, such as the popular 5/8-wave whip, can also be rather unproductive if the antenna is situated on the car in such a way that something less than a perfectly circular pattern results. An unobtrusive quarter-wave whip on the roof is likely to be more consistent in its coverage than a 5/8-wave whip on the cowl or the rear deck. A tape-on rooftop mount has been a fixture of the ARRL *VHF Manual* for ten years, and versions of it have been used by the writer since the early 1950s with uniformly good results. Such a mount and a light whip that collapses to under 6 inches in length are carried on plane trips, along with an old Johnson 540 hand-held unit, and this combination has given good service in all parts of the country in a wide variety of rental cars.

How About the Broadcast Whip?

In a family situation that dictates minimum disfiguration of the car, the whip antenna used for the car radio begins to look attractive. Many would-be mobileers try it, often with indifferent results. It is usually somewhat better than using a one-watter's built-in whip, but that is faint praise, as we shall see later. Most whips are cowl-mounted, not far from one of the body pillars, and there could hardly be a worse place on the car from the standpoint of trying for omnidirectional coverage. More important, feeding such an antenna properly may seem to present an almost insurmountable problem.

The fellows who install car radios must delight in mounting whips in places where the base cannot be reached without pulling out some of the car's interior trim. This is often easy, but putting it back may not be. And that coaxial line coming out from deep within the body's innards was never intended for use at 146 MHz. It has a fine-wire inner conductor running loosely in a plastic sleeve, insulating it from the shield. The impedance is high enough so that at an electrical quarter-wavelength or odd multiple thereof it tends to act like an impedance *mis*matching section, leaving the 2-meter rig working into an impedance many times what it was designed for. This may not have made too much difference in vacuum-tube days, but transistor amplifiers must "see" something fairly close to 50 ohms or they may simply refuse to "play."

The author's Karmann-Ghia has the standard VW whip installation, with about 40 inches of coax, which turned out to be a *wrong* length. It works after a fashion when the whip coax is fed through a makeshift adaptor shown herewith, but an ITC Multi-2000 hooked to it worked only on the low-power position. The power levels under normal circumstances are roughly 2 and 10 watts, for *low* and *high* respectively, but with the SWR which this lash-up represents the antenna length



A convenient adaptor for connecting car-radio coax to extensions of other types uses a PL-259 plug, left, and a car-radio antenna jack, right.

* Technical Department, ARRL.

had to be adjusted very carefully or the amplifier refused to put out at all on *high*.

The impedance of the load is repeated at every half-wave point along a transmission line, so the whip's coax could have been pruned to length experimentally, except that it had only about two inches to spare, as installed. Then a possible solution was spotted in a display rack of car-radio accessories on the parts counter of a local distributor. Ward Products Corp.'s "Radio Lead Extensions," complete with plug at one end and jack at the other, are available in multiples of 12 inches in length. One 12-inch and one 36-inch extension were purchased for tests.

Checking Results

A field-strength indicator was set up out front, where it could be seen from inside the car. Then, with an SWR indicator connected in the line between the rig and the adaptor where the line changed to the car-radio coax, the antenna length was adjusted for maximum fs-meter reading and minimum reflected power. These coincided at 19.5 inches whip length. (It may be different in another car, as the rooftop mount, with the same whip, works best at 19 inches.) With the Ghia's original line the SWR was prohibitively high, and the whip adjustment was very critical. Received signals were far down in comparisons with the roof antenna. A 12-inch extension helped some, but obviously we still had the wrong length. The 36-inch extension also worked poorly. The two extensions in series worked better, giving an SWR down near 2:1 and less critical adjustment.

Before cutting into either extension we decided to check for propagation factor and trim for length on that basis. The fittings used on the car-radio coax present appreciable impedance bumps, but with the extensions in place the propagation factor was measured at about 0.72, or 58 inches for a full wavelength at 146 MHz. The extension on the Ghia line was trimmed a bit long, and a check indicated that the guess was close. Another inch was removed, and the SWR indication was then the same as with the rooftop mount and all-50-ohm feed.

With this combination the Multi-2000 loads equally when switched between the rooftop mount and the broadcast whip. The roof mount gives more uniform coverage, and around the outer edge of a repeater's service area these differences are apparent. In some places the directional effect of the whip helps, but don't count on this happening often. In any event, the modified whip is very much better than using a hand-held unit on its own antenna. If connected to a dash-mounted switch or relay control, the whip can continue in its intended role and serve the 2-meter rig as well.

About Those Built-In Whips

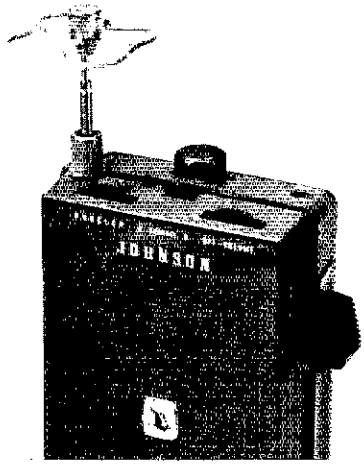
The whip on a hand-held portable is usually a quarter-wavelength long, or somewhere near it. But an antenna of this length must have ground as the other half of the system, or it does not work well. Where is "ground" when the operator is holding the unit up to his face and shouting at its speaker? Nowhere – that anyone can depend on. Result: hand-held units give low power a bad name in fm work. Actually, one or two watts should handle a high percentage of all 2-meter fm work with repeaters, if the power is put into the antenna reliably. It rarely is with small portable rigs. With almost any of them, and notably with the Johnson 540, more antenna makes a *big* difference. Stick an alligator clip or two on yours and see.

Of course not much can be added to the whip length permanently without making use of it inconvenient, or even dangerous. You can carry a small extension in your pocket, and slip it on when needed, but the top-loading arrangement shown in the accompanying photograph can be installed on the 540 antenna permanently without sharp-point problems.

The construction is almost self-explanatory. Simply mount four solder lugs under the cap, to make the supporting members; then solder No. 14 wire in loops between the outer lug ends, and screw the cap back on.

This addition brings a signal from a distant station from the barely-audible level up to almost full quieting. Used in an old convertible that is the writer's prized summer car, it works practically as well as a proper quarter-wave whip mounted in the center of the rear deck. It does not equal the rooftop mount on the Ghia, but in operation away from the car it effects a real improvement in signal level, both transmitting and receiving. Measurements indicate something on the order of 6 dB, which isn't bad, for four solder lugs and a few inches of wire.

(Continued on page 28)



For improved performance with the whip antenna in a hand-held fm transceiver, try top loading. This capacitance hat uses four solder lugs and loops of No. 14 wire. It improves results some 6 dB, transmitting and receiving, when used with the Johnson 540 shown.

A Morse Code to Alphanumeric Converter and Display

Part II

BY THOMAS P. RILEY,* WA1BYM

Last month the theory of operation was presented along with the information necessary for programming a read-only memory (ROM) for conversion from the Morse to the American Standard Code for Information Interchange (ASCII). This month's article describes the circuit construction and final test and alignment of the Morse to alpha-numeric converter.

Circuit Description

The band-pass filter, Fig. 1 of Part I and Fig. 4 of this part, is a modified 3-pole Butterworth type. The 88-mH inductors are surplus toroidal units similar to those advertised in most ham publications. Ten-percent-tolerance capacitors are a must and can be made up of parallel combinations, although several companies offer the values shown as stock items. The receiver audio must come from a low-impedance source such as directly across the loudspeaker terminals (with the loudspeaker still connected). Do not attempt to get the audio from the headphone jack of your receiver, as most receivers provide a high output impedance to drive headphones.

The ATD is constructed from an NE555 timer IC which has proved to be a very versatile device. In this project it was used in three different applications. Basically the device consists of two voltage comparators which are internally adjusted to 1/3 and 2/3 of the power supply voltage. The outputs of each comparator drive an *R-S* flip-flop. The input resistors and sensitivity control bias the input at a point just above the threshold value of 1/3 Vcc. When the audio drives the input below the 1/3-Vcc point, the output goes high. A 1000-ohm, pull-up resistor is used on the output to assure a "high" voltage of +5 V. The sensitivity control is used like a squelch control. The control is adjusted when no signal is present (i.e., just background noise) to the point where the LED indicator just goes off.

Another NE555 timer is used for the FTD. The output of the low-pass-filter is applied to both comparator inputs in order to obtain the dual threshold effect described earlier. The threshold points are modified to 1/6 and 1/3 of Vcc (corresponding to 1/3 and 2/3 of +2.5 V) by returning pin 5 through a 2200-ohm resistor. An open collector output is available which is used as an LED driver. The output at pin 3 is inverted from the desired output. Transistor Q1 inverts the signal to restore it to its proper phase.

* 12 Tickle Rd., Westport, MA 02790.

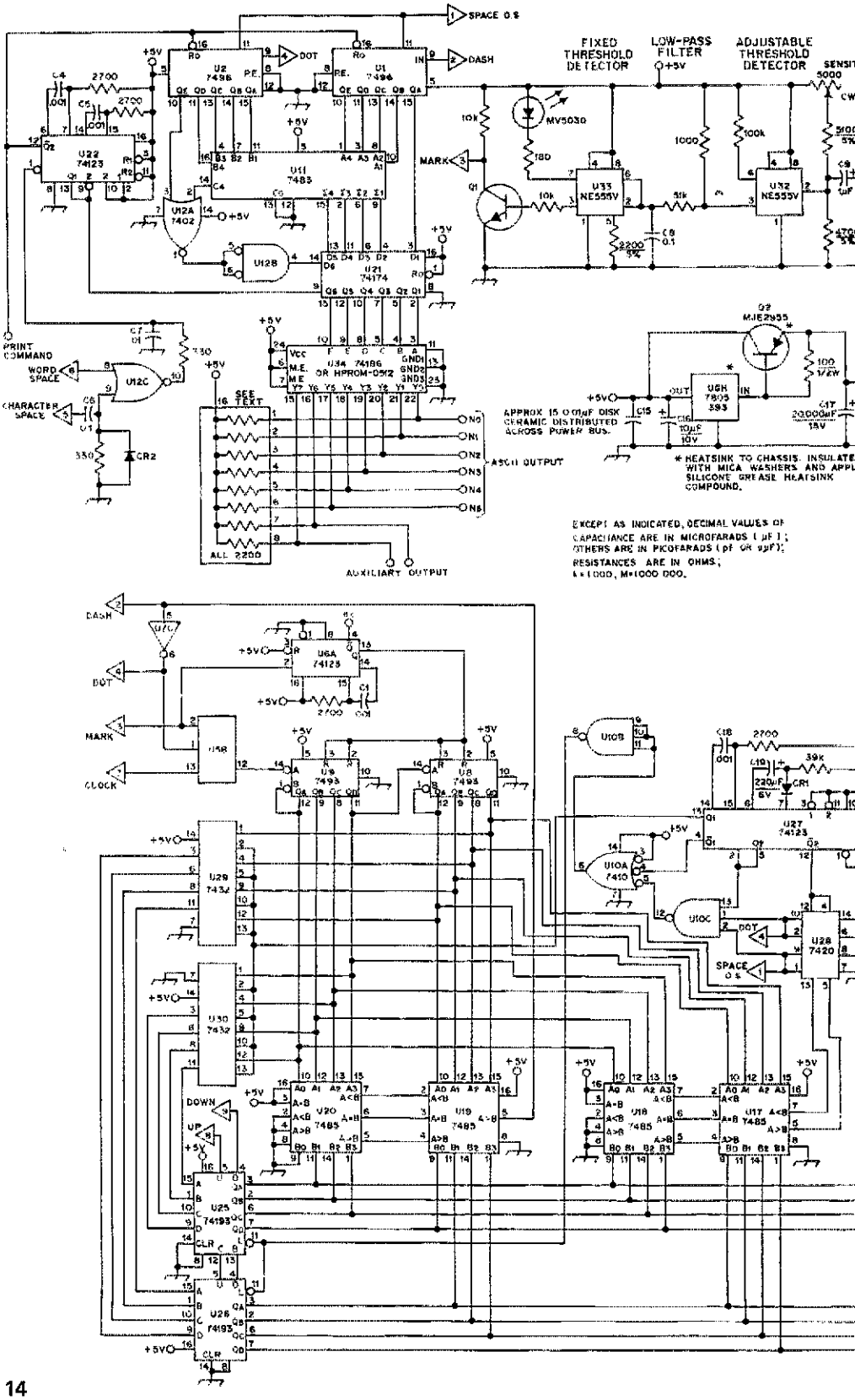
U27 is a dual one-shot. Depressing the CAL button fires both one-shots, which have pulse widths of 2 seconds and 1 μs. During the 2-second period the NAND gates of U28 are disabled and NAND gate U10C is enabled, thus putting the system into the CAL mode. The 1-μs pulse puts a logic 1 on all preset inputs to the up/down counter via OR gates U29 and U30. In addition it provides a "load" pulse to the up/down counter via OR gate U10A and inverter U10B, thus presetting the up/down counter to 11111111. Subsequent "load" pulses are generated by the space one-shot following the reception of a dot at the output of gate U10C. These pulses load the contents of the mark counter into the up/down counter again via OR gates U29 and U30. When the 2-second one-shot goes off, the system is returned to the NORM mode by disabling NAND gate U10C and enabling NAND gates U28.

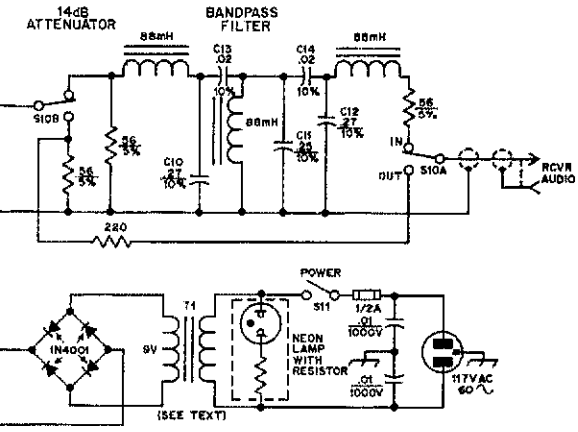
Construction

All circuitry, with the exception of the power supply and band-pass filter, was assembled on a 4-1/2 × 8-inch perforated board. Wire-Wrap sockets and wiring were used for all connections, but standard solder connections can also be used. Keep interconnecting wires as short as possible by using point-to-point, straight-line wiring rather than harnessing the wires into neat bundles. A 14-pin Wire-Wrap socket was mounted on the back of the chassis through which the ASCII code, print command and ground are made accessible to the printing device.

I assembled the unit in a Heath cabinet in order to match my existing equipment. The unit could be assembled into a much smaller cabinet, as evidenced by the photographs.

Use a heavy bare wire or bus strip for the +5 V and ground buses. The buses are laid between the rows of ICs and supported by flea clips. Disk-ceramic bypass capacitors are then soldered between the buses, spacing them at about one capacitor for every two ICs. Tie all the pins to be grounded on each IC together, and then run a single wire from one of these pins to the ground


SPACE O/P
DASH
DOT
FIXED THRESHOLD DETECTOR
LOW-PASS FILTER
ADJUSTABLE THRESHOLD DETECTOR
MV5030
MARK
PRINT COMMAND
WORD SPACE
CHARACTER SPACE
SEE TEXT
ASCII OUTPUT
AUXILIARY OUTPUT
APPROX 15 000µF DISK CERAMIC DISTRIBUTED ACROSS POWER BUS.
* HEATSINK TO CHASSIS. INSULATE WITH MICA WASHERS AND APPLY SILICONE GREASE HEATSINK COMPOUND.
EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (µF); OTHERS ARE IN PICOFARADS (pF OR µµF); RESISTANCES ARE IN OHMS; k=1000, M=1000 000.
CLOCK
DOWN
UP
SPACE O/P



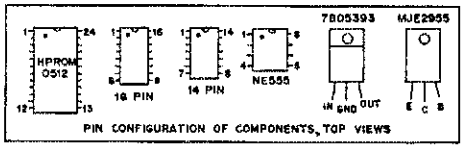
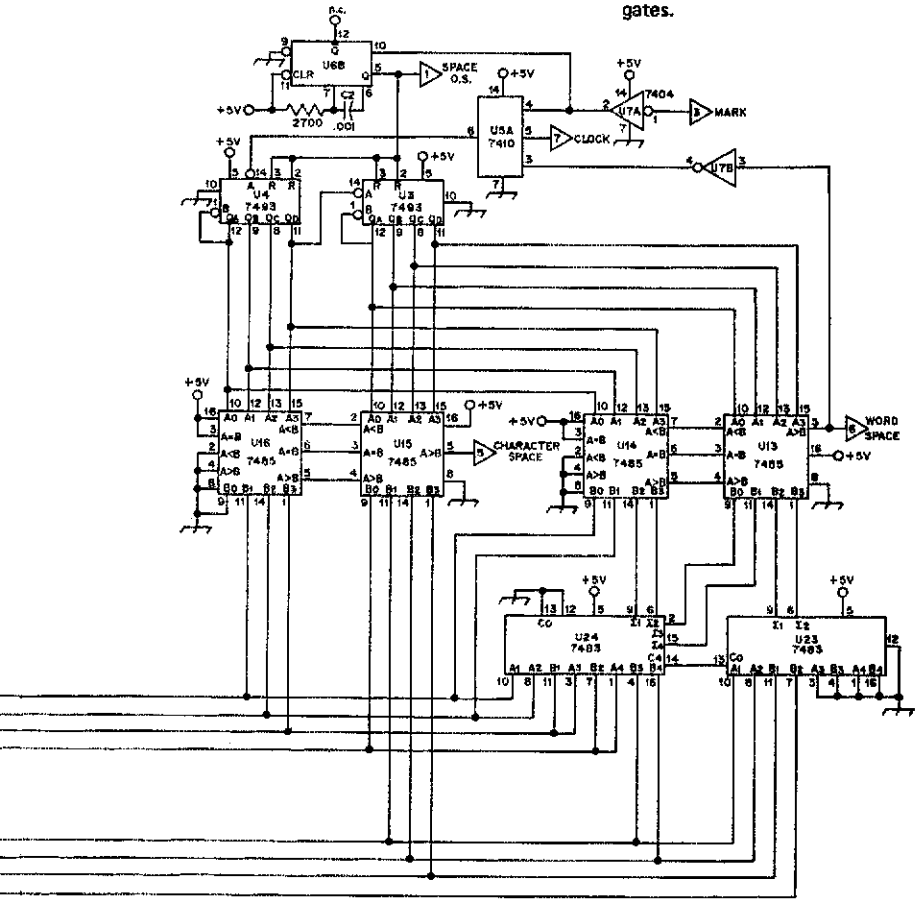


Fig. 4 — Schematic diagram of the Morse Code to Alphanumeric Converter. Integrated circuits U1 through U30 are all TTL devices. Several manufacturers make these devices and assign different prefixes and suffixes to their part numbers. Where a 7402 is called out, Texas Instruments SN7402, Motorola MC7402P or a Signetics N7402A could be used. The ASCII to TV display converter will be shown in Part III of this article.

CR1,CR2 — Silicon diode, 1N4001 or equiv.
LED — Monsanto MV 5030 or equiv.
Q1 — npn switching transistor, 2N3904 or equiv.
Q2 — pnp power transistor, Motorola MJE2955 or equiv.
T1 — Triad F-44X, 12.6 V at 2 A (modified, see text).
U1,U2 — 7496 5-bit register.
U3,U4,U8,U9 — 7493 4-bit binary counter.
U5,U10 — 7410 triple 3-input positive NAND gates.
U6,U22,U27 — 74123 dual retriggerable monostable multivibrator with clear.
U7 — 7404 hex inverters.
U11,U23,U24 — 7483 4-bit full adder.
U12 — 7402 quadruple 2-input positive NOR gates.
U13 thru U20 — 7485 4-bit magnitude comparator.
U21 — 74174 hex/quadruple *D* type flip-flops with clear.
U25,U26 — 74193 synchronous 4-bit up/down counters.
U28 — 7420 dual 4-input positive NAND gates.
U29,U30 — 7432 quadruple 2-input positive OR gates.



bus. The same holds for +5-V connections (i.e., do not run grounds from one IC to another and then to the bus).

Total power requirements are 5 volts at approximately 1.1 A. This is obtained from a 5-V, three-terminal fixed voltage regulator and series pass transistor. Both devices should be electrically insulated from the chassis with mica washers. Coat both sides of the mica washers with silicon heat-sink compound. This assures good thermal conductivity to the chassis.

I decided to use a filament transformer; however, 6.3 V could not produce enough voltage while a 12.6-V unit provides too much voltage causing excessive power dissipation in the pass transistor. The end result was to use a 12.6-V, 2-A transformer. Twenty-five turns were removed from the secondary winding of a Triad F-44X resulting in a loaded output voltage of about 9 V. This is easier to do than it may sound as the secondary winding is wound over the primary. Remove the paper insulation and then unsolder the enameled primary and secondary wires from the terminal-strip strain reliefs. Remove twenty-five turns from the secondary winding (and paper insulation as is necessary); then resolder the terminal-strip strain reliefs and assemble with epoxy cement.

The 2200-ohm pull-up resistors which are connected to the outputs of the PROM were packaged in a hybrid DIP network. This package was used only because it was available. Individual discrete resistors can be used and should easily fit in the same place as the IC socket.

System Adjustment

Set the volume control on the receiver to normal listening level. Tune in a dead spot on the band and adjust the sensitivity control so that the LED indicator turns on. Then adjust the sensitivity control so that the LED just goes off and stays off (i.e., does not flash intermittently). Tune in the desired station such that the LED flashes in sequence with the incoming code. This is a bit tricky with the filter switched in, as the station must be tuned to produce a precise 1-kHz beat note due to the narrow passband of the filter. Now press the CAL button then sit back and read the copy.

It is interesting to note that the system can tolerate and adjust itself for code speed changes of as much as 2 to 1. Therefore, you can usually tune from one station to another without the need to recalibrate. If the system does lose lock and start printing a bunch of nonsense, simply press the CAL button again.

When applying power for the first time, it is wise to insert a dc ammeter in the +5-V supply line. If the ammeter indicates about 1.1, that is a pretty good indication that there are no wiring errors that could result in burning up of ICs. The ammeter can then be removed and the +5 V connected permanently.

Another helpful test is to connect the system to a code-practice oscillator and check that the ASCII output is correct for each character. In order to do this, however, the word-space line must be disconnected. This is because shortly after each character is sent a word space is detected, which changes the ASCII output to 100000. To disable the word space, disconnect pin 8 of U12C from its normal connection and temporarily connect it to ground. Press the CAL button; then send a few characters in order to lock the system onto your code speed. Now send another character and check that each ASCII output is correct by monitoring the LED indicators (if installed) or by use of a voltmeter. After you're satisfied that everything is working correctly, reconnect the word-space line to its normal configuration.

The timing diagram of Fig. 7 (Part III) should also prove helpful for troubleshooting in the event that it is needed.

Conclusions

All of the ICs are available through surplus distributors who advertise in amateur publications. If the strip printer is desired in lieu of or in addition to the ASCII/TV converter, pricing and technical information may be obtained directly from the manufacturer: Computer Terminal Systems, 52 Newtown Plaza, Plainview, NY 11803.

The design and development of this project was quite enjoyable, exceeded only by the pleasure of actually using the finished product. Although it may appear to be an expensive "toy," it has proved to be a useful tool. This is especially true when engaging in a QSO with someone who has a poor fist as it usually makes the difference between good copy and no copy at all. In addition, I have completely eliminated the *Q* signal QRS from my amateur vocabulary!

Part III of this article on the display will appear in a subsequent issue. QST

Strays

How about rummaging through that junk box to see if you can locate any RCA 7412 cadmium-sulfide photoconductive cells? Obsolete six years ago, they are needed as replacement parts in an optical device used for work by a blind amateur and another blind person. Any amateur having pertinent information can contact David Lubar, WB9DQM, P.O. Box 3571, Peoria, IL 61614.

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The American Samoa Department of Education invites all who QSLed with their special call KS6SFA to apply for a special certificate, with an s.a.s.e. please. Numerous cw contacts were made on 15, 20, and 40 meters. Send requests to: KS6SFA, Department of Education, American Samoa 96799.

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For the collector in the western United States, the newly founded California Historical Radio Society plans activities for all areas of radio collecting – monthly meetings, swap meets, and a quarterly journal. Displays will be featured at the society's base of operation, the San Jose Historical Museum.

A Resistive Antenna Bridge . . . Simplified

BY JERRY SEVICK,* W2FMI

AS WAS SHOWN previously,[1] a bridge using a single variable capacitor can be used to measure resonant impedances of antennas and losses in coils with reasonable accuracy. With addition of an L/C network, the bridge can also be very useful in adjusting antennas for resonance conditions. Recently it was brought to the author's attention that a bridge using a variable resistance could also perform well. This is possible because the range of antenna impedances is generally low enough to allow for low values of resistance in the arms of the bridge. Under these conditions parasitic capacitances are negligible up to 30 MHz.

Resistive bridges have the advantages of small size, readily available components, and dial calibrations which can be made practically linear. Two bridges are shown with their respective calibration curves. The first is a linear device. The second expands the lower portion of the calibration curve, 0 to 30 ohms, to measure lower values of antenna impedance and coil losses more accurately.

Bridge Details

The resistive bridge with a variable resistance in one arm and equal resistances in the other two is shown in the photographs, and schematically in Fig. 1A. The nonlinear bridge is similar mechanically. The small enclosures and compact layout minimize lead lengths. With the linear version the dial practically reads directly in ohms. In using the L/C network described in the previous article, a constant offset occurs, because of ohmic loss in the coils. This can be as high as 20 ohms, as is shown by the 160-meter curve with the L/C network, Fig. 2A.

The variable resistor used in the bridges has a parasitic (stray) capacitance of the order of 10 to 20 pF, which has little effect even at 14 MHz. Other potentiometers of similar design can probably be substituted. The calibration curves provide a good check. If the difference between the calibrations for the lowest and highest frequencies to be used is greater than an ohm or two, parasitic capacitances are probably excessive.

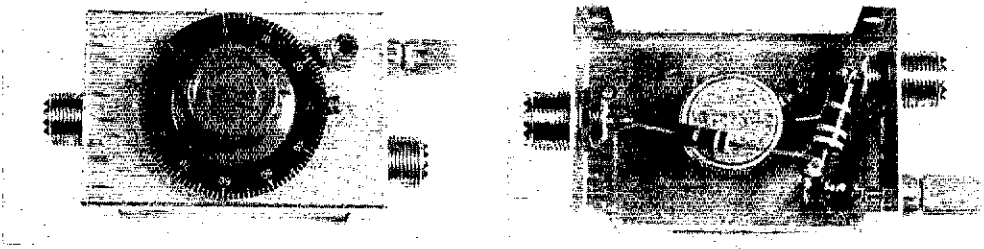
The nonlinear bridge uses most of the same components, but the control is connected in the differential mode, as shown in Fig. 1B. Resistance is subtracted from one arm and added to the other, tending to spread out the low end of the resistance scale for increased accuracy. In this version, the dial can be read easily to 0.5 ohm.

Results

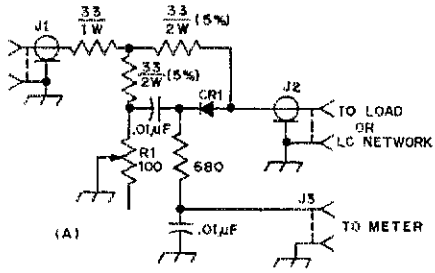
The author has found these resistance bridges to be entirely satisfactory for measurements in the range of 1.8 to 30 MHz. Because of their greatly expanded scales, as compared with the capacitive

* 22 Granville Way, Basking Ridge, NJ 07920.

[1] Sevick, "Simple RF Bridges," April, 1975, *QST*, page 11.



Exterior and interior view of the resistive bridge. Appearance and component arrangement are essentially the same for the two types described.



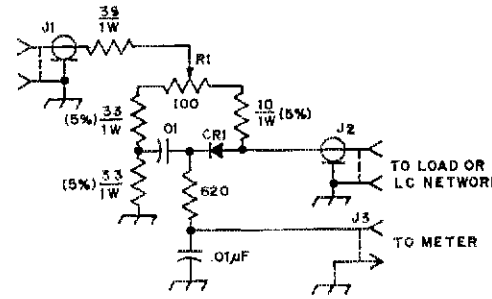
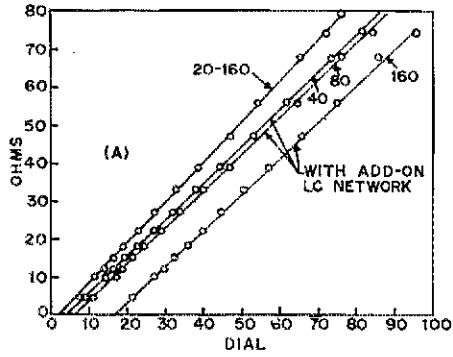


Fig. 1 — Schematic diagram and parts information for the linear (A) and nonlinear (B) resistance bridges. Resistor wattages are the minimum recommended.
CR1 — Germanium diode.
J1, J2 — Coaxial connector, chassis type.
J3 — Phono jack.
R1 — 100-ohm, 2-watt linear control (Allen-Bradley, Type J).



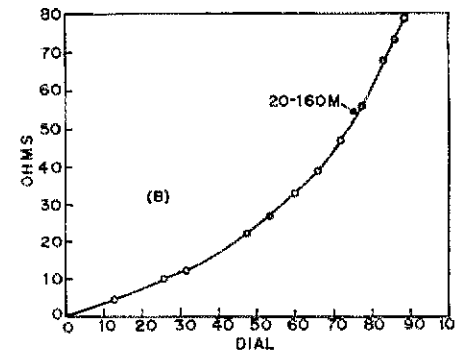
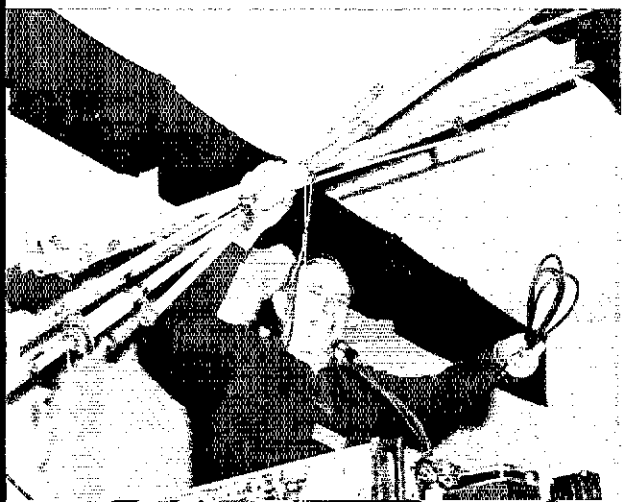


Fig. 2 — Calibration curves for the linear (A) and nonlinear (B) resistance bridges. The add-on *L/C* network used was described in the author's April *QST* article on capacitive bridges.

bridges, and generally lower values of resistance in all arms of the bridge, they tend to have less marked nulls when used with very low-power signal sources. Increasing the minimum power to 20 or 30 milliwatts, when using the sensitive meter described previously, should take care of this.

In closing, I want to thank Roger A. Sykes, W1PP, for bringing the resistive bridge to my attention. QST



Strays

Has your club ever had an auction? Auctioneer WA1TBY conducts the Wellesley (MA) Amateur Radio Society's first such attempt, a great success. *(Photo by WA1RGA)*

Pattern Factors for ELEVATED HORIZONTAL ANTENNAS over Real Earth

BY HARDY K. LANDSKOV,* W7KAR, ex-W6QQW

PATTERN FACTORS for elevated horizontal antennas over perfectly conducting earth can be found in *The ARRL Antenna Book*, and in practically all other books written about antennas. Since there is no such thing as "perfect earth," true elevation-plane patterns can be expected to deviate radically from the published perfect-earth cases.

A good report on antennas located over real earth, published a few years ago, gave rigorous mathematical derivations of input impedance and power gain of thirteen different antennas, including the rhombic and Yagi.[1] To solve the equations and plot the results for the pattern factors, a computer program was written, and run on an IBM 360/65 Computer.

Background

When an antenna is located above the earth its directional properties are modified considerably from those of the same antenna in free space. The principal effect is modification of the antenna free-space H-plane pattern. A thorough description of how elevation-plane patterns are formed can be found in *The ARRL Antenna Book*, Chapter 2, under the heading, "Ground Effects." Figs. 1A, 4, 7, 10 and 13 shown here are essentially the same as those in the ARRL text that show the elevation-plane patterns for a half-wave horizontal dipole, at various heights above perfectly conducting ground. They are shown here to facilitate comparison with the real-earth cases, shown in the top row, and in the middle and right columns of the page.

Real-Earth Patterns

For antennas over real earth, the pattern factors are markedly different. Because the earth is lossy, part of the energy in the earth-directed wave is absorbed by the ground during the reflection process. The amount of absorption is a function of the grazing angle ψ; the conductivity of the earth, σ; the relative dielectric constant, ϵ_r; and the frequency, F. (By definition, the grazing angle is the angle the reflected ray makes with the earth.)

The real-earth pattern factors were run at 14 MHz, using two representative ground conditions. Where the lobe patterns are simple enough to permit easy reading (the three figures at the top of the page) the perfect-earth theoretical patterns and those for practical ground conditions are shown together. The B curves in the top row, and the center column are for antennas above ground having a conductivity $\sigma = 0.005$ mhos/meter, and a relative dielectric constant $\epsilon_r = 15$. These are "ballpark figures" for grassy moist pastoral land, typical of much of the middle western and northeastern states. It is interesting to note that as the height of the antenna is increased the magnitude of the lowest lobe increases. The reason for this is simple: regardless of ground conditions, the smaller the grazing angle the greater the magnitude of the reflection coefficient, R_h. Note also what happens to the nulls. In the real-earth patterns they are no longer sharp and well-defined, as they were in the perfect- earth case, but have deteriorated with decreasing conductivity and relative dielectric constant.

The C curves, and those in the right column are for ground conductivity $\sigma = 0.002$ mhos/meter and a relative dielectric constant $\epsilon_r = 5$. These numbers are representative of drier areas of the country, such as deserts. Notice again the increased attenuation of the earth-directed wave for antennas of low height. Also the nulls have become less defined. However, at heights of a wavelength or more the magnitude of the lowest lobe is almost the same as for the perfect-earth case. Again, for low grazing angles the magnitude of the reflection coefficient is close to one.‡

The 20-meter band was chosen because of its

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[1] Ma and Walters, *ESSA Technical Report, ERL 104-ITS 74*, Power Gains for Antennas Over Lossy Plane Ground, April, 1969 (available from Supt. of Documents, Washington, DC 20402, for 65 cents).

[‡ EDITOR'S NOTE: The author did not include it in his article text, but he pointed out in a covering letter that the ARRL *Handbook* and *Antenna Book* are slightly in error in the matter of ground-reflection factor for vertical and horizontal antennas. The factor is most accurate for grazing angles *below* 15°, for horizontal antennas, because the complex reflection coefficient is closest to 1 at these angles. For vertical antennas, the reflection factor is most accurate *above* 15° elevation. Below 5° vertical hf antennas exhibit severe cutback in the elevation plane, due to poor soil conductivity. At some angle between 3 and 15°, depending on the dielectric constant of the soil, there will be a further cutback in the elevation-plane pattern. For more on this, check "Brewster Angle" in antenna engineering texts.]

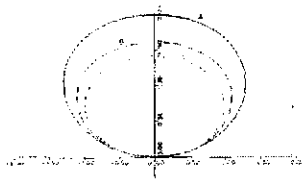


Fig. 1 — Antenna height λ/4.

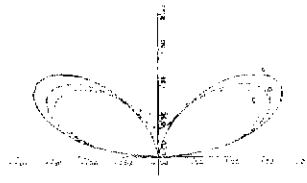


Fig. 2 — Antenna height λ/2.

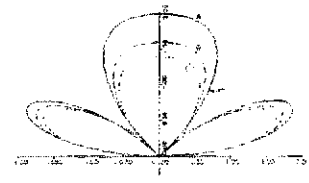


Fig. 3 — Antenna height 3/4λ.

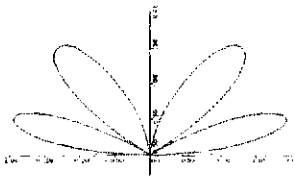


Fig. 4 — Antenna height 1λ, perfect ground.

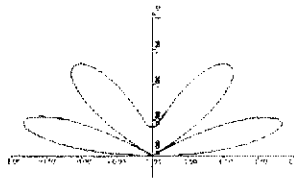


Fig. 5 — Antenna height 1λ, moist ground.

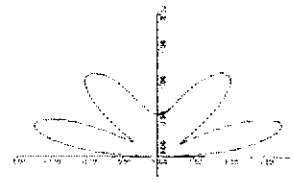


Fig. 6 — Antenna height 1λ, arid ground.

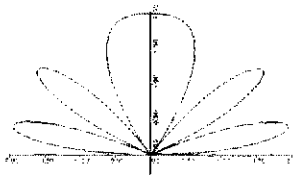


Fig. 7 — Antenna height 1-1/4λ, perfect ground.

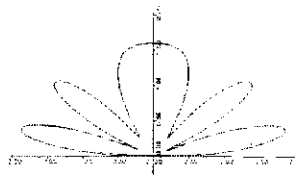


Fig. 8 — Antenna height 1-1/4λ, moist ground.

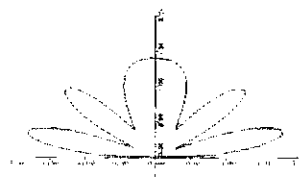


Fig. 9 — Antenna height 1-1/4λ, arid ground.

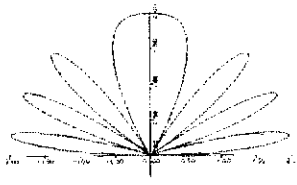


Fig. 10 — Antenna height 1-3/4λ, perfect ground.

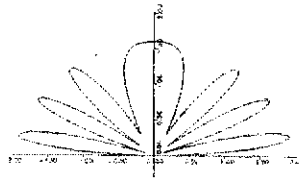


Fig. 11 — Antenna height 1-3/4λ, moist ground.

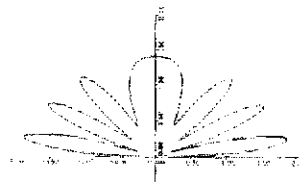


Fig. 12 — Antenna height 1-3/4λ, arid ground.

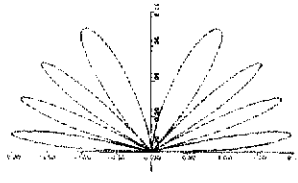


Fig. 13 — Antenna height 2λ, perfect ground.

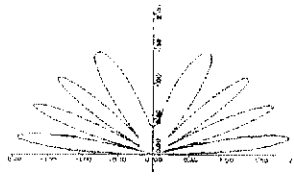


Fig. 14 — Antenna height 2λ, moist ground.

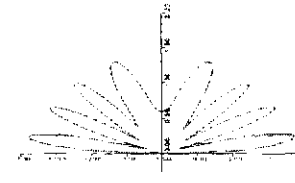


Fig. 15 — Antenna height 2λ, arid ground.

Pattern factors for horizontal half-wave antennas at various heights above three types of ground: the theoretical perfectly conducting ground, moist pastoral land, and dry soil typical of deserts and other arid areas. These are represented by Curves A, B, and C, respectively, in the top row, and by the figures in the three columns, left to right, otherwise.

popularity, and because antennas for use in this band can be erected at heights of one wavelength or more by many amateurs. Patterns were also run for 80, 40, and 10 meters, but changes were surprisingly small, in the neighborhood of 0.1 dB different from the 20-meter case.

An approximation of the gain of a half-wave dipole antenna over lossy earth can be made by using the principle of pattern multiplication.[2] Simplified, the power gain of a free-space, half-wave dipole is multiplied by the square of the value of the pattern factor, to yield the final power gain. Mathematically:

$$G = 1.64 \times 2^2 = 6.56, \text{ or } 8.14 \text{ dB}$$

(Free-space dipole + pattern factor value for perfect earth) This is only an approximation of the theoretical power gain, since the radiation resistance varies with ground conditions and height, and appears in the power-gain formula for a dipole antenna. (See page 10 of reference 1.) However, the example is sufficient to illustrate how the gain of a dipole varies with height and ground parameters.

Table 1 gives the gain of a dipole for the two typical ground conditions and perfect earth. Notice that at low antenna heights the antenna gain suffers quite badly, while at the maximum of 4 wavelengths the poorest condition is only 0.2 dB below the perfect-earth case.

Also given in the table is the angle above the horizontal where maximum gain occurs. The slight difference between perfect and lossy-earth cases is the result of phase angle of the reflection coefficient, ψh, appearing in the term which governs the pattern-factor lobe structure.

For perfect earth, $\psi h = 180°$ for all grazing angles, while for lossy earth ψh varies, and is a function of the grazing angle.

Conclusions

Some very important conclusions can be drawn from the above.

1) Low heights should be avoided with all horizontal antennas, because their gain suffers badly at elevations under one wavelength above ground.

2) Antennas located one wavelength or more above ground have gains within a few tenths of a dB of the perfect-earth case, *regardless of soil conditions.*

3) High-angle radiation (above 45°) suffers as much as 3 dB, for antennas over poor earth, regardless of antenna height. This is an important consideration currently, with DXing on 80 and 160 meters gaining popularity. Not many 80-meter antennas are more than 1/4 wavelength above ground, and practically no 160-meter antennas are.

[2] Jordan and Balmain, *Electromagnetic Waves and Radiating Systems*, 2nd. Edition, Prentice-Hall, Englewood Cliffs, NJ, 1968, pp. 365-369.

Table I

Gain of a λ/2 dipole as a function of height and ground parameters, using lowest lobe.

	Approximate gain, dB/isotropic radiator			*Direction of gain, above horizontal*		
Height above ground	*A*	*B*	*C*	*A*	*B*	*C*
1/4λ	8.14	6.28	5.14	straight up	straight up	straight up
1/2λ	8.14	7.16	6.60	30°	29°	29°
1λ	8.14	7.64	7.30	15°	14.5°	14.5°
2λ	8.14	7.90	7.72	7.5°	7°	7°
4λ	8.14	8.03	7.94	3.75°	3.5°	3.5°

Case A: Perfect earth
Case B: Moist soil
Case C: Dry soil

Strays

To bring amateur radio to the public and to get a taste of Field Day operating, the newly organized Keene High School Amateur Radio Club (NH) set up stations in the downtown commons during the local sidewalk carnival days. About 30 messages were originated by spectators and public interest in the hobby was very alive. Amateur radio also received good publicity via local press and radio.

THE TROMBONE TRIMMER

Build Your Own Variable Capacitors

BY JAY RUSGROVE,* WA1LNQ

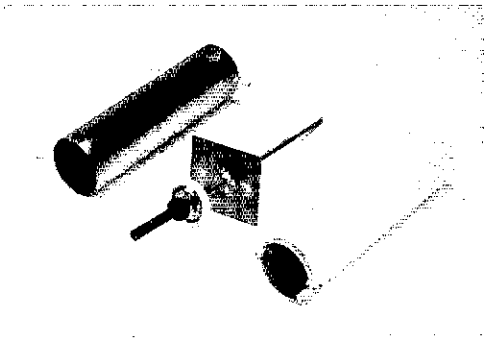
Plenty of amateurs talk about how tough it is to get variable capacitors — and it is. WA1LNQ does more than talk; he shows how to make a slick variable capacitor — and rated above Novice power levels too!

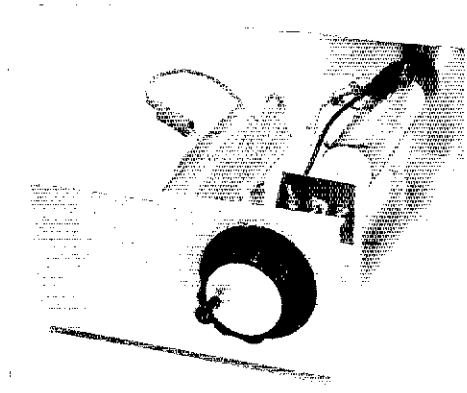
TRIED RECENTLY to locate variable capacitors? The species is nearly extinct! Some manufacturers have gone out of business, no longer make capacitors, practically doubled their prices, or won't sell them in small quantities. Experimenters and builders suffer. As with anything else, when the quantity of available units goes down and the demand goes up, prices soar out of sight. If the builder is lucky enough to find some of the endangered species, the selling price is apt to include the buyer's right arm! At present there seems to be at least one solution to the problem — build your own.

First Attempt

The first capacitor constructed in the ARRL lab was fashioned after an ordinary air-variable capacitor. The stator and rotor plates were cut from doubled-sided circuit board material. Two pieces of small-diameter threaded rod and numerous nuts, were used to hold the stator plates in position. The nuts were placed strategically on the rod to provide equal spacing between the plates. The rotor plates were spaced evenly on a third piece of threaded rod. This rod also served as the control shaft. As expected the capacitor worked fine; however, it did have one drawback. It would be exceedingly difficult to duplicate using ordinary hand tools. A better construction technique had to be found.

* ARRL, Novice Editor.





Photograph of the parts that make up the variable capacitor. At the left is the outer cylinder with attached steatite pillars. The bolt protruding from the side of the cylinder is one of the tie points for the alligator clips. The drive mechanism can be seen at the center of the photograph. At the right is the inner cylinder with Teflon sheet attached.

Tubular Capacitors

The concept of tubular capacitors is far from new as they have been used in uhf and vhf equipment for a number of years. Their main limitation, with respect to ht-band use, is their relatively low maximum capacitance value — typically 50 to 100 pF. This problem might be overcome if a somewhat larger unit could be constructed. It was decided to go ahead with the project, especially since it appeared that the only tools necessary to construct such a unit would be a hacksaw, drill and a screwdriver. Ten-mil thick Teflon sheet was to be used as the dielectric material between the two cylinders. Teflon of this sort can be purchased from many plastics supply houses. A 6-inch long piece of 1-1/2-inch diameter copper tubing is used for the outer cylinder of the capacitor. A 5-1/4-inch long piece of 1-3/8-inch diameter aluminum tubing serves as the inner cylinder. The reason for using two different types

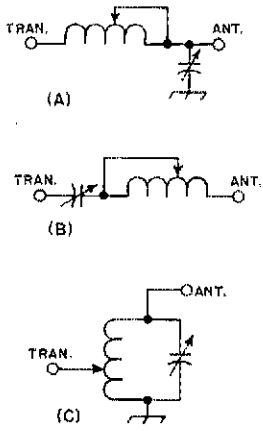


Fig. 1 — Here are several circuit configurations that are possible with the tuner.

of tubing is that these particular sizes, along with the Teflon dielectric, telescope with just the right amount of tension. The "right amount" means not so tight that the inner cylinder binds when sliding in and out, and not so loose that the fit is sloppy. Bear in mind that copper tubing is measured in terms of an ID dimension and aluminum tubing is measured in terms of OD. It is not mandatory that these particular sizes of tubing be used, as any two pieces that telescope with the proper fit should work equally well. The piece of Teflon measures 4-1/2 × 6 inches, and when placed on the cylinder should overlap approximately 1/4 inch.

A piece of clear plastic tape is then affixed to the Teflon along the entire length of the seam to hold it in place. The Teflon will overlap the back of the cylinder approximately 3/4 inch, so that when the two cylinders are unmeshed the inner cylinder will be completely out from within the larger cylinder, and resting on the Teflon. This provides a low value of minimum capacitance which is necessary if the capacitor is to be used in equipment that covers the 10 and 15 meter bands. Two holes should be drilled directly opposite each other, 1/4 inch in, on one end of the cylinder. These holes facilitate mounting of the spade lugs (see the photograph). Two notches are cut in the Teflon so that it may be slipped under the heads of the spade-lug bolts. When the bolts are tightened the Teflon will be unable to shift position.

The parts that make up the drive assembly can be seen in the photographs. The plate is made from a piece of double-sided circuit board material and measures 1-3/4 × 2 inches. Two holes are drilled through the circuit board. They correspond to the position of the spade bolts that are attached to the inner cylinder. A third hole should be drilled midway between the first two holes. A piece of threaded rod, 6-1/2 inches long, should be inserted through the third hole in the circuit board. Two nuts, one on each end of the shaft, are loosely tightened against and soldered to the plate. The rod used in this unit was cut from a piece of No. 8-32 threaded stock. A larger thread pitch would have been a better choice because many revolutions of the control knob are necessary for the inner cylinder to travel its full length. A Millen 59016 shaft coupling was used to couple from the small-diameter threaded shaft to an insulated 1/4-inch shaft. The insulated shaft is necessary to keep both sides of the capacitor above ground. The grommet on the insulated shaft serves as a spacer to keep the metal portion of the shaft coupling from touching the bushing on the front panel. Two 1-1/2-inch steatite pillars are cemented to the outer cylinder using GE Silicone Glue and Seal. Epoxy cement will work just as well.

The formula for determining the capacitance per inch of length of a tubular capacitor is:

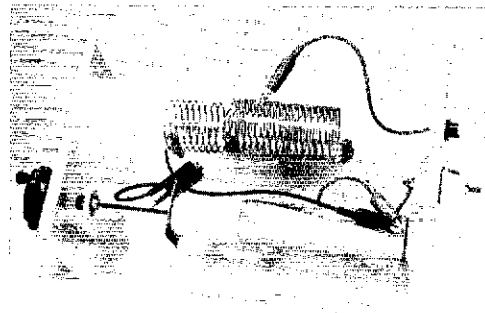
$$C = \frac{0.614\ (\epsilon_r)}{\log_{10} \frac{R_1}{R_2}}$$

where R_1 is the radius of the outer cylinder (inner dimension), R_2 is the radius of the inner cylinder (outer dimension) and ϵ_r is the dielectric constant of the insulating material. The dielectric constant is the ratio of the capacitance, with some material other than air between the plates, to the capacitance of the same capacitor with air insulation. In the case of Teflon the dielectric constant is 2.1. Solving the equation with our dimensions:

$$C = \frac{0.614\ (2.1)}{\log_{10} \frac{1.5}{1.375}} = 34.1 \text{ pF per inch}$$

Total $C = 34.1 \times 5.125$ inches = 174.8 pF.

(Continued on page 34)



Interior view of the transmatch. The large coil is 35 turns of B & W 3026 coil stock. The small coil is 9 turns of B & W 3021. A small coil is desirable if the coupler is to be used on the 10- and 15-meter bands, as a small amount of inductance is usually required. The appropriate connections in the coupler are made with 5000-volt, test-probe wire and alligator clips.

A 5¢ TRANSISTOR TESTER

BY JAMES J. BROPHY*

DO YOU OWN A collection of unmarked, untested diodes and transistors? Plenty of semiconductor assortments are bought for bargain prices on today's market, but finding out which are the good or bad devices can be perplexing!

A conventional transistor tester can be used to grade out the defective units or to identify the leads of diodes and transistors, but the same process is possible by using a simple ohmmeter and a single resistor. Interested? Read on.

One 5-cent resistor and an ohmmeter are all that's needed to determine the base connections of unmarked transistors, tell npn from pnp types, distinguish between silicon and germanium devices, and even measure the current gain of junction transistors. For an additional 10 cents you also can measure the transconductance of FETs.

The ohmmeter function in either a VOM or VTVM involves an internal battery and a current-indicating meter. Almost any ohmmeter type is satisfactory if it has a range with a center scale reading of 500 or 1000 ohms. First, determine which test prod is positive when the VOM or VTVM is used as an ohmmeter. Measure the voltage between prods with another voltmeter or open the case and trace the circuit. Also, it's helpful to know the voltage of the internal battery, which is often either 1.5 or 3.0 volts.

Identifying Diode and Transistor Types

A semiconductor pn junction such as a diode rectifier or the emitter-base junction and base-collector junction in a transistor have a low resistance in the foward direction when the p-type side is positive with respect to the n-type side. Therefore, when you connect the positive test prod of the ohmmeter to the p-type side and the negative prod to the n-type side, the ohmmeter indicates a low resistance. Reversing the test prods should result in a very high resistance reading. Thus, you can distinguish the anode and cathode terminals of unmarked semiconductor diodes and rectifiers. A convenient way to relate the anode and cathode terminals with n-type and p-type regions and with the polarity for forward bias is shown in Fig. 1.

* 4901 South Lawn Ave., Western Springs, IL 60558.

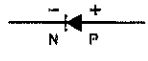


Fig. 1 — Diagram of a junction diode indicating n and p regions. If the ohmmeter probes are connected with the polarity shown, the diode will be forward biased and a low resistance reading will occur.

In this way you can identify the leads of an unmarked junction transistor and tell whether it is a pnp type or an npn type. Find the common lead which shows low-resistance forward conduction with both other leads, and you have discovered the base terminal. The polarity of the test prod touching the base lead is negative for a pnp transistor and positive for an npn type. It is easiest to find this by connecting one ohmmeter test prod to any transistor lead and touching the other prod to each of the remaining two leads in turn. Repeat for the other leads, each time watching the ohmmeter reading. If none result in a low resistance between both of the other two leads, reverse the test prods and start over. There is only one successful combination (since there is only one base lead), unless the transistor is open or shorted.

In the process of identifying the base lead, an indication of whether or not the transistor is made of germanium or of silicon can be obtained also. This is often useful information in connection with transistor-bias design, particularly in direct-coupled circuits, and for operating-temperature considerations.

The properties of semiconductors are such that pn junctions of germanium usually have a lower forward resistance than the silicon type at the same forward voltage. The exact resistance reading noted on an ohmmeter depends somewhat upon the range scale and the internal battery voltage. Typical ohmmeter readings are about 200 ohms for germanium devices compared with 800 ohms for silicon units when using a 1000-ohm center scale (VTVM ohmmeter) with a 1.5-volt internal battery. The same units indicate about 100 ohms and 200 ohms respectively (VOM type of ohmmeter) with a 500-ohm center scale and a 3-volt internal battery. These differences in readings using the two meters are expected because of the nonlinear properties of pn junctions. Also, there is some variation between different devices of the same general type, such as would result from their internal design for maximum current-carrying capacity and other factors.

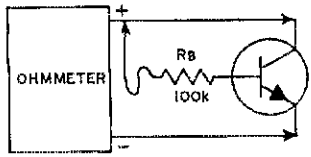


Fig. 2 – Testing a bipolar transistor with the ohmmeter.

Measuring the Current Gain

The next step is to determine the collector and emitter leads of the transistor and to get a general idea of its current gain. Excluding the base lead, clip one ohmmeter test prod to one transistor lead and the other test prod to the remaining lead of the unknown transistor. The ohmmeter will indicate a very large resistance since one of the junctions is under reverse bias. Now connect a resistor (an inexpensive 100-kΩ carbon type is quite satisfactory) from the base lead to the positive test prod if the transistor is an npn type. (See Fig. 2.) Connect the base lead to the negative test prod in the case of a pnp type. This biases the emitter junction in the forward direction, which results in collector current and a deflection on the ohmmeter. In effect, the transistor is now operating as a dc amplifier.

The transistor base-collector current gain is approximately the ratio of the base-bias resistor to the ohmmeter reading, R or:

$$\beta = \frac{R_b}{R} = \frac{100{,}000}{R}$$

The reading is now repeated after the ohmmeter test prods are reversed. The arrangement producing the greatest current gain determines which of the leads is the emitter lead and which is the collector lead. Highest gain occurs with the transistor connected as shown in Fig. 2 if it is an npn type. Conversely, the negative prod is at the collector terminal in the case of pnp units.

The exact value of current gain determined by this simple circuit depends somewhat on properties of the ohmmeter used. Consequently, the results should be viewed as indicative of transistor quality and gain, rather than as a precise measurement of transistor parameters. Actually, measurements of a selection of transistors in a typical assortment showed gains ranging from 20 to 400. All units that looked alike had approximately the same current gain, although there were occasional exceptions which produced significantly lower values. Good correlation between gains measured with the tester and tabulated values for several known transistors was observed also.

The scheme works best for small-signal transistors, although most power transistors can be tested as well. Power units do not seem to yield particularly reliable values for gain. However, the test does indicate clearly whether or not a device is operational. Incidentally, for convenience in testing different kinds of transistors with a variety of base and lead arrangements, it proves convenient to attach an alligator clip to each end of the resistor. Thus the ohmmeter prods and the resistor are simply clipped to the transistor leads and interchanging connections is easy.

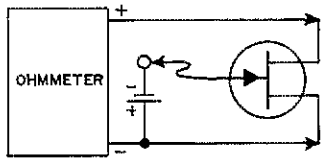


Fig. 3 – An ohmmeter and a battery can be used to test a junction FET.

Testing FETs

A technique similar to that used for bipolar transistors is applicable to junction FETs as well. First, identify the drain and source leads of the FET by finding the pair of leads that indicates the same resistance when the test prod connections are interchanged. The resistance between drain and source in an FET arises simply from the channel resistance, so it is the same for either direction of current flow. A typical value is 200 ohms. You can tell whether the FET is an n-channel or a p-channel type by noting the polarity of the test prods for forward conduction between the gate lead (the third lead) and either the drain or source lead. An n-channel FET shows a low resistance reading when the positive test prod is connected to the gate in conformity with previous tests.

The gain of an FET is measured by its transconductance, which is the change in drain current resulting from a change in gate voltage. Notice that an FET is a voltage-controlled amplifier in contrast to a junction transistor which is current controlled. Therefore, in order to test FETs, you need a small battery to use as a bias source.

Connect the ohmmeter between the source and drain leads as determined previously. Short the gate to the negative ohmmeter prod in the case of an n-channel unit, or to the positive prod for a p-channel FET. The reciprocal of the ohmmeter reading is the zero-bias channel conductance, G_o. Now connect the gate as in Fig. 3 for an n-channel FET to the negative terminal of the penlight battery (the gate is connected to the positive battery terminal for a p-channel FET). The reverse bias at the gate in either case causes the channel resistance reading to increase, which shows that the FET is operating. The reciprocal of this reading is called G_b, and the transconductance, g_m, is proportional to the difference: $G_o - G_b$. Here again, the actual value depends somewhat upon the ohmmeter properties, but the test is indicative enough for most experimental purposes. QST

LINEAR TUNING — WHAT PRICE?

BY DONN G. SHANKLAND,* W8WVS

ONE OF the frustrating challenges facing the home construction artist is that of making his equipment approach commercial gear in smoothness, appearance, operating convenience and design quality. It simply takes too much time and money to engineer each phase of a project to a professional level, even though the amateur may know how to do it. One area in which there is room for much improvement is in oscillator tuning. The commercial transceiver usually boasts a highly linear multiturn master oscillator, the result of considerable design effort. This note will show how the average ham can approach this quality in his homemade VFO, using only common inexpensive parts.

Everyone knows that the frequency of a tuned circuit varies with the capacitance like $C^{-1/2}$. Thus, the ordinary variable capacitor, whose actual value depends linearly on the angle of rotation, cannot give a linear frequency-vs-angle characteristic. The usual solution is to use a large padding capacitor, and just tune a small variable capacitor to cover the desired range. The drawbacks to this are twofold: the tuning curve is still not linear, and the frequency stability is less than it could be. Let's look at stability, for a moment.

Let's say we're building a VFO to cover 8.0-8.5 MHz for vhf use. If the oscillator has a stability of 10^{-4}, we expect frequency drifts on the order of 800 Hz if we operate the oscillator at 8 MHz directly, and the nonlinearity in our tuning curve is about 12 kHz, so the result is neither very stable nor linear. That is, by adjusting the tuning curve so that it is correct at the end points, the error can be reduced to about 12 kHz near the center (though this is still too large to justify a geared dial). Higher stability is achieved by changing the oscillator range to, say, 1.0-1.5 MHz, and mixing with a 7-MHz signal from a crystal oscillator. The percentage stability of the VFO is about the same, and the crystal is stable to about 10^{-6} or so, so we expect our drifts to be about 100 Hz, a considerable improvement. However, we would now have a nonlinearity of 73 kHz, and a dilemma!

The equipment manufacturer usually solves the problem in the following way. Keeping the VFO frequency low to achieve stability, he uses a specially designed variable capacitor or inductor which gives a straight-line tuning curve. Then he can use a 10:1 or 50:1 geared dial mechanism, and calibrate, meaningfully, the fast-turning dial directly in kHz, since the tuning rate is now quite uniform over the band. The amateur cannot hope to duplicate this result unless he buys one of the variable inductors, or obtains one of the straight-line-frequency capacitors through surplus stores.

Using the Midline Capacitor

There is another and very inexpensive solution which is available to all. A number of companies manufacture a variable capacitor called a "midline" design, which uses semicircular plates, but with the pivot point offset, as in Fig. 1.

This offset causes the capacitance to vary nonlinearly with the angle of rotation, and while this is not the exact variation needed for a straight-line frequency curve, by adjusting the size of the padding capacitor one can get an optimally linear result for any given amount of offset. With a given padder, adjusted for optimum linearity, one has no control over the frequency ratio that can be covered by the tuned circuit. However, one can adjust the inductance so that this ratio corresponds to the desired frequency range in kHz. For example, one common offset is one-third of the radius of the capacitor plate. For this value of h, the optimum padder has a capacitance equal to 0.4235 times the capacitance range of the midline variable. This fixes the maximum-to-minimum frequency ratio at

$$\sqrt{\frac{1.4235}{0.4235}} = 1.833.$$

So if, for example, we want to vary over a range of

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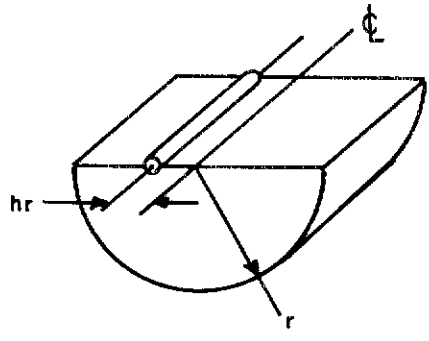

Fig. 1 — A "midline" capacitor is made by off-setting the rotor shaft on the semicircular rotor-plate assembly.

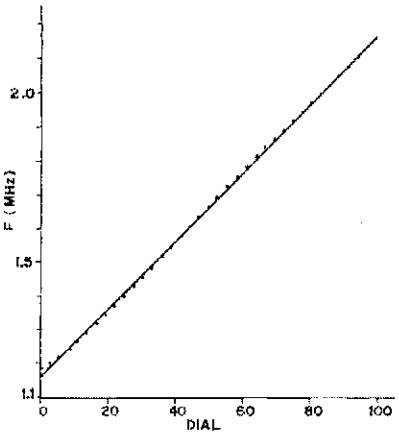

Fig. 2 — High degree of linearity obtained with optimum padder capacitance for a maximum-to-minimum frequency ratio of 1.833 and a midline variable capacitor, for a tuning range of 0.5 MHz.

0.5 MHz, we would adjust our inductance so that the frequency limits were about 0.6 MHz and 1.1 MHz, respectively. (The exact range would be 0.581 MHz to 1.081 MHz, from Table I.) With this setup, we would then obtain a tuning curve as shown in Fig. 2, with a theoretical rms frequency error of about 2-1/2 kHz, a very satisfactory linearity. Then, of course, we would mix the VFO signal with a crystal-derived signal at 7.4 MHz, so as to obtain our desired 8.0 to 8.5 MHz tuning range.

How do we know what padding capacitance to use to get optimum linearity? And how do we adjust the circuit to achieve the desired result? In Fig. 3 are presented the results of a computer calculation using an optimization program, which has calculated the ratio of optimum padding capacitance (C_o) to total change in capacitance of the midline variable, and the low-frequency f_{min}, for a linear change of 1 MHz over the range of the variable. Also shown is the predicted rms frequency deviation from linearity, Δ_f, for a 1-MHz tuning range. This information, plotted for a range of h values, is given in tabular form in Table I.

The construction of the actual circuit is simple. One first measures the h value of his midline capacitor. Then he measures the maximum and minimum capacitance and subtracts to get the ΔC. From the table or graph, he determines the ratio of C_o to get ΔC for his h value, and multiplies this by ΔC to get C_o. This is the total padding capacitance, including stray capacitance, coil self-capacitance, etc. Using a variable capacitor whose maximum capacitance is $\geq C_o$ then allows one some adjustment. Finally, one multiplies f_{min} by the desired tuning range in MHz, to get the actual f_{min} in MHz. The circuit is aligned by repetitively adjusting the inductance so as to give the calculated f_1 with the midline capacitor nearly meshed, and the variable padder so as to give f_2 with the midline nearly open, until no further adjustment is necessary. Frequencies f_1 and f_2 are alignment frequencies where the dial should agree exactly with the actual tuning curve.

If a tuning range other than 1 MHz is desired, then F, Δ, f_1, and f_2 should all be multiplied by the desired tuning range in MHz. Actual capacitors will give curves differing somewhat from the theoretical, chiefly at the ends of the range. This may necessitate some extra work to get optimum linearity for one's own setup.

Practical Results

A VFO was constructed using these principles, and the actual tuning curve vs dial settings are shown in Fig. 2, scaled to the same frequency range. The measured results are not as good as the theoretical curve, the largest deviations occurring at the ends of the tuning range. Nevertheless, for a 500-kHz tuning range, the rms error is 5.7 kHz, and the maximum error is 12.9 kHz. These are deviations from the optimum linear curve. The errors are such that if the intended range were to precisely cover an amateur band, the actual range would lie wholly within the band by a few kHz.

In summary, curves are presented for designing optimally linear tuning mechanisms using readily available and inexpensive capacitors. The resulting frequencies and tuning curves make it possible to construct highly stable heterodyne VFOs and receiver local oscillators, while retaining an excellent degree (about 1%) of linearity for uniform dial calibration.

Acknowledgement: Mr. Paul Gregory, W8NPE, built the VFO and supplied the counters on which the measurements were made. The author is also grateful to him for many discussions on this and other amateur projects.

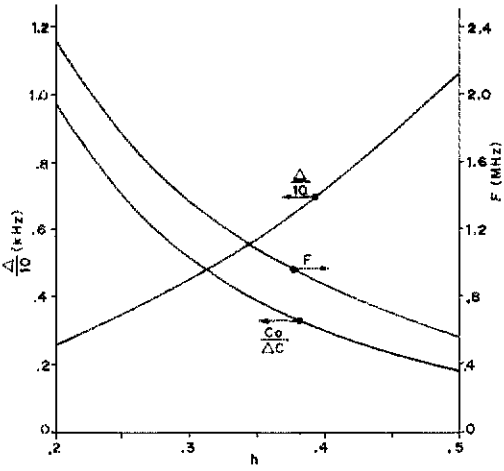

Fig. 3 — Results of a computer calculation for the ratio of optimum padding capacitance to total change in midline variable capacitance, C_o, and the low-frequency f_{min}, for a linear change of 1 MHz Δ_C.

Table I — Factors in the design of a linear VFO tuning system.

h	$C_O/\Delta C$	F(MHz)	Δ (kHz)	$\bar{\Delta}$ (kHz)	f_1 (MHz)	f_2 (MHz)
0.2000	0.968	2.326	2.6	9.4	2.4143	3.2784
0.2333	0.771	1.913	3.1	11.5	2.0033	2.8701
0.2667	0.624	1.601	3.8	13.9	1.6939	2.5633
0.3000	0.512	1.357	4.5	16.5	1.4526	2.3249
0.3333	0.423	1.161	5.2	19.2	1.2588	1.1349
0.3667	0.352	0.999	6.1	22.3	1.0994	1.9902
0.4000	0.294	0.863	7.1	25.5	0.9663	1.8509
0.4333	0.246	0.747	8.1	29.0	0.8531	1.7427
0.4667	0.205	0.647	9.3	32.8	0.7553	1.6463
0.5000	0.171	0.559	10.6	36.9	0.6699	1.5568

h = Offset from center as a fraction of the radius.

C_o = Total padding capacitance.

ΔC = Capacitance variation: $C_{max} - C_{min}$.

F = Lower frequency of optimum 1-MHz range linear scale.

Δ = Theoretical rms error.

$\bar{\Delta}$ = Theoretical maximum error.

f_1 f_2 = Frequencies of exact agreement between actual and linear scales.

Ideas On . . .

(Continued from page 12)

Small Beams for Mountain-Topping

One of the writer's favorite pastimes in summer hamming is hitting the high spots, which abound in New England's rough terrain. But early tries with fm didn't repeat the old thrills. There were plenty of stations, to be sure — but it was not much fun what with the fm receiver's well-known penchant for responding only to the strongest signal on the listening frequency. And as for working through repeaters, most of which are at lower elevations than this mountaineer's favorite haunts, keying them up three or more at a time is no way to make friends!

If you intend to use your fm rig from the high spots, by all means get yourself some physical selectivity, in the form of a beam antenna. There are small Yagis available from several commercial sources. A cut-down Channel 6 TV antenna works well. Or make your own from information in the *VHF Manual*.

This writer is no lover of vertical polarization, but you go with the multitude, so our portable Yagi now has provision for operation in the vertical position. A small vertical Yagi has a sharp horizontal pattern, so good physical selectivity is possible. A 5-element Yagi will sort out several different strong signals on 146.52, if they are coming from points differing in beam heading by 30 degrees or more. A 4-foot piece of wooden closet pole is used with our sectional aluminum support, to keep the top vertical member from affecting the antenna radiation pattern. The coaxial line is brought out along the boom and down in back the reflector element, for the same reason.

If you like your mountain-topping away from roads that allow cars to reach the vantage points on many mountains, you may want to try something like W1CUT's "Two-Toter Two," described in *QST* for October, 1974. If so, note that there is an error in the element lengths, Fig. 1, page 37. The dimensions given are for each half of the element, not for the overall length, as indicated. Laird's earlier Two-Toter, in July, 1971, *QST*, may also be of interest. This writer's golf-bag beam, described initially in *QST* for October, 1967, is reproduced in *The Radio Amateur's VHF Manual*, 1968 and later editions. Earlier versions in all previous editions are also adaptable to vertical service. QST

Strays

University credit for amateur radio? Starting in January, the University of Hartford is offering a graduate course entitled "The Amateur Satellite." It deals with classroom applications of satellites in the Oscar series (see QST for May 1975, page 47) and will deal with practical approaches which can be used by teachers. The class will meet at the Talcott Mountain Science Center and those wanting further information may call the center at 203 677 8571.

James Millen Manufacturing Company has made available a two-page article on design of magnetic shields, such as those used around CRTs in oscilloscopes. Requests for the article, "Helpful Hints in the Design of Magnetic Shields," should be sent to James Millen Mfg. Co., Inc., 150 Exchange Street, P.O. Box 126, Malden, MA 02148.

Modern Naval communications took a backseat to Samuel Morse and a handkey on the *Kitty Hawk* and her escort *Bronstein* during their Indian Ocean excursion. Working with their counterparts the Royal Kenyon Navy, U.S. Navymen reactivated cw with some of the senior radiomen delving into their memories to recall a talent put aside as early as 1960.

A General Technique for Satellite Tracking

BY PETER DRAKE THOMPSON, Jr.*

THERE HAVE BEEN numerous articles published during the past years on the subject of tracking amateur satellites. These articles provide information concerning the ground track of a particular satellite and the visibility contours, or viewing circles, for a given site. However, none have presented a general technique whereby tracking for any satellite/ground station combination could be accomplished. Since the introduction of the pocket-sized electronic slide-rule calculators, the computation of the pertinent parameters required to track a satellite has been made easy.

The purpose of this article is to present a method for obtaining the ground trace of any satellite and the visibility contours associated with any tracking station. A sample problem is solved to illustrate the ease with which this technique can be applied.

Terminology

A basic understanding of satellite orbits is necessary before the ground trace of a satellite can be computed. The orbital inclination and altitude of the satellite is all that is needed to calculate the ground trace of a satellite in a near circular orbit. The inclination of an earth satellite is the angle that its orbit plane makes with the earth's equatorial plane. As depicted in Fig. 1, the inclination angle (i) is measured in a counter-clockwise direction from the equatorial plane when the satellite is moving south-to-north. The type of orbit, as illustrated in Fig. 2, is determined by the inclination. Orbits which have inclinations between 0 and 90 degrees are commonly referred to as posigrade orbits, while retrograde orbits have inclinations between 90 and 180 degrees. Polar orbits are ones which have 90 degree inclinations and equatorial orbits are ones in which the orbit plane lies in the equatorial plane; i.e. zero-degree inclinations.

The period of an orbit is directly proportional to the 1.5 power of the semi-major axis of the orbit, which is a function of the orbital altitude. This means that by placing a satellite at the correct altitude, any desired orbital period can be obtained. With most commercial communication satellites, where it is desirable for them to have a 24-hour period (where the orbital period coincides with the earth's rotational period, resulting in the satellite remaining fixed with respect to a point on the earth's surface) they are placed at an altitude of approximately 35,786 kilometers (19,323 nautical miles). When a satellite is in a near circular orbit the average radius of the orbit can be used to determine the orbital period. The average radius can be found from the apogee (the most distant (R_O) can be found from the apogee altitude (H_A – the most distant oribital point from the earth) and the perigee altitude (H_P – the orbital point nearest the earth).

$$R_O = \frac{(H_A + R_E) + (H_P + R_E)}{2} \qquad (1)$$

Note: The altitudes are expressed in kilometers.

$$T_A = \frac{\pi}{30}\sqrt{\frac{R_O^3}{\mu_E}} \qquad (2)$$

The time interval between two successive perigee passages of an orbiting satellite is known as the anomalistic period (T_A), and can be computed in minutes from the above relationship.

The oblateness of the earth causes the major axis of the satellite's orbit to rotate and hence the apogee and perigee to move while the satellite is revolving in orbit. Astronomers call this motion the "rotation of the line of apsides." Depending upon the inclination of its orbit, this movement results in the spacecraft having to travel more or less than 360 degrees between successive passes through a point in space. If this point is in the earth's equatorial plane and the satellite is traveling north, the point is called an ascending node. The time interval between two successive passes through an ascending node is known as the nodal period (T_N).

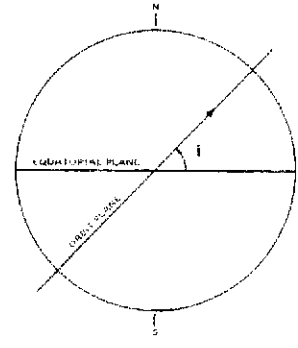

Fig. 1 – Orbit inclination.

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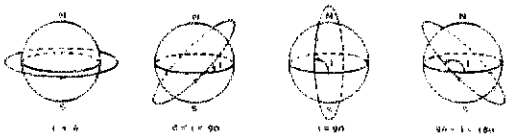


Fig. 2 — Types of orbits.

The next expression shows the relationship between the nodal and anomalistic periods.

$$T_N = T_A \left[1 - \frac{3}{4} J_2 \left(\frac{R_E}{R_o} \right)^2 \left(4 - 5 \sin^2 i \right) \right] \quad (3)$$

If published orbital data are available, the nodal period can be taken as the average time per orbit between any two ascending nodes.

A Satellite's Ground Track

Once the nodal period is known, the satellite's ground trace can be determined. The ground trace is the loci of the subsatellite points (the intersection of the local vertical passing through the orbiting satellite and the earth's surface). Prior to calculating the ground trace, it is necessary to establish a sign convention for latitude and longitude. The equations in this article were developed using positive toward the north and east. (That is, 10°S latitude would equal −10° latitude, and 100°W longitude would equal −100°E or +260°E longitude.)

To this point, no mention has been made of the fact that as the satellite revolves about the orbit, the earth rotates beneath it. Hence the ground track of a satellite will be determined not only by the motion of the satellite in orbit, but also by the rotation of the earth. For the moment, consider a non-rotating earth where the satellite's ground track would be formed by the intersection of the orbit plane and the earth's surface. The effect of the earth's rotation will be discussed later. The change in the latitude and longitude of the subsatellite point on a non-rotating earth can easily be computed for any time (t) after a nodal passage. When in a circular orbit, a satellite has a constant angular velocity.

$$\omega_s = \frac{360}{T_A} \quad (4)$$

The arc distance the spacecraft will travel during the time interval (t) after nodal passage is directly proportional to its angular velocity.

$$\nu = \omega_s t \quad (5)$$

During this time interval the latitude of the subsatellite point will change.

$$\phi_s = \sin^{-1} (\sin \nu \sin i) \quad (6)$$

And the longitude of the subsatellite point will also change

$$\Delta\lambda_V = \frac{\cos i}{|\cos i|} \cos^{-1} \left(\frac{\cos \nu}{\cos \phi_s} \right) \quad (7)$$

where $|\cos i|$ is the absolute value of the cosine of the inclination angle.

While the satellite travels northward from the equator during the time interval (t), the earth will rotate and hence change the longitude of the subsatellite point an additional amount. The amount the longitude changes because of the earth's rotation during this time interval (t) is given by the next relation.

$$\Delta\lambda_E = \omega_E t \quad (8)$$

Besides the changes in longitude due to the movement of the satellite revolving around the orbit and the rotation of the earth, the longitude of the ascending node will also change slightly during each revolution of the satellite. This perturbation is caused by the earth's oblateness and is called "nodal regression." The change in longitude due to the regression of the node during the time interval (t) can be computed from the following expression:

$$\Delta\lambda_R = \omega_R t \quad (9)$$

where the regression rate is found from the following equation.

$$\omega_R = \frac{2025 \left(\frac{R_E}{R_o} \right)^2 \sqrt{\mu_E} \cos i}{\pi \sqrt{R_o^5}} \left\{ -5 \left(\frac{R_E}{R_o} \right)^2 \sin^2 i \left[8J_2^2 + 7J_4 \right] - 8J_2 + 2 \left(\frac{R_E}{R_o} \right)^2 \left[3J_2^2 + 10J_4 \right] \right\} \quad (10)$$

In the case of Oscar 6 (see Table I), the regression rate is in the order of 0.0007 degrees per minute (0.08 degree/orbit), and can be neglected since its contribution to the total nodal shift is insignificant for a single orbit. However, the nodal regression becomes important when a multiple-orbit ground track is being considered.

The total longitude shift of the subsatellite point can be computed for any time after the nodal crossing from the following expression.

$$\Delta\lambda_s = \Delta\lambda_V - \Delta\lambda_E + \Delta\lambda_R \quad (11)$$

The corresponding change in the latitude of the subsatellite point can be found from equation 6, since it is not affected by the earth's rotation.

The ground track of a satellite can be computed from equations 5 through 11 by incrementing the time interval (t). The ground trace corresponding to a specific node can easily be determined from the following relationship.

$$\lambda_s = \Omega_N + \Delta\lambda_s \quad (12)$$

Note: Remember the sign convention, that west longitudes are negative.

Visibility Contours

Once the satellite's ground track is known, it is

Table I — Sample Problem

Satellite: Oscar 6
Type of Orbit: Circular
Orbit Altitude: 1452.958 Km
Orbit Inclination: 101.77 deg.
Tracking Station: New Orleans
Latitude: 30°N
Longitude: 90°W
Height: 0.0 Km

Constants: (See Glossary for definitions.)

R_E = 6378.165 Km
ω_E = 0.2506844 deg./min
μ_E = 398603.2 Km^3/sec^2
J_2 = 0.00108228
J_4 = −0.00000212

Calculate the ground track at each 5-minute interval, and the visibility contours at each 30 degrees of azimuth for elevation angles of 0, 30 and 60 degrees.

Calculated Values:

Anomalistic Period: 114.94567 minutes
Nodal Period: 114.99469 minutes
Nodal Regression Rate: 0.0006885 degrees/minute
Station Visibility Contours: See Table II.

necessary to determine when the satellite will be within range of the ground station. This can be accomplished by determining when the satellite will pass within a cone whose apex is at the center of the earth and whose altitude passes through the tracking site. The central angle of this cone is a function of the radius of the satellite's orbit, the height of the tracking station above the earth's surface, and the desired elevation angle above the horizontal at the tracking site. The intersection of the cone and the earth's surface defines a visibility contour for the tracking site. The satellite will be within range of the station when the ground track falls inside this visibility contour, and will have an elevation of at least the specified elevation angle.

The great circle arc distance (θ), or one-half the central angle of the cone of a visibility contour can be determined from the next relationship.

(13)

$$\theta = 90^\circ - \epsilon - \sin^{-1}\left[\left(\frac{R_E + H_T}{R_o}\right)\cos\epsilon\right]$$

This equation is a function of the elevation angle (ϵ), which can be varied to provide any number of visibility contours.

Each visibility contour is generated by incrementally varying the azimuth (A_Z) from zero to 360 degrees. The latitude corresponding to a point having a great circle arc distance of θ at an azimuth of A_Z, from the tracking site is found from the next equation.

(14)

$$\phi_C = \cos^{-1}\left[\cos\theta\sin\phi_T + \sin\theta\cos\phi_T\cos A_Z\right]$$

The corresponding longitude can be obtained from the following expression.

(15)

$$\lambda_C = \lambda_T \pm \cos^{-1}\left[\frac{\cos\theta - \sin\phi_T\sin\phi_C}{\cos\phi_T\cos\phi_C}\right]$$

The plus-minus sign in the previous relation indicates that the right hand term is added for azimuths between zero and 180 degrees and subtracted for azimuths greater than 180 degrees. In fact, it is not necessary to compute the right-hand term in the longitude equation (15) or the corresponding latitude (equation 14) for azimuths greater than 180 degrees, since the contour will be symmetrical about its north-south axis. That is, the same value of the arccosine term in the longitude equation (15) and the same latitude computed in equation 14 can be used for azimuths of A_Z and 360°-A_Z.

Visibility contours for three different elevation angles are tabulated in Table II for the tracking site and satellite combination given in the sample problem (Table I). Each contour presented in Table II was calculated for each 15 degree increment of azimuth.

The distance from the ground station to the satellite (slant range) is directly related to the great circle arc distance (θ) of each visibility contour. The following relation can be used to compute the slant range:

$$S_R = \sqrt{R_o^2 + R_T^2 - 2R_oR_T\cos\theta} \qquad (16)$$

where the radius of the tracking site is given by the next equation.

$$R_T = R_E + H_T \qquad (17)$$

A Tracking Calculator

After the ground track and the visibility contours have been computed, it is necessary to plot this information to determine the times and azimuths of acquisition and loss, and the time, azimuth and angle of maximum elevation. The visibility contours of the tracking station can be plotted on a map, or on either rectangular or polar graph paper. Fig. 3 shows the contours plotted on polar graph paper. Regardless of the type of paper, the visibility contours will not necessarily be circles. This deformation results when a circle on the surface of the spherical earth is projected to the flat plane of the map or graph paper. Also, the lines of constant azimuth will not necessarily be straight lines.

The satellite's ground track should be plotted on transparent or translucent paper such as drafting mylar or tracing paper. The ground track is plotted by placing the clear sheet over the map or graph paper used for the visibility contours so that its grid can be used as a reference to plot the ground track. Also indicate the north pole on the ground track, since this will be required later. The Oscar 6 ground track, from Table II, is shown

TABLE II

Elevation Angle (deg)	0		30		60	
Arc Distance (deg)	35.47		15.14		5.97	
Slant Range (km)	4544		2362		1629	
Azimuth (deg)	Latitude (deg-N)	Longitude (deg-E)	Latitude (deg-N)	Longitude (deg-E)	Latitude (deg-N)	Longitude (deg-E)
0.00	65.47	-90.00	45.14	-90.00	35.97	-90.00
15.00	63.20	-70.54	44.52	-84.56	35.75	-88.10
30.00	57.39	-57.43	42.73	-79.76	35.12	-86.36
45.00	49.69	-50.64	39.99	-76.05	34.12	-84.90
60.00	41.18	-48.11	36.57	-73.64	32.84	-83.85
75.00	32.50	-48.36	32.76	-72.54	31.37	-83.24
90.00	24.03	-50.56	28.86	-72.65	29.82	-83.12
105.00	16.09	-54.32	25.09	-73.82	28.29	-83.45
120.00	8.97	-59.42	21.69	-75.91	26.89	-84.20
135.00	2.98	-65.74	18.82	-78.75	25.70	-85.32
150.00	-1.60	-73.13	16.66	-82.16	24.79	-86.72
165.00	-4.48	-81.34	15.31	-85.98	24.22	-88.31
180.00	-5.47	-90.00	14.86	-90.00	24.03	-90.00
195.00	-4.48	-98.66	15.31	-94.02	24.22	-91.69
210.00	-1.60	-106.87	16.66	-97.84	24.79	-93.28
225.00	2.98	-114.26	18.82	-101.25	25.70	-94.68
240.00	8.97	-120.58	21.69	-104.09	26.89	-95.80
255.00	16.09	-125.68	25.09	-106.18	28.29	-96.55
270.00	24.03	-129.44	28.86	-107.35	29.82	-96.88
285.00	32.50	-131.64	32.76	-107.46	31.37	-96.76
300.00	41.18	-131.89	36.57	-106.36	32.84	-96.15
315.00	49.69	-129.36	39.99	-103.95	34.12	-95.10
330.00	57.39	-122.57	42.73	-100.24	35.12	-93.64
345.00	63.20	-109.46	44.52	-95.44	35.75	-91.90
360.00	65.47	-90.00	45.14	-90.00	35.97	-90.00

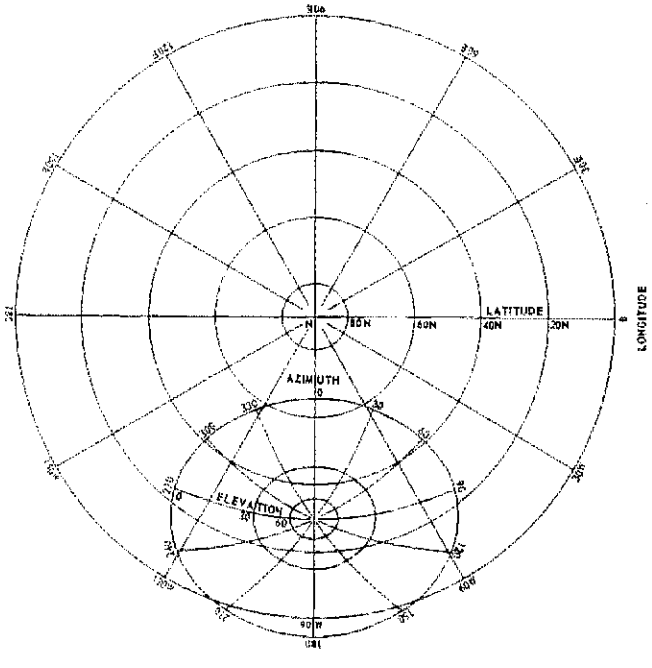


Fig. 3 — Tracking-site visibility contours.

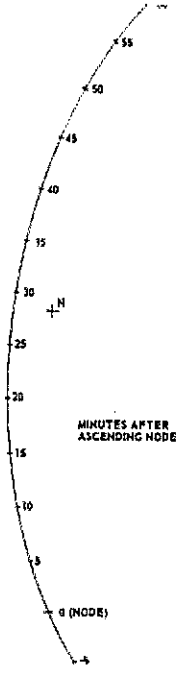


Fig. 4 — Oscar 6 ground track.

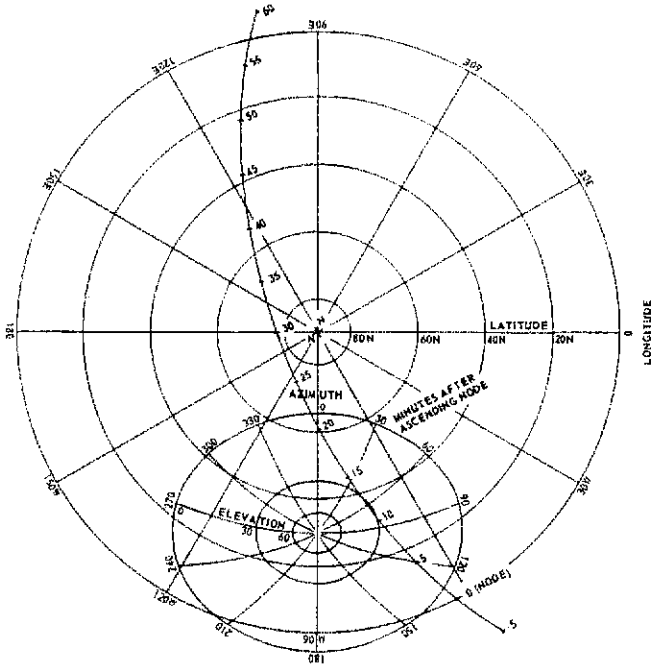


Fig. 5 – Completed satellite tracking aid.

Table III

Pertinent Tracking Information

Condition	*Time*	*Azimuth*	*Elevation*
Acquisition	2	130°	0°
Maximum Elevation	12	60°	31°
Loss	22	355°	0°

Table IV

Limits on Nodal Longitude

Pass	*Longitude Range*
Ascending	33°W-122°W
Descending	48°E-138°E

plotted in Fig. 4.

To obtain the necessary tracking information, all that remains to be done is to overlay the ground-track plot on the visibility-contour plot. First align the north poles on the two graphs and place a pin, bolt or pop-rivet through them. See Fig. 5. Then rotate the ground track node to the desired nodal crossing longitude. The pertinent tracking parameters can now be read directly from the graphs. These data are tabulated in Table III for a node at 62°W longitude. Equivalent data for any desired node can be easily found by setting the node on the ground-track plot to the desired nodal longitude.

The tracking plots can also be utilized to determine the range of nodal longitudes for which the satellite will come within range of the tracking site. This is accomplished by simply making the ground track tangent to the desired visibility contour and reading the longitude at the node (equator crossing). These data can be generated for both ascending (south-to-north) and descending (north-to-south) passes of the satellite. Table IV lists these limits for the Oscar 6/New Orleans combination. Once these are found, any nodal crossing can be rapidly checked to determine if the satellite will come within range of the ground station during that orbit.

Although the ground track of Oscar 6 was computed for 5-minute intervals in the sample problem, any time interval can be selected. The smaller the interval, the closer the times can be read from the graphs. Likewise, any interval can be selected for the azimuths and any number of elevation angles used to develop the number of station visibility contours required. However, it is not practical, from a graphic standpoint, to select too small an interval for these variables. Perhaps 1/2 minute, 5 degrees and 10 degrees should be considered to be the lower limits on the increments for the calculations involving the ground track, azimuth and elevation angle, respectively.

Although an evening or two will be required to calculate and plot the data, it will be time well spent. The graphs will provide a quick and accurate means of obtaining the needed tracking information.

Glossary

Symbol	*Definition*	*Units of Measure*
λ_C	The longitude of a point on the visibility contour	Degrees East
λ_S	The longitude of the subsatellite point.	Degrees-East
λ_T	The longitude of the tracking station.	Degrees-East
μ_e	The product of the Universal Gravitational constant and the earth's mass (398603.2).	Km3/sec2
ν	The angular distance traveled by the satellite from the ascending node.	Degrees
T_A	Anomalistic orbital period.	Minutes
T_N	Nodal orbital period.	Minutes
ϕ_C	The latitude of a point on the visibility contour.	Degrees-North
ϕ_S	The latitude of the subsatellite point.	Degrees-North
ϕ_T	The latitude of the tracking stations.	Degrees-North
ω_E	The angular velocity of the earth (0.2506844).	Deg/Min
ω_R	The nodal regression rate.	Deg/Min
ω_S	The satellite's angular velocity.	Deg/Min
Ω_N	The longitude of an ascending node.	Degrees-East

I would like to express my gratitude to my wife for her patience, encouragement and help, and to Messrs. Robert D. Taylor and John G. Swider for their suggestions and encouragement. QST

The Trombone Trimmer

(Continued from page 23)

A capacitor constructed according to the dimensions given above will have a measured capacitance range of 5 to 380 pF. The reason for the discrepancy between the calculated value and the "real life" value is that the formula assumes the inner cylinder is centered exactly in the outer cylinder. In practice the Teflon overlaps at the seam and the inner cylinder is not exactly in the center. Although it is not offset by much, this change in position has a large effect on the denominator of the equation. As the ratio of R_1 to R_2 is reduced, which is what happens when the inner cylinder is not exactly centered, the overall denominator becomes quite a bit smaller. As the denominator is made smaller, the value of the capacitor gets larger – closer to the 380 pF value that was measured.

The dielectric strength of Teflon is 1000 to 2000 volts per mil thickness at dc. Since the dissipation factor of Teflon remains essentially constant throughout the rf spectrum, the 1000- to 2000-volt-per-mil rating will also remain relatively constant. The dissipation factor (D) of a capacitor is defined as:

$$D = \frac{1}{Q}$$

where D is a number that represents the merit of the capacitor, and Q is the capacitor Q. The ratio of energy stored in a capacitor at the time the electrostatic field is being established to the losses in the capacitor during the same time is called the Q or quality factor. Q is seldom used in characterizing a capacitor as the losses are generally small, which makes the Q value extremely large. For convenience, the dissipation factor (D) is used.

Test Circuit

The capacitor needed to be "field tested" so it was incorporated into a simple random-wire-antenna coupler. Since this article was not intended to be an expose on random-wire couplers, but rather a description of an easy-to-build variable capacitor, the coupler itself will not be described in great detail. Fig. 1 shows several of the matching configurations possible with the device. It was used with several different random-wire antennas on all bands from 160 through 10 meters. In each case one of the three configurations shown in Fig. 1 provided a match between the low-impedance transmitter output and the unknown antenna impedance. The location of the clips on the coil and the amount of capacitance is determined experimentally with the aid of an SWR indicator placed in the line between the output of the transmitter and the input to the coupler. A good earth ground should be connected to the chasses of the coupler. (This coupler was tested at the 1000-watt level with no signs of arcing or overheating.) QST

Modifying the Heath HW-16 from 15 to 20 Meters

BY LLEWELLYN P. ROSE,* G5BGA

Described here is a simple modification for the Heath HW-16 transceiver which will provide 20-meter coverage. Total cost is approximately $7, and the conversion can be completed in one evening.

WHEN MY SON enlisted in the Air Force, I inherited the HW-16 that he had used during his Novice years. For my recent move to England, I decided to keep my ham gear to a minimum and the HW-16 appeared to be a good, lightweight companion for me.

The transceiver performed admirably on the 40- and 80-meter bands despite the European broadcast interference. There never seemed to be much activity on the 15-meter band at times when I could operate. As a result, the instruction manual was inspected to see how difficult it would be to convert the transceiver for 20-meter operation. Surprisingly, it was a simple operation, requiring one new crystal and two capacitors along with an easy alignment procedure. The following steps explain the conversion.

Simple arithmetic and reference to the circuit description (pp 54-56 in the HW-16 manual) show that substitution of a 19.545-MHz crystal for the 26.545-MHz crystal will put the 6EA8 heterodyne oscillator on the correct frequency for 20-meter receiver coverage. Remove the chassis bottom plate and the top cover. Unsolder the ground wire from the top of the 26.545-MHz crystal and push the wire aside temporarily. From underneath the chassis, carefully unsolder the crystal pin connections while pulling on the crystal from the top side of the board. Replace the old crystal with the 19.545-MHz unit. Resolder the pins and the ground wire on top of the crystal.

* US Army Standardization Group, UK, Box 65, FPO New York 09510.

Power was applied to the HW-16, and weak 20-meter signals were received. A check of the L1 and C41 resonant frequency showed that the circuit tuned from 17 to 25 MHz. A 100-pF mica capacitor was soldered across L1. The circuit now tunes from 12 to 19 MHz. Refer to the receiver alignment instructions on pages 42 and 43 in the instruction manual. Perform the 21-MHz alignment procedure, bearing in mind that you are actually aligning the receiver for 20-meter operation. Remember that the transceiver now tunes from 14.0 to 14.250 when the band switch is placed in the 15-meter position. At this point the received signals will be somewhat weak. This is because the transmitter pi-network output circuit serves also as the receiver antenna circuit, which has not been adjusted for 20-meter operation thus far.

Transmitter modification involves changing the tap on L12. Unsolder the four wires which connect to L12, remembering where each of them was connected. Unscrew the two 6-32 hex nuts which secure the coil to the chassis, set the nuts and lock washers aside, and remove the coil. The 15-meter tap is located 7 turns from the bottom of the coil (chassis end). Use a pair of pliers to remove the loop that forms this tap. From the bottom of the coil, count up 11 turns (half way between the 15- and 40-meter taps) and grip the wire at this new position with a pair of pliers. Twist the wire to form a new loop. This will retighten the turns on the coil form. Scrape away the insulation on the loop and solder a one-inch piece of bare wire to the new tap. This wire is necessary to reach from the new tap to the wire coming from the band switch. Replace L12 and resolder the four wires which were previously removed. Solder a 20-pF mica capacitor across the two terminals of L9, the

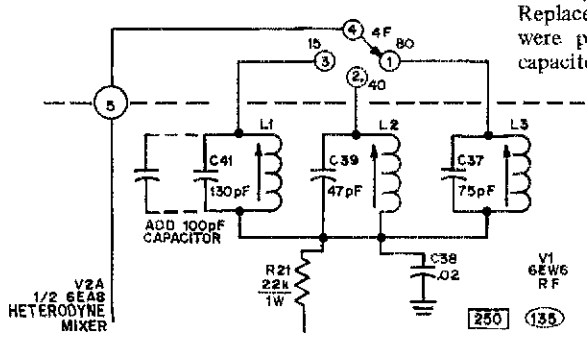


Fig. 1 — Partial schematic diagram showing the addition of a 100-pF capacitor across the rf-stage plate-tuning coil.

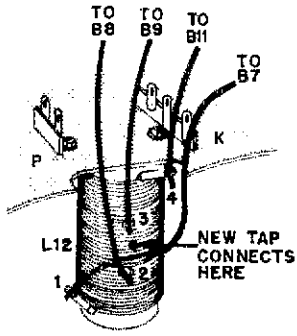


Fig. 2 — Sketch showing approximate location of the 20-meter tap on L12.

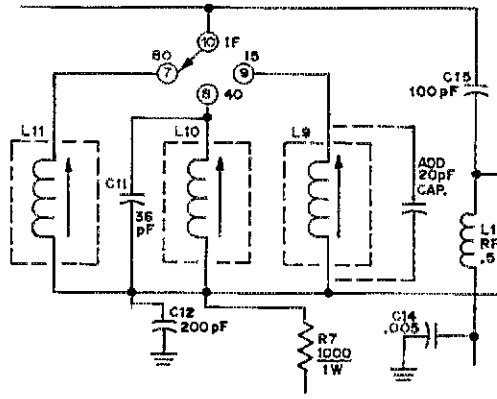


Fig. 3 — Partial schematic diagram of the driver plate circuit. A 20-pF capacitor must be connected in parallel with L9.

driver-plate coil. This completes the transmitter modifications. Refer to the transmitter alignment section of the instruction manual and perform the 15-meter alignment procedure. Use 40-meter crystals or 40-meter VFO output for 20-meter operation.

Replace the bottom plate and top cover and the job is finished. It might be well to make a small label, "14.0" and tape it over the "21.0" lettering on the front panel. The HW-16 can be returned to 15-meter service by reversing the foregoing procedure. QST

Strays

Interested in learning how to get on the Oscar satellites? Send an s.a.s.e. th Hq. for the basic information.

STOLEN EQUIPMENT

ICOM K-20, Serial No. 7128, was stolen from car. Contact Baltimore City Police, case No. 5153189.

Drake ML-2, Serial No. 10284, stolen on September 16. Morton L. Church, WB4AUH, 3860 Abingdon Road, Charlotte, NC 28211.

Recovered by the Cobb County Detectives Dept. of Marietta Georgia, a Clegg FM-27B. Serial No. 27123-376.

Theft from automobile: Heath HW 29 transceiver on Sept. 17. Frank L. Wayland, K3GJL, 374 Hibbs Ave., Glenolden, PA 19036.

METURM 2-meter fm radio was stolen in Sacramento, CA. Serial No. NOC-038. Mac Petersen, W7WKF, 270 East 3300 South, Salt Lake City, UT 84115.

Theft from truck on Sept. 24 in New Jersey. Standard fm transceiver 851T, Serial No. 111057; Clegg FM 21, Serial No. 711; Erotron (REPCO) VHF FM Hand-Talkie high band "tracer" with leather case and rubber antenna; Sharp Calculator PC-1802, Serial No. 47271910; Panasonic Underdash FM Stereo Receiver. Reward offered. Gerald Prim, P.O. Box 748, North Arlington, NJ 07032.

RL Drake ML 2, Serial No. 11603. William Tilghman, W4CKW, 448 W. Oakridge, Apt. 201, Orlando, FL 32809.

Clegg 27B FM was stolen from car on Sept. 7. Serial No. 27102-611. R.C. Blodgett, WA2DEW/KV4CQ, 372 Essex Ave., Bloomfield, NJ 07003.

Gladding 25 FM transceiver was stolen from car on Aug. 16. Serial No. 97050743. Richard E. Levandowski, 849 Macbeth Circle, Lakeville, MN 55044.

IC-22, Serial No. 13 12 122, was stolen from car in Dallas, TX. Perry W. Barker, WA5IKU, 2240 Prichard Lane, Dallas, TX 75227.

ICOM IC-22-A, Serial No. 340 1470, and Drake TR-4 taken during a robbery on Sept. 24 at home of W8KPD. Notify Madison Twp. Police, Trotwood, OH. 45426.

SB-144, Serial No. 720168. Carl Sensabaugh, WA4VOC, Rt. 1, Box 349, Forest VA 24551.

Standard 826M, Serial No. 203046. Jack C. Hemby, W5WOQ/WA4SHZ, 3408 O'Hara Rd., S.W. Huntsville, AL 35801.

Regency HR 2A, Serial No. 04 72028. Was stolen from car. Reward offered. Harold N. Sharpe, WA7RFR, 1403 9th Street South, Nampa, ID 83651.

Heathkit HW-202 was stolen from auto on August 2 in Columbus Ohio. Also log book and photocopy of license WA8YGY. Paul J. Scott, WA8YGY, 110 Knollwood Drive, Redwood Falls, MN 56283.

Swan 350, Serial No. 171805. Frederick C. Crowell, W9MIB, 5331 Old Georgetown Rd., New Albany, IN 47150.

Swan FM 2X, Serial No. 10451 was stolen from auto in Charlotte, NC. J.R. Morehead, WA4VEG, Rt. 8, Shelby, NC 28150.

Genave GTX-10, Serial No. 11-26, suspected to have been stolen, recovered. Don Osmund, WB9LWN, 533 Brainerd Ave., Libertyville, IL 60048.

HR2, Serial No. 04-02981. William W. Fulcher, K4RTA, 105 Freshrun Drive, Hendersonville, TN 37075.

Drake R-4, Serial No. 1174; Drake T4X, Serial No. 10327; Drake DC4, Serial No. 1777. Leo Jendrazkiewicz, 5459 W 83rd Place, Crown Point, IN 46307.

IMPROVED FREQUENCY STABILITY for the HEATH SB-300

BY FREDERICK H. SCHMIDT,* W4VWS

THE Heath SB-300 is considered to be a very stable receiver when in good condition. Heath specifies that for a 10% line voltage change, the receiver frequency change will be less than 100 Hz. After several years of operation my receiver failed to meet this specification. The main cause of trouble is the filament voltage change on the linear master oscillator (LMO). The LMO tube is a 6AU6A. A step change in line voltage produces an immediate change in the LMO frequency, followed by a drift to some new frequency. This effect could be reduced, but not completely eliminated by selecting a "good" 6AU6A. To remove this source of instability, a precision-regulated, 6.3-volt dc supply was employed. Fluctuations in line voltage still caused the LMO to shift frequency slightly. A voltage-regulator tube (VR-150) was used to stabilize the oscillator plate voltage. These changes effected a distinct improvement. Then, for a line voltage change of 10%, no change in LMO frequency could be detected. A frequency counter with 1-Hz resolution was used for this test.

* Emory University, University Computing Center, Uppergate House, Atlanta, GA 30322.

Unfortunately, the receiver was still not completely stabilized. The crystal-controlled heterodyne oscillator was investigated next. It was somewhat surprising to find that the heterodyne oscillator was quite sensitive to changes in filament voltage as well as plate voltage. When these voltages were regulated, as in the LMO circuit, there was a marked improvement in receiver stability. The beat-frequency oscillator (BFO) appears to be quite stable without voltage regulation.

The power supply circuit is shown in Fig. 1. Any circuit capable of furnishing regulated voltages of 150 dc at 10 mA and 6.3 dc at 600 mA would

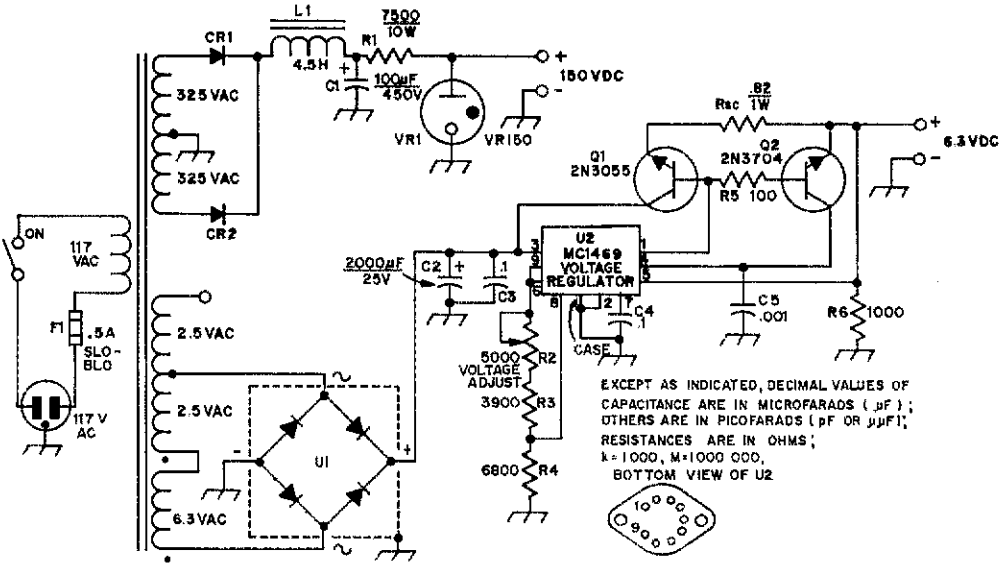


Fig. 1 — Circuit diagram for the regulated power supply. Unless otherwise noted, all resistors are 1/2-watt composition. Capacitors are disk ceramic except those with polarity marked, which are electrolytic.
C1 — 100-µF electrolytic, 450 V dc.
C2 — 2000-µF electrolytic, 25 V dc.
CR1, CR2 — Silicon diode, 1000-PRV, 500 mA.
F1 — 0.5 A, Slo-Blo type.
L1 — Choke, 4.5 H, 50 mA (Stancor C1706 or equiv.).
Q1 — 2N3055 transistor.
Q2 — 2N3704 transistor.
R2 — 5000-Ω linear-taper control.
T1 — 117-volt primary; secondary 650-V at 40 mA, center tapped; 5 V at 2 A; 6.3 V at 2 A (Stancor PC-8406 or equiv.).
U1 — Bridge rectifier assembly, 25 volt, 1 ampere.

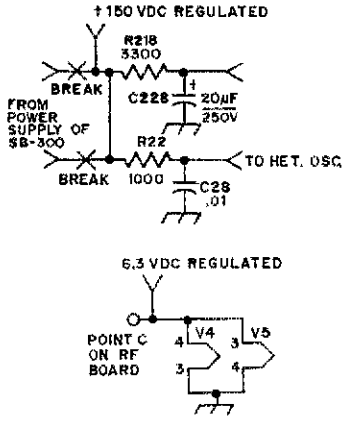


Fig. 2 — Connections to SB-300 receiver.

be suitable. The value of Rsc (0.82 ohm) was chosen to limit the output current to approximately 700 mA. R1 should be adjusted to produce 6.3-V dc at the output with no load connected. Current limiting will occur when the supply is first turned on due to the low resistance of the cold tube heaters.

The regulated voltage sources are connected easily to the receiver without drilling holes or altering the printed circuit boards. Unsolder the two brown wires connected to the terminals marked C and D on the rf circuit board. Solder these two wires together and tape their ends to prevent unwanted contact with other circuits. Connect the regulated 6.3-V dc source to the terminal labeled C on the rf board. This feeds the regulated filament voltage to the LMO tube (V5) and the heterodyne-oscillator tube (V4). Next, disconnect and tape the wire coming from the power supply that is connected to R218, and do likewise for the wire coming from the power supply to R22. Connect the regulated +150-V dc source to these two resistors. The modifications are shown in Fig. 2. The power supply cable can be passed through the rear hole that is in line with the band switch.

If the LMO, BFO and high-frequency oscillator are used to drive external devices such as a transmitter, they should be isolated by means of a buffer stage to prevent frequency changes due to variations in the load. QST

November, 1925

. . . Staffer John Clayton says crystal control is the answer to achieving steady waves, among other things permitting high-peak audio amplification for better selectivity. He describes in down-to-earth terms the pioneering work of Dr. A. Hoyt Taylor at the Naval Research Laboratory. A description of NRL is another feature this month.

. . . Ralph Heintz shows his design of a high-power marine set; the imaginative engineering well portends the birth of Heintz & Kaufman later in the decade.

. . . Stanford University has been sending standard frequency signals from 6XBM for more than a year, and this issue describes the equipment, antennas and operating system.

. . . Technical Editor Kruse says some key-thump filter designs will take out the keying as well as the thump, and shows us an appropriate compromise.

. . . The details of effective log-keeping are outlined by A. L. Budlong, who has become assistant to the Secretary upon the departure from Hq. of Charlie Service.

. . . The days of the wet battery are numbered, and even the dry cells will get a run for their money from the new "B eliminator" produced by Raytheon.

. . . The Editor chides us for untruthful (over-optimistic) signal reports — as ever!

Use your Zip code when writing ARRL.

November, 1950

. . . Advances in voice operation highlight this issue. W1RXX analyzes the effects of clipping and filtering on speech intelligibility. VE3PN adds some data on bandwidth vs. quality. Technical Editor Grammer tops things off with a general discussion of frequency response and effective communication.

. . . Sideband gets another strong boost from W1JEO's design of a crystal-filter rig with sideband and carrier rejection being done around 450 kc.

. . . The National Security Resources Board's official report provides that amateurs *will* be used in civil-defense communications. ARRL Emergency Coordinator W7NJ's report on the Seattle A-Bomb test is a major example of how we can serve.

. . . The multi-talented W1TS has designed a mobile bandswitching converter, which staffer W1LOP checked out extensively in his own vehicle.

. . . "General Operating" is the theme of this month's installment in the League series on amateur operating, principally trying to replace the boiler-plate QSO with some lively conversation.

. . . W3FQB has come up with a neat design for a tubeless electronic key, achieving compactness through use of RC timing circuits and selenium rectifiers.

. . . The popular ARC-5 war surplus rig has produced some TVI headaches, but W2ZYX shows us some effective cures. — *W1RW*

Recent Equipment

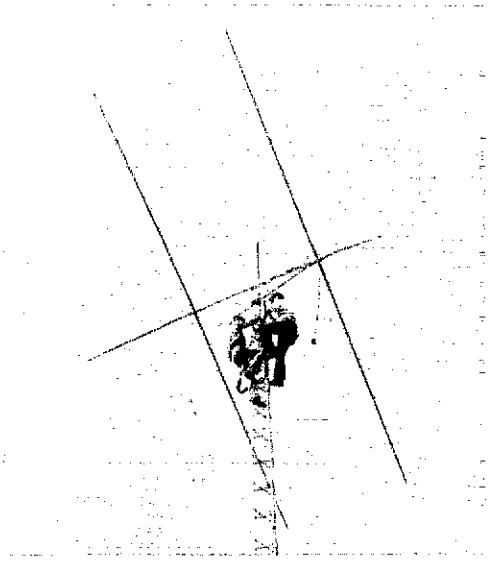
To acquaint you with the technical features of current amateur gear.

SKYLANE PRODUCTS CUBICAL QUAD ANTENNA

SKYLANE PRODUCTS MANUFACTURES kits for 2-, 3-, and 4-element "cubical quads" in fiberglass or bamboo models. The two-element bamboo version was assembled by the reviewer. Inasmuch as the electrical properties of the quad have been covered in detail elsewhere, this review is confined to the mechanical aspects of the Skylane antenna.

A subject of continuing interest (and controversy) among quad enthusiasts is the choice of spreader material. It seems that every known substance including bamboo, fiberglass, aluminum and PVC tubing has equally vocal proponents and detractors. To add to the confusion, conventional folk wisdom in the Northeast says that a quad made from *anything* is due to have an early demise, come wintertime. It is not surprising, therefore, that the writer was originally skeptical about the durability of bamboo spreaders. However, any visions of rug poles dangling in pieces from the top of a sixty-foot tower were quickly dispelled when the antenna was unpacked and inspected.

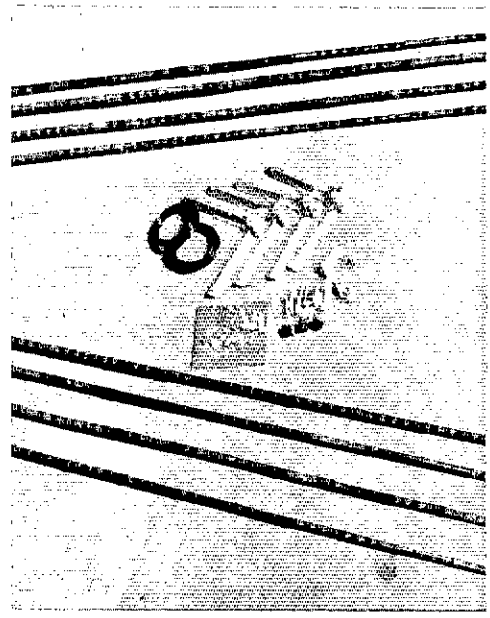
The quad kit is shipped from Skylane in two packages. One, a long thin carton, contains eight bamboo spreader poles and the aluminum boom and the other smaller carton is for the wire and hardware. The bamboo poles are fairly uniform in size and are thirteen feet long, tapering from 1-1/2 inches in diameter at the butt end to a diameter of 5/8-inch at the tip. Each one weighs about two pounds. The bamboo is coated with spar varnish at the factory as protection against moisture, giving the spreaders a dark brown finish. With this coating alone, the manufacturer estimates an average spreader lifetime to be between two and five years, depending on local temperature and humidity conditions. Skylane advises that wrapping each spreader with a layer of plastic electrician's tape (not included in the kit) will increase substantially the expected life of the material. This procedure was not attempted with the quad assembled by the writer.



Each of the spreaders comes with two holes drilled through at the butt end to clear the bolts that are used to attach the spreaders to the aluminum hub or spider. Additionally, holes are drilled at three positions along the length of each spreader for small eyebolts that are used to support the wire elements. During assembly of the quad, a generous amount of sealant (not included in the kit) was applied around each of the holes and the associated hardware in order to prevent the accumulation of moisture inside the bamboo. Sealant was also used at the butt and tip of each spreader. Each of the eight bamboo poles comes drilled at the same distances from the hub, and identical lengths of wire are used for the driven element and reflector loops. Small coils are inserted in the reflector loops to make them electrically longer than the driven-element loops. Undrilled bamboo poles otherwise identical to the spreaders provided in the kit are available from Skylane to accommodate those who prefer to drill holes at different locations, as well as those who would rather not have any holes drilled at all.

The spiders are two-piece cast aluminum assemblies that clamp down on the boom when two mounting bolts are tightened. There is no locking pin to prevent rotation of the spiders with respect to the boom, but from the writer's experience no such pin is needed. Once the spiders are secured properly, the quad elements remain correctly aligned. An eight-foot section of thick-wall (0.133-inch) aluminum tubing, 1.315 inches OD is used for a boom. A 9-1/2-inch square aluminum plate 3/16-inch thick is supplied predrilled for use as a boom-to-mast mount. Standard TV type U-bolt assemblies attach the boom and mast to the plate. At this point, a bolt through the boom and plate would be useful, although none is supplied with the quad kit. The hardware used in assembling the quad is galvanized, but the manufacturer recommends coating all of the hardware with a spray-on rust preventive that can be purchased from Skylane or may be available locally. This measure is good practice when building any kind of antenna, as it ensures that years after the hardware is initially tightened it will still be possible to

The Skylane Products 2-element triband cubical quad kit is shown here prior to assembly (the boom is not in the photo). The kit includes bamboo spreaders, spider assemblies, wire, reflector coils, boom, boom-to-mast mounting plate, plus all necessary hardware.



remove it without resorting to the use of a hacksaw.

Two spools of No. 14 Formvar-coated solid copper wire are included in the kit. Lengths of 70 feet for 20 meters, 47 feet for 15 meters, and 35 feet for 10 meters are suggested in the Skylane literature, as are six different rf feed methods. However, material is supplied for only one of the suggested feed systems, namely a type SO-239 receptacle mounted in a square of Plexiglas to which all three driven-element wires are connected. To reduce interaction between the 10- and 20-meter loops (being tied together in this fashion), it is recommended that a dipole be used instead for the 10-meter driven element. A length of nylon rope and two egg insulators are supplied with the kit to hold the dipole to the spreader arms.

Rather than feed the quad using the manufacturer's method, the writer preferred separate coaxial matching transformers, a relay box, and a single feed line. One difficulty became apparent immediately. A pronounced sag resulted because of the spacing between the driven elements required to prevent them from shorting. However, this problem might be overcome by either redrilling the holes in the spreaders (for the driven elements) or, better still, by fabricating an insulating plate so that the three elements could be joined at their intended locations without shorting.

The quad can be assembled and installed on a tower by one person, although there are certain operations like placing the spider/spreader assemblies onto the boom and hoisting the antenna into place on top of the tower that proceed more smoothly with the aid of one or two assistants. The completed quad weighs approximately 35 pounds, and can be turned by a well-built TV antenna rotator. The turning radius is just under 10 feet.

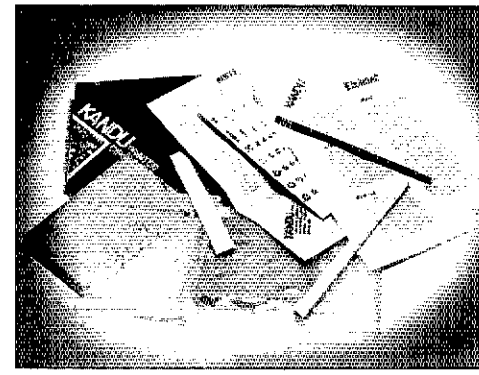
The only discrepancy noted between the assembly instructions and the kit was that two washers were indicated on a drawing of the eyebolt fastening instructions, whereas only enough washers to permit the use of one per eyebolt were included. This was easy enough to cure by purchasing 25 cents worth of washers from the local hardware store. A visual inspection of the bamboo spreaders made after the quad had been in service for just over one year revealed a series of longitudinal surface fissures ranging in length from two to six inches. Also, the original varnish had weathered somewhat. It is the writer's opinion that the structural integrity of the spreaders is not compromised by the appearance of the cracks. A new coat of varnish was applied to the bamboo, and it is expected that the quad will withstand at least an additional year of exposure to the weather. *–WA1JZC*

The Skylane Products Cubical Quad Antenna

Frequency Range: 20, 15, and 10 meters.
Assembled Weight: 35 pounds.
Boom Dimensions: 8 feet long, 1.315 inches OD.
Turning Radius: 9.5 feet.
Price Class: $90.
Mast Size: 1-1/4 inches.
Manufacturer: Skylane Products, 406 Bon Air Ave., Temple Terrace, FL 33617.

• New Apparatus

KANDU PRINTED-CIRCUIT KIT



Many experimenters classify the task of laying out a circuit-board pattern, drawing the pattern on the board, and then etching the board as a necessary nuisance! If you are one of those

experimenters, you might consider using the printed-circuit kit manufactured by Kandu, Inc. While it won't help with your original layout design, it will make the transfer of the pattern to the copper, and the etching of the board a simple job. The Kandu system utilizes an acid mask to protect the copper from the etchant. The acid mask is coated onto the back of a piece of paper which is attached to a 4 X 6- inch copper-clad board. Next, you place the artwork over the acid mask sheet and trace the circuit. As you trace the circuit, the protective material is deposited on the copper. When you complete the task of transferring the mask, the board is ready to etch.

The kit contains an etching bag and powdered ferric chloride. One simply adds powdered etchant and ordinary tap water (amounts given in the instructions), along with the board to be etched, into the etching bag. A special bag lock is included to help prevent accidental spillage of the etchant. The etchant is reusable, and enough is supplied for several boards.

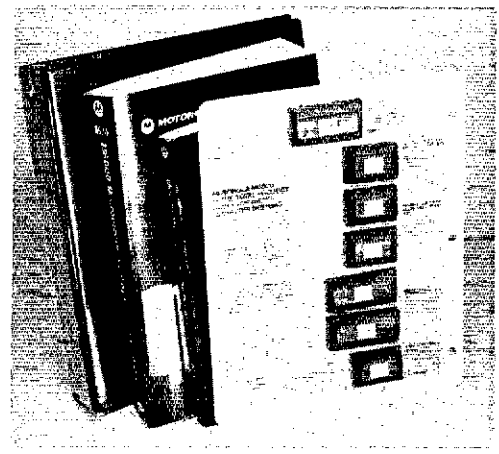
The kit also contains a template which aids in the tracing of the layout on the acid mask, a 4H drafting pencil, masking tape and complete instructions. The price class is $8, and the kit is available from Laco Industrial Electronics Corp., 4924 Fourth Avenue, Brooklyn, NY 11220. Replacement boards and etchant are also availabel from Laco. – *WA1LNQ*

MOTOROLA M6800 MICROCOMPUTER SYSTEMS DESIGN EVALUATION KIT

Lately there's a lot of talk about microcomputers and microprocessor units, sometimes abbreviated μP or MPU. What's all this talk about? How can one learn more about microprocessors? Is it true what they say, that within the next several years microprocessors will become almost as commonplace as electronic calculators are today?

Likely the price range of μP systems will never be down to the $20 or so of a bargain 4-function calculator. But the fact is that more and more such processors are coming into use every day. In essence, microprocessors have already found their way into the field of amateur radio. To wit, the functions of Dodd's "Contestor" (*QST*, February, 1975), Horowitz's "Compucoder" (*QST*, June, 1975), and other specialized digital-logic devices described of late for home construction, can *all* be handled by a single microcomputer of appropriate design and memory capacity.

One way for an individual or group of persons to obtain hands-on experience with microprocessors is through package deals such as Motorola's M6800 design evaluation kit. Available from distributors of Motorola's semiconductor products in a price range of $300, the kit includes seven ICs which contain the electronics for a small microcomputer system, a loose-leaf notebook full of specification sheets, engineering data and general information on the M6800 line, a 714-page applications manual, and a 310-page programming manual. The ICs include an MC6800 MPU IC which is an 8-bit central control for the M6800 family, capable of addressing 65,000 bytes of memory with its 16-bit address lines, two MCM6810L1 128 X 8-bit RAMS, two MC6820 peripheral interface adapters, one MC6850 asynchronous communications interface adapter, and one MCM6830L7 1024 X 8-bit ROM which is programmed to load, display, and provide output data for the M6800 system. These are MOS n-channel silicon-gate devices, and require



only a single 5-volt supply. The M6800 system uses a single bus organization that allows memory and interface devices to share the same address space; no multiplexing or decoding is required. All devices are TTL compatible.

Don't get the mistaken impression that this design-evaluation kit includes all components and step-by-step instructions for a do-it-yourself project. The user must provide all the necessary hardware, the power supply, some means of entering data into the M6800 system, and some means of displaying the output data. Further, the user must either have a working knowledge of microprocessor design or else do a goodly amount of homework before he can successfully wire up a system that will meet his desires or requirements. And a lot of that knowledge must be in the software area – that pertaining to programming, computer languages, and the like. (Much of the necessary knowledge can be obtained through short seminars or night-class courses being offered at intervals in various larger cities and in some universities throughout the country, tuition and fees usually running between $200 and $450.)

But what this kit does do is offer a convenient means of obtaining ICs and required data for a small, easy-to-use μP system that is highly adaptable to a variety of applications. There's no need to shop around and pick up all sorts of loose materials. And, as a matter of fact, the cost of the complete kit is less than that of the individual ICs if purchased separately. The kit can open the door for an amateur who wants to get into the microprocessor field – experimentally or otherwise. It is manufactured by Motorola Semiconductor Products, Inc., Box 20912, Phoenix, AZ 85036. – *KIPLP*

Strays

K6WM passes along a suggestion for leisure reading – *The Bruneval Raid Flashpoint of the Radar War* by George Millar. Amidst its background info about the electronic warfare of communications, it mentions the ham radio operator who dismantled the Bruneval radar installation under German fire. Interesting reading for WWII buffs and those of that vintage says Ross.

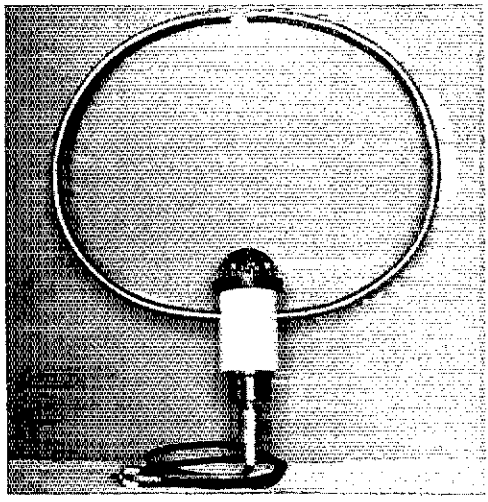
Hints and Kinks For the Experimenter

ANOTHER LOOP ANTENNA FOR HUNTERS

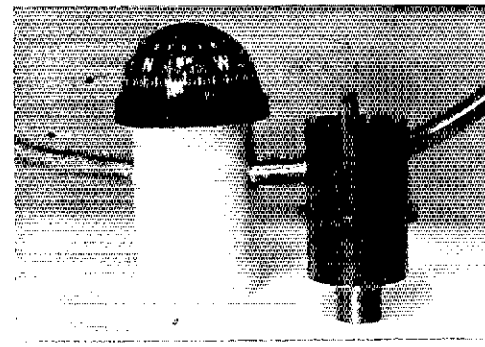
The general use of frequency modulation (fm) on the vhf and uhf amateur bands has complicated the problem of direction finding (DF). The limiter circuit used in fm receivers leaves no easy point in the receiver from which monitoring of signal levels can be accomplished. The use of some other circuit source for indicating the DF steer is required.

Most fm receivers include the use of a squelch circuit. An adjustable sensitivity control sets the minimum level at which the squelch will "open" and the audio from the receiver will be heard. With the antenna described here connected to the receiver, rotating the antenna will cause the signal to "pop" in and out. To improve this effect, some control over the amount of signal the receiver "hears," and proper adjustment of the squelch threshold, is needed. The latter is usually performed by the operator and the former is accomplished by inductively coupling the feed line from the receiver to the antenna.

Photo I shows such an antenna system. The loop is made from 40 inches of 3/8-inch OD copper tubing, bent into a circle with the ends about 1 inch apart. The coupling link is a piece of hard-drawn copper wire, fastened to the center of a bulkhead fitting from a small boat. The size of the coupling link should be kept as small as possible since it also might function as a very small loop, rather than a coupling device for the antenna.



View of the completed loop antenna. The compass adds magnetic heading indication to the antenna operation, useful when plotting a "steering" heading.



The coupling link is installed in a bulkhead mount similar to the type used on many small sailing craft.

To use the loop, it is connected to the receiver by a length of coaxial cable, with the coupling link parallel to the loop for maximum coupling of the antenna to the feed line. After the signal is tuned in, rotation of the coupling link will attenuate the signal until a point is found where a sharp null will be indicated as the antenna is rotated. PVC plumbing fittings were used to give the antenna a "finished" appearance; nothing is unusually critical about the design. The antenna has been used to "home" on the transmitter, a 25-watt, 2-meter signal from as close as 50 feet, and also on the 162.55-MHz Weather Service broadcast station in New York, a distance of over 60 miles. *B. C. Algeo Jr., W3EM*

KEY DOWN

Maybe your XYL won't like you drilling holes in that maple operating desk so you can mount your new electronic keyer paddle or "bug." Two-way carpet tape placed on the bottom of the "keys" will hold them quite well; also the tape is useful for wall maps and other items that require hanging. – *Larry R. Baine, W8GBR*

TV BACKDROP

With more amateurs using SSTV and fast (regular) scan television, the need for a white backdrop becomes important for the production of high-contrast pictures. The installation of a white roll-type window shade hanging from the ceiling, mounted a few feet behind the subject, provides a suitable background for this purpose. – *Robert W. Gervenack, W7FEN*

BREAK-IN DELAY FOR THE HT-46

Owners of the Hallicrafters HT-46 transmitter, treated in Recent Equipment some years ago (*QST* for Aug., 1966), may be interested in the circuit described here. It is easy to build and is not expensive. Break-in delay is provided during cw operation through addition of this unit, and antenna changeover from transmit to receive is made possible by the plate relay used in the new circuit. Although we have no information to offer about use of this circuit with similar types of commercially made transmitting equipment, chances are the accessory could be adapted easily for addition to other kinds of gear.

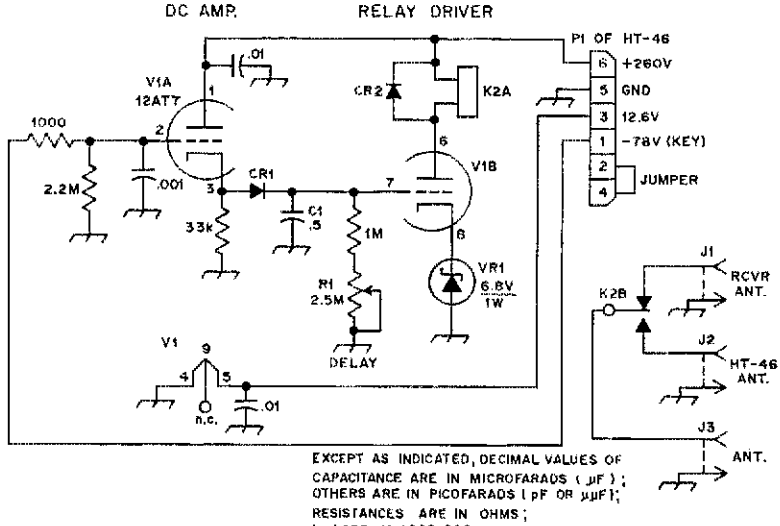
This assembly is *not* a VOX box. Hallicrafters did manufacture such an accessory (model HA-16) for ssb operation, and the circuit of that item is contained in the HT-46 instruction manual for those who may want to build one.

All of the operating voltages for the break-in delay "gizmo" are borrowed from the HT-46; they're taken through the VOX accessory socket on the rear apron of the transmitter (J6 on the HT-46 diagram). Plate voltage for V1 is obtained from pin 6 (+260V), and heater voltage is taken via pin 3 (12.6 V ac). Pin 5 of J6 serves as the ground connection after the lead originally connected to it is unsoldered from terminal 9 of K1 and connected to chassis ground in the HT-46. Pin 1 of J6 is connected to the keying line at J2 after being unsoldered from C4 in the transmitter. The foregoing modifications make J6 unsuitable for use with the HA-16 VOX unit. Those wishing to retain the VOX-connection facility of J6 may elect to add a four-terminal connector on the rear apron of the HT-46 chassis for connection to the circuit shown here.

One other change was made to the HT-46 by the writer; a jumper was placed across terminals 5 and 6 of S1A to maintain cutoff bias on the HT-46 keying line during standby (function switch in STANDBY mode). Without the change the outboard break-in delay will actuate when the HT-46 is in standby, as V1A will conduct unless the grid is supplied with negative voltage.

Almost any plate relay will suffice at K2A, provided it is a spdt variety. The relay contacts should have good insulating material (ample for up to 100 watts of rf power), and the contacts should be rated at 2 amperes or more. The builder can use a 5000- or 10,000-ohm relay, or any value in between those ohmic amounts.

R1 is the delay control. With the component values specified, the delay range is on par with most commercial break-in delay circuits. Shorter delays can be had by making C1 lower in value, or vice versa. If receiver muting is of interest, use a dpdt relay at K2A. The second set of relay contacts can be used for that application. — *WICER*



Schematic diagram of the break-in delay assembly. The circuit can be built in a Minibox, and should be shielded to prevent rf energy from causing adverse effects. Fixed-value capacitors are disk ceramic. Decimal-value capacitors are in μF. Fixed-value resistors are 1/2-watt composition types.

C1 — High-quality 0.5 μF, 100 volt or greater. Mylar, polystyrene, or glass capacitor recommended.

CR1, CR2 — Low-voltage silicon diode; 1N914 or power-supply type rectifier diode suitable.

J1-J3, incl. — Chassis-mount coaxial fitting of builder's choice. Phono connectors suitable.

K2 — Plate relay. See text. (Advance GHE-2C-10,000 used by writer.)

P1 — Plug furnished with HT-46.

R1 — Linear-taper 2.5-megohm control, carbon type.

VR1 — 6.8-volt Zener diode.

ARRL
10-Meter Contest

As this is written (mid-September) propagation signs are good for the third annual 10-Meter Contest. Dec. 13-14 are the dates; *please* send an s.a.s.e. for log forms before the event. Having the proper forms makes it easier for you as an operator and for your harried contest reporters.

This year's rules are the same as last year; the contest runs from 1200Z Dec. 13 to 2359Z on Dec. 14; no time limit. Anybody can work anybody, providing both ends of the QSO are on 10 (Oscar excepted). All QSOs count 2 points, except QSOs with Novices count 4 points. CW contacts must take place *below* 28,500 (except Oscar). Suggested frequencies are:

CW	28000-28050
Novice	28100-28150
SSB	28500-28600
A-M	28800-29000

Be sure to avoid the Oscar down-link frequencies: 29.45-29.55.

GL! — *WA1STN*

Rules

1) Eligibility: This contest is open to all amateurs worldwide.

2) Object: To exchange QSO information with as many amateur stations in any and all parts of the world as possible on 10 Meters.

3) Contest Period: The contest shall run from 1200 GMT December 13, 1975 to 2359 GMT December 14, 1975. This is a 36-hour period with no limitation on operating time.

4) Conditions of Entry: Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority and the decisions of the ARRL Awards Committee.

5) Entry Classification: Entries will be classified as single or multiple-operator stations. Single operator stations are those in which one person performs all transmitting, receiving, spotting and logging functions. Multiple-operator stations are those obtaining any assistance, such as from spotting or relief operators, or keeping the station log or records. Multiple-transmitter stations are prohibited. The use of electronic or mechanical devices and/or any other method of simultaneous operation of two or more transmitters is prohibited.

6) Exchange: Amateurs in the 50 United States and Canada will transmit signal report and state or province. Others will transmit signal report and consecutive serial number starting with 001. Note: Those amateurs licensed by the U.S. Government or branch thereof not located in a state (i.e. KP4 KW6 KZ5 KC6, etc.) will transmit the consecutive serial number. Stations that are not land-based transmit signal report and ITU Region. The District of Columbia is considered part of Maryland.

7) Valid Contacts: A station may be worked once on cw and once on phone. All contacts must be either cw to cw or phone to phone. Crossmode contacts do not count for contest credit. Oscar contacts may be counted. All cw QSOs must take place between 28.0-28.5 MHz except those made through Oscar.

8) Scoring: Two points are earned for each completed two-way exchange. Four points are earned for a completed two-way exchange with a W or K Novice. Incomplete QSOs will not count for contest points and/or multipliers. Multipliers: The multiplier will consist of the number of different states, Canadian call areas (VE1-VE8, VO), ITU Regions (as sent by non-land-based stations) and countries as determined by the ARRL Countries List. A state or province cannot be counted again as a country. Final score = QSO points times the multiplier.

9) Reporting: Contest work may be reported either on the forms available from Hq. or on a reasonable facsimile. Send a self-addressed stamped envelope to ARRL for the appropriate forms. All entries must be postmarked no later than January 19, 1976 in order to be eligible for *QST* listing and awards. An entry consists of the log and summary sheet. Check sheets are not mandatory.

10) Awards: Awards will be issued on a section or country basis. A certificate will be awarded to the highest scoring single operator station in each section, Canadian call area and foreign country. Multiple-operator and Novice stations will receive an award if three or more such entries in a section are received or if the entry displays exceptional effort. Region awards for non-land-based stations will be issued if participation warrants.

11) Judges: All entries become the property of ARRL and none can be returned. All entries will be passed upon by the ARRL Awards Committee whose decisions will be final. The committee will void or adjust entries as its interpretation of these rules may require.

12) Disqualification: If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or scoring discrepancies.

If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest.

The calls of all disqualified participants will be listed in the *QST* report of the contest.

Any participant on the borderline of disqualification but not actually disqualified will receive a warning letter from the Communications Manager.

For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria. QST

THE INCREDIBLE JA(+ JH,JR,JE,JF,JG, JI) PHENOMENON

BY HAL OFFUTT,* K8HVT/JA1ZXX

The incredible explosion of amateur activity in Japan ranks as one of the more significant developments in amateur radio during the past decade. This rapid expansion has been evident in two closely-related areas: the manufacture and marketing of high-quality, low-priced equipment; and the dramatic surge of interest in amateur radio inside Japan. While most active amateurs are quite familiar with the former phenomenon, it seems that few know much about what has been going on inside Japan itself. This article will describe the current amateur scene in Japan and attempt to explain how the Japanese have got where they are.

RECENTLY MANY HAMS around the world have become aware that an extraordinary amount of amateur growth has been taking place in Japan. Yet for most, I think, it will come as something of a surprise to learn that Japan has pushed past the United States to become the nation with the largest amateur population in the world. What may be even more surprising is the fact that this distinction was achieved as far back as 1971. In that year alone a staggering 50,000 new operators joined the ranks of Japanese amateurs.

To date there have been approximately 500,000 operator licenses issued in Japan. At current rates of growth, which show no sign of slackening, this figure will reach 750,000 by 1980. The number of outstanding tickets has more than doubled since 1970 and has increased seven-fold since 1965. The figures for total licenses for each year since 1965 are given in Table 1.

Just how remarkable this figure of 500,000 licenses is may be seen by glancing at a few statistics. Japan's half-a-million licenses compare with about 255,000 (May, 1974) for the United States. Yet at 110 million, Japan's population stands at just over half our own. Thus, there is approximately one amateur license for every 220 Japanese, compared to about one in every 850 in the U.S. A committee of the Japan Amateur Radio League (JARL) has calculated that there are 0.6 hams per square kilometer in Japan, while the U.S. has only 0.036 and England 0.083.

Before we get too deep into the numbers game, however, I should make an important clarification. In Japan, operator and station licenses are separate, and there is a rather large difference in the totals for each. In contrast to 499,308 operator's licenses, the number of station licenses (and thus call signs) stands at only (only?) 286,247 (both figures are as of March 31, 1975).

There are a number of reasons for this disparity. One is that the figure of 500,000 refers to licenses and not individuals. Since all operator's licenses are issued for life, an amateur who

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JARL President Shozo Hara, JA1AN, explains some of the equipment used in amateur radio to H.I.H. Prince Hitachi and Princess Hitachi, the royal guests of honor, at Japan's first national hamvention held near Mt. Fuji in April, 1975.

TABLE I

Total Japanese Operator and Station Licenses Since 1965*

Figures are as of March 31 for the year given.

Year	Operator's Licenses	Station Licenses
1965	70,479	38,438
1966	82,841	45,032
1967	103,613	53,048
1968	129,459	66,365
1969	163,229	83,224
1970	205,262	105,933
1971	256,655	136,914
1972	315,270	180,268
1973	369,495	213,335
1974	429,922	246,514
1975	499,308	286,247

*Source: The Japan Amateur Radio League, and the Japanese Ministry of Posts and Telecommunications.

upgrades to the next class will not have his or her first license nullified as in the U.S. It is possible for one individual to hold as many as four licenses in Japan. Table II details the four Japanese license classes and presents totals for each.

But this factor can account for, at most, a small part of the disparity. The remainder of this number simply haven't applied for their station licenses. Reasons given for this range from a loss of interest in the hobby to a lack of funds to purchase equipment (one is supposed to have equipment before applying for a station license, since the type of equipment must be mentioned on the application). Some people apparently use a spouse's or a club call sign and do not need their own.

Going from just a few hundred to nearly 300,000 stations in two decades is quite a remarkable feat in anybody's book.

Whether one takes the figure for operator's licenses or for station licenses, however, it should be clear that what amounts to a revolution in amateur radio has occurred in this Asian nation. Going from just a few hundred to nearly 300,000 stations in two decades is quite a remarkable feat in anybody's book. How has this been done?

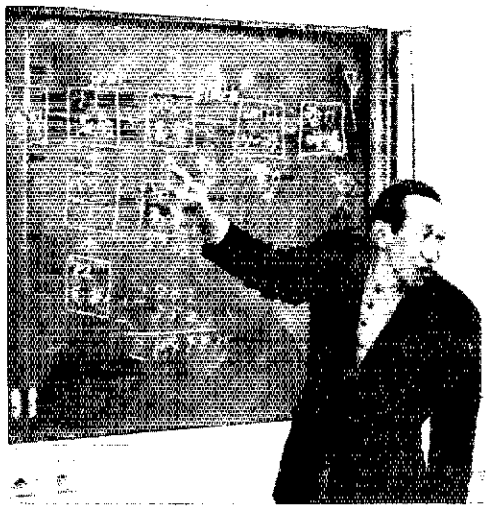
Broadly speaking, it is simply the result of a long-term campaign on the part of the Japanese to swell the ranks of their amateurs, a campaign which continues today. Speaking at Japan's first Amateur Radio Symposium in late 1973, JARL President Shozo Hara, JA1AN, summed up the philosophy that has apparently guided Japanese amateur radio over the past twenty years: "It may not be good to go on increasing our numbers blindly, but our average annual rate of growth is not that high. It is necessary to have a system which allows an annual growth of 10-20%."

A great deal of their growth stems directly from the unique licensing system that has been developed over the years. Structurally, there are four classes of amateur license in Japan today. License requirements and privileges are detailed in Table II. A glance at this table reveals that the no-code Radiotelephone Class license accounts for over 85% of all licenses. Subtracting all these from the total would leave only 61,712 amateurs, still a respectable number but not quite in the "revolutionary" category. Obviously, then, the Radiotelephone Class has played the key role in the Japanese "miracle."

This license was born in a major reorganization of the licensing structure undertaken in 1958. Prior to this time there were two licenses: First and Second Class. The former bestowed all amateur privileges. The latter did not allow operation on 10, 15 and 20 meters and held output power to 100 watts or less. The Second Class at that time, interestingly, had no code test and did not permit cw operation by its holders. Five years after the 1952 postwar rebirth of Japanese amateur radio, there were 5,000 stations on the air.

The new license structure that came into effect in November, 1958, was to bring about a dramatic change in this figure. Two new classes were created: the above-mentioned Radiotelephone Class, and a Radiotelegraph Class. In these two classes licensees were limited to amateur frequencies above 50 MHz or below 8 MHz, and were restricted to ten watts output power. The Radiotelephone Class license required no test in Morse code and permitted no Morse operation. The Radiotelegraph Class required a 5 wpm code test and permitted no phone operation. Privileges and requirements of these two classes remain the same today, except that operation has been expanded to include all amateur bands except 14 MHz.

The Radiotelephone Class proved immediately popular. By the end of 1959 nearly 16,000 individuals had passed the new test and obtained operator's licenses. Thereafter for the next five years, between 7,000 and 10,000 new operator permits were issued every year. By 1965 there were over 65,000 such licenses. On the other hand, the new Radiotelegraph Class was not as popular. Barely 600 such tickets had been issued in the first year, and by 1965 there were only 6,000. The number of First Class operators grew by less than 400 during these years.



Tadahisa Ishiguro, JA1OG, explains the workings of a ssb transmitter at a JARL-sponsored training session for the Radiotelephone Class. (Feb., 1975)

Part of the 50-some class members listening to JA1OG's lecture.

Radio Law was and continues to be, one of the greatest obstacles to the development of Japanese amateur radio.

One of the greatest obstacles to the development of Japanese amateur radio was, and continues to be, the Radio Law, (the Japanese equivalent of the U.S. Communications Act of 1934) whose cumbersome regulations make little distinction between commercial, amateur and other types of communication stations. One especially troublesome provision requires on-the-spot inspection of all stations. Seeing this procedure as a block to expansion, the JARL and the Ministry of Posts and Telecommunications came up with a method of simplifying things for new amateurs. Under the "Sanctioning" system, the JARL is authorized to act as "guarantor" to the Ministry for all ten-watt class stations which are using equipment certified acceptable by the JARL.

This works as follows: A recently licensed amateur who wishes to obtain a station license submits his application to the JARL, describing his equipment. If it is a rig that has been approved by the JARL, he need only mention its number. If it is not, he must submit diagrams to satisfy the League that it is up to certain standards. Upon JARL approval, the application is forwarded to the Ministry with a certificate of guarantee. When this procedure is followed, the Ministry waives the requirement for a station inspection and issues the station license and call sign directly to the applicant. This procedure applies only to ten-watt class licensees, however, and all first- and second-class stations still must be inspected by the Ministry.

Perhaps the most unique and important feature of the Japanese approach is the Classroom Training System.

Perhaps the most unique and important feature of the Japanese approach is the Classroom Training System. Even with the introduction of the new and relatively easy-to-get ten-watt licenses, there was still a general feeling that it was too difficult to obtain an amateur license. One reason was that the Ministry only offered license exams twice a year. It was not long before the JARL came up with a way around this problem. JARL developed and conducted a Classroom Training System for prospective ten-watt licensees, consisting of courses of fixed content and duration. Those who complete the training course and pass the final examination with a score of 60% or better receive their Radiotelephone license without taking the government test. The regulation change necessary to accommodate this change was made in December, 1964, and the JARL began offering these courses in early 1966.

This course is important enough to discuss in some detail. In 1974 there were some 564 such

TABLE II

Japanese License Classes

License	*Requirements*	*Privileges*	*No. of Operator Licenses as of March 31, 1975*	*% of Total*
First Class	Theory Test Morse Code test of 12 wpm Japanese Morse test	All amateur privileges	4,763	.95%
Second Class	Theory Test Morse Code test of 9 wpm	All amateur privileges but limited to 100 W antenna power	20,112	4.0 %
Radiotelegraph Class	Theory Test Morse Code test of 5 wpm	Operation on all bands except 14 MHz cw only. Antenna power limited to 10 W.	36,837	7.38%
Radiotelephone Class	Theory Test	Operation on all bands except 14 MHz phone only. Antenna power limited to 10 W.	437,596	87.64%
TOTALS			499,308	99.97%

*Source: Japanese Ministry of Posts and Telecommunications.

The display of Trio, Co., the maker of Kenwood gear, at Japan's first hamvention held near Mt. Fuji in April, 1975.

courses offered by the JARL at locations throughout Japan; 501 were courses for the Radiotelephone Class, while the remaining 63 were short courses for cross-training to the Radiotelegraph Class. There were no courses offered to newcomers for the Radiotelegraph Class. The Standard Radiotelephone Course requires 40 classroom hours. There is also a Short Course which runs only 20 hours and is designed for those who have some knowledge and can pass a preliminary screening test.

Classroom instruction is divided between theory and regulations. Standardized JARL textbooks and study manuals are utilized. Basic areas of theory are covered briefly with emphasis on broad understanding of principles and equipment operation instead of detailed knowledge of individual circuits. Although a lot of information is covered in the course, not nearly as much is required to pass the test, which is rather simple and requires very little technical knowledge or understanding. Typical questions might be to define things like spurious emissions, RIT, or the function of a low pass filter. The ease of the test is reflected in the percentage of people passing the course which, according to JARL figures, runs at about 85%. I would estimate the general level of difficulty of the ten-watt class exams to be about mid-way between those for U.S. Novice and General Classes.

If the goal of this new licensing structure and class was to increase amateur numbers, it was a smashing, unqualified success. While in the first year only 6,000 people went through these courses, five years later this figure had increased to over 35,000 annually. In all, over 209,000 individuals have received their operator's licenses through such training courses. Biannual Ministry exams are still given for all classes of licenses, and about 40-50% of all new amateurs still enter through this route. But the Classroom Training System has clearly played a key role in the growth of Japanese amateur radio.

Amateur radio in Japan today is beset with a mountain of problems, some of which will not easily be solved.

If the Japanese have been something of miracle workers when it comes to accomplishing their goal of high growth, they nevertheless have shown themselves to be susceptible to the hobby's accompanying problems. Amateur radio in Japan today is beset with a mountain of problems, some of which will not easily be solved. Not the least of these is serious overcrowding of many of the ham bands, caused by so many active stations operating in such a small area. Worst are 40, 6 and 2 meters in the urban areas, where QRM and blocking often reach nightmarish proportions. And with so many people living on such a small island, TVI and other types of interference are also major problems.

More serious is a widespread flaunting of regulations, complicated by a general lack of monitoring. Infractions like improper identification are commonplace occurrences. Since there is no restriction on the purchase of equipment, ten-watt licensees can, and frequently do, operate 100-watt or larger rigs with impunity. There are also many stations operating on the 14-MHz band without proper authorization, according to the JARL.

In an effort to come up with proposals for solving some of these problems, the JARL established the Amateur Radio System Research Committee. In an interim report on its findings, the committee described the situation as follows:

> At present in Japanese amateur radio there are many stations violating the regulations. Some overpowered stations almost openly exceed by a wide margin their licensed antenna power; many Radiotelephone and Radiotelegraph Class stations operate on the 14-MHz band; and so forth. These stations cause disruption not only within Japan but on a global scale, especially on the hf frequencies, and there have been

Contester JA2IYJ tries out the straight key in a "fast-sending" competition at the Yokohama DX Convention held in April, 1975.

Sorting QSLs at the JARL.

strong protests from neighboring countries.

If this situation continues in the future, there is a danger that this could develop into a serious problem in which the international reputation not only of Japanese amateur radio but even of our country will be harmed. We feel that the situation has become extremely grave.

Another serious difficulty facing Japanese amateur radio is the tendency of many ten-watt class amateurs to lose interest in their hobby. According to the monthly *JARL News*, many of those hams stay on the air only six months or a year and then begin to lose interest. The magazine fears that this may be caused in part by the very ease with which one can become an amateur today. The convenience in getting a license, buying a rig, and getting on the air has in the magazine's view turned becoming a ham into something of a fad: "It is a fact that even though the number of amateurs increases, the number of people who tire of the fashion and leave is also extremely large."

The JARL's own membership figures support this statement. With the noteworthy exception of JAs (many of whom are old-timers and hold First- or Second-Class licenses), membership in the League is highest among the most recently-licensed hams, the JGs at 5203, and steadily declines to only 2038 for the JHs, the oldest group outside the JAs. At 2741, the latter, interestingly, have more members than JHs, JRs, or JEs.

Perhaps the biggest problem the Japanese amateurs face is simply their own numbers. Maybe it is not that there are too many hams in Japan but that there are too few outside the country. In comparison to all their neighbors, the Japanese amateur presence looms so large as to be absolutely overwhelming. A DX station on 20 or 15 is normally completely swamped by JAs within minutes of coming up, especially on ssb. Working JAs one after another may be fun for a while, but many DX stations seem to tire of it rather quickly and either turn their beams elsewhere or simply QRT. In my own experience as a JA, I have found that many stations simply won't answer my calls. I used to think that being a W/K station was a terrible fate for a DXer, but now I know that there is one much worse.

I hasten to add that the Japanese are making great efforts to solve these problems. The JARL has worked out frequency allocation plans to minimize overcrowding and their efforts have paid off. In many cases, crowded bands have led to wider utilization of vhf and uhf frequencies, as well as to technological improvements and better equipment. For instance, crowding on 6 meters led to the popularization of 2 meters. Crowding there, where crystal-controlled wide-band fm has been the rule, has led to the development of a whole new generation of fine vfo-controlled ssb transceivers for this band. It has also prompted the expanded use of the 432 MHz band (Japan does not have use of 220), and today there are several good ten-watt ssb transceivers available for this band.

Other problems have also gotten attention. Japanese ham publications such as *CQ Ham Radio* and the *JARL News* are full of advice and columns on how to QSO, how to be a good operator, how to chase DX, how to have English QSOs, etc. Taken together, these efforts have produced some remarkable results in a rather short time.

How do foreign amateurs feel about their JA counterparts?

To find out how some foreign amateurs feel about their JA counterparts, I sent a short questionnaire to about 25 very active American contesters whom I had contacted from Japan. The opinions of these individuals concerning the JAs were almost all favorable, with most finding the JAs to be courteous and competent operators. A couple of the most interesting comments: W6NUT: "It is possible to work JAs at a higher rate on cw than any others, including Ws. I tip my hat to them." K6SDR: "I personally feel the JA operators are the best in the world as contest operators. They are well-disciplined and orderly and I always look forward to a good opening during a contest as it is easy to work from 120-150 per hour due to their operating habits. I wish the U.S. ops were as disciplined." W6OAT: "Without the JAs we would be lost!" W7GKF: "*By far* the JA hams are the *most* courteous hams in the world!" About the worst comment I received about the JAs is that they send too many QSLs!

(I was also surprised to learn from the survey just how important the JAs have become in

Workers process operators' licenses at the JARL.

Selling JARL training course textbooks and other amateur materials at the JARL.

contests. Several stations reported over 1,200 contacts in recent ARRL DX Tests and a couple had over 1,700! They were all understandably grateful for the boost this gave their scores.)

Of course, these comments do not represent everyone in every country, and I'm sure that one could gather quite a list of unfavorable comments as well, especially from those Pacific countries that have to live with the massive JA presence on a daily basis. But I think that most feelings of antipathy that might exist stem basically from the great numbers of JAs rather than from any particular bad operating practices.

One question which many in this country will have about the Japanese licensing system is how have the Japanese managed to permit hf operation by holders of a no-code class license. Section 3(1) of Article 41 of the Radio Regulations Annexed to the International Telecommunications Convention states: "Any person operating the apparatus of an amateur radio station shall have proved that he is able to send correctly by hand and to receive correctly by ear, texts in Morse code signals. Administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 144 MHz."[1]

This Section would appear to make the Japanese Radiotelephone Class license illegal. But wait. The Japanese have found what they feel is a way around this regulation. Article 3, Section 3 of the same Regulations provides that treaty signatories are bound by the Regulations whenever there is a possibility of causing "harmful interference" to other, authorized stations. The key phrase here is "harmful interference," which the Regulations define (in Paragraph 93) as:

> Any emission, radiation or induction which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.

The Japanese have turned Article 3, Section 3 around, and maintain that as long as there is no "harmful interference" to other stations, there is no problem with waiving the code requirement for hf operation. Obviously their view is that ten-watt stations cannot cause such "harmful interference" to other operations. However, the fact that many such stations are managing to communicate widely and *are* causing interference problems is a source of concern for the Japanese amateur.

Given the many difficulties faced by Japanese amateur radio today, it is somewhat surprising that there is not a strong drive to promote the upgrading of the ten-watt class license. Yet aside from a few articles extolling the merits of Morse code in the *JARL News* – and a one-hour code practice session on 40 meters each week from JARL – there is very little movement in this direction. The JARL position is that upgrading is a fine thing but that it should be a matter of individual initiative and not something in which the League should take an active role. As a consequence, perhaps, numbers of First and Second Class license holders have been relatively small with the current total for both amounting to less than 25,000. One wonders what kind of results the Japanese could achieve should they ever turn their talents to this task.

The main entrance to the JARL in the Sugamo section of Tokyo.

A fundamental philosophical difference.

I should make one final observation with respect to Japanese amateur radio. This concerns

[1] For a good discussion of the power these regulations carry, see R. P. Haviland, W3MR, Amateur Radio and the International Regulations, *QST*, April, 1971.

(Continued on page 130)

42nd ARRL November Sweepstakes Announcement

Why not try the November Sweepstakes this year? Just ask those who have participated in the past – it is real fun, and easy, too. Read the rules below carefully, and study the sample exchange. Decide how many contacts you figure on making, and write to headquarters for an "SS package." You'll need one log sheet for each 100 contacts, one dupe sheet (Operating Aid No. 6) for each mode (cw and phone) and one summary sheet for each mode. Send a self addressed, stamped envelope, with 10 cents postage for every five sheets requested. Take it from those who have been contesting for years: it is much easier if you have the right forms *ahead of time.*

In order to minimize interference to non-contest stations, the following frequency ranges are suggested:

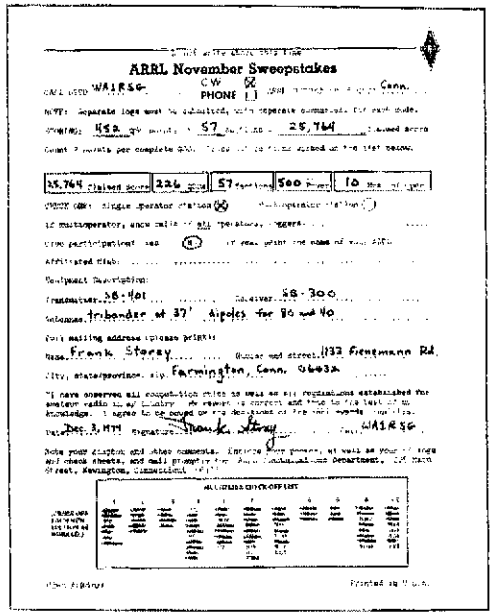
cw	phone
3550-3650	3850-3950
7050-7100	7200-7250
14050-14100	14250-14300
21050-21100	21300-21400
28050-28100	28600-28800

Look for Novices around 3710, 7110, 21110, and 28110. If you find activity too heavy near the middle of a range, move toward the edges, where things often go a little easier.

After the SS, be sure to postmark your entry by December 22, 1975. The letter from your club's secretary (Rule 11b) must be postmarked by January 5, 1976. Good luck! – *WA1STN*

CONTEST PERIODS

Starts		*Ends*
Saturday, Nov. 22 2100 GMT	PHONE	Monday, Nov. 24 0300 GMT
Saturday, Nov. 8 2100 GMT	CW	Monday, Nov. 10 0300 GMT



ARRL November Sweepstakes

Sample summary sheet.

Rules

1) *Eligibility:* This contest is open to all radio amateurs in (or officially attached to) sections listed on page 6 of this issue of *QST.* U.S. possessions in the Pacific are part of the Hawaii section. KP4, KV4 and KG4 are all part of the West Indies section.

2) *Objects:* To exchange QSO information (as explained in section 5) with as many amateurs in (or officially attached to) ARRL sections.

3) *Conditions of Entry:* Each entrant agrees to be bound by the provisions as well as the intent of this announcement, the regulations of his licensing authority and the decisions of the ARRL Awards Committee.

4) *Contest Period and Time:* All contacts must be made during the contest period indicated elsewhere in this announcement. Time spent listening counts as operating time. No more than 24 hours of operation are permitted during the 30 hour period. "Off" periods may not be less than 15 minutes at a time. Times on and off and QSO times must be entered in your log.

5) *Valid QSOs:* Contacts must include certain information sent in the form of a standard message preamble, as shown in the example. Cw stations work only cw stations and phone stations only other phones. Valid points can be earned by contacting stations not working in the contest upon acceptance of your preamble and receipt of a preamble.

6) *Scoring:* Each station from which a preamble is received and to whom a preamble is sent and acknowledged, results in 2 points. Partial QSOs do not count for scoring purposes. No additional points can be earned by recontacting the same station, regardless of the frequency band (i.e., repeat QSOs, even if on different bands, are not allowed). The total number of ARRL sections (plus VE8) worked during the contest is the section multiplier – maximum possible total of 75.

The final score equals the total points times the section multiplier.

7) *Entry Classification:* Entries will be classified as single or multiple-operator stations. Single operator stations are those in which one person

EXPLANATION OF "SS" CONTEST PREAMBLE

	Nr	*Precedence*	*Call*	*CK*	*Place*
Exchanges	Consecutive Serial Number	Power input less than 200 watts dc	Send your station call	CK (Last two digits of year first licensed)	Your ARRL section
Sample	NR 1	A	WA3FHB	65	MDC

performs all transmitting, receiving, spotting and logging functions. Multiple-operator stations are those obtaining any form of assistance, such as from spotting or relief operators, or keeping the station log or records. The use of any type of "spotting" or "multiplier" net places the entry in the multiple-operator class.

8) *Reporting:* Contest forms (log sheets, summary sheets, Operating Aid 6) are available free from ARRL Hq., or you may use forms of your own design provided they follow the indicated format. Every competing entry claiming 200 or more QSOs must have cross-checking sheets (Op. Aid 6 or similar) attached. **ANY LOG OMITTING TIMES ON AND OFF, OR OMITTING QSO TIMES, OR OMITTING CROSS-CHECK SHEETS (WHEN REQUIRED), OR OMITTING A SUMMARY-SHEET OR ANY INFORMATION REQUESTED THEREIN (see sample) WILL NOT BE CONSIDERED FOR COMPETITIVE QST LISTINGS OR AWARDS.** Such logs will be classified as "check-logs" and will be processed accordingly. All entries become the property of ARRL and none can be returned. Although FCC rules no longer require most logkeeping, each competitive entry submitted must include date, QSO times, times on/off, exchange sent, exchange received, band, and mode.

9) *Misc. Rules:* A transmitter used to contact one or more stations may not be subsequently used under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOC).

Yukon-N.W.T. (VE8) counts as a separate multiplier, for a possible total of 75 multipliers.

If your power is 200 watts d c or less, send "A" as your precedence; otherwise send "B".

The operation of two or more transmitters simultaneously is not allowed.

10) *Awards:* Certificates will be awarded in both the cw and phone contests to the highest scoring class "A" entrant and the highest scoring class "B" entrant in each section, provided that *either* (1) there are at least three single operator competing entrants from that section in that power class, *or* (2) the top single operator score from that section in that power class has 10,000 points or more. Similarly, a certificate will be awarded to the highest scoring Novice or Technician licensee in a section provided that *either* (1) there are at least three single operator competing entrants of that license class in that section, *or* (2) if, in the opinion of the Awards Committee, the entrant displayed exceptional effort.

Multiple-operator entries, regardless of license class of operators, are not eligible for certificate awards and will be listed separately in the final results in *QST*.

11) *Club Competition:* Only ARRL Affiliated Clubs may participate in the club competition. A member must be listed in the regular score listings before he can be counted for a club.

A) In order for a club to be listed, two points must be met:

1) At least 3 entries from members of the club must be submitted.

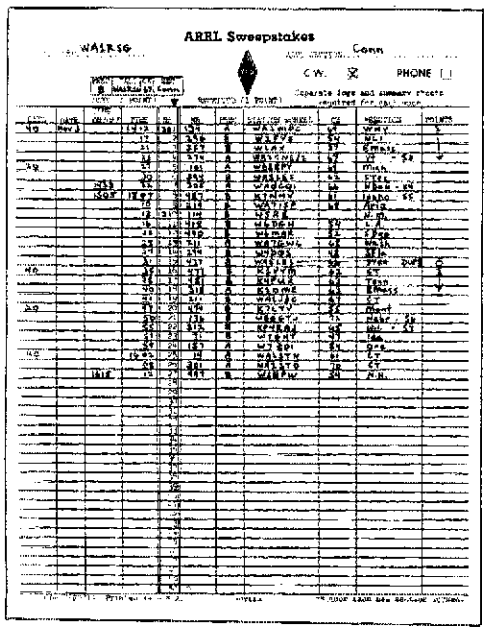
2) *Either* (1) all club entries must be submitted to Hq. in one bunch *or* (2) the club secretary must submit a list of club members eligible to compete for the club who have separately sent in entries. If possible, this list should include approximate scores for each member and a claimed total for the club.

All members wishing to be included in the club scores must indicate the club name on their summary sheet *and* the club letter (if one is sent in accordance with the previous paragraph) must indicate that said member is eligible to compete for the club.

B) Members eligible to compete:

1) Bona fide club members living up to 50 miles from the club affiliation address need not attend any minimum number of club meetings. However, to be considered bona fide, a member must be active in club affairs.

2) Members residing between 50 and 175 miles from the club affiliation address must attend at least 50% of the in-person club meetings during the year immediately prior to the date of the contest.


ARRL Sweepstakes

Sample log sheet.

(Continued on page 130)

ARRL 160-Meter Contest

THE 6th ANNUAL ARRL 160-Meter Contest will be held December 5-7, 1975.

Please remember to keep the "DX-window" (1825-1830 kHz) clear. This is the spot DX goes to get away from stateside QRM. Don't call there -- they usually listen from 1800-1805 and, in any case, will announce exactly where they are listening. Listen for KH6-types in the 1995-2000 range.

Don't forget to use the 1830-1850 portion. It will help spread out the QRM that is so noticeable in the bottom 25 kHz. -- *WA1STN*

Rules

1) This contest will start at 2200 UTC Friday, December 5 and end at 1600 UTC Sunday, December 7, 1975. This is a 42-hour period with no limitation on operating time. Cw only.

2) The contest is open to all amateurs. A QSO with an amateur in an ARRL section (see page 6, *QST*) is worth 2 points. QSOs with amateurs not in an ARRL section are worth 5 points. DX to DX QSOs will not count.

3) Multipliers are the 74 ARRL sections, VE8 and each foreign country worked.

4) The exchange will be the report, plus ARRL section for those in an ARRL section. Those participants outside of an ARRL section will send a report and the name of their country.

5) Competition is within the section and non-W/VE country for certificate awards. Division high scorers will have their section award endorsed with an appropriate seal. Multioperator work is permitted with scores to be shown after single-operator listings (no certificates).

6) Contest work may be reported either on the forms available from Hq. or on a reasonable facsimile. An entry consists of the log and summary sheet. Check sheets are not mandatory.

7) Entries become the property of ARRL, none can be returned. Awards Committee decisions are final. Send an addressed stamped No.10 envelope for appropriate entry forms. All entries must be postmarked no later than January 10, 1976, to be eligible.

8) If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or scoring discrepancies.

If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest.

The calls of all disqualified participants will be listed in the *QST* report of the contest.

Any participant on the borderline of disqualification but not actually disqualified will receive a warning letter from the Communications Manager.

For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria. QST

FEEDBACK

In my article on measuring receiver dynamic range (*QST* for July, 1975) there were two errors, the meter used in the rf detector should be a 10-mA type rather than the 10-½A variety specified, and the term "tangential sensitivity" was used improperly in the text. The proper definition of the term is given in the MIT Radiation Labs series, and is usually associated with an input signal which results in an output signal-to-noise ratio of 8 to 9 dB -- not the zero dB implied in my article. Thanks to A. B. Tarbell for pointing out the second blunder to me and the editors. -- *W7ZOI*

— • • • —

In the LKA-1 Linear Amplifier (*QST* for June, 1975, the voltage ratings of C1 through C6 should be 450 volts and not 150 as indicated in Fig. 1. Also, the 20-kΩ bleeder resistors across these capacitors should have a 20-watt rating and the rating of the BIAS ADJUST control, R3, is 25 watts.

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In Hints and Kinks for November, 1974 *QST*, page 43, the 2N3906 was labeled incorrectly in the "Solid-State Relay" circuit (Fig. 4). The collector and emitter leads should be reversed and the arrow should be pointing inward (pnp device).

Table I was inadvertently omitted from Edlund's article, "The W5DS Hula-Hoop Loop," *QST* for October, 1975. Here 'tis.

Table 1

Loop Parameters (At 3.8 MHz)

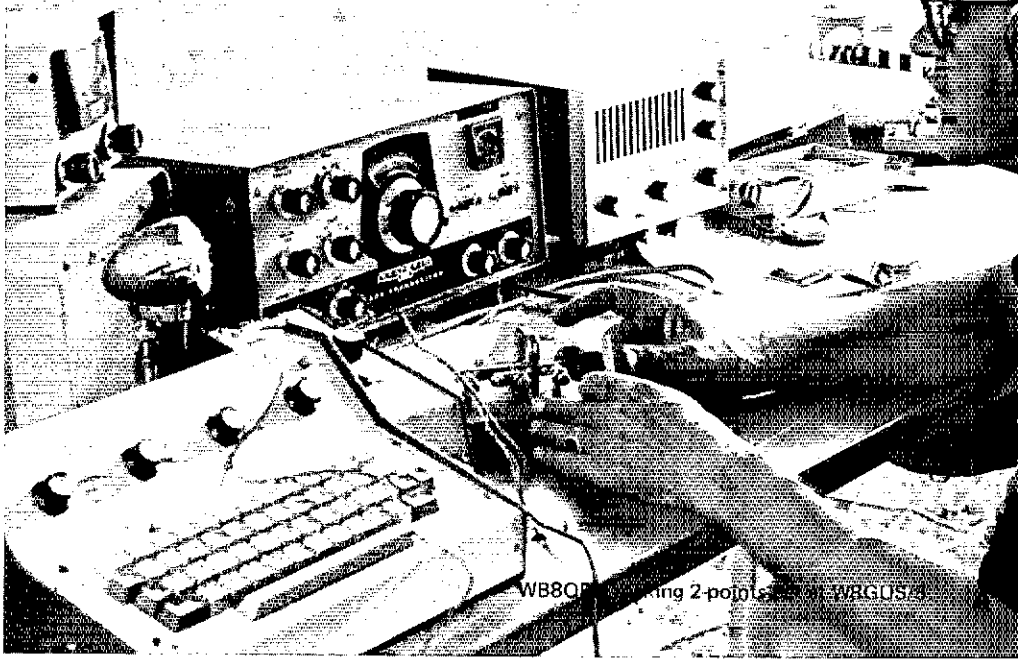
L_L = 14.5 μH.
Q = 139 (Unloaded Q.)
C_{TUNING} = 93 pF.
$C_{DISTRIBUTED}$ = 28 pF.
Loop Diameter = 34" (86 cm).
Turns = 2.
Total wire length = 17.54' (5.45 meters).

— • • • —

Peter Bertini, K1ZJH, calls our attention to an omission in Fig. 7 of his 50-MHz transceiver article in March *QST*, page 29. The 1000-ohm resistor, R5, mentioned in the text, page 30, should be in the line between the cw terminal of S3 and pin 1 of U7, instead of the direct connection shown in the diagram. The transceiver will work as shown, but more carrier (greater cw power) will be obtained with the resistor in the circuit. Operation on ssb is unaffected, either way.

K1ZJH also mentions that where Teflon-insulated No. 26 wire is specified ordinary enameled wire can be used, if care is taken to avoid shorts that might result from wire abrasion in winding or soldering.

FD Results, 1975



REPORTED BY JIM CAIN,* WA1STN

MAN, woman, birth, death, Field Day. Well maybe not quite that important, but our annual outing is right up there. Where else do you have over 10,000 of our number all participating in the same organized event on a single weekend? FD has something for everyone, ham and non-ham alike, and we needn't go into the details. Everyone knows about the fun, the hassles, the public relations, the contesting, the fraternalism, the beer-can verticals, the mosquitoes (and other bugs), the heat, the cold, the rain, the snow, and the Monday morning after. What did we leave out?

This year's FD had a significant change in the rules: double points for contacts made on cw. Not one of the 10,406 individual participants this year was opinionless; everyone either 1) loved it; 2) hated it; 3) didn't care. The general feeling of feedback comment was slanted towards No. 1. It's easy to see the effect the bonus points had on score standings; just look for the group with more points but fewer total contacts than groups down the listings a bit. Sure, there are differences in the bonus points various groups qualify for, but all groups at the top of each category listing tend to qualify for most, if not all the bonuses. The difference in many cases boiled down to which operation had a key and which didn't.

Like most trial contest rules changes, this one will be in effect for at least another year. Right now, it looks like those in favor outnumber those against by at least 2-to-1; if you don't agree with that, let your Contest Advisory Committee member know NOW. The best way to do that is write to CAC, c/o ARRL, and *all* members of the Committee get a copy of your letter.

Speaking of bonuses, most everyone qualified for whatever they claimed, with the exception of the message origination. Some were nowhere even close to standard ARRL form (that doesn't mean the thing has to be filled out on an ARRL message blank); it *does* mean all pieces of information must be there somewhere. Most who didn't qualify for the bonus miscounted the "check." Several ARRL publications contain details on message handling,

CLUB AGGREGATE MOBILE SCORES

No. Cal. Contest Club	4492
MARC of South Bend	512

* Asst. Communications Manager, ARRL

and now is the time to assign someone in your group the exquisitely simple job of figuring out how the devil to properly originate a message next year. Take a look at how much farther your group would have been up the standings with 50 extra points!

Much of the Kontest Korner's time is consumed deciphering FD entries each year; the overwhelming reason for this is the use of non-standard or outdated summary sheets. If you had a current FD summary (CD66, 375), you know how easy it was to figure your score, including the cw points. If you had an old form, you had to make do, and it took us twice as long to check it over.

Make it easy on us *and you* and next time request not only a current CD66 summary sheet, but also some Operating Aids No. 6. That's the famous "dupe sheet" which satisfies FD rule No. 13, which requires entries to submit an alphabetical list of stations worked by band. No, the completed Op Aid No. 6 isn't in perfect alphabetical order, but it is close enough. We wonder about groups who use their own duping system – 'cause we have yet to see one as easy to use as Op Aid No. 6. They're free for the asking, folks.

Now about those of you who aren't listed. Most were too late in getting entries in to headquarters: a few were missing vital parts of the entry (mainly the lists of stations worked) and probably at least a couple were lost in the mail system. We bend as much as we can, but there has to be a limit or this report would be in next year's *QST*.

The boss says it's time to quit blithering and get down to reporting, so here goes. FD 1975 had 1107 entries, slightly down from 1974's 1126. The 2733 transmitters reported are an increase, although the 10,406 operators manning them are down about 10% from '74. Battery entries continued their climb, 94 this time around. As usual, class 2A was most popular, followed by 3A and then 1A and 1B in a virtual tie.

W1VV/1, Murphy's Marauders, set a new contact record of 8174; the PVRC group at W3IN/3 overcame a rain handicap to also break their old record with 7355 two-ways – deluge handicap would be more the word for it. W2RJ/2 only had a small 19-transmitter operation in 1974, so they decided to put a couple more on the air this year. Where do they find enough bands to run 21 rigs at once?

Ex-purveyor or pathetic poetry V.Y. Senny Tree has become indisposed somewhere in the grassy hills of Idaho, but WB2TBB, an operator at K2LSA/2, has come up with this year's adverse poetic contribution:

We were plagued by bees, bugs, and the like,
competing with QRM, QSB through the night.
And of course the dipoles put up quite a fight,
all at ninety degrees Fahrenheit.
We prayed and we hoped
when the generator choked,
Our foe Murphy would not go for broke.

Senny, where are you when we need you?

K8EMY/8 (3A)

Class-A Call-Area Leaders

(Calls in Bold face represent over-all class leaders)

1A

VE2CVR/2
W1EIA/1
WB2PJH/2
WA3GAY/3
WB4VOS/4
W5DDL/5
K6MQX/6
W7KII/7
W8LW/8
K9IU/9
KØDIA/Ø

2A

VE1FO/1
W1HFB/1
W2LZ/2
K3OIO/3
W4QJU/4
K5RWK/5
W6OAT/6
W7AC/7
W8OK/8
WA9UMU/9
WØQQQ/Ø

3A

VE2CRL/2
W1TX/1
W2PE/2
W8GFG/3
W4TRC/4
W5ZR/5
W6OTX/6
W7KIS/7
W8MAA/8
W9LT/9
WØERH/Ø

4A

VE2CWI/2
W1MHF/1
WA2UOO/2
W3ZH/3
W4IZ/4
WB5EBK/5
K6YA/6
W7DG/7
W8FY/8
W9LO/9
WØEI/Ø

5A

VE3DRT/3
K1MUJ/1
K2GH/2
K3SSC/3
WA4LZR/4
W5TI/5
W6PAA/6
W7YN/7
WB8JBM/8
W9LM/9
WØILR/Ø

6A

VA3ZM/3
WA1HOB/1
W2DMC/2
WA3PJQ/3
W4DW/4
K5AEU/5
W6TRW/6
K7LED/7
K8ALB/8
K9IYT/9
KØKKV/Ø

7A

K2AA/2
WA3MRV/3
K4BFT/4
K6QEZ/6
W7FR/7
W8VPV/8
W9IC/9
KØCNV/Ø

8A

VE3DC/3
W1MV/1
W2DED/2
W3PIQ/3
K4FMA/4
WA6BGS/6
W7AIA/7

9A

W2LI/2
K6EAG/6

10A

W1BIM/1
K6HAI/6

11A

K6CD/6
W9JZ/9

12A

VE3MRC/3

14A

W1VV/1

15A

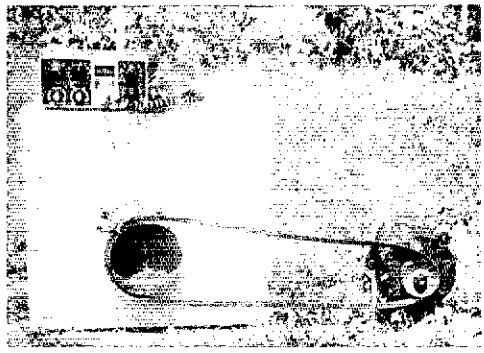
VE3WE/3

16A

VE3IBM/3
W3IN/3

21A

W2RJ/2



WB2NRP/2 (4A) named their natural power source "Joe Ham".

FD Soapbox

Class D home stations serve a useful purpose during FD, but some were not exercising the necessary restraint and were observed calling CQ. That should be left to the portables. – (W9NU). Murphy chose to strike not our beam on an inviting 40 foot tower, but rather a lowly vertical on a simple mast. Filling the generator required two people: one to pour the gas and another to fend off the mosquitoes. – (W9HOQ/9.) Our generator spits at us, mutters, groans, stalls and sputters; after some cajoling, flattery and finally threatened mayhem, it always settles down and purrs like a kitten. – (W2LI/2). We favor encouragement for emergency stations (fixed or portable) having a generator power as standard equipment. – (W6CXO). Last year we quenched our thirst with beer, and improved our score by 25%; this year we switched to daquaris and only gained 4%. – (K6MQX/6). How about red pop next year? – Ed. Up in the hills at 6900 feet isn't the place to launch balloons; 30 mph winds are standard features of such locations – (K7CC/7). We used model rockets to swing an 80-meter V-beam over 750 feet of trees. – (K2KI/2). "W4BRB's Competition" achieved a respectable score, largely due to the fine training we received from W4BRB and W4EPO. – (WB4VOS/4). We started with the 5-watt Argonaut on ssb and made 2 or 3 contacts per hour, then switched to cw and doubled our rate, quadrupling our point production. – (K4IKG/4). No bugs in the equipment but worked WBØANT and KØFLY consecutively. – (K9KID/9). The Pasadena Chapter house of the Red Cross is in a residential area, so didn't fire up the generators which are permanently installed; they're ready, though. – (W6APW/6). How about bonus points for a FD-type setup during the November SS, and a different multiplier for battery operation of the new medium-power solid-state rigs? The times-2 multiplier on cw is OK, but I still need a times-3 at my code speed! – W4GHV/5). What started out as a story for the local TV station ended up on the ABC network nationwide Sunday night. – (W9LM/9). Was plagued by all kinds of problems and really learned the meaning of field expediency. . . . guess that's what Field Day is all about, anyhow. – (W7FPX/7). Please note my call, and then believe me next year when I answer your FD call. – (W9FD). Heard 70 sections last year (as an SWL) but sure had more fun working 19 of 'em this time! – (WN8TVD). Our number-one phone man developed laryngitis. – (WA2FHF/2). Finally got our generator working, then were chased away by some neighboring insomniac campers. – (WBØMAO/Ø). Managed to find a good spot radio-wise, considering I was outvoted by the family 8-to-1. – (K6LWT/6). For once (in twenty years) nothing went wrong. – (W6ANB/6). Were having a tough time putting up a 50-foot mast with tribander, until a fire department ladder truck "just happened by." – (KIJNQ/1). Too many reliable stations went to cw, and we weren't prepared. Wait 'till next year! – (W9LKO/9). Central Utah AREC Field Day near Heber X Four dead operators X Three flat batteries X One crisp rig X Three Arec members X Regards. – (K7SAI/7).

Scores

Class A stations are clubs and groups in the field with more than 2 operators. Scores are tabulated according to the number of transmitters operated simultaneously at each station and the final score. The "power classification" used in computing the score is indicated by the letter A,B, C and D after the number of QSOs shown. A indicates power up to and including 10 watts (Multiplier of 3); B indicates power over 10, up to and including 200 watts (multiplier of 2); C indicates power over 200 (multiplier of 1).

W6JTH/6 (1B, Battery) operating from Mt. Langley, with Mt. Whitney in the background.

1A - Battery

K6MQX/6	Noah's ARC	514-	A-	3-	3510
W1EIA/1	Conn Wireless Assn	325-	A-	4-	3345
WØAA/Ø	Minn Wireless Assn	307-	A	3-	3170
WA9CSS/9	Aunt Dorothy's Farm Pond RC	294-	A-	3-	3040
K8YQW/8	Canton ARC	286-	A-	5-	2945
K8VQP/8	Non Club Group	308-	A-	3-	2860
WØMHK/Ø	Red Rock Radio Rangers	336	A-	4-	2625
WB2PJH/2	Richmond County ARC	561-	B-	6-	1776
W7JAV/7	Teledyne Wah Chang RA	303-	A-	5-	1665
WAØOFZ/Ø	Viking ARS	227-	A-	13-	1600
K3QBD/3	First State ARC	206-	A-	13-	1555
WB9ITH/9	RFEAR ARC	539-	B-	6-	1238
W3RWW/3	Non Club Group	191-	A-	5-	1110
VE2AQV/W6	Pleasant Hill ARES	377-	B-	10-	960

1A

K9IU/9	Ind Univ ARC	1856-	B-	6-	4664
W8LW/8	RWU AKW AKU VHV	1222-	B-	5-	4388
W9YT/9	Badger ARS	1640-	B-	4-	4084
WA9ZBV/9	Radio Hill Boys	1776-	B-	4-	3770
W5DDL/5	Lafayette ARC	1258-	B-	15-	3728
DJ6RD/W9	Independent Contest Operators	1657-	B-	7-	3630
VE2CVR/2	Vallee Du Richelieu ARC	888-	B-	6-	3506
K9BGL/9	Belleville AR Foundation	1063-	B-	3-	3384
KØDIA/Ø	Aether Tweakers	1022-	B-	8-	3296
KØGXC/Ø	Wilson Brothers	1497-	B-	3-	3263
W1TM/1	Non Club Group	926-	B-	9-	3134
WB4VOS/4	W4HRB's Competition	705-	B-	5-	2970
W9LI/9	Lake Co ARC	955-	B-	12-	2780
K4HY/4	Owensboro ARC	639-	B-	23-	2706
WØAWB/Ø	Non Club Group	626-	B-	5-	2698
WB9IDY/9	RCA ARC	959-	B-	8-	2686
W4BFB/4	Mecklenburg ARS	877-	B-	13-	2670
W9YB/9	Purdue ARC	977-	B-	12-	2664
K4IM/4	Central Va. Contest Club	676-	B-	7	2608
W8TO/8	Columbus ARA	624-	B-	8-	2592
KØAXU/9	Northwest St Louis ARC	993-	B-	4-	2568
W8BVU/8	Schoolcraft College ARC	760-	B-	10-	2562
K4KJQ/4	Blue Grass ARC	794-	B-	15-	2552
WB9LWM/9	Hersey HS ARC	753-	B-	5-	2532
W7KH/7	Ogden ARC	912-	B-	15-	2514
W1QI/1	Candlewood ARS	782-	B-	15-	2500
WA9HEU/9	Non Club Group	724-	B-	3-	2420
W8HID/8	SE Mich ARA	563-	B-	6-	2252
KØDEW/Ø	Lebanon ARK	584-	B-	10-	2242
KØBIX/Ø	Warrensburg ARC	986-	B-	24-	2222
WØGO/Ø	Cedar Valley ARC	643-	B-	16-	2202
W9EJ/9	Soc of Radio Operators	917-	B-		2200
K8RMN/8	CW Tri-County Radiotelegraphy Soc	550-	B-	7-	2200
K4BJQ/4	Hillbilly ARC	604-	B-	12-	2198
WA3GAY/3	Univ of Delaware ARC	763-	B-	4-	2130
WB8RUO/8	Indian Hill HSRC	741-	B-	8-	1960
KG4AN/4	Guantanamo Bay ARC	782-	B-	10-	1934
K4KJD/4	Limestone ARC	630-	B-	9-	1922
W7SPJ/7	Utah ARC	566-	B-	25-	1830
KH6RS/6	Maui ARC	450-	B-	12-	1824
K4JP/4	Gastonia Gas Lighters	667-	B-	9-	1800
WB8RXK/8	SPARC	759-	B-	6-	1776
W9CCD/9	Nutty Net	733-	B-	11-	1760
VE6AXH/6	Rattlesanke Junction Water Diviners	419-	B-	3-	1754
WBØKRX/Ø	Santa Fe Trail VHF Club	742	B-	10-	1750
W1AQ/1	ARA of S. New Eng.	490	B-	11-	1744
WØNG/Ø	Twin Cities DX Assn	491	B-	5-	1734
WØDSW/Ø	Ski Country ARC	566	B-	10-	1724
VE3FOX/3	Independent Ontario Operators	638	B-	5-	1690
W8EQ/8	Lima Area ARC	414	B-	27-	1688
K5AOL/5	Red River Valley ARC	733	B-	8-	1678
K2KI/2	Non Club Group	429	B-	8-	1570
K3TVT/3	Green Hills Field Players	486	B-	5-	1552
WA3UUQ/3	Marty's Marauders	724	B-	4-	1546
K7SAI/7	Central Utah AREC	523	B-	4-	1544
VE2CAR/2	Chateauguay ARC	487	B-	7-	1540
W4NVU/4	Dade RC	423	B-	18-	1520
K6RS/6	Non Club Group	472	B-	3-	1516
W4CN/4	ARTS	593	B-		1480
WØWWV/Ø	Hastings ARC	615	B-	25-	1476
W6ACP/6	ACP/BZT/MVV FD Ops	658	B-	3-	1466
WA6YGA/6	CARS	316	B-	8-	1464
W6VID/6	McDonnell Douglas Astronautics RC	546	B-	7	1434
WA3W?A/3	Columbia ARC	303	B-	8-	1388
WB6HYD/6	Minnis + Morrice	568	B-	4-	1388
WA5KAK/5	Friendly ARES	400	B-	3-	1374
WB2WWP/2	Nassau County ARC	477	B-		1358
WX?Q/8	Ohio County WVa AREC	400	B-	15-	1356
KØLUP/Ø	TUN-TVN-LUP	570	B-	3-	1290
KnIDA/6	Crescent Bay Emerg Radio Net	517	B-	10-	1284
VE3SFP/3	Champlain Rep. Assn	526	B-	10-	1268
VE3DDK/3	Non Club Group	292	B-	3-	1268
W?YH/7	RHO Epsilon Radio Fraternity—Alpha Chapter, Univ. of Wash.	397	B-	4-	1232
W2PGS/2	Oswego County ARA	502	B-	15-	1222
W8RTR/8	Canton ARC	655	C-	10-	1201
K4BEZ/6	Humboldt ARC	514	B-	27-	1200
WA4GDN/4	Gulf Coast ARC	956	C-	20-	1183
WA9WSL/9	Indian Hill ARC	822	C-	8-	1181
WB8MIP/8	John Marshall HS & Alumni ARC	531	B-	3-	1174
W4FVV/4	Anderson RC	399	B-	10-	1168
WA3UCQ/3	UCA,UCR,UCS	415	B-	3-	1130
W7EO/7	Butte ARC	941	C-		1121
K9EIU/9	NIARC	486	B-	4-	1112
W4AP/4	Montgomery ARC	430	B-	9-	1108
W5RE/5	Non Club Group	255	B-	3-	1094
W2ZJ/2	Elmira ARA	364	B-	12-	1082
VE?BWI/7	Beaver Valley ARC	315	B-	7-	1078
KØLHE/Ø	Hilltop Radio	310	B-	5-	1074
W7WNE/7	Anaconda ARC	385	B-	7-	1074
WBØGIV/Ø	Benton Co ARC	452	B-	8-	1068
W9IUI/9	Non Club Group	352	B-	4-	1026
WØWSV/Ø	Cedar Valley ARC	381	B-	16-	1012
WBØLEY/Ø	High Country Ham Club	283	B-	5-	1010
WØPHP/Ø	Spearfish RC	422	B-	3-	1008
WA6IDN/6	Non Club Group	278	B-	4-	998
XK3AEA/3	Peterborough ARC	313	B-	7	992
W8QAO/8	K – Mart Group	419	B-	6-	988
WSIDX/5	Texas Southmost ARC	388	B-	5-	982
W8PN/8	Chippewa ARC	351	B-	12-	952
K8DXF/8	Mason Co RC	336	B-	12-	940
WØDUW/Ø	Suburban RC	345	B-	17-	938
WB8OLO/8	Oxford Area Amateurs	257	B-	6-	928
KØNL/Ø	Hiawatha ARC	345	B-	7-	890
VE?DRW/7	T and K ARC	227	B-	4-	890
CH1AO/1	Truro ARC, Inc.	234	B-	12-	872
WN4IIW/4	Kentuckiana RC Novices	180	B-	7	870
WN6CDY/6	West Valley ARA Novices	155	B-	4-	870
W6JXK/6	Non Club Group	200	B-	3-	854
VE1IV/1	Pictou County ARC	327	B-	11-	854
W?OBE/7	Univ. of Wyo ARC	271	B-	14-	794
WA1AAU/1	Hanscomb AFB MARS Team	288	B-	6-	792
WBØLOB/Ø	Great River ARC	310	B-	10-	770
W4HEH/4	Alexandria ARC	149	B-		746
WA3KBN/3	MD Area OS Navy MARS	308	B-	5-	740
WN8IIN/8	Columbus ARA	151	B-	10-	704
VE?ASC/7	Chilliwack ARC	247	B-	6-	700

Balloons, such as this one at VE2CV/2, have seen a resurgence in popularity in recent years.

K4VB/4	Southeast Bell RC	261	B- 6-	694
WB0IKJ/0	Non Club Group	286	B- 3-	690
W0ICR/0	Electron Club of Denver	293	B- 9-	686
VE5LM/5	East Mountain RC	241	B- 7-	682
WA4CHJ/4	Franklin – Southampton AREC	244	B- 6-	644
W6OT/6	Oakland RC	247	B-	644
WH9IFZ/9	Oak Park & River Forest HSARC	197	B- 3-	642
W4ZBB/4	Playground ARC	138	B-	632
WA5WUX/5	Meriden ARC	518	C- 4-	618
WA7THF/7	Quinault Mt. Bitsko Fignuts	201	B- 3-	574
W0AJA/0	Coon Valley ARC	192	B-10-	534
WB4DZL/4	UVARC	43	A 7	530
WA5NRZ/5	ARC of Southwest La	210	B- 7-	520
VE7CUW/7	Conox Valley Wireless Club	203	B-	506
WA0NWR/0	Hole-in-the-Day Gang	136	B- 3-	470
K8SHE/8	Non Club Group	172	B- 3-	466
WA5VTW/5	Troop 259 RC	155	B- 7-	460
W8CRR/8	Scioto Valley ARC	353	C- 5-	453
WB5IKE/5	Ruston Area ARC	98	B-12-	362
WB2VPY/2	Cheming Co AREC	209	B-23	359
WN7YFI/7	Non Club Group	50	B-11-	300
WB4VJK/4	Univ of South Carolina ARC	51	B- 4-	252
KL7GCH/KL7	Soc. for Preserv of AR in Kodiak	162	C 4-	184
K1CGI/1	Radio SEBAGO	26	B- 3-	154
Commercial Mains				
WB4MZT/4	Southeastern Va Wireless Assn	686	B- 7	2736
WB8PRR/8	Highland View Hospital ARC	513	B- 4-	1476
WB0IYN/0	N.Suburban W.A. and North Star Highbanders	364	B-	1068
W1SW/1	Phillips Academy ARC	215	B- 3-	590
2A - Battery				
W2LZ/2	Walton RA	499	A- 9-	4970
W1EDH/1	Middlesex ARS	224	A-10-	2445
W3AI/3	R.F. Hill ARC	248	A- 7-	2120
WB2ENI/2	Trenton/Willingboro Wireless	303	A- 3-	1755
K6IJ/6	Cuddy Valley Boys	168	A- 3-	1695
WA4JOS/4	Lake Cumberland ARA	371	B- 6-	1238
VE3AOI/3	Non Club Group	300	A- 4-	1200
W5GB/5	NMSU ARC	308	A-	1125
K8PBO/8	Non Club Group	121	A- 6-	905
WA6BIE/6	Non Club Group	47	A-	350
2A				
K3OIO/3	Upper Bucks RS	3231	B- 4-	8771
K5RWK/5	Richardson Wireless Klub	3412	B-17-	7072
W8OK/8	Miami Valley AR Contest Soc.	2524	B-12-	6918
W4QJU/4	Rotten Radio ARC	2739	B- 5-	6798
W6OAT/6	No. Cal. Contest Club	2051	B- 7-	6165
W6PIY/6	West Valley ARA	1989	B-18-	5864
W4JJ/4	St Andrews Bay ARS	2247	B- 4-	5792
W8GYH/8	Ohio Valley Teratology Network Contest Comm.	1785	B- 8	5692
W0QQQ/0	Kansas State Univ. ARC	1718	B-10-	5396
WB8MNX/8	Steelworkers ARA	1938	B-20-	5310
W0MXW/0	Rochester ARC	1794	B-36-	5202
WA0CVS/0	Colo. Contest Conspiracy	1750	B- 9-	5034
W0GI/0	Douglas Co ARC	1671	B-18-	4828
W4YUU/4	Non Club Group	1109	B- 9-	4444
W7AC/7	Willamette Valley DX Club	1480	B- 8-	4402
W8UK/8	Kanawah ARC	1479	B-21-	4326
W8VM/8	Westpark Radiops	1505	B-16-	4302
WA9UMU/9	Glen Gates Gang	1506	B-21-	4254
W2EQK/2	Old Barney ARC	1297	B-15-	4058
W9SM/9	Wisc. Valley RA	1216	B-12-	3964
W4KVK/4	Henderson ARC	1278	B-16-	3956
W4NLX/4	Indian River ARC	1083	B-20-	3956
W2AO/2	Boiled Owls of NY	1232	B-11-	3924
K4KDJ/4	Va. Tech. ARA	1356	B-19-	3902
K0EPC/0	Non Club Group	1514	B- 8-	3836
W0OJY/0	Prarie Dog ARC	1245	B-10-	3784
W9DIY/9	RA Megacycle Soc	975	B-20-	3728
K0FLY/0	Radio Renegades	1164	B- 6-	3704
K4WCC/4	ARC of Ft. Belvoir	1097	B-19-	3588
W9AML/9	Cent. Ill. RC	1124	B-20-	3584
W5PDO/5	Los Alamos ARC	1140	B-17-	3561
W4CQ/4	Charlotte ARC	1125	B-12-	3450
W5ABD/5	Westside ARC	1009	B-17-	3432
WB4AIN/4	Ten-Four Good Buddies	1063	B- 6-	3430
W9RBD/9	Kemper ARC	993	B- 9-	3394
K2DR/2	Holmdel ARC	985	B-20-	3360
K6AA/6	United RAC	1170	B-15-	3270
K5AT/5	Plano ARC	1089	B-25-	3232
WGTX/0	Denver RC	1162	B- 7-	3174
W0SOE/0				
(4WN0PCF)	Wichita ARC Inc.	904	B-46-	3110
K4HEX/4	Lynchburg ARC	850	B-23-	3090
K2BK/2	Overlook Mtn. ARC	942	B-10-	3080
WA8CYE/8	Industrial Nucleonics RC	901	B-18-	3056
WB2ELW/2	South Towns ARS	1160	B-15-	3020
K6FO/6	Worldradio Staff RC	1026	B- 7-	3012
W1HEB/1	Middlesex ARC	1111	B-15-	2974
W9MVS/9	W/K ARC	983	B- 7-	2900
W4KCO/4	Tuscaloosa ARC	1003	B-25-	2896
VE1EO/1	Halifax ARC	845	B-15-	2890
W4JNB/4	Muscle Shoals ARC	942	B-10-	2872
W8UM/8	Univ. of Mich. ARC	892	B-15-	2856
WA1UBC/1	Derry ARC	820	B- 8-	2830
W4UIC/4	Five Flags ARA	755	B-25-	2829
W8UOS/8	Long Wires	907	B-14-	2824
K3AK/3	Comsat & IBM ARCs	922	B-15-	2818
KP4USN/KP4	Sabana Soca ARC	942	B- 7-	2812
VE7NAJ/7	Nanaimo ARA	814	B-10-	2792
W9EJZ/9	Wausau Breakers	1037	B- 8-	2780
K7NWS/7	Boeing Employees ARS	868	B-	2734
W9AA/9	Hamfesters RC	867	B-12-	2726
K8KRG/8	Northern Ohio AR Soc	979	B-15-	2722
W1HJS/1	Hewlett Packard Med ARC	1091	B- 6-	2706
W9NN/9	Point Radio Ama Ltd.	846	B- 9-	2678
K8RAY/8	Farmington ARC	965	B-14-	2664
WA0UWE/0	Non Club Group	1112	B- 5-	2640
WB8PGW/8	The Area B Soothing Libations Consuming Corps; Ham Radio and Softball Divisions	795	B-11-	2624
WA1TCP/1	Bristol County ARC	705	B- 4-	2604
WA2FHF/2	The Aphids	888	B- 4-	2596
VE3RAM/3	Ottawa Valley Mobile RC, Inc.	791	B-16-	2596
W3OI/3	Lehigh Valley ARC	853	B-12-	2576
K9ZEO/9	Marshall County ARC	877	B-16-	2552
K5AS/5	NW Arkansas ARC	909	B-18-	2544
W5HFK/5	Enid ARC	895	B-	2534
VE3RC/3	Ottawa ARC	790	B-15-	2498
WA4URA/4	Clarksville Ft. Campbell ARC	743	B- 6-	2490
VE7CEB/7	Base AR Service	1076	B-28	2480
W4ABK/4	Kentuckiana RC	781	B-22	2462
W8MRM/8	Motor City RC	808	B-28-	2436
W8MB/8	Oak Park ARC	767	B-10-	2436
W0BRN/0	Three Rivers ARC	945	B-10-	2428
K5WPH/5	Sun City ARC	720	B-	2424
W5UK/5	Greater New Orleans RC	918	B-14-	2415
WB8QXB/0	S. Lyon Area ARC	883	B- 7-	2388
VE5AA/5	Saskatoon ARC	678	B-15-	2378
K0FTY/0	Mid Missouri RC	1101	B-10-	2362
W4DYV/4	Crater ARS	794	B-18-	2338
W0IA/0	Rocky Mtn. VHF Soc	858	B-10-	2304
W0CRI/0	Northeast Missouri ARC	578	B-	2298
W3AED/3	Lake Shore ARA	1049	B- 8-	2298
WA0NLK/0	Normally Lazy Kilowatts	747	B- 8-	2280
K5TAN/4	Melbourne Area Super Hams	774	B- 7-	2248
W5SSV/5	Mid Jefferson ARC	810	B-25-	2236
WB0CLP/0	Holdrege Area ARC	785	B-23-	2204
W4SUN/4	Sun Worshippers	956	B- 6-	2182
W8VA/8	Tri-State ARA	724	B-12-	2177
WA9YRN/9	Oshkosh ARC	669	B-10-	2176
WA6DFM/6	Very Fine Operators	800	B-10-	2156
WA6PPD/6	Chicks Ranch Hams	704	B- 6-	2128
WA6TSF/6	Barstow ARC	598	B-10-	2114
W6AA/6	FMARC	552	B-20-	2108
W3LWW/3	Foothills RC	886	B-10-	2102
W3QZF/3	Horseshoe RC	533	B- 5-	2098
K9CDB/9	Non Club Group	761	B-14-	2052
K8IDAA/8	Holland ARC	621	B-12-	2042
W0CUS/9	Explorer Post 473	678	B-17-	2042
W7WMO/7	Central Wash. ARC	886	B-12-	2022
W6KA/6	Pasadena RC	733	B-10-	1998
VE3LJ/3	Ottawa Gourmet ED Group	598	B-11-	1994
WB2NEL/2	Non Club Group	610	B- 5-	1983
W2AE/2	RA of Greater Syracuse	611	B-10-	1954
W0EEE/0	Univ. of Mo-Rolla ARC	662	B- 6-	1952
WB0NVY/6	Redwood HS ARC	805	B-13-	1952
WA4HWI/4	Forsyth ARC	526	B- 6-	1946
K2QO/2	Irvington RAC	721	B-10-	1930
VE2CRG/2	Non Club Group	504	B-	1924
VE3CAB/3	Georgian Bay ARC	640	B-15-	1912
W5UW/5	Madison ARC	741	B- 6-	1908
W5ZDN/5	Central Texas ARC	586	B-26-	1864
VE3BPC/3	Rideau ARC	540	B- 9-	1854
VE7ARV/7	Vancouver ARC	546	B-12-	1849
K7LTV/7	Non Club Group	636	B- 5-	1838
W8EIY/8	Milford ARC	807	B- 9-	1818
W9PPD/9	Hagerstown Hams	521	B- 6-	1780
W0HK/0	Explorer Post 11	965	B- 4-	1773
W2ZV/2	Brookhaven Nat Lab RC	620	B- 7-	1758
WS1DFZ/5	Albuquerque Renegade Radio League	508	B- 8-	1756
K5AYA/5	Non Club Group	624	B- 9-	1746
W0NOZ/0	Huron ARC	721	B- 8-	1742
W5ES/5	El Paso ARC	608	B-20-	1740
WA9ORC/9	Chicago FM Club	579	B-20-	1724
W3FT/3	Baltimore ARC	572	B-18-	1720
W0AZR/0	Austin ARC	720	B-18-	1700
K4SG/4	Cary ARC	503	B-12-	1698
VE4RO/4	South Western Manitoba ARC	525	B-19-	1694
W3OK/3	Delaware - Lehigh ARC	659	B-10-	1690
W0EBE/0	SW Missouri ARC	623	B-30-	1674

K4NDH/4	Northwest ARC	578	B-11-	1666
K6MN/6	Santa Barbara ARC	914	B-26-	1665
WA1HRC/1	WELI ARC	605	B- 6-	1646
K6YGS/6	South Peninsula AR Klub	494	B- 4-	1644
W5GAD/5	Jefferson ARC	587	B-12-	1616
WA1RJI/1	Masi ARC	467	B-20-	1596
K2AHP/2	NYC Repeater Assn	451	B- 3-	1588
W@GV/@	Bell ARC	503	B-12-	1578
W9LXV/9	Motorola ARC	431	B-	1576
W7DP/7	Walla Walla Valley RC	444	B-20-	1574
W@JCY/@	Non Club Group	659	B- 4-	1574
W7YB/7	Mont. State Univ. ARC	588	B- 8-	1554
K2AJV/2	Livingston ARC	468	B- 9-	1546
K8UTT/8	Ford AR League	447	B-11-	1520
WA9YAK/9	Univ. of Wisc., Platteville	626	B- 7-	1518
VE6NC/6	Northern Alberta RC	537	B- 8-	1490
W6AK/6	Sacramento ARC	698	B- 9-	1436
W5RRR/5	Johnson Space Center ARC	509	B-10-	1426
W@FIT/@	Albert Lea Spiderweb ARA	436	B-12-	1426
W@RR/@	Heart of America RC	461	B-10-	1396
W5SYN/5	Brazoria Co ARC	549	B- 9-	1394
VE3CWO/3	York North ARC	446	B-10-	1392
WB5EKU/5	Non Club Group	365	B- 5-	1386
W9LFU/9	Hancock Co. ARC	416	B-12-	1370
W@GKP/@	Arrowhead RA & Explorer Post 405	400	B-10-	1364
VE7DSU/7	Columneetza RC	446	B- 7-	1356
W3DOS/3	Dept. of State ARC	289	B-25-	1346
WA4ZPO/4	Oconee ARC	408	B-17-	1342
W4PQD/4	RATS	454	B-26-	1336
W4OLB/4	Smoky Mtn. ARC	366	B-20-	1306
WB4TEU/4	Brightleaf ARC	332	B-12-	1290
W5UCY/5	Jackson Co ARC	451	B-10-	1260
WA6HQQ/6	Gray's Young Gabbers	373	B- 6-	1256
W2JDH/2	Sayreville Emerg Assn	392	B-11-	1232
K2LSA/2	Stateline RC of NY & NJ	380	B-10-	1226
WA3YVY/3	NE Phila ARC	462	B- 7-	1218
W@MR/@	JM ARC	443	B- 7-	1204
K@PYZ/@	Three Rivers ARC	336	B-	1202
W8MAI/8	Blossomland ARA	384	B-20-	1200
WB9LSV/9	Fremd ARC	356	B- 3-	1148
W3VI/3	Huntingdon Co ARC	272	B- 6-	1134
W8BLV/8	Dial RC	296	B-15-	1130
W@AFG/@	W. Nebr. Tech ARC	436	B- 7-	1122
W3PSH/3	Keystone ARC	235	B- 4-	1118
K@UEV/@	Chippewa RAC	345	B-10-	1096
W5DSC/5	Victoria ARC	313	B-10-	1084
K5CC/5	Non Club Group	394	B- 7-	1082
K@AGF/@	St. Paul RC	356	B-20-	1076
WB@DDH/@	Mesaba Wireless	350	B-11-	1070
W3AVK/3	W. Branch ARA	397	B-10-	1066
K3HXS/3	Non Club Group	391	B- 7-	1016
VE7ARM/7	Richmond ARC	376	B- 6-	1002
WA7YAV/7	Sehome HS ARC	357	B- 7-	986
W5ANR/5	Fort Smith ARC	377	B- 7-	974
K2BG/2	Rancocas Valley ARA	230	B-11-	966
W8PIF/8	Marinette-Menominee ARC	375	B- 8-	958
W5BQN/5	Point Comfort ARC	409	B- 4-	950
WB4TON/4	Hollywood ARC	302	B-13-	948
W8GQN/8	Straits Area RC	271	B- 8-	948
W2RCX/2	Genesee RA	278	B-	942
K@GFV/@	Iowa-Missouri ARC	341	B- 6-	932
K6CBP/6	Sierra Foothills ARC	335	B- 3-	920
K4HYB/4	Charles E. Newton RC	317	B- 8-	902
WA4TFZ/4	Albermarle ARC	276	B- 4-	894
W8CQK/8	Battelle Columbus RC	265	B-	890
VE4BB/4	Winnipeg ARC	248	B-10-	868
W@WYV/@	Bellevue ARC	235	B- 6-	856
VE4QD/4	Brandon ARC	292	B- 9-	846
K4FAU/4	FAU ARC	174	B-12-	819
W3IB/3	Non Club Group	276	B- 6-	802
VE1CFB/1	Slemon Park ARC	324	C- 8-	782
W5CFX/5	MTA ARC	246	B-13-	748
K4FDY/4	Maxwell AFB USAF MARS	257	B- 8-	714
WB9FTY/9	Richmond ARA	241	B- 8-	686
VF7ES/7	Totem ARC	235	B-11-	658
WB4TOP/4	Wake Tech Inst. ARS	123	B-15-	651
WA@PPW/@	Storm Lake AR	222	B-10-	644
WA7KCK/7	Non Club Group	221	B- 3-	642
WB9MSM/9	Non Club Group	323	B- 7-	620
W@YL/@	Story Co ARC	175	B- 8-	586
WB@KCD/@	Ten J ARC	185	B- 4-	570
WA5IPF/5	Wheat Straw ARC	91	B- 9-	532
WB8RCR/8	Explorer Post 2773	134	B-10-	520
K7UGE/7	Las Vegas ARC	139	B- 4-	496
W7ITR/7	Panaoramaland ARC	176	B-10-	452
W7OEK/7	Rogue Valley ARC	62	B- 3-	436
WB9MIY/9	Bay View HS ARC	135	B- 5-	285
WB5NET/5	SE Louisiana ARC	26	C- 3-	176

Commercian Mains

W5AC/5	Memorial Student Center Radio Committee	867	B-11-	2050
WB@JQJ/@	Janesville HS ARC	672	B-11-	1924
W3AA/3	Beacon RA	484	B-12-	1636
WA6DEI/6	Explorer Post 2955	876	B- 7-	1503
W1NRG/1	Meriden ARC	455	B-13-	1076

3A - Battery

W8DF/8 (+WN8SSB)	So. Mich. ARS	508	A-38-	4425
W9OOG/9	Lakeview ARA	1080	B-13-	3131
W3FQR/4	Dit Happy Dash Hounds	255	A-10-	2640

3A

W5ZR/5 (+WN5MYO)	Texas DX Soc	2557	B-24-	9280
W4TRC/4	Kingsport ARC	2518	B-40-	7826
W1TX/1 (+WN1UKO)	Conn. Wireless Assn.	2441	B-24-	7140
W9LT/9 (+WN9QEI)	Ft. Wayne RC	2164	B-50-	7054
W8GEG/3 (+WN3YTA)	Shenango Valley AR ED Group	1906	B-11-	6398
W4SKH/4 (+WN4TGB)	Oak Ridge ARC	1834	B-20-	6112
K1JMR/1	Norwood ARC	2068	B-23-	5922
W6OTX/6 (+WN6IJP)	Palo Alto ARA	1907	B-22-	5534
K9HWI/9 (+WN9OUF)	Barrington ARS	1757	B-22-	5501
K9TZZ/9 (+WN9NBS)	RA Tech Soc	1779	B-20-	5490
W@ERH/@ (+WN@NOR)	Johnson Co RAC	1547	B-49-	5344
K1JNQ/1 (+WN1SSL)	Sharon ARA	1698	B-14-	5144
W6YRA/6	UCLA ARC	1702	B-10-	4980
W8MAA/8 (+WN8RDA)	Cent. Mich. ARC	1622	B-58-	4942
W7KIS/7 (+WN7BLF)	Motorola ARC of Ariz	1394	B-20-	4930
W7YE/7 (+WN5MWQ/7)	Ariz Mtn Moguls	1622	B-27-	4784
W@IS/9 (+WN9OOS)	Quad City RC	1400	B-30-	4600
VE2CRL/2	de Laval ARC	1223	B-15-	4592
W5BW/5	Miss. Coast ARA	1754	B-28	4517
W2PE/2 (+WN2WPM)	RA of Western NY	1376	B-32	4504
W9OJR/9 (+WN9RBM)	Joliet ARS	1520	B-	4422
W9HE/9 (+WN9OOG)	Non Club Group	1341	B-13-	4378
W5LL/5	Tombigbee ARC	1957	B-20-	4329
W6AB/6 (+WN6KTA)	Satellite ARC	1671	B-18-	4320
WA3RCA/3 (+WN3WSS)	PENNARC	1540	B-27-	4298
K6KH/6 (+WN6FEE)	Northrop RC	1486	B-32-	4258
W9HOQ/9 (+WN9OOX)	Libertyville & Mundelein ARS	1347	B-25-	4280
K5OCM/5 (+WN5OJT)	Old Natchez ARC	1824	B-14-	4116
W9HHX/9 (+WN9RGN/9)	Milw. School of Engr ARC	1502	B-15-	4076
W2SE/2	New Providence ARC	1177	B-30-	4054
VE2CV/2	Non Club Group	1196	B-16-	3968
WA6WGM/6 (+WN6GRQ)	Saratoga ARA	1381	B-21-	3926
W4RYZ/4	Panama City ARC	1551	B-24-	3920
K3OTY/3	Etna RC	815	B-12-	3890
WB4WME/4	Oak Ridge Youth ARC	1125	B- 9-	3866
W6PW/6	San Francisco RC	1272	B-15-	3824
KZ5FD/KZ5 (+KZ5EDN)	Canal Zone ARA	1135	B-30-	3754
WA5BRF/5 (+WN5OMH)	Hot Springs ARC	1355	B-20-	3738
W6KW/6	Estero ARC	1234	B-22-	3734
K3MTK/3	Suburban ARC	1252	B-20-	3698
K@LIR/@	St. Louis ARC	1218	B-25-	3612
WA3NSZ/3	Randallstown ARC	1215	B-10-	3582
W9LUQ/9 (+WN9OTK)	Fon du Lac ARC	1209	B-18-	3558
K2INO/2 (+WN2APU)	Jersey Shore ARS	1052	B-30-	3538
VE2JB/2	Granby ARC	989	B-20-	3466
W5EC/5	Dallas ARC	1574	B-120-	3448
W8VVL/8	Queen City Emerg Net	993	B-20-	3414
K3KSS/3 (+WN3YJY)	Carroll Co ARC	1287	B-10-	3412
WB2QBP/2	American Red Cross Emerg RC	1158	B-20-	3406
W2CVT/2	POK ARC	1163	B-16-	3400
WB4BBB/4 (+WN4NIM)	RAC of Knoxville	1263	B-15-	3358
W@ZWY/@ (+WN@MZM)	Sioux Falls ARC	978	B-20-	3352
W8ZPF/8	Cres ARC of Western Electric	1016	B-17-	3234
W@CET/@ (+WN9NHZ)	Kaw Valley ARC	939	B-17-	3216
W9PCS/9	York RC	1100	B-14-	3181
W3PGA/3	Aero ARC	990	B- 7-	3178
W2MPM/2	Band Dit-Dahs	1116	B-11-	3153
W@AIH/@	Grand Island ARS	886	B-15-	3148
K8EMY/8	SE ARC	1203	B-25-	3137

W6HS/6 (+WN6KCR)	Crescenta Valley RC	1016	B-20-	3094
WA6ODP/6	Livermore AR Klub	947	B-18-	3043
W4BFM/4 (+WN4MGJ)	Decatur ARC	820	B-30-	3032
W7GV/7 (+WN7BKJ)	Old Pueblo RC	1099	B-25-	3025
W0NE/0 (+WN0NIU)	Winona ARC	950	B-17-	3024
VE3NSR/3	North Shore RC	1095	B-14-	3006
W0SCM/0	Independent FD ARC	1024	B- 8-	2984
W2BP/2	RAM ARC	812	B-15-	2932
W2SEX/2 (+WN2UJG)	ARA of the Tonawandas	898	B-26-	2912
W9EK/9	W. Allis RAC	981	B-21-	2802
W2DQ/2	Suffolk Co RC	899	B-14-	2786
WA0UGU/0	PHD ARA	853	B-39-	2782
W8ON/8 (+WN8UJL)	Adams-Brown Co AREC	794	B-20-	2760
W1EBW/1	W.Mass. AREC Repeater Assn	699	B- 9-	2746
W8DSO/8	Barker's Bandits	860	B- 9-	2628
WA6MQS/6	THERE	949	B- 5-	2616
W3IK/3	Butterfly Net	938	B-13-	2576
K3IVO/3	Free State ARC	724	B-15-	2572
W9BFO/9 (+WN9ORT)	SE Ill. Ham Soc.	981	B-14-	2482
W5RWI/5 (+WN5ODP)	Denton Co ARC	772	B-16-	2417
K4JYO/4	Cen Ala ARS	905	B-	2394
W1DHT/1	Bristol RC	535	B- 8-	2372
K4PHY/4	Bristol ARC	767	B-20-	2346
W2LCA/2	North Country RC	803	B- 8-	2338
K9HDH/9	Elkhart RC ARC	832	B-15-	2332
W8TNO/8	Oakland Co ARS	970	B-15-	2296
K6CLZ/6	Non Club Group	1043	B-16-	2288
W9REC/9	Chicago Radio Traffic Assn	709	B- 8-	2288
W2OC/2	Westchester Emerg Assn	743	B-25-	2270
W0BMJ/0	Marshall RC	898	B-12-	2262
W6NI/6	East Whittier RC	734	B-26-	2260
W1TKZ/1 (+WN1TAK)	Wellesley ARS	560	B-15-	2242
W1EKT/1	Quannapowitt RA	680	B-23-	2236
W2JUG/2	W. Jersey RA	640	B-	2230
W0MG/0 (+WN0OVO)	NE Iowa RA Assn	694	B-15-	2218
K7UGT/7	Sierra Nev ARS	855	B-15-	2208
W8YDK/8 (+WN8UDD)	MARC	797	B-20-	2162
K9WFL/9	Huntington Co ARS	646	B-19-	2162
W6SO/6	San Fernando Valley RC	847	B-10-	2126
VE3KAR/VE3	Kingston ARC	524	B-25-	2126
WA9LGQ/9 (+WN9QBM)	Indianapolis Red Cross RC	824	B-17-	2090
W5KA/5	Austin ARC	657	B-13-	2062
WA6AEG/6	Mt. View HS ARC	505	B-11-	2060
WB4KIF/4	Non Club Group	717	B-15-	2056
W6LMN/6 (+WN6BTU)	San Mateo RC	625	B-21-	1974
WB4NTR/4 (+WN4MRC)	Murray State Univ ARC	737	B-14-	1968
WB6USB/6	Murphy's Radio Class	688	B-44-	1930
W2ODV/2	Bayonne CD ARC	472	B- 7-	1912
K8VOA/8 (+WN8TTL/8)	Copper Co RAA	627	B-16-	1894
KH6IFY/KH6 (+WH6IJO)	Iolani School RC	563	B-12-	1894
WB5LEP/5	ARC of Shreveport	588	B-23-	1892
K3ZAC/3	Warminster ARC	617	B-25-	1888
W1FW/1	Merrimack Valley ARC	644	B-10-	1848
WA0CGV/0	McDonnell Douglas (St.Louis) ARC	642	B-14-	1848
VE3HB/3	Oakville ARC	500	B-12-	1846
W8LXL/8	Detroit Metro RC	660	B- 8-	1840
WA1GUD/1 (+WN1IIR)	Keene HS ARC	635	B-15-	1822
VE7EZ/7	Victoria Short Wave Club	544	B-25-	1804
K6AGF/6 (+WN6ECJ)	Tri-Counties ARA	530	B-15-	1792
WA7YYY/7	Nelso Longview ARC	680	B- 7-	1788
W2YKO/2	Lake Success RC	561	B-15-	1782
W1WQM/1	Port City ARC	510	B-12-	1746
W7NBR/7 (+WN7BOB)	Spokane RAs	506	B- 8-	1714
K4BV/4 (+WN4QQQ)	Daytona Beach ARA	380	B-	1686
W2ESL/2	Columbia Co AREC	519	B- 9-	1670
W9WWI/9 (+WN9OWA)	Clark Co ARC	456	B-10-	1658
W7VE/7	ARAB	596	B- 3-	1648
WB8BKA/8	Spartan Village Wireless Assn	565	B- 4-	1632
W1BD/1	Central Vt ARC	499	B- 9-	1610
K2VSO/2 (+WN2WXG)	Mt Vernon HS RC	378	B- 7-	1602
W9CSF/9 (+WN9RBH)	Mich City ARC	475	B-30-	1590
W4MM/4 (+WN4JAJ)	Alabany ARC	539	B-20-	1576
K9RHH/9 (+WN9QBY)	Menomonee Falls RC	392	B-16-	1575
W9LKO/9	DAI-KLO-UKO-POH	631	B- 4-	1574
WB8SMC/8	Farout ARC	442	B- 8-	1532
K0REC/0	Terre DuLac Repeater Club	532	B- 9-	1518
VE1CRC/1	Charlottetown ARC	634	B-10-	1518
WA3ZGI/3	American Red Cross ARC	393	B- 4-	1486
K9LZC/9	Columbus ARC	405	B-10-	1436
W7PR/7 (+WN7BIZ)	Eagle Rock RC	470	B-16-	1412
KL7EGN/KL7	Alaska State MARS ARC	455	B-14-	1394
W3KEK/3	RF Hill RC	371	B- 5-	1366
WA7NDB/7	Scout Explorer Post 308	383	B- 9-	1298
W7SAA/7	Non Club Group	363	B-12-	1280
W9VQE/9	Argonne ARC	338	B- 7-	1276
WB2RLO/2	Fair Lawn RC	334	B-11-	1266
W0BXR/0	Davenport RAC	463	B-12-	1256
K6BJ/6	Santa Cruz ARC	324	B- 5-	1254
K6OEH/6	HFEA ARC	409	B- 8-	1250
W7PXL/7	Valley RC of Eugene	687	B-12-	1246
W9EBN/9 (+WN9OBE)	Grant Co ARC	319	B- 6-	1234
K5JOA/5 (+WN5LXF)	Miami ARC	344	B-10-	1220
WA7EOD/7 (+WN7BMA)	Emerald ARS	334	B- 6-	1184
WA6BAI/6	Tulare Co ARC	399	B-12-	1148
WA0HOU/0	Blue Valley ARC	319	B-14-	1130
WA7LAZ/7	Hualapai ARC	354	B- 9-	1120
WA9EIH/9	Elmwood Park CD	344	B-12-	1103
W5DRZ/5	Broken Arrow ARC	379	B-20-	1098
W4JNY/4	Va Beach ARC - Tidewater ARC	274	B-20-	1068
VE4IX/4	Non Club Group	324	B- 8-	1050
K7CC/7	Tuscon Desert Rats	254	B- 9-	982
WA3NYY/3	The Clang Gang	278	B- 8-	978
WA2LIN/2 (+WN2WEK)	Orange Co ARC	274	B-	969
K0IUC/0	New Ulm ARC	270	B- 5-	966
K9GXU/9 (+WN9QXC)	St. Clair ARC	224	B-10-	954
WB6JHC/6	USC Buffalo Hunters	235	B- 7-	936
W9CEQ/9	Fox River Radio League	314	B- 5-	928
WB8ROL/8	W. Milton ARC	213	B- 6-	924
WB5MUW/5	Pan American Univ. ARC	304	C- 8-	855
W0VZG/0	Pilot Knob ARC	447	B-12-	849
W4GAC/4	St. Petersburg ARC	514	C-23-	814
VE3SWA/3	South Waterloo ARC	325	B-12-	814
K3JML/3 (+WN3YYC)	Non Club Group	244	B- 3-	812
WB9LUK/9	Dewitt Co AR	193	B- 4-	792
WB2TRN/2	Fun Generators	164	B- 3-	760
WA9NWA/9	Marshfield Area ARS	168	B- 4-	752
KL7IEJ/7	Moose Horn ARC	304	B- 7-	710
W4LLO/4 (+WN4MBG)	Key West ARC	103	B- 7-	702
W5SMZ/5	Saline Co ARC	459	C- 8-	689
W4CYL/4	Non Club Group	205	B- 7-	660
WB0DRV/0	Durango ARC	96	B- 7-	548
W2CWW/2	Staten Island ARA	36	B- 7-	472

Commercial Mains

W6GGR/6	Humboldt ARC	948	B-	2778
W8YCK/8	Big Bend ARC	630	B- 9-	1504
W1CWA/1	Bloomfield ARC	480	B- 6-	1380
W0ZDT/0	Spencer ARC	325	B-12-	1120
K9NBH/9	Great Lakes RC	358	B- 8-	834
WB4BGL/4	Scotland Co ARS	234	B- 7-	602

4A - Battery

K6FUN/6	Longo Mountain RC	657	A- 7-	4785
K7AIO/7	Tektronix RC	302	A- 7	2690
W9AZ/9 (+WN9RDI)	Kankakee ARS	301	A-15-	2230
WA1TCS/1	Dorchester ARC	212	B- 8-	1044

4A

W4IZ/4 (+WN4MST)	N. Fla. ARS	2628	B-50-	6896
K6YA/6	Foothills ARS	2217	B-22-	6732
W6IEZ/6	Richmond ARC	1908	B- 9-	6184
W9LU/9 (+WN9QEC)	Dyankee RC	2087	B-28-	6072
W4CVY/4 (+WN4NAK)	Columbus ARC	2011	B-17-	6072
K4EG/4 (+WN4KJC)	Alamance ARC	1733	B-22-	5606
WA2UOO/2	Wireless Inst. of the Northeast	1694	B-12-	5566
W4AUM/4	Woodbridge Wireless	1596	B-33-	5280
K4EZ/4	Southeastern DX Club	1586	B-20-	5262
W0HF/0	Allen Co AR Tech Soc	2222	B-12-	5166
W6IBL/6	Citrus Belt ARC	1692	B-20-	5123
W6ZL/6	Orange Co. ARC	2053	B-38-	5070
W9JOO/9 (+WN9NEU)	Wabash Co ARC	1541	B-11-	5026
WB2NRP/2	RS of Greater Brooklyn	1684	B-12-	4930
W4POX/4 (+WN4MAV)	Portsmouth RC	1240	B-15-	4526
W2GLO/2 (+WN2ANK)	Nutley ARS	1345	B-30-	4464
W4MOF/4	Buncombe Co ARC	1318	B-15-	4372
W0IE/0	Wecomm ARC	1954	B-17-	4358

W3ZH/3	ARINC ARC	1305	B-14-	4046
K6LKD/6	Escondido ARS	991	B-12-	3992
W2ZQ/3 (+WN2AWS)	Delaware Valley RA	1744	B-15-	3988
W6DL/6	Hughes El Segundo Employees Assn ARC	1269	B-28-	3978
W2VDX/2	IBM Owego ARC	1340	B-	3912
W3BN/3 (+WN3ZKU)	Reading RC	1163	B-21-	3892
W8EY/8 (+WN8VDP)	Van Wert ARC	1351	B-16-	3860
WØEQU/Ø (+WNØPPK)	AK-SAR-BEN RC	1223	B-52-	3738
K8LUC/8	GE Evendale AR Snc	1040	B-12-	3700
WB5EBK/5 (+WN5LII)	Key Klickers	960	B- 7-	3697
W6OS/6	Fairmon Electric AR Team	1550	B-11-	3500
W7UG/7	Lower Columbia ARC	1256	B-14-	3494
WA6GFY/6	Lockheed Employees ARC	1113	B-17-	3486
VE2CWI/2	West Island ARC	1049	B-	3484
W3OC/3 (+WN3YNF)	Two Rivers ARC	1023	B-30-	3464
WB4ABT/4	Southern Peninsula AR Klub	1110	B-22-	3428
W7UK/7 (+WN7AIH)	RC of Tacoma	1386	B-25-	3340
W6UL/6	Fullerton RC	1171	B-18-	3254
W7IO/7	Arizona ARC	1117	B-32-	3244
K4LA/4 (+WN4GWW)	Charlotte Co ARC	826	B-16-	3190
WA6TOW/6	Coastside ARC	1094	B-11-	3188
WB8KLF/8 (+WN8VEI)	Livonia ARC	1125	B-30-	3176
W4DRW/4	Arlington ARC	874	B-12-	3174
W9IKN/9	Elgin ARS	1001	B-11-	3141
WB2SUO/2 (+WN2UGP)	Thomas A Edison ARA	756	B-14-	3132
W6SE/6	Stockton ARC	996	B-11-	3040
W3YS/3	S. Maryland ARC	894	B-25-	2978
W1MHF/1	Non Club Group	675	B- 6-	2977
WB6EGE/6 (+WN6IKQ)	Petaluma DX & Experimenters Soc	1014	B-17-	2944
W2VA/2 (+WN2UJH)	Wantagh ARC	940	B-20-	2928
W4VTA/4	Confederate Signal Corps	1083	B-54-	2902
W8HS/8 (+WN8SVI)	Hazel Park ARC	1011	B-50-	2892
VE3PRC/3	Peel ARC	811	B-20-	2820
W2DMM/2	Inter Co ARC	798	B-12-	2752
WA9IYO/9	Elk Grove ARC	952	B-16-	2746
W3SL/3	Delaware ARC	895	B-15-	2725
W9CCU/9	Wheaton Community RA	795	B-20-	2706
W3VPR/3	Anne Arundel RC	726	B-15-	2578
W5ISV/5	Pampa ARC	912	B-20-	2568
W3CSL/3 (WN3YFQ)	Monessen ARC	847	B-28-	2546
W5RK/5 (+WN5OUU)	Tidelands ARS	864	B-40-	2504
K1JH/1	Roger Williams VHF Soc	898	B- 4-	2410
WA8MTX/8	Monroe Co Comm Assn	735	B-10-	2358
W1OC/1 (+WN1UAV)	Concord Brass Pounders	817	B-14-	2320
W5TLL/5	Tulsa Repeater Organization	752	B-12-	2316
K6LI/6	NBARA/SARS	594	B-25-	2272
WA4EPM/4	Ole Va Hams ARC	1476	C-21-	2249
WA3EWJ/3	Montgomery ARC	695	B-20-	2224
W6SG/6	Marin ARC	782	B-18-	2221
W3UKZ/3 (+WN3ZHA)	RF Hill ARC	598	B- 6-	2186
WA4TLI/4	Onslow ARC	824	B-20-	2183
W8WE/8 (+WN8USL)	Intercity RC	677	B-25-	2116
WA7APE/7	Scottsdale ARC	596	B- 8-	2088
K4JMC/4	Gadsden ARC	750	B-12-	2068
W8AX/8	Thumb ARC	612	B- 9-	2066
K2BDX/2	Kearny ARC	522	B-15-	2048
W8BQ/8	Triple States RAC	531	B-26-	2014
W2FWG/2	TARCOM	620	B-12-	1982
W8GVB/8 (+WN8SFB)	Marion ARC	693	B-16-	1932
WB8VKB/8	Cherryland ARC of Traverse City, MI	602	B-12-	1888
WA1TWX/1	Tri Cities ARC	325	B-18-	1876
W7HNZ/7	Spokane Dial Twisters	663	B-25-	1864
W3FDU/3	York ARC	566	B-10-	1840
WB4CMQ/4	Non Club Group	560	B- 5-	1780
K7BHM/7	Non Club Group	589	B- 5-	1762
K7SKW/7	Mt. Baker ARC	557	B-25-	1728
W3NKF/4	Naval Research Lab ARC	475	B-19-	1728
K8ZAS/8	Delta Co ARS	587	B- 8-	1634
W6TO/6	Fresno ARC	430	B-24-	1492
KØBYC/Ø	KC Assn for the Blind	371	B-22-	1484
K3ELT/3	Milton ARC	390	B-11-	1366
W3KKG/3	Lancaster Field Operators	407	B-10-	1346
WITFS/1 (+WN1UHE)	Granite State ARA	322	B- 9-	1264
W1WXZ/1	Provincetown Snobs	378	B-10-	1242
WA9CJN/9	Kishwaukee ARC	672	C-10-	1240
WØQQ/Ø (+WNØODH)	Tri-Lakes ARC	335	B-17-	1218
VE2CDD/2	Club Des Dix	512	C- 8-	1208
W7NV/7	KARS	314	B- 9-	1124
W9LMP/9	Non Club Group	301	B-17-	1080
WA2IFL/2 (+WN2WWW)	Boy Scout Troop No 44	265	B-11-	1052
W9EIH/9	Madison Co ARC	651	C-11-	1051
WA3OER/3	The British Thermal Unit	268	B-20-	1050
KØYRL/Ø (+WNØPDP)	M Troop	462	C- 8-	1001
W2OW/2	Binghamton ARA	336	C-13-	948
WA8WSO/8	TRW RC	394	C-10-	941
W4WVJ/4 (+WN4RYW)	Loudon Co ARC	350	B- 7-	916
WB9KKW/9	Big Thunder ARC	179	B-11-	878
WA2UIR/2	Ogdensburg ARC	193	B-16-	846
KL7AA/KL7	Anchorage ARC	331	B-15-	843
W7QZU/7	Idaho Soc of RA Magic Valley Chapter	170	B-18-	806
W3RCN/3	Rock Creek ARA	340	B- 6-	748
KØZFK/Ø (+WNØOKH)	Jefferson Barracks ARC	145	B- 6-	690

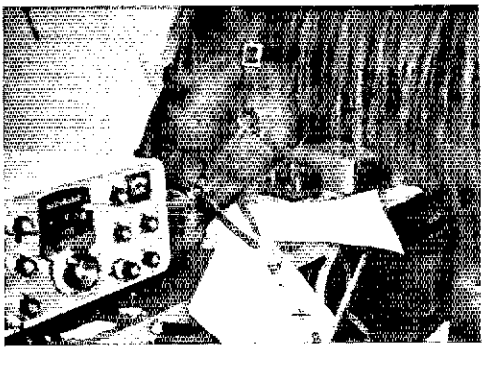
Commercial Mains

WA6VBU/6	Mike and Key RAC	657	B-10-	2000

SA

W9LM/9 (+WN9PEA)	Northwest ARC	3304	B-37-	9738
W6PAA/6 (+WN6HLF)	NCCC - SCCIRC	3020	B-16-	8924
WA4LZR/4	Motorola ARC Ft Lauderdale	2988	B-16-	8742
WB8IBM/8 (+WN8THQ)	North Ridgeville, Elyria, Columbia & Bay Village Pond Swimming, Creek Stomping, Mud Sliding, Tree Climbing, Operator Drowning, HSRC, Assorted Alumni & Friends	2482	B-11-	7138
K8HUT/8 (+WN8SLQ)	L'Anse Cruse ARC	2136	B- 5-	7130
K3SSC/3	Belmont ARC	2636	B-30-	7052
W9WXK/9	VARA	2082	B-20-	6358
W3SK/3 (+WN3YBN)	Penn Wireless Assn	1912	B-33-	6167
W5TI/5 (+WN5NKG)	Kilocycle Club of Ft. Worth	2032	B-150-	5932
K2GH/2 (+WN2WLG)	Bergen ARA	1847	B-25-	5484
WA2LQO/2	Grumman ARC	1605	B-38-	5300
K2AE/2 (+WN2SCH)	Schenectady ARA	1426	B-43-	5050
K6SYU/6	Anaheim ARA	1585	B-40-	4756
K9BPL/9	Motorola-Schaumburg	2740	B-21-	4712
W3QL/3	S. Chester Co ARC	1466	B-15-	4700
K1MUJ/1 (+WN1UDS)	Eastern Conn ARA	1459	B-34-	4612
W7YN/7	Nevada ARA	1202	B-18-	4538
K8SCH/8 (+WN8UNF)	OH-KY-IN VHF RS	1555	B-22-	4046
W4CUE/4	Birmingham ARC	1267	B-38-	4028
K8DAC/8 (+WN8ROC)	Saginaw Valley ARA	1212	B-40-	3754
K2IQ/2 (+WN2YGV)	Utica ARC	1066	B-24-	3686
W3EPC/3	William Penn RC	966	B- 9-	3618
W8VY/8 (+WN8UHE)	Kazoo ARC	821	B-25-	3294
W8ID/8	Seneca RC	1061	B-10-	3201
W8ICS/8	Indian Hills RC	857	B-20-	2958
W2LOG/2	Tompkins Co RC	862	B-13-	2836
W4UOI/4	Middle Tenn ARS	1025	B-17-	2756
W4CRM/4	New River Valley ARC	892	B-14-	2730
W8CQ/8	Catalpa ARS	838	B-12-	2730
K3CSG/3	Abington ARC	678	B-12-	2666
W1HHJ/1 (+WN1UIK)	Chelmsford ARA	725	B-14-	2462
W6NWG/6	Palomar RC	866	B-107-	2452
WA1NBO/1 (+WN1TSH)	Whitman ARC	605	B-	2440
W1BRF/1	Quinebaug Valley ARC	645	B- 7-	2380
K3IEC/3	Cumberland ARC	646	B-15-	2301
VE3DRT/3	Skywide ARC	728	B-13-	2276
K3ZDR/3	Quad-Co ARC	627	B-10-	2178
CY6NQ/6	Calgary ARA	657	B-80-	2148
W3UU/3	Harrisburg RAC	501	B-25-	2040
W6LHJ/6 (+WN6FRZ)	Sonoma RA	495	B-13-	1950
K6OWR/6 (+WN6KDF)	Victor Valley ARC	618	B- 9-	1786
W1MEM/1	Hartford Co ARA	508	B- 9-	1726
W5EA/5	Twin City Amateur	362	C-15-	1660
W2ESS/2	Drumlins ARC	440	B-12-	1602
K9ULK/9	Winslow ARS	468	B- 8-	1590
W6RO/6 (+WN6JJY)	ARA of Long Beach	793	C-29-	1510

W9ILR/9 (+WN9OSU)	Longmont ARC	383	B-10-	1386
6A					
W6TRW/6 (+WN6HEU)	TRW ARC	2753	B-35-	8704
K7LED/7	Mike & Key ARC	2834	B-40-	7922
W2DMC/2	Crystal RC	1772	B-	6320
WA3PJQ/3	Maryland Mobileers ARC	2044	B-31	6000
K2DN/2	Comm. Club of New Rochelle	1437	B-13-	4604
W2MMD/2	Glouster Co ARC	1341	B-24-	4492
KØKKV/Ø	Lincoln ARC	1390	B-31-	4476
W4DW/4 (+WN4LYN)	Raleigh ARS	1198	B-30-	4026
K8AEU/8	Bolivar Co & Washington Co ARC	1106	B-16-	3594
K8ALB/8	Critical Bias RC	1036	B-16-	3388
VA3ZM/3	Guelph ARC	1055	B-20-	3274
WA1HOB/1	Winn's Losers	1135	B- 8-	3226
WB8CSQ/8	Cascades ARS	1024	B-10-	3144
K9IYT/9 (+WN9QNB)	Whitewater Valley ARC	819	B-14-	2943
VE3UI/3	West Side ARC	905	B- 8-	2780
W2ZE/2 (+WN2UUM)	E. Brunswick ARC	651	B-20-	2594
W9IIVI/9	Peoria Area ARC	694	B-16-	2436
W3CWC/3	Antietam ARA	1060	B-20-	2208
K6QHQ/6	South Bay ARS	597	B-17-	2130
K6GIP/6 (+WN6JAQ)	Monterey Park ARC	495	B-16-	1882
WBØKRA/Ø	Fairbault ARC	428	B-	1856
W5MS/5	Corpus Christi ARC	369	B-27-	1520
W7EK/7 (+WN7ALI)	Cascade RC	454	B-11-	1498
Commercial Mains				
WA1BFU/1	Hampden Co RA	783	B-	842
7A				
W7ER/7 (+WN7YPH)	W.Wash. DX Club	4590	B-45	12474
K2AA/2 (+WN2UAD)	South Jersey RA	3072	B-35	9638
K4BPT/4	Huntsville ARC	3004	B-46-	9326
K6QEZ/6	Ampex Employees ARC	2562	B-17-	8118
W8VPV/8 (+WN8RZQ)	Cuyahoga Falls ARC	2021	B-26-	6400
W6CX/6 (+WN6KGI)	Mt. Diablo ARC	2282	B-27-	6198
W9IC/9 (+WN9OGN)	Chicago Suburban RA	2012	B-40-	5858
W9DUP/9	Du Page RC	1485	B-50-	4822
W2OYH/2	Morris RC	1056	B-17-	3934
WA8ICQ/8	Wayne ARES	931	B-18-	3112
W9DUA/9	Sangamon Valley RC	1402	C-24-	2830
W7FEL/7	Clallam Co ARC	593	B-14-	2218
KØCNV/Ø (+WNØPCM)	Empire RC	751	B-13-	1780
WA3MRV/3	Non-Club Group	338	B- 9-	1448
WB8LGK/8 (+WN8UEA)	Hocking Valley ARA	484	B-15-	1400
8A				
K4FMA/4	Radio 88	2202	B-19-	6816
VE3DC/3	Hamilton RC	2194	B-33-	6420
W3PIQ/3	South Hills Brass Pounders & Modulators	1802	B-58-	5704
WA6HGS/6 (+WN6ENP)	ARC of El Cajon	1469	B-53-	4936
K6IS/6	North Hills RC	1884	B-25-	4816
W7AIA/7	Clark Co ARC	1528	B-20-	4710
W2DED/2 (+WN2TZM)	Cranford ARS/AREC	989	B-23-	3644
W1MV/1 (+WN1TZO)	Massasoit ARA	616	B-23-	2870
9A				
W2LI/2 (+WN2UPI)	Tri Co RA	2118	B-32-	6398
W2GSA/2 (+WN2BAG)	Garden State ARA	796	B-25-	3122
KnEAG/6 (+WN6JIK)	Hayward RC	674	B-27	2860
10A				
W1BIM/1 (+WN1TYR)	Central Mass ARA	1395	B-25-	5004
K6HAI/6	North Shores ARC	1249	B-18-	4468
11A				
W9JZ/9 (+WN9OQK)	Four Lakes ARC	2459	B-60-	8068
K6CJD/6 (+WN6HDR)	Poway ARS	1170	B-20-	4006
12A				
VE3MRC/3	Metro ARC	1913	B-32-	6586
14A				
W1VV/1 (+WN1SXS)	Murphy's Marauders	8174	C-36-	12251
15A				
VE3WE/3	Scarborough ARC	3667	B-49-	8884
VE3NAR/3	Nortown ARC	2472	B-64-	8459
16A				
W3IN/3	Potomac Valley RC	7355	C-18-	11361
VE3IBM/3	IBM Toronto & Toronto DX Club	2647	B-22-	9118
21A				
W2RJ/2 (+WN2ANN)	Englewood ARA	2251	B-66-	8910



An occasional happening at 225 Main Street, Newington, is what is not-so-originally referred to as a "Caption Contest." WB4CMQ/4 captioned their picture (left) "Equine QRM horsed around with our antennas with a Tennessee Walker pulling our SWR bridge out the window." We offer the following further possibilities: "CQ Foal Day." "How to keep the fillyments from going out." "I've heard of getting hoarse on FD. " "After 1 AM, Field Day becomes a nightmare." So much for this end, over to you." Sorry, we can't print the best one.

Class B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the other operator (if known) is shown following that of the amateur whose call was used. Figures following the calls indicate number of contacts, power, and final score. An asterisk following the callsign indicates set-up operations did not begin until 1800 GMT on Saturday.

Class-B Call-Area Leaders

(Bold Face=Over-all class leaders)

1B	2B
VE3EKS	VE3GXZ/3
K1FWE/6	WA1AHQ/1
WB2ABD/2	WA2DFI/2
W3HHV/3	WA3SWF/3
WB4IOJ/4	WB4DNB/4
K5LXZ/5	
W6ANB/6	WB6MPM/6
K1PKQ/7	WA7SJV/7
WB8AZD/8	K8GIV/8
WA9LOT/9	
WØISJ/Ø	WBØPBI/Ø

1B - Battery

WB9LGZ/9	260	A-	2800
VE3EKS/3 (+VE3HJV)	460	A-	2625
K6EBH/6 (+K6LLE)	718	B-	2314
WØEIT/Ø (+WØHXB)	548	B-	2216
WA3TBW/3 (+WA3UCI)	175	A-	2000
WØOGJ/Ø	182	A-	1920
WA6EUZ/6 (+WB6OVV)	171	A-	1655
W2BX/2 (+K2PZF)	149	A-	1590
WB8OSM/8	220	A-	1470
W5RMZ/5	136	A-	1460
K4IKG/4 (+WA4BWT)	144	A-	1365
WB4SYC/4	115	A-	1250
K2KF/2	105	A-	1200
WAØAGN/Ø	133	A-	1095
WBØAPG/Ø	143	A-	1080
W6JTH/6 (+WA6VBA)	88	A-	1030
WB2REF/6 (+WB6JSL)	90	A-	1000
WB9LKC/9	118	A-	945
WB2USK/2 (+WB2UQM)	79	A-	885
WA8RFN/8 (+WA8RQU)	76	A-	860
KH6IDR/6 (+KH6HOZ)	162	B-	848
W5IYH/5 (+WB5KDX)	131	A-	805
WA6YPE/6 (+WA6MCL)	70	A	800
WB9JKN/9 (+WB9MDQ)	102	A-	790
W4GHV/5 (+WN5LGD)	278	B-	732
K6LWI/6	63	A-	730
WA3RSG/4	60	A-	720
WB4GHZ/4	57	A-	670
W5SHJ/5 (+WN5NEN)	94	A-	670
W6RHR/6 (+WA6UIK)	153	B-	584
WAØTFD/Ø (+WAØTNT)	67	A-	565
W7LNG/7	31	A-	560
WBØDGS/Ø (+WBØCMZ)	63	A-	510
WB5LHG/5	34	A-	440
WB2DLA/2	27	A-	370
WB9GSP/9 (+WB9IUQ)	26	A-	360
K8HVA/8 (+K8IIA)	97	B-	294
WB5CYG/5 (+WB5DHZ)	91	B-	282
K1PQV/1	115	A-	280
W6FAW/6	15	A-	250
W4BUA/8	12	A-	220
K3RXK/3	41	B-	208
WA7PRZ	45	B-	176
WA2CHX/2 (+W7ELK)	14	B-	156
W2WSS/2	3	A-	130
WA1MYK/1	4	B-	108
W2DIQ/2	1	A-	102
WA4GRO/4	9	A-	90
WA6ITY/VE8	11	B-	22

1B

WA9LOT/9 (+WA9IXF)	887	B-	3226
W6ANB/6	884	B-	3016
WB2ABD/2 (+WB2PAY)	821	B-	2638
W3HHV/3 (+K3ONW)	832	B-	2636
WØISJ/Ø (+WAØEBZ)	755	B-	2632
WA6SNK/6 (+WB6MKY)	862	B-	2546
KØUYN/Ø (+KØCVA)	1045	B-	2540
WBØFGR/Ø (+WBØLLR)	976	B-	2428
K5LXZ/5 (+WB5GVE)	891	B-	2194
WA9NPM/9 (+WBØNQY)	926	B-	1976
K6KQ/6 (+WN6PNZ)	631	B-	1814
WBØNMC/9 (+WN9OSJ)	788	B-	1712
WB4IOJ/4	526	B-	1680
WB4YIX/4 (+WN4HRQ)	555	B-	1506
K2FVW/2	305	B-	1416
WA6WHC/6 (+WB6GYJ)	381	B-	1370
WBØNNR/Ø (+WB9BVZ)	378	B-	1260
WA6EGI/6 (+WB6CFD)	301	B-	1186
TIØRC/W6 (+TI5KGG)	530	B-	1160
WB4LBB/4	494	B-	1140
WB9IWO/9 (+WB9LPE)	339	B-	1132
WA5MMD/5 (+WA5ERN)	306	B-	1124
WB8MWG/8 (+WB8BYB)	461	B-	1072
K6BEI/6 (+WB6UTN)	326	B-	1052
K3MRG/3 (+K3NLY)	409	B-	1018
WA6SXL/6	303	B-	938
K1PKQ/7	404	B-	908
WØYHE/Ø (+WAØIWW)	312	B-	904
WA3MYI/3 (+WA3IJB)	390	B-	902
K9VHF/9	372	B-	894
K4CGY/4	366	B-	832
WB4FKO/4	268	B-	810
WA5NHI/4 (+WB4HOF)	289	B-	764
WB9GMV/9	254	B-	758
WB4KGY/4 (+K4KCF)	190	B-	732
WBØOAZ/Ø	364	B-	728
WN7YOK/7 (+WN7AFI)	147	B-	688
W7EPX/7	272	B-	644
K1FWE/1 (+WN1STJ)	210	B-	626
W6OKK/6 (+K6AYA)	176	B-	626
W3EAN/3 (+W3EBY)	153	B-	606
WA1UIG/1	248	B-	596
K9HOQ/9 (+WN9NRT)	124	B-	596
WN1UYU/1	149	B-	596
WB6OLJ/7	192	B-	594
WA6UXA/6 (+WN6EOE)	208	B-	572
WA2LOF/2 (+WB2DGW)	196	B-	560
WBØLMW (+WAØRAD)	90	B-	558
WA3YEG/4	243	C-	534
W9GFQ/9 (+W9OYH)	123	B-	530
WB5NGB/5 (+WB9MZD)	189	B-	528
WB5KVO/5 (+VE6AXB)	205	B-	526
W6KHS/VE7	203	B-	506
WA8AEG/8	169	B-	496
WBØJSU/Ø	143	B-	386
WA7QLS/7 (+WA7OEO)	135	B-	370
VE7AED/7	110	B-	370
WA7EUI/7 (+K7YSV)	182	B-	364
WA7MSQ/7 (+K7ZSA)	263	C-	363
WB4RVD/8 (+WB4PLL)	129	B-	358
WA6GIY/6	101	B-	352
WN1TWD/1	85	B-	340
WA7NZT/7	112	B-	278
WB5HAE/5	81	B-	262
WN4LBB/4 (2 oprs)	33	B-	232
WBØMAQ/Ø (WBØLSD)	16	B-	210
WBØKYJ/Ø (+WAØQIT)	82	B-	204
WA1CUN/1	19	B-	172
K4HTA/4	23	B-	92
W8HR/8	15	B-	60
WNØODL/Ø (+WØMVF)	8	B-	32

Commercial Mains

WB8AZD/8 (+WA8UON)	605	B-	1868
WB2WXS/8 (+WA8DXB)	306	B-	1106
K9KID/9 (+WA9YYF)	303	B-	694
WA6VYW/4	306	B-	686
WB9EXE/9 (2 oprs)	240	B-	640
W6APW/6	145	B-	498
WA1DXR/1 (+WN1UOA)	69	B-	276
WA4AUX/4	102	B-	242
WA1TNX/1 (+WN1UCP)	55	B-	218
WA1PNW/1 (+WA1LRL)	30	C-	30
WA6YWS/6	8	B-	30

2B - Battery

WA3UDS/3 (+WA3QMJ)	137	A-	1150
K4ILI/4 (+K4UJS)	89	A-	1090
W6LHY/7 (+WB6JMA)	122	A-	995
WA6WJV/6 (+WA6JFP)	77	A-	930
WB5IBQ/5 (+WB9LSM)	13	A-	330

2B

WA2DFI/2 (+WA2APE)	1066	B-	3662
WA3SWF/3 (+WA3TTS)	1006	B-	3542
K3DPQ/3 (+K3JGI)	1252	B-	3448
K3TEJ/3 (+K3RZF)	688	B-	2860
WB4DNB/4 (+WA4DEQ)	821	C-	2510
WB6MPM/6 (WAØKXJ)	740	B-	2492
WA4JVO/3 (+WA4TLB)	694	B-	2250
WA1AHQ/1 (+WA1AHI)	697	B-	2196
K8GIV/8 (+K8BQI)	622	B-	2102
WA7SJV/7 (+K7YXS)	540	B-	2080
VE3GXZ/3 (+VE3EJE)	385	B-	1478
WB4OKA/4 (+WA4LBO)	366	B-	1334
WA7KLK/7 (+WA7KPH)	508	B-	1216
K7DQ/7 (+K7CXZ)	326	B-	1158
WA2SNQ/2 (+WB2SGT)	469	B-	1038
W5TES/6 (+WB5GWZ)	455	B-	1028
WBØPBI/Ø (+WBØFHS)	407	B-	1020

WA7RAR/7 (+WA7UCQ)	298	B-	1000
W6OUR/6 (+W6OZW)	338	B-	926
K1EUM/1 (+WA1RTC)	264	B-	902
WB4YJP/4 (+WB4YJO)	272	B-	794
VE1CI/1(2 oprs.)	159	B-	554
WA2IJE/2 (+WA2SBQ)	128	B-	506
W3JER/3 (+WA3RPO)	196	B-	496

Commercial Mains

W6ZRJ/6 (+K6BGM)	41	B-	214

Class-C Call-Area Leaders

(Bold Face=Over-all class leaders)

1C

WA2EAH/1	**WB6CEP/6**
K2LGJ/2	**WB8JYX/8**
W5SCO/3	**WA9BVL/9**
W4OZF/4	**WØMOQ/Ø**

1C

W4OZF/4 (3 oprs)	1209	B-	3574
WB6CEP/6	809	B-	2488
W6MLK/6 (5 oprs)	319	A	1895
W5SCO/3 (2 oprs)	168	A-	1138
W3NZ/3	184	B-	836
WA6DIL/6	342	B-	784
WB6RGR/6	164	B-	553
K2LGC/2	164	B-	516
WB8JYX/8	158	B-	442
W6JVA/6 (2 oprs)	39	A-	190
WA9BVL/9	125	B-	350
WØMOQ/Ø	59	B-	336
WB6DSV/6	40	A-	300
WA7PEI/Ø	78	B-	256
WA2EAH/1	152	B-	252
W6CLM/6	152	B-	252
W6DAT/6	23	A-	215
W9ZMR/4	56	B-	212
K6VGA/6	37	B-	174
KH6IKB/6	36	B-	172
WA9CHY/9	31	B-	162
W6PRI/6	28	B-	156
K6AYA/6	13	B-	152
WA4EMU/4	22	B-	144
W4DRP/4	12	B-	124
WB6KHZ/6	13	A-	65
WB2VDF/2	27	B-	54

Class-D Call-Area Leaders

(Bold Face=Over-all class leaders)

1D

VE3AKG	W6RNU
WA1RQT	W7ZMD
WA2VPA	W8BNF
W3EWL	**WB9MOG**
K4UWH	WBØIKN
K4CHE/5	

1D

WB9MOG	689	B-	1920
WBØIKN	750	B-	1840
KØCXR (2 ops)	1201	C-	1778
VE3AKG	1158	C-	1563
K4UWH	172	B-	1060
WB9OLF (2 ops)	346	B-	1048
K9KOI/9 (2 oprs)	498	B-	996
W3FWI	336	B-	984
WB8BNF	350	B-	974
WA4JRC	324	B	936
WA1RQT	270	B-	906
WA1HAX	217	B-	868
K4CHE/5	210	B-	840
WA2VPA	245	B-	798
WA4ZUI	339	B-	778
W7ZMD	319	C-	738
WA4LXV	184	B-	724
WA3WRO	179	B-	716
W6RNU	183	B-	594
WA2QKF	142	B-	568
WB6MKP	284	B-	568
WA2WUZ	283	B-	566
WB6KUM	129	B-	528
K2ARO	258	B-	516
WB4JAF	158	B-	516
WA3UXA (2 oprs)	174	B-	472
W4WKO	391	C-	446
WA8VKK (2 oprs)	111	B-	444
W6MJP	109	B-	436
W3ARK	108	B-	432
WN4NKL	106	B-	424
KH6CKJ	370	B-	411
WB5KAW	201	B-	406
W8IZZ	100	B-	400
WB4DKM	380	B-	380
WA4EBN	139	B-	372
K2EF	122	B-	350
WB9OWJ	175	B-	350
W9NU	165	C-	330
K1UEH	124	B-	260
WBØEMI	63	B-	252
K4BZH	61	B-	244
W4YSJ	119	B-	238
WN2VMU	58	B	232
WØFDM/Ø	62	B-	228
W6WDH	77	B-	206
WN1TDH	51	B-	204
VO1KE	48	B-	192
W9MDW	145	C-	186
WN8TVD	39	B	156
W6RQZ	27	B-	154
W9AXI	49	B-	148
W5SOD	48	B-	144
WB6VAF	64	B-	136
W6PFE	64	B-	128
W5BWM	61	B-	122
WA4NFS	30	B-	120
WBØQUT	57	B-	116
WBØNCJ	92	B-	106
WN6FUZ/6	22	B-	88
WA2PMW	37	B-	74
WB9HGN	30	B-	60
WN8SNO	14	B-	56
W3NHX	11	B-	44
WBØQYR	11	B-	44
WN8TJS	10	B-	40
W4NTF	9	B-	36
K5BY	15	B-	30
WN3YKK	7	B-	28
WA6HAD	14	B-	28
WA6UAV/7	7	A-	28
WA6ORJ	9	B-	18
WA1PLK	4	B-	16
W7PSS	2	B-	2

2D

WA9JCO/9 (3 oprs)	1459	B-	3662
W4DUG (15 oprs)	392	B-	1382
WA2PSP (6 oprs)	551	B-	1220
WA1FKE (4 oprs)	304	B-	940
W5ZD (3 oprs)	394	B-	788

3D

W3EDY (5oprs.)	1125	C-	1467
WB8HIW (3 oprs)	441	B-	542

1E - Battery

W2HVO	130	A-	1160
WB4PDE	166	A-	1045
WAØUCU	63	A-	730
W4AWS	33	A-	430
WN6AIT	70	B-	280
WA7PRZ	45	B-	176
WN4TNC	17	A-	170
W4ZRJ	12	C-	120

1E

K3GJD (8 oprs)	768	B-	2724
W6RPU/6	549	B-	1964
K4FC (15 oprs)	256	B-	830
K8DDV/8	227	B-	454
W2DUS	70	B-	380
WA2IUC	100	B-	300
WB8IUU	121	B-	242
WA7IBD	19	B-	44

2E - Battery

K1GAX (4 oprs)	342	A-	3250

2E

W6CXO (4 oprs)	97	B-	294

Check Logs

VE3AWE, VE7JB, W1RE, W1AJK, WA1VCH/1, W2UL, WB2FXY, K3TUA, W3CVE, W3GN/8, W3USS, WA3TMP, WA3WOC, K4PR, WA4AUX/4, W5EIJ, WA6EKJ, W8EQG, W8IBX, W8SP, W8VUV, W8ZTA/8, WA8MAZ, WB8LZR, WB8OLR/8, WN8RDN, WN8UPZ, K9DTB/9, W9IJ, W9PTI, WB9OYD, WBØHJQ, DK5OS.

QST

Strays

I would like to get in touch with . . .

. . . amateurs interested in starting a net on 40 or 80 meters for chess playing. WN2WPI.

KC1CRD was a special call assigned this spring to commemorate the 200th anniversary of the Battle of Concord, 1775-1975.

— . . . —

January VHF SS results: WB9NXB, Illinois, was listed as operating both 6 and 2 meters when, in fact, he placed second in Illinois operating 2 meters *only*.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY ROBERT J. HALPRIN,* WB2NOM

Station Identification

RECENT reports from W2JI and K3CPF indicate a recurrent problem. For instance, imagine a flood hits the town where Charlie, W1XYZ, lives. Charlie goes out with his AREC group, providing emergency communications for his community. He operates for 16 hours amidst the rain and the mud, without a break; no food, no rest. Finally, the situation stabilizes and the emergency operations secure. Charlie drags himself home, exhausted. While his wife prepares the meal he's been dreaming about, he relaxes in his easy chair, watching the television with half-open eyes. Suddenly, he hears something which brings him wide-awake instantly. The TV newscaster has just mentioned what a fine job the Citizen Band operators did in the emergency, but not even a word about the hams. That long-anticipated meal doesn't seem so appealing anymore.

This omission by the news media might occur in another way. Suppose the next morning Charlie gets up (painfully) and gets ready for work. He's sitting in the kitchen, eating breakfast and reading the morning paper. Lo and behold, the newspaper is singing the praises of the CB'ers, but again, no mention of the AREC.

If this has happened to your group, first of all don't fly off the handle and get yourself an ulcer. Take pride in knowing that your AREC group served the public admirably, regardless of the mistake the news media made. Secondly, as soon as you can, call your local newspaper/broadcast station. Get everyone to write letters to them. Explain who the amateurs are, and what the AREC did in the recent emergency. Do this in a clear, concise, unemotional manner. Nowadays, the media's responsiveness to the community comes under close scrutiny. Accordingly, the media are interested in having a positive public image (no pun intended). They should appreciate being set straight and hopefully they will make amends in print/on-the-air. Remember, both amateur and commercial licensees have a public service responsibility.

Hot off the presses. The 1975/76 ARRL Net Directory, which lists almost 600 public service nets, is yours for the asking. To get your copy by first-class mail, please send Hq a legal-size s.a.s.e. (number 10 envelope) with 20 cents U.S. postage. Don't confuse this with the Repeater Directory, which is available, postpaid, for 50 cents to League members and one dollar to non-members. Any questions??

■ **Making somebody happy.** If we asked you to name the group that has over 1100 members and that's been meeting on 20 meters since 1962, what would you say? DXers anonymous — zip code hunters — decibel honor roll? Nope, it's the International Handicappers Net on 14,287 kHz, Monday through Friday at 1500 UTC. WBØLTF reports that the purpose of the net is to provide good fellowship and service to the many disabled amateurs. Phone-patches and informal messages are regularly handled. Unfortunately, formal traffic is not handled because many of the operators on the net have difficulty writing. The manager of IHN is W6MLZ. So if you're tired of exchanging signal reports with complete strangers on the low end of the band, why not drop-in on the IHN? You'll meet a lot of friendly people and you just might be able to help someone out. — *WB2NOM*

On Emergency Communications

WA2KOJ, Assistant Emergency Coordinator for Oswego County, N.Y., supplies an information

*Communications Assistant, ARRL

This distinguished looking group attended the annual New Jersey Net Picnic on July 26. Standing, left to right: W2JI, WB2WRT, W2CVW, K2KF, WN2TZM, WB2RMK, WA2SRQ, WB2AEH, W2SWE, WA2SLF, WA3QOZ, WB2VPR, WB2VTT, WB2LCV, WA2DSA, WA2CCF, WA2WKH and WB2FLF. Kneeling: WB2UJD, WB2OYV, WA2DVE, WB2HSG, WA2SHT, WA2DIW, WA2UOO, WB2FCD, WB2RKK, WB2PBO, WA2WDT, WA2VEN, WB2PYM, WA2VPA and WB2WBH.

sheet for public-service minded 2-meter fm operators. Here are some of the main points of this useful guide:

With the advance of utilization of two-meter amateur radio, we now have an even greater opportunity to provide a public service, thus strengthening our position in the eyes of our community and governments. This potential does require intelligent and responsible action, so the following guide was compiled to be of assistance in reporting emergencies while in mobile or portable operation.

Emergencies requiring action fall into three categories: Accidents, fires and situations jeopardizing personal health and welfare.

Correct procedure requires that the following steps be taken:

1. Determine the total situation as soon as possible.

2. Decide what agencies should be advised and in what order.

3. Report the situation accurately and concisely on the auto-patch, or via relay through a base station. (You should have the telephone numbers of police, fire dept., handy.)

4. Standby in the area until the situation is resolved.

What do you report? Accident, fire, etc., the degree of seriousness, number of cars involved, injuries and potential hazard.

Where: give an accurate placement as to street, road, or route, and a given distance and direction from some landmark.

Public service agencies do not care how or where they get reports of emergency situations but they do care about the accuracy of such reports. When making a report, make it as accurate as conditions permit. Identify yourself as an amateur radio operator. — *WA2KOJ*

■ For August, 35 Section Emergency Coordinators reported a total AREC membership of 12,758. At this time in 1974, 42 SEC reports were received with a membership of 14,188. Apparently the summer slump is taking its toll. Sections reporting were: Ala, Alaska, Alta, Ariz, Colo, Conn, Del, EMass, Ill, Ind, Kans, Ky, Mar, Mich, Miss, NLI, NC, NFla, NNJ, NTex, Okla, Ont, Org, Oreg, Pac, RI, SDgo, SCV, Sask, SFla, SNJ, STex, Utah, WMass, WPa. The following sections, not included in the list in September *QST* have a 100% reporting record: SFla, SNJ, STex, Utah, WMass, WPa.

Traffic Talk

How about those phone traffic nets that have roll calls? If you have traffic, you'll sit there 20 minutes waiting for the roll call to be over before you're permitted to pass any messages. As a matter of fact, if you're not on the net control's list, forget it. You'll be there a half hour before you can even modulate your rig. Wouldn't it be efficient (like most nets) to pass the traffic first, and then have the rest of the session available for ragchewing? These roll call nets do standby for emergency and/or priority traffic at the beginning of the net. But what if you arrive on net frequency two minutes after roll call gets underway? Well, baby, that emergency message better not be anything *really* important. If a group wants to socialize that bad, why continue the pretense of holding a "traffic" net? Call it a ragchew net instead. Furthermore, why even meet on the air? Meet at the local pizza parlor. The money you pay to get your call sign on the list (no kidding) could just as well be spent on pizza.

It makes life a lot easier for the guy trying to deliver the message you just originated if you include a telephone number. When you're on the receiving end, and a message comes through without one, you do have a recourse. Consult the telephone book or call Directory Assistance. Directory Assistance is free (at least it was five minutes ago). This is a method for determining whether a message on the borderline of your toll-free calling area is a local call or not. Even long-distance directory assistance is free; just dial the area code you want (found in your phone book), followed by 555-1212. It could be useful in determining whether a garbled message is going to Newark, Delaware, or Newark, New Jersey. Many thanks to RM WB6OYN for bringing this up in a recent SCN bulletin. Just let your fingers do the walking . . . — *WB2NOM*

■ *National Traffic System.* PAN mgr. K7NHL reports unexpected traffic load, along with some of the worst conditions in years. D1RN moved to 3950 kHz. Traffic up 15% over August '74, sez D3RN mgr. WB2FWW/3. Harv has been appointed Traffic Program Committee Chairman for 1976 National Convention. Worst representation in years, sez W3NEM. WB6PVH new DRN6 mgr. WA5IQU is at the helm of RN5. D8RN needs WVA representation. DTWN will be meeting at 2300Z on 7232.5 or 3932.5 kHz, depending on conditions, until December 31. Net certificate winners: WA1PGY (D1RN), WA3QOZ (D3RN), WA8JXM (8RN), WB7AEL (DTWN).

August Reports

Net	*Sessions*	*Traffic*	*Avg.*	*Rate*	*%Rep.*
EAN	31	1437	46.6	1.106	97.9
CAN	31	1111	35.8	.828	100.0
PAN	31	1125	36.3	.820	90.8
DEAN	42	418	9.9	.444	50.0
1RN	57	481	8.4	.433	
D1RN	31	131	4.2	.305	84.8
2RN	62	549	8.8	.792	98.1
D2RN					
3RN	62	342	5.5	.363	89.2
D3RN	31	105	3.3	.333	94.4
4RN	51	364	7.1	.311	76.0
D4RN					

Communications for the Michigan amateur canoe races were handled by the Milford, Mich., ARC. Here, W8JWQ types out race standings on the video display.

The Bellingham, Mass., AREC sponsored an amateur radio display at the Bellingham Bicentennial Fair on July 3-4. From left, Emergency Coordinator W1EQH, WA1VAM and assistant EC K1DVX.

RN5	60	552	9.2	.294	78.8
DRN5	31	119	3.8	.189	73.7
RN6	62	717	11.5	.456	100.0
DRN6	31	137	4.4	.166	59.4
RN7	62	436	7.0	.517	83.6
DRN7	30	35	1.1	.105	31.3
8RN	56	419	7.4	.348	86.5
D8RN	31	106	3.4	.322	65.6
9RN	60	499	8.3	.360	89.5
D9RN	31	113	3.6	.213	87.9
TEN	–	–	–	–	–
ECN	62	271	4.3	.340	85.0
TWN	60	331	5.5	.226	83.2
DTWN	24	101	4.2	.134	60.6
CTN	31	496	16.0	.346	91.2
TCC Eastern	113[1]	732			
TCC Central	524[1]	524			
TCC Pacific	110[1]	817			
Sections	4003	14866	3.7		
Summary	5063	27334	5.4		
Record	5520	31117	16.4		

[1] TCC functions not counted as net sessions.

[2] Section and Local nets reporting (121): AENB AEND AENI AENM AENW SMENS (AL), ASN (AK), ATEN HARC (AZ), AMBN APN ARN ATN OZK (AR), NCN NEN NTN SCN (CA), CN CPN (CT), DEPN DTN (DE), EAST EMTN FPTN GN NFPN QFN QFTN TPTN VEN (FL), GSBN (GA), IMN (ID,MT), ILN (IL), JNN (IN), 175MN TLCN (IA), QKS-SS (KS), KNTN KRN KTN KYN MKPN (KY), LAN LSN LTN (LA), MDD MDCTN (MDC), EMRI EMRIPN EM2MN NENN WMN WMPN (MA), MACS MNN MI6MN QMN WSBN (MI), PAW (MN), MSBN MSN MTN (MS), MON MOSSBN MSSN (MO), WNN (NE), NHVTN (NH,VT), NJN NJPN NJSN PVTEN (NJ), SWN (NM), NLI NLIPN NLS NYS (NY), CN NCSSBN THEN (NC), NDRACES (ND), OSSBN 6MTRN (OH),OAN OLZ OTWN STN (OK), BSN (OR), WPTN (Pac.), EPAEP&TN PTTN WPA (PA), VSBN BSN (VA), WSN (WA), WVN WVMN WVPN (WV), BWN WIN WNN WSBN (WI), MTN (MB), APN (Mar.), GBN ODN OPN OQN (ON), WQV/UHF (PQ).

Transcontinental Corps

K7NHV received a TCC-P certificate. Traffic way up, but functions hampered by poor conditions in all areas. TCC-E losing a fine operator as WB4SGV departs for college, WA1STN takes over for him.

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	124	91.1	1837	732
Central	93	86.0	1064	524
Pacific	124	88.7	1679	817
Summary	341	88.6	4580	2073

The TCC roster (August): Eastern Area (W2FR, dir.) – W1s NJM QYY YNE, K1s EIR GMW, WA1s MSK POJ, W2s FR GKZ KAT/3, WA2s DSA ICB PJL UWA, WB2s PYM RKK, W3EML, K3s CB MVO, W4UQ, K4KNP, WB4SGV, W8PMJ, K8KMQ, WA8HGH, WB8ITT, VE3s GOL SB. Central Area (KØAEM, dir.) – W4OGG, WB4DXN, W5s MI GHP QU UGE UJJ, WA5IQU, W9s CXY DND NXG, WA9FED, WB9KPX, WØs HI, INH LCX QMY ZHN, KØCVD, WAØs, MLE TNM. Pacific Area (K5MAT dir.) – W5RE, K5MAT, WB5KSS, W6s BGF BVB EOT MLF REF VZT, K6HW, WA6DEI, WB6s DJP OYN, W7s BQ DZX GHT KZ, K7s IWD NHL NHV QFG, WØs LQ LRN, KØDRL, WBØs AXW HCK.

Independent Nets (August)

Net	*Sessions*	*Traffic*	*Check-ins*
Central Gulf Coast Hurricane	31	94	1938
Clearing House	–	296	585
Hit & Bounce	31	1866	423
IMRA	34	541	1105
Mission Trail	31	175	1260
North American	25	73	137
Washington Region	13	25	165
20 Meter ISSB	21	1093	273
75 Meter ISSB	31	481	1155
7290 Traffic	42	435	1443

Public Service Diary

■ Atlanta, GA – April 3, WB4ITB, Chief-Clinical Bacteriology Branch, Center for Disease Control, provided emergency medical instructions via radio for HC1CU on behalf of an Ecuadorian hospital besieged by a respiratory infection epidemic. The problem was solved when a contaminated hospital disinfectant was replaced. – *(CDC-Dateline)*

■ Mercer Co., NJ – July 20-22. The Trenton RACES organization was activated following heavy flooding in the area. Amateurs provided communications and aided in the evacuation of flood victims. – (W2JI, SEC SNJ)

■ Chestertown, NY – August 3-4. Following severe thunderstorms and heavy winds which damaged 21 homes and summer dwellings, the Glens Falls AREC swung into action, handling emergency communications on 6 and 2-meters for the Red Cross. – (K2AYQ, EC Glens Falls)

■ Richmond, IN – August 16. While supplying communications for a Shrine parade, members of the Richmond ARC were on hand to call for an ambulance when one of the spectators suffered a seizure. *(Spectrum)*

■ Baja, CA – August 25. San Diego area amateurs provided for the air evacuation of the sole survivor of a plane crash. Communications were handled on WestCARS and the Taco Net on 75 meters. – (W6GBF, SCM SDgo)

■ Tyler, TX – August 28. K5ROZ/mobile 5 checked into DRN5, 7290 kHz, to report an overturned car on an interstate highway. Net manager W5KLV called authorities. – (W5KLV)

■ Pinellas Co., FL – August 31. At 0400Z, WB2EHP/mobile 4 requested assistance (on 6 meters) after coming upon the scene of a motorist out of gas on a lonely road. WA4ZDY, WA4GCH and WA4PTM answered the call and WA4ZDY drove to the scene with a can of gasoline. – (K4SCL, SCM SFla)

■ Little Rock, AR – September 5. Approximately 15 amateurs assisted in the securing of an eye for an emergency operation in Memphis, TN. The traffic was handled on MidCARS, 7258 kHz. – (K4DLA)

■ Brownsville, TX and vicinity – August 29-31.

Public Service Honor Roll August 1975

This listing is available to amateurs whose public service performance during the month indicated qualifies for 40 or more total points in the following nine categories (as reported to their SCM). Please note maximum points for each category. (1) Checking into cw nets, 1 point each, max. 10; (2) Checking into phone/RTTY nets, 1 point each, max. 10; (3) NCS cw nets, 3 points each, max. 12; (4) NCS phone/RTTY nets, 3 points each, max. 12; (5) Performing assigned liaison, 3 points each, max. 12; (6) Phone patches, 1 point each, max. 20; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

WB5AMN . . . 74	WA5YEA 50	K5YHR 44
WB5LJI 65	W6RNL 50	WA4BAX 44
WA4FBI 64	WB2IZN 49	WB4EKJ 44
WA1MSK 62	W2OL 49	WA4FPJ 44
WA3OOZ 62	WA2PIL 49	K4ETB 44
W5KLV 62	WB2RMK . . . 49	WB4GHU 44
K1PNB 61	WA3YKZ 49	WA4HUB 44
WA2DSA 61	WA3WRN . . . 49	WB4OXT 44
WB2UWW/3 . . 61	WA5PRI 49	W4WXZ 44
WA3DUM 61	K5MAT 49	W4YZC 44
WA3PHQ 61	W5MYZ 46	WB9NME 44
WB4EZQ 61	WA6TVA 49	W9NXG 44
W4OGG 61	W7GHT 49	WA9OVT 44
WB4YKM . . . 61	WA7MEL 49	KØCVD 44
WA5IQU 61	WB8NIL 49	WØOI 44
WA5ZZA 61	K9LGU 49	VE3EQZ 44
WB6HDL 61	K9ZTV 49	VE3GOL 44
W7OCX 61	KØMRI 49	VE3SB 44
WBØCZR 61	WØOYH 49	WA1OME/Ø . . 43
WRØHBM 61	VE3BRG 49	WB5MEG 43
WB9ICH 58	KL7IDO 48	WIDMS 42
WB9MDS 58	WA1POJ 47	WA1MJF 42
WAØEMD . . . 58	WA2PCP 47	W2MTA 42
WA1QKD . . . 57	WR5EMA 47	WA3VRM 42
W2MLC 56	VE1ARB 47	WN5NKD 42
WB2OYV 56	VE3GT 47	W5IOJ 42
WB2RKK 56	W2ER 46	WA3VBM 42
WB2WRT 56	W6REP 46	WA7OOF 42
WB4IYW 56	K1PAD 45	WAØLIH 42
W5GHP 56	WB2VTT 45	WA1MJF 41
WBØJGT 56	WB4DXN 45	WB5DCY 41
VE1AMR 56	W5IGF 45	WB5KGP 41
WB4JHQ 53	WBØOCT 45	WR6IYA 41
W6IKH 53	WBØKWJ 45	WAØGLI 41
W9MFQ 53	KØZXE 45	WBØHOX 41
WB2FDW 52	WIBVR 44	WAØYNP 41
WB6OYN 52	W1YNE 44	WB5IDXB . . . 40
VE3GFN 52	WB9HTM 44	WB9KPX . . . 40
	WA3WPY 44	

The South Texas Emergency Net was activated during an alert for Hurricane Caroline. Sixty-five amateurs participated. – (W5KLV)

■ Ketchikan, AK – July 20. When a girl was accidentally hurt on Metlakatia Indian Reservation, KL7HGA and KL7IBG maintained around-the-clock contact with the girl's parents in Mesa, AZ, to keep them posted as to the nature and extent of the injuries. – (WA7OYX)

■ *Repeater Log.* According to reports received, repeaters were used to report 29 traffic accidents and related occurrences, 11 fires, four dangerous situations, one tornado, and twice provided individuals with emergency medical aid. The following repeaters were involved: WR1s AAC ABX ACP ACZ, WR3s ACM ADG, WR4s ADO AGZ, WR5s ADC AHX, WR6s ACF AII, WR7ACM, WR8ABZ and WRØACD.

■ *Special Activities, July* The Sangamon Valley Radio Club (1L) provided communications for a soap-box derby on July 19. – (K9FNB) *August.* Ten amateurs ran a message handling service and an amateur radio display during Coast Guard Day festivities on Governor's Island, NY, on August 3. – (WB2EDW, EC) On August 8, the Mountain ARC and W3BHE provided communications between a handicapped group at a campsite in WV, and their friends and relatives at c.d. headquarters in Cumberland, MD. – (W3FA, SCM) The Wacom ARC conducted an amateur radio display and message traffic service at the Washington, Co., PA, fair on August 11-16. – (WA3OKK, EC) Seven Ottawa Co., OH, amateurs put together an amateur radio information booth at the Ottawa Co. Fair, on August 14-18. – (WA8HGH, EC) Members of the Quannapowitt Radio Association handled communications for the Heritage Days Parade in Salem, MA, on August 17. – (WA1SYO) The Lynchburg (VA) supplied communications for an air show at Lynchburg Municipal Airport on August 16-17. – (W4GCE, SEC) On August 23 the Milford (MI) ARC supplied communications for the Michigan State amateur canoe race championships. – (K8SWW, EC) Approximately 80 amateurs from the Central Florida Repeater Assoc. and the Orlando ARC provided communications for parade officials during a Shriners' parade (over 5000 marchers) in Orlando, FL, on August 23. – (W4UJL, EC) Communications for the 65th annual Dipsea Race from Mill Valley to Stinson Beach, CA, were handled by the Marin (CA) ARC on August 24. – (WA6CBQ) Members of the Northern Illinois Repeater Club and the Mongomery (IL) ARC handled communications during the Mid-America Canoe Race on the Fox River. – (Western Electric-WE).

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for August Traffic

Call	*Orig.*	*Recd.*	*Sent*	*Del.*	*Total*
W3CUI	1067	1201	2064	37	4369
W3VR	241	453	670	19	1383
WØWYX	33	655	225	430	1343
W6RSY	0	623	661	1	1285
KØZSQ	0	434	0	434	868
K9UPM	1	154	429	256	840
KØYEK	2	348	28	320	698
WA3UKZ	288	58	343	4	693
W3AVJ	2	334	312	0	648
WB9NVN	3	318	305	11	637
WA4SCK	3	320	308	2	633
K4SJH	4	312	252	6	574
WA4EBI	3	293	273	2	571
WB2EDW	13	263	266	23	565
WB8MZZ	0	258	288	19	565
KH6IAC	12	264	252	30	558
KØYEK(Jul)	0	346	0	346	692
W3AVJ(June)	3	325	298	2	631

BPL for 100 or more originations-plus-deliveries

WAØVAS	152	W4RKH	126	WA8WZP	111
WA3ATQ	132	WB5MEQ	123	WA2ELW	102
KG6JAQ	131	VE1ARB	113	WA3PHQ(Apr.)103	
		WA3RFY	111		

More-Than-One-Operator Station

WB2RNF/2	336	WØAA/Ø	269

BPL Medallions (see December, 1973 *QST*, p. 59) have been awarded to the following amateurs since last month's listings: WA3QYY, W4LDM, K5TIC.

The BPL is open to all amateurs in the United States, Canada and U.S. possessions who report to their SCM a message total of 500 or a sum of originations and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

Strays

The Pacific North West recently celebrated the 150th anniversary of the founding of Fort Vancouver by the Hudson's Bay Company in 1825. In addition to programs, exhibits, and pageants at the Old Fort sponsored by the National Park Service, the local Clark County Amateur Radio Club operated a station, W7AIA, on all amateur frequencies daily for one month, from a 100 year old building.

Hamfest Calendar

Massachusetts – The Middlesex ARC's annual auction is Friday, November 28 at 8 PM at the Mason-Rice School, 149 Pleasant St. in Newton. Club share is 15%. For more info contact: WA1JWQ, 16 Beale St., Brookline MA 02146.

Ohio – The Massilon ARC flea market and auction is November 21 under one roof, one acre. Unlimited parking. Dollies and carts available for big loads. The location is at the Amherst Park Civic Center (Amherst Park shopping center complex) corner of Lake Ave. and Amherst. Flea market opens at 6AM; activity from 7:30 'til 11 PM.

Ohio – The Erie Amateur Radio Society's Fourth annual Thanksgiving Auction is Sunday afternoon November 30 at the Laborers Union Hall, 2109 West Perkins Ave., Sandusky (across from the New Departure plant). Doors open at 11; auction starts at 1:30 PM. No commission charged; admission $1. Free coffee. Plenty of parking, good restaurants in the area. Simplex call-in on .52. It's a go, rain, shine or snow. QST

COMING ARRL CONVENTIONS

November 1-2 – New England Division, Hartford, Connecticut.

NOTE: Sponsors of large ham gatherings should check with League Headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.

QUADRAPLEGIC HELPS OTHERS THROUGH AMATEUR RADIO

BY ALLAN K. CHAPMAN,* W6MEO

PERSONAL COURAGE and determination, as well as the dedication of others mark the story of Otho Jarman who, at the age of 22, became a quadraplegic while saving the life of a drowning child. Sixteen years later, despite the fact that he can move only his head, Otho is an active and useful ham radio operator.

In July, 1970, the Barstow Amateur Radio Club offered to help any handicapped person interested in amateur radio. Otho, who had no previous experience, responded. By studying and being tutored one hour each Sunday for seven weeks he passed his Novice exam and began to communicate with the outside world using Morse code. Ten months later he began studying for a higher grade and license and, after three weeks, he passed the Conditional exam and received the call WB6KYM. He is now contemplating the test for an Advanced.

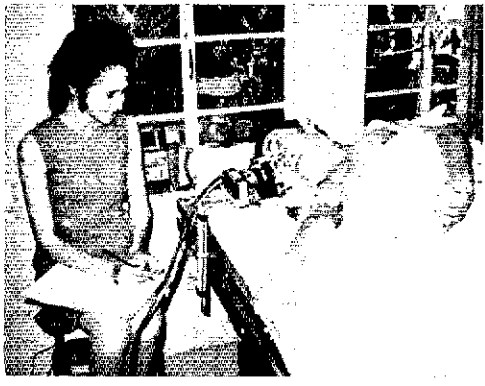
Otho operates his equipment and sends and receives code by using neck and facial muscles and an ingenious system of controls which was built and installed by experts who work in electronic industries and government facilities nearby. Servo motors and relays are controlled by microswitches actuated by his lips, tongue or cheeks. One rig uses a voice-operated electronic key to send Morse code. An old Motorola single-channel two-meter fm transceiver, which is set up on 146.16/76, is operated by tone bursts which are actuated by his chin or tongue. Frequency tuning of a rebuilt Swan 270 transceiver on 15 and 40 meters is accomplished with a geared-down reversible motor which is controlled by cheek pressure. The 15-meter beam antenna is rotated from a 3-position chin switch, and the power with which Morse code characters are formed is turned on and off by breath sounds which are translated into electrical impulses at speeds up to 35 words-per-minute (Otho's operating speed is 18 to 20). All the special ham equipment is designed and built by the Barstow Amateur Radio Club, which installs and maintains all of the radio gear at their own expense.

Otho has been a help to others, just as he has been helped. Among those who benefited from his concern are an amateur who is also a quadraplegic who expressed a desire for special key and controls. Otho passed the request on to the radio club, and another key was made up and shipped. He also helped an amateur who could not speak to contact a doctor about special medicine. (This was accomplished after Otho spent a few hours talking to him in code.)

Otho comments, "I can't put into words how much this means to me, or express gratitude to these friends from the Barstow Amateur Radio Club. I feel a whole new world has opened up for me. I hope each of my friends who have given me so much help and encouragement are recognized. In particular, there is WA6CMZ, who designed my key and control systems, as well as W5UNF; WA6MUQ; W6ZGC; WB6IOE; W6PVR; W6FRW; WN6WYG; WA6HWV; and W6GXC."

These amateurs, along with Otho's wife, Jimmie, who arranges the controls, keeps the log, and dials the telephone for him, have helped him to become a functioning part of the amateur radio world. Through him, we catch a glimpse of what courage and determination can do.

* 100-L East Alhambra Road, Alhambra, California 91801.



Otho Jarman operating amateur radio station while wife Jimmie keeps the log. His code speed is 18-20 words-per-minute.

Happenings of the Month

ARRL ELECTION BALLOTING . . .

Each year there are elections in half of the League's 16 divisions for the offices of director and vice director. If two or more candidates qualify for an office, a ballot is prepared. This year four of the eight director posts and all of the vice director positions are contested, as compared with only nine of the 16 slots two years ago. Here are the lineups:

In the **Atlantic Division,** incumbent Harry A. McConaghy, W3SW and Richard J. Karl, W3ZUH, are candidates for director, with incumbent Jesse Bieberman, W3KT, David Heller, K3HNP, and Harold C. Smith, WA2KND, as candidates for vice director. William W. Loucks, VE3AR, William L. Skidmore, VE3AUI and Henry W. Thel, VE7WJ are running for vice director in the **Canadian Division.** In the **Dakota Division,** Garfield A. Anderson, WØKE, and Benjamin J. Layton, WØUTT, are on the director ballot; vice director nominees are Ernest G. Anderson, WØRRW, Edward C. Gray, WAØCPX and Tod Olson, WØIYP. The vice director contest in the **Delta Division** features incumbent John H. Sanders, WB4ANX and Malcolm P. Keown, W5RUB.

In the **Great Lakes Division,** vice director candidates are the incumbent William E. Clausen, W8IMI, and Leonard M. Nathanson, W8RC. Vice director Richard Pitner, WØFZO from the **Midwest Division** is challenged by Claire Richard Dyas, WØJCP. J.A. Doc Gmelin, W6ZRJ, the current director, and Gary A. Stilwell, W6NJU, are candidates for director from the **Pacific Division,** with William W. Eitel, W6UF/WA7LRU and incumbent Albert F. Gaetano, W6VZT on the vice director ballot. In the **Southeastern Division,** two incumbents fight it out: Director Larry E. Price, W4DQD and Vice Director Ted R. Wayne, WB4CBP are running for director. The vice director candidates are Bev Cavender, K4VW and James A. Gundry, W4JM.

Accordingly, ballots were mailed during the second week of October to all Full Members of the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions who were on the League roster by September 20.

Any Full Member – including a family member – who did not receive a ballot by November 1 should immediately get in touch with headquarters. Ballots must get back to Newington by November 20 to be counted.

. . . AND ELECTION RESULTS

Where only one candidate is lawfully nominated and eligible for a particular office, the Executive Committee is authorized to declare that person elected without membership balloting. Accordingly, Directors **Max Arnold, W4WHN,** from the Delta Division; **Richard A. Egbert, W8ETU,** from the Great Lakes Division; and **Paul Grauer, WØFIR,** from the Midwest Division have been reelected for two-year terms commencing at noon, January 1, 1976, in the absence of opposing candidates.

Similarly, **Ron J. Hesler, VE1SH,** becomes the new director for the Canadian Division, replacing A. George Spencer, VE4IM, who was not a candidate for reelection. Ron makes his home in Sackville, is 54 years old, and is a retired business executive. He has served since 1974 as an assistant director in the Canadian Division; in June, 1975 he was appointed as vice director to fill the vacancy created by the resignation of Howard R. Cowling, VE3WT. He is also section emergency coordinator of the Maritime Section; cofounder, past secretary and past editor of the VE1RPT Association; past president, Sackville Amateur Radio Club; past district manager, Canadian Amateur Radio Operators Association; Life Member of ARRL and QCWA; and member in good standing of a baker's dozen radio societies! Ron was first licensed as VE1KS in 1937 and held VE2QF from 1957 to 1965.

BEHIND THE DIAMOND

Our first candidate for this revival of Behind the Diamond is Vice President *Victor C. Clark, W4KFC.* Vic can be easily recognized at League gatherings: he's the one who is always bending over so people can hear him. At 6'4" he's getting a bit tired of hearing so often, "How's the weather up there?"

Vic was first licensed in September, 1933, when he obtained the call W6KFC in Phoenix (yes, it was 6-land back then). He served as Section Communications Manager of Arizona from 1937 to 1939, and again as SCM of Virginia from 1950 to 1952.

From 1952 to 1966 he was assistant director of the Roanoke Division, and director 1967-1974, at which time the Board of Directors elected him to the post of first vice president of the ARRL.

Vic has an impressive list of amateur radio credentials. He served for five terms as president of the Potomac Valley Radio Club, is trustee of K4CG, the Coast Guard Amateur Radio Club station, holds an ORS appointment, is a member of the AREC, A-1 Op Club, and a Charter Life Member of ARRL. He also holds certificates for BPL, WAS, and DXCC. Perhaps his most prestigious award is the 1936 Hiram Percy Maxim Award, established in honor of the League's founder by his children. This award was given annually to that League member under 21 years of age who was believed to have made the greatest individual contribution to amateur radio, or who had the best all-round record during a given year.

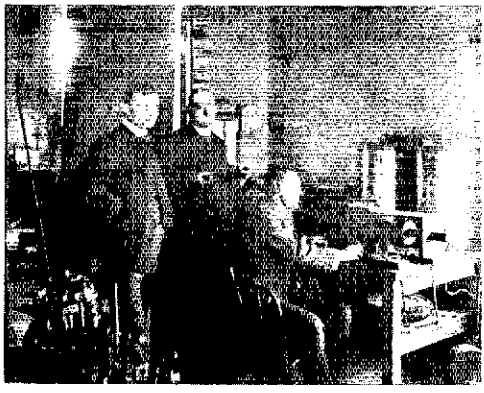
A graduate of George Washington University, Vic worked for the Federal Aviation Agency as chief of the Navigational Aids Section during the years 1941-1962. He then became laboratory director of the U. S. Coast Guard Electronics Engineering Laboratory in Alexandria, Virginia. Vic, now 58, retired from that post in 1973.

Vic and his wife Hester, WA4PAE, live in Clifton, Virginia. They have six children, two of whom – Ken, K4OKZ and Andy, WA4PRF – are also hams. When first asked if he has any hobbies other than ham radio, Vic smiles and replies, "You mean there are other hobbies?" Further probing reveals that he possesses a private flying license (an apt avocation for one whose head is already close to the clouds) and, closer to earth, he also has been known to raise a racket playing tennis and the ukulele.

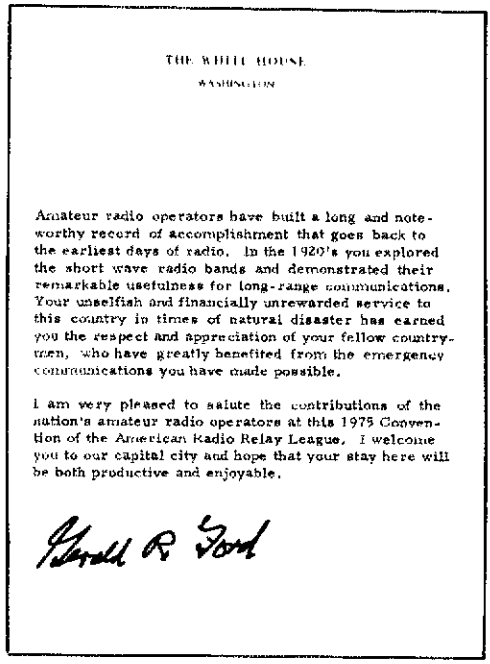
PIONEERS COMMEMORATED

The Murgas Amateur Radio Club of Wilkes-Barre, Pennsylvania will commemorate on November 23 what they believe is the first transmission of wireless telegraphy over land 70 years ago by the Reverend Joseph Murgas. The observance will entail a reenactment of the first message – this time in the amateur bands – and a public display at the Sacred Heart Hall, 603 North Main Street, Wilkes-Barre. National and local dignitaries, ARRL officials and the general public have been invited.

The adjacent photograph shows the 1905 station with Father Murgas and friends who were observing.



PRESIDENT FORD COMMENDS AMATEURS



THE WHITE HOUSE
WASHINGTON

Amateur radio operators have built a long and noteworthy record of accomplishment that goes back to the earliest days of radio. In the 1920's you explored the short wave radio bands and demonstrated their remarkable usefulness for long-range communications. Your unselfish and financially unrewarded service to this country in times of natural disaster has earned you the respect and appreciation of your fellow countrymen, who have greatly benefited from the emergency communications you have made possible.

I am very pleased to salute the contributions of the nation's amateur radio operators at this 1975 Convention of the American Radio Relay League. I welcome you to our capital city and hope that your stay here will be both productive and enjoyable.

Gerald R. Ford

A UNIQUE RADIO CLUB

One of the most active radio clubs in the New York metropolitan area is a bit different than most – the Hall of Science Radio Club, operators of WB2JSM at the Hall of Science of the City of New York, a modern museum at the site of the former World's Fair in Flushing Meadow. The club conducts instruction for amateur radio licenses of all classes four nights per week, with more than 250 students enrolled in the term which began September 20. The club is also active in contests, nets, field trips, public service work and public relations – including a project to demonstrate Oscar satellites to the high school students of New York City. The guiding spirit for amateur radio at the Hall of Science is its director, Robert C. Reiley, WB2FHN, himself a successful student of the first licensing class at the Hall.

TEMPORARY USE OF ASCII

In September the Federal Communications Commission issued a special temporary authorization (STA) for the experimental use of the American Standard Code for Information Interchange (ASCII) 8-unit teleprinter code in connection with Oscars 6 and 7. The STA is unusual since it can apply to any user of the amateur satellites, not just a few specific stations. Users of Oscars taking advantage of this authority are urged to make reports on their ASCII

At Prose Walker's retirement party: A. Prose Walker, W4BW (left); John Jacobs, W4ZDN; Vern Wilson, W4MA *(K4WAX took the picture – thanks)*

experiments to Amsat, Box 27, Washington DC 20044, since that group – which obtained the STA – must make a report to FCC at the end of the trial period next February.

Incidentally, Oscar 6 was three years old on October 15 – congratulations to all who participated in designing, building and securing the successful orbiting of this "bird."!

RULES FOR ARRL HAMFESTS ADOPTED

The Executive Committee has adopted new rules which permit ARRL sanctioning of hamfests after approval by the director of the appropriate division. The rules are similar to, but simpler than, those which have been in effect for official ARRL conventions, and more than one hamfest can receive recognition in a given area.

The convention rules have been modified as well, to provide for Section, State and Division conventions as well as the National, and to spell out, for the first time, the services to be provided for a convention sponsoring groups in return for their becoming "Official." One new benefit, for both ARRL conventions and ARRL hamfests, is *QST* display advertising at reduced rates.

The new rules are incorporated in the Articles of Association and By-Laws pamphlet which has just been reprinted. Affiliated clubs and ARRL officials will automatically receive a copy of the booklet. Members may obtain one by writing Membership Services Department, ARRL Hq., Newington, Conn 06111. A self-addressed stamped envelope, business size with 10 cents postage will help us give you faster service.

WA/WB/WN4 QSL BUREAU TO MOVE

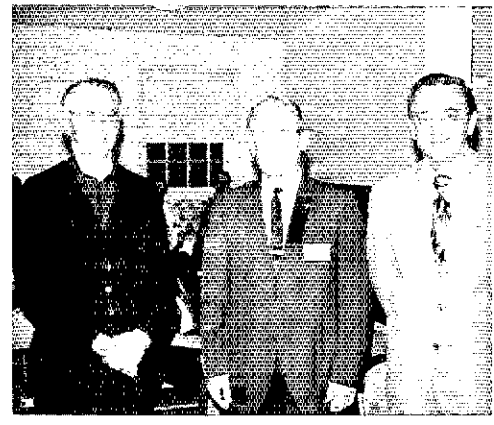
The term of J.R. Baker, W4LR, as QSL Manager for WA4/WB4/WN4 amateurs will end on January 1, 1976. Jake has been manager of this bureau since 1968; as W1JOJ, he had earlier served as manager of the W1 Bureau. Many amateurs have expressed praise for his conduct of this important volunteer task. Headquarters adds its warm thanks to Jake, his wife and his helpers for the time they have devoted to this work.

In keeping with League policy, an ARRL affiliated club, Sterling Park Amateur Radio Club, of P.O. Box 599, Sterling, Virginia 22170, has been appointed as the WA4/WB4/WN4 QSL Bureau for an initial term of three years. The manager is Terry Norman, WA4HPF.

Cards for amateurs having W4 and K4 calls continue to be handled by SPARC's neighbors, National Capitol DX Association, Box DX, Boyce, Virginia 22620.

And this is a good time to remind all amateurs: help your QSL Bureaus to help their fellow amateurs by keeping at least one self-addressed envelope with a ten-cent stamp on it (more if you get cards frequently) on file at the bureau handling your call area. Even if you don't particularly expect or want cards, this courtesy will help cut down on the Bureau's biggest problem – a backlog of unclaimed cards. QST

Strays



About 50 members and guests at a recent meeting of the Garden State Amateur Radio Association were treated to a three-barreled presentation on antennas. Jerry Sevick, W2FMI, *QST* cover plaque winner for "The W2FMI Ground-Mounted Short Vertical" in the March issue, expounded his latest on short verticals. Also in attendance and furnishing pertinent comments and data were Walt Maxwell, W2DU, cover plaque winning author of the current *QST* series, "Another Look at Reflections," and Bob Lewis, W2EBS, coauthor with Doc Brown of the 1937 IRE vertical "Bible."

Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

MISPLACED PRIORITIES

● With regard to the scholarly article on Electromagnetic Pulse in the September issue of *QST*, may I point out that within a very short time after the detonation of a nuclear weapon, there will be more fundamental issues at stake than the mere maintenance of communications. – *Peter Payzant, VE1APH, Lower Sackville, Nova Scotia.*

PARTLY PARTS

● I just finished reading the article on parts procurement in the August issue of *QST*. It seems to me that over the last few years I have read a dozen such articles in several different publications on the same subject.

I'm sitting here in the shack writing this and as I look around me I see 17 pieces of home-brewed equipment and only five that were factory built. What also comes to mind is that in all the time I was building the home-brewed stuff I never once had a real hard time in coming up with the parts to build them out of.

I can of course remember back in the 50's when one could pick up a catalog and order all the parts to make a piece of equipment out of the one catalog; we are never again going to be able to do something like that so I see no sense in even worrying about it.

I do have a lot of catalogs from several different mail order companies, however, and by ordering from several of them I have always come up with what I needed. I also don't know where everyone comes up with this $25 minimum order fee either; most minimum fees are $5 or $7.50 and just about any order will take care of that with today's prices.

I also find that by tearing apart old TV and radio chassis I get a small fortune of good usable parts.

The purpose of this letter is just to let you know that not everyone is having all that difficulty in finding the necessary parts to keep the soldering irons hot; it just takes a little more looking and time than twenty years ago. – *Wayne Letourneau, WBØCTE, N. St. Paul, MN*

● Many charming things have slipped into the past. There was the friendly local grocery store – a non-polluted fishing stream – a man and his family living off his farm – a ham who builds his own receivers. And now, there is a serious threat that construction of ham equipment will slip into the past – except perhaps for kits. Kits are fun but usually very little is learned about electronics and communications. Perhaps it's not important for hams to build equipment and certainly some sophisticated gear is best manufactured as the result of, and in accordance with, top engineering teamwork. But some equipment can and should be constructed by the ham for the skills and creativity required in home-brew construction. There is considerable personal satisfaction in constructing a device that works well and in some instances actually advances the art.

It seems very clear to the writer that radio amateurs are at a crossroads. Unless an active program is pursued to change the direction – if possible – the activity of radio amateurs in construction projects is headed straight down the road to oblivion. – *Loran R. Bittman, WN1UIE, Lexington, MA*

BRICKS AND BATS

● After a full year of membership in the ARRL, I still have yet to find a worthwhile article in *QST*. As for those articles that might have proved interesting, I am saving them so I can read them after I get my doctorate in physics. The rest of *QST* seems to always be crammed with a lot of garbage on contests and sweepstakes. I must say that I got hours of enjoyment from reading the lists of calls of a couple of thousand amateurs who made a few two-second contacts. I feel the whole League is geared toward those amateurs who are over 60. The only way to keep our frequencies and keep amateur radio is to get young blood into it. And the thought of learning Morse code does not turn on many young people.

After criticizing the League, you may be curious as to why I am renewing my membership. While I do not think that your magazine is worthwhile, I do think that it is important to have a ham fraternity to express the opinions of this small group. I would like to point out that one part of *QST* does sometimes come up with a good article. That is the Correspondence From Members. I particularly enjoy reading the criticism of my fellow amateurs. If this letter should by some mistake come to be printed, it will undoubtedly be surrounded by letters of praise and glorification for the League. – *Larry Scheck, WN2WNA, Brooklyn, NY*

● The only reason I am resubscribing is on the off chance that one of your technical or construction articles might possibly prove interesting or useful. Unfortunately most of your space is wasted on trivia such as contest results, etc. The only purpose that this serves is to boost the ego of someone whose call was printed three pages into the list, halfway down the page, and if he needs this to boost his ego, he's in a bad way. If you *must* report on contests, why not restrict it to one page (or less) per contest? – *Don Allison, WB4ZIU, Florence, AL*

● I realize the state of the art is quite advanced now with IC's, etc., but I strongly urge *QST* and ARRL to remember that ham radio is still, after all, a hobby, not a profession; and its members include amateurs with varying education and experience backgrounds.

I have a 2nd class radio-telephone license and an Advanced Class amateur license, but by profession I am an accountant. I, for one, feel *QST* articles are getting to be a little too heavy on advanced technology that few amateurs understand

or have a reason or time to learn. How about some more attention to the many amateurs who are not electrical engineering majors or electronics professionals! – *M.D. Collum, W5FZV, Dallas TX*

TEACHING AID

● I have used my radio gear in a general social studies classroom with great results in teaching geography, U.S. History and Civics. You may be interested in learning that a number of national education publications are interested in the use of ham radio in a social studies classroom. For example, the National Education Association periodical *Today's Education* will have comments in the November/December edition. I am presently drafting a manuscript for national *Social Studies Trends* publication.

I have received inquires from the PBS station in Miami, Florida, and have attempted to provide them with data for a special presentation on this subject. I also copied and furnished them with the May 1975 *QST* article "Amateur Radio Boosts Education" pertaining to the innovative program using Oscar satellites. I further invited them to write to the League asking you for audio/visual aids for their presentation.

I was extremely amazed at the tremendous success I had last year in using amateur radio as a supplemental teaching/learning aid but even more overwhelmed at the public response, both local and national. Your August 1975 *QST* editorial was especially timely in that the public's awareness and image of amateur radio has been boosted significantly. And, of course, the younger generation is being sold on amateur radio.

The excellent films you made available to me as well as the literature you provided to the students provided an excellent foundation from which I built the social studies-science lab in my school. – *Lou Hoekstra, W1TRB, Orlando, FL*

PHONE PATCHING CODE PRACTICE

● Just recently a friend of mine expressed an interest in becoming a licensed amateur. Naturally, I was happy to hear this and jumped at the opportunity to teach him the code. Unfortunately, he lived several miles from my place and daily commuting proved to be somewhat inconvenient – both financially and time-wise. Code tapes were considered but temporarily rejected due to his inexperience and incomplete knowledge of the code. To deal with the problem, I simply "allowed myself to be reminded" that the solution sat right in front of me – on top of my transceiver! Through use of the sidetone monitor, with the transceiver in the cw-receive mode and the antenna trimmer detuned to minimize noise, I was able to transmit code signals over the telephone by using the phone patch. Obviously, a separate code oscillator could be used just as well and no noise problems would be present at all. However, one was not available and the noise was essentially minimal.

Though I've never heard of this approach being used before, I'm sure that it's been practiced by other hams. I would simply like to remind the fraternity of its feasibility and testify that it's a great way to get together. – *Ken Taylor, K5PKU, Richardson, TX*

NEW STUDY GUIDE

● I thought you might be interested in a "find" I made the other day at my local Radio Shack store. It is a license manual written in the "self-teach" style, entitled: *From 5 Watts To 1000.* This manual starts out with Morse code and goes up through the General Class license.

My experience to date has been that persons who have no technical background find this book much easier to understand than other publications. I am currently using it, in addition to the ARRL publications, to teach some prospective Novices and have been very pleased with the results. I highly recommend this book to anyone teaching or studying for an amateur radio license. – *W. D. Rhodes, WB2JMX, Hilton, NY*

GOLDEN AGE DISCOUNT?

● I happen to be retired on a fixed income, and in these days of double digit inflation, it's just a question of priorities. There are so many places to put a given amount of money, after which one must stop. I think there will be other places next year which are going to take precedence over ARRL. Perhaps the chaps who can afford it will be able to carry on.

One suggestion might be for ARRL to establish a reduced membership for senior citizens who can meet certain requirements. I feel sure that in the long haul the results would be favorable to the League and to amateur radio at large.

The principle of lowering fees for retired persons is by no means new, and is worthy of serious consideration by the League. – *F. E. Batt, VE7BNZ, Rossland, BC*

A STATELY IDEA

● In your *QST* magazine, you have about five pages of Ham-Ads from a lot of states. How about putting all the ads from the same state together. That way it would save the old man's eyes, be more fun looking for bargains, and much improve the format. – *George Parsons, WB4BAB, Portsmouth, VA*

REACHING FOR IMPROVEMENT

● Just so we don't labor under any misconceptions about opposition to HR 7052, let me quote from correspondence I recently received from the Electronic Industries Association: "HR 7052 is a 'motherhood' bill, poorly written, that by itself won't solve anything. It does *not* have the support of the FCC, but was prompted by an activist within the ARRL."

They are correct that the bill by itself will not correct anything, but when properly implemented it could solve this problem that has been with us for many years. The pity of it is that when the manufacturer adds the necessary parts at a cost of about 55 cents, he will probably raise the list price at least ten times that much.

Since when does this trade association speak for FCC? We know they covet our frequencies for expansion of CB usage; do they want more CB linears on the air so interference with other electronic gear will increase? Whoever this "activist" that started this action is, I believe he deserves the gratitude of every licensed amateur. Let's support the ARRL RFI Task Force; send that letter in today! – *John P. Weber, Jr., K4JW, Melbourne, FL*

[EDITOR'S NOTE: For those that "came in late," HR 7052, dealing with Radio Frequency Interference (RFI), is discussed in *QST*: page 79, July; page 37, August; page 76, September; page 82, October.]

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Long time no hear from old buddy Grommethead Schultz so we dropped by and zinged his bell. The porch lights blinked "K". We bopped on in. Only nine P.M. and Grom was already in the sack. We found a seat in his messy bedroom and asked how come; were DX conditions so bad or had his sacroiliac snapped out again?

Schultzie said not really. He was just keen to finish a dream he had started last night. Meaning to find out how he manages this neat trick we demanded a fill-in. It was rated G. "I dreamed I was Howard Hughes, a brand new ham, with a huge bank balance and DX appetite to match. I had my checkbook out and was about to let my fingers do the walking through a stack of fancy radio catalogs. Then my stupid alarm clock went off."

We had to admit that the possibilities were intriguing. Would Howard start out modestly and trade up, say, once a week? Or would he go for (hah!) broke right away and skim the high-priced cream, nothing but the superbest? And just how high a tower to start off with – five hundred feet, a thousand? We had a terrific urge to rush home, hit the hay and break in for a three-way with Schultz and Morpheus. Grom said he wouldn't mind so long as we didn't hog the QSO. But then we recalled something out of a *QST* of long ago.

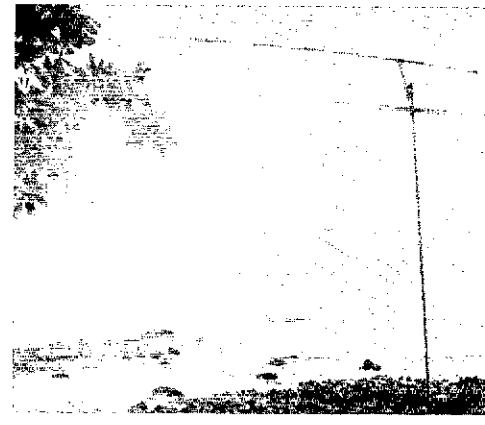
"Your're too late, Grom. Already been done. I mean Mr. Hughes once was one of us, trying his early DX wings as 5CY down Houston way. Oldtimers may remember his addressing the National Convention at Chicago in '38 as an ARRL member. That was the year he soared around the world in record time with the 20- and 40- meter aid of Ws 2UK 4DHZ 6CUH and other prominent DX hounds. Where were you?" Those were wasted nonradio YL-chasing days, Grom ruefully recalled.

Nothing is now more precious to ex-5CY than his privacy, we hear, a commodity hard to hang onto in high financial circles. We agreed that for all we know old HH may be back in there right now quietly slicing a share of 14-MHz pie. Real low profile, like maybe even with QRP and an underground quad.

* c/o ARRL, 225 Main St., Newington, CT 06111.

What:

40 PHONE has never been peppier but W/Ks almost have to stand on their heads to work the stuff. Mighty frustrating to tune around downband and hear pockets of rarish goodies working each other. Once in a while they split-tune the Yank band and sometimes they can be flagged down with cw but it's no picnic. Anyway, thar's DX gold in them thar hills of SWBC splatter. W9LNQ, WAs 2JZX 8LXJ, WBs 2EOO ØNOU and the literary DX grapevine report 7-MHz ssb action by As 2CCY 9XH 35AF, Cs 3HQ 9MJO, CE3s AKO EZ, CM3HG, CN8HD, CO2DC, CP5KYS, CRs 4BC 4BS 6GA 6ZB, CTs 2AE 2BN 2BP 2BS 3AR, DKs 2FW 4TP W5L/OHØ DL8FP, DM2AYK, EAs 6CS 8BW 8CR 8DI 8HA 9FB 9FC, EL7F, EP2SN, Fs 2MO 8WQ, FB8YC, FC6CLD, FG7s AN AO, FL8s DN OM, FP8DH, FR7s AK ZW, FYØBHI, Gs 2PU 3MWZ, GCs 2FMV 3DVC, GD3HQR, GI3OQR, GM5BCV, HA4KYN, HBØ AFI AZD, HCs 1MM 1PA 1WH 2TV 3WH 5GL 7BA ØARC, HH2WF, HIs 3FG 8HA 8MFP 8XAW 8XKP 8XRG, HKs 1CMX 1VT 4CCX 4DEG 4DHR ØBKX ØCOP, HP1AQ, HRs 1AHN 1GK 1MM 2BLP 2FVB 4SPR 6SWA, HV3SJ, Is 1GPK 3FIN 4BMJ, JAs 1DJL 1ELY 2EZD 3BG 3RRN 6YTU 7FTX 9APS ØSJA, JHØZBT, JWs 5NM 8IL, JYs 3ZH 9GR, KC4s AAC AAB USA USV, KGs 4DS 6RO, KL7s GD GKY IBG, KM6s EA EB, KP4s AN BCL EAK, KS6s FF SFA, KV4s FC FZ IJ, KX6LP, KZ5s BC BD BH OC, LUs 1ZA 2AFH 2FFD 3AHK 4AIW 6DTJ, LZ2KLC, OAs 1NDY 4AAM 4AB 4AFV 4ALC 4ALP 4OS 8CD 8V, OD5s BA CS IO, OEs 2WSL/5B4 5CA/YK 5KE 9HHI, OHs 2BM 2QV ØJN, OJØMA, OK3CED, ON6BC, OX3s OO CS, OY7BD, OZs 5KF 8BV, P29MJ, PAØGMW, PJs 2MI 2RR 8HS, PYs 1FI 2ELZ 2FFC 4BNU 6AHA 6TZ 7BVW 7CND, PZ5FB, SP9CV, ST2AY, SVs 1HU ØWJJ ØWKK, TF3s AW IRA, TGs 5NW 8IA 9DF 9ND 9PW, TIs 1K 2HMF, TR8s DG SS, TU2CH, UAs 9CBO ØYT, UC2IJ, UD6BR, UF6FAV, UKs 5MAF 6LAZ, UL7LEZ, UP2PAC, UQ2DV, UR2s DJ GU, VKs 2AHK 2AVA 2GO 2ID 2IP 2WC 3AH 3MR 3RE 3XI 3ZL 4AK 5PB 6HD 7CK 7GK 7LH 7MD, VO2AW, VPs 1FF 1IL 2AA 2AC 2DM 2EEB 2GHR 2LBX 2LL 2MCT 2MW 2SG 2SQ 2SV 2VZ 5GT 8NT 9AD 9CP 9HM, VQ9BP, VRs 1PE 4BS 4DX 6DX,



TI9FAG's rock-strewn QTH of the Month looks ready to spring a pack of pirate ghosts lugging treasure chests. Wonder what they'd make of the three-band two-element Yagi which also supported one end of the DXpedition's 160-meter dipole. More Cocos Island photography is to be found on a following page courtesy HB9AHL & Co.

VS6DO, VU2s AIK GDG, XE1s CCW CX QP, XF4A, XW8s HJ HP, YBs 7AAA 9ABX ØABV, YN1s AWH EWN MAB WB ZGR ZMS, YO3AC, YS1s DME JWD SC, YU1EXY, YVs 1AQE 1BI 5CKR 5ENN 5EUX 5MO 6CO 7GX, ZB2CF, ZDs 7PS 8MF, ZF1s BH MA, ZLs 1BIL 1CD 1TB 2AUJ 4BC 4BO 4KF, ZP5s AL AR CF VO, ZSs 4PB 6ADT 6ARS 6DN 6DW 6KD 6TL, 3As 2EE ØFY, 3B8CV, 3Ds 2RM 6AX, 4J9A, 4U1ITU, 4X4s JS QG, 4Z4HF, 5H3KA, 5B4ES, 5N2AAE, 5T5FP, 5U7s AH BA BD, 5W1AU, 5Z4OM, 6F8J, 6W8s DY FP, 6Y5DE, 7X2s ARA SMA, 8P6s CJ AH, 8R1s AG CB G, 9G1s DY GE, 9H1s AV ED, 9J2WR, 9K2AU, 9M2CK, 9Y4s NP T VT and 9X5VA. Europeans congregate mostly around and above 7050 kHz, other regions just below 7100. It's rough but better than zilch. Much more manageable under the circumstances is DX hunting on

40 CW where one can slide right up to targets. W/Ks with Extra Class honors really make out on 40-meter radiotelegraphy, most overseas beepers hovering just over the 7000-kHz brink. When things break wide open, however, Generals can seize a goodly share well above 7025. A substantial sampling offered by "How's" correspondents Ws 7YF 9LNQ, WAs 2JZX 3SWF 8YTL, WBs 2EOO 4ZVF 8FOS ØNOU, WNs 1UAW 6GKE, VO1KE and the aftmentioned periodicals of clubs, groups or individuals: As 2CCY 2CGX 4XFX 9XU, Cs 21JA 31HL 31HU 31IU 6ABB 6ABC 6ANP 9MCN 9MIZ 9MJO, CEs 2GL 3AVB 3AXP 7MQ 8AA 8AK 9AT, CMs 2FI 2RF 2RR 2VG 3HG 6AH 6OB 7GH, CN8s AQ CF, COs 2AA 2BM 2JA 2KG 2SM 5DM 5FS 5VM 6FA 6RCC 7CD 7RCB 7SG, CPs 1EU 5GK 5KYS, CRs 4BO 4BS 6AI 6AP 6CK 6IK 8AI, CTs 1QN 1QP 2AK 2AO 2BN 2BQ 3AK, CXs 1AAC 1BB 4AB 5CB 7AZ 7BQ 9BT, DJs 6SI/OHØ 6ZM 7MI 7OM 9IE, DKs 1NT 2FW 3XQ 4PE 6NN/C6 8SV, DLs 1DQ 1PM 6KT 8CM, DMs 2CMF 2CXE 2DBO 3YBF 4YUG, DUs 1ON 6RH, EAs 1FD 1EH 1IV 4BV 4ED 6AU 6DF 7WW 8BF 8FE 8FJ 8GP 8HJ 8HZ 8IQ 8LK 9EO 9EU 9FG, FIs 2CL 3CP 8BS, EL2FT, Fs 5IN 6ARC 6BEE 6BSU 6BWO 6CNI ØAHY/FC, FB8YC, FCs 2CH 9VN, FG7s AE AM AN AO AQ XJ, FK8s BU BV CD KAA, FMs 7WH ØBHI, FO8EG, FP8AP, FR7AQ, FYs 7AA ØBE ØBL, Gs 3FKM 3SZA 3VQP 3ZDW 5JL 6CJ, GCs 2CNC 2FMV 2LU 5BLG 5BLF, GI3s JEX USK, GMs 3YOR 4DKO 6RV, HAs 1XR 3KNA 6NW 8DE ØKLE, HBs 9AGG 9AYO 9BBL 9FP 9Q 9ZE ØAAL, HCs 1CW 1XG 2AF 2HM 5EE, HHs 2WF 5KL, HIs 3JEI 3PC 7RFM 8CNT 8NVA 8MFP 8RHM 8WR, HKs 1BCX 2DP 3CGX 3CTJ 4COK 4EX 5DGG 9EB ØAA ØBKX, HMs 1DH 1IG 1IJ 1TA 4HF 4HU 5GM 5HA 5HD, HPIs AH JC XYZ, HR1s AT KS, HS2s AIG AKO AKP, HR1s ATKS, Is 2BBH 2BZN 3FIN 4BNR 5YT ØAVC ØEA ØGKU ØHCJ ØPAB, IMØBVS, IS0s FPH PZR RNU, IT9s PUG WGI, JAs 1NLX 1TSA 1ZOS 2CG 2SYJ 3EA 3CJO 3KWJ 3RRN 5FBZ 5PL 6DCT 6HK 7AS 7CBA/JD1 7FHX 7IJ 8FSZ 9APS ØAT, JD1s ABZ AJZ YAA, JF1s COE DOG UVJ, JHs 1APF 1FIJ 2IPD 2YCF, JR1BRV, JTs 1AM 4KAB ØAE, JW5NM, JX2HK, JY9PP, Ks 2VUI/C6A 4BR/VP5 4OKZ/TI2, KC4AAD, KGs 4BE 6ARH 6JAR, KH6s AKX AT BTH BZF CF HC IJ, KL7s AMP DVE FA PI, KM6EB, KP4s DJE EAJ EBR EDQ TIN WL, KX6s BB MV, KV4s AA CI FZ IO, KS6s, FF SFA, KZ5s DX KP RS, LAs 1K 2B 5NM 7FJ ØAP, LUs 1ZA 2AHV 2DFX 2EF 3EX 6DKX 7KAT 7WAH 8AHW 8BAO 9CV 9FAZ, LX1BJ, LZs 1DL 1GC 1KDP 1KRA 1KSZ 1KVF 1YY 2AW 2KAF 2KDI 2KKK 2KMX 2KWR 2RI 2SC, M1C, OAs 2CD 4AHZ 4AJI 4AJO 4AMM 4J4O, OD5s IO JH LX, OEs 5CA/YK 5KE 9AHI 9BE, OHs 1KA 1KO 5YX 8RC ØMA, OKIs ATP DR FQL MBS, ONs 4FI 6JN 6VK, OXs 3DL 3OO 3RA 3XO 5BW, OY5NS, OZ1LO, P29s KE MJ PN, PAØ AAC CFW CVW KQC, PI1LC/mm, PJs 2JW 2VD 3SF 8AA 8AS 9JT, PYs 1DB 1DNS 1KMT 1MHQ 1NEW 2FFA 2FOS 2GV 2GVQ 3AO 3BOQ 3MU 4BNQ 5AUW 5CFK 5CHU 6AHA 7ADL 7AES 7AGS 7AZQ 7BEM 7BXC 7CHV 7CKI 7PO 8AKL, PZ1s AH AW, SMs 2EPE 3EAG 5AYY 6DHU, SPs 1ALK 2AX 3KEV 4HEO 4KGF 4SSQ 5GH 5KDV 6BYE 8GQU 8HPK 9BPF 9IHW, SV1DO, ST2AY, TFs 3AU 3AW 3IM 3IRA 5TP, TGs 4JR 4SR 9XM, TI2s BEV PZ, TU2s DD EF EV, TR8BJ, UAs 1CUM 2AVO 3AFL 3QBF 3RDY 4CBO 61A ØKAW ØLU ØSAS ØSDR ØUBH ØZBN ØZBP, UB5s DAE EDY FAQ IF JAR LI MCU MFU QBF ZAT ZBB, UC2s AAF OAF OQ RZ, UD6s DFY DHU DII DJX, UF6s FCE FCO FDO, UG6AD, UH8s DU YAA, UI8s ACC FAJ OK, UJ8s AB JCG JCL, UKs 1AAA 1AAG 1PAA 2GAC 2WWW 3RAD 5MAF 5MBQ 5QAC 6AAY 6DAC 6DRD 6LAZ 6VAA 7NAB 7NAQ 8ABD 9AAN 9CAE 9CCJ ØFAJ, UL7s AAL EAR JAK OF PBN WH, UM8s MAR MAS MBA MBD, UO5s GR OWB, UP2AW, UR2s AAK TAX, UT5s AA AB RF, UWs 4AK 6MP, UY5s LO LX, VE8OV, VKs 2AHK 2AIR 2AJ 2ALK 2AMB 2AX 3BFT 2BIL 2BZM 2EO 2FU 2GS 2IN 2KD 2OO 2QL 3BEH 3BS 3CF 3FC 3FH 3MH 3MR 3WU 3XI 3YD 3ZM 4HY 4NS 4QM 4XA 4UF 4UR 5FH 5HP 5LI 5LU 5MD 6HQ 6RF 6RS 6WT 7CM 7GK 7LH 7RY 7ZO 9RH, VO1KE, VPs 1FF 1LE 2E 2EEC 2DE 2GFA 2KK 2KX 2LAW 2LBH 2LL 2SAI 2SAH 2SL 2SPI 2ST 2VAS 2VL 5AA 5AH 5CW 8NN 9AD 9EJ 9HO 9HP 9HW, VQ9M, VRs 1AA 1PE 4BS, VSs 5DB 5MC 6DD 6GE 6HI, VU2s ABC RQ, Ws 2KGY/4X 6TJI/OA4, WA7UGF/KL7, WN6HMS/KC4, WS6FG, XEs 1BGM 1ENF 1EQ 1EXP 1FGB 1FR 1JMI 1PZ 1YA 2AAU 2GQ 2H 2MX 2QJ 2RLP 2VB, XW8HJ, YBs 9ABX ØADV, YK1KAS, YNs 1LED 1OC 1ZD 9FS, YOs 2ARV 4HW 5BEU 6MZ 8AHL 9AEL 9AG 9AVK 9DQ 9IE, YS1s AG CHE GWE WPE, YUs 1AG 1AJF 1AOT 1AW 1BCD 1BKL 1WXY 2CCJ 2CCM 2CDO 2CDS 3ACF 3CNO 3CYT 3DCD 3DMN 3DQ 3TKN 4EJC 4ELA, YVs 1ADT 1AOT 4AKI 4BE 4OW/7 5ANT 5AXX 5BNR 5CKR 5CVE 5TT, ZB2s A CJ CS FX, ZC4RH, ZDs 7PS 8DX 8TG 8TM 9FS, ZFs 1JV 1KV 2JS, ZF1s AU JE SB, ZK1DD, ZLs 1AMM 1AOO 1BLS 1CD 1PF 1ST 2ABZ 2AI 2AMP 2AUH 2BEN 2IJ 2JA 2KS 2MT 2OM 2TG 2RC 3ABV 3GG 3LM 3QX 4AW 4BC, ZPs 4AA 5AL 5CF 5EC 5RL 5TE 5VG, ZSs 1A 1NG 2A 2EM 2JL 2MI 4PB 5AP 5DE 5EL 5FY 6ABO 6AK 6ARS 6DN 6FY 6KD 6KO 6RH 6WRC, 3AØFY, 3B8DO, 3Ds 2RM 6AA 6AX, 3V8AC, 4Ks IC 1F 2AB, 4U1ITU, 4W1ZB, 4X4s CJ JS MK WF, 4Z4s BR GG IX, 5T5s CJ FP ZR,

KZ5WA closes down this Howard AFB barracks layout for return Stateside after 12,000 contacts in sixteen months. Howard should have WA8WWM back on the air in Michigan by the time this *QST* gets around.

TI9FAG was deployed from left, power plant, sleeping quarters and operations tent. The landfall view of Cocos Island was snapped from arriving transport. Other TI9FAG photos appeared here last month via W4VPD.

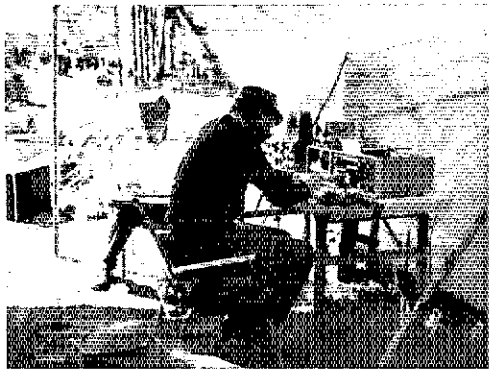
5U7BA, 5W1AB, 5X5NK, 5Z4s JE OM TT, 6W8s BL DY FP, 6Y5s DE SR, 7Xs 2ARA 4AN 4BW ØWW, 8P6s BU DW GN GP, 8R1J, 9G1s AA LZ, 9H1DV, 9J2s EA WR, 9K2DR, 9L1s JI JT, 9Ms 2AX 2CW 2CX 2RB 8ET 8HG, 9V1s OK OP SH, 9Y4s DS and TR. Forty easily rates some sort of ionospheric award for sticking around at night after 20 splits. But nowadays even 7 MHz gets the willies in the wee hours.

W h e n :

160 — METER DX diggers are toeing up for the annual 1.8-MHz Transatlantic Tests a top-band activity nurtured by W1BB and associates since the early 1930s. Again this season veterans are urged to watch primarily for 160-meter newcomers who will be crossing the pond on 1.8 MHz as "FTs," first-timers. Test sessions will be held this 1975-'76 season at 0500-0730 UTC on November 16, December 21, January 11 and February 8. W/K/VEs are requested to call CQ DX TEST or CQ FT DX during the first three minutes of 15-minute periods beginning on the hour, listening for 12 minutes, etc., until the DX ball starts rolling. Clock accuracy is a must. Europeans normally congregate in the 1825-1830-kHz "DX window," our side just above 1800. Remember, these Tests are not meant to be contests. . . . Westerners get their chance in another series of 160-Meter Transpacific Tests at 1330-1600 UTC on November 15, December 20, January 10 and February 7. JAs bunch up from 1907.5 to 1912.5 kHz, KH6s just under 2000 kHz, ZLs near 1875 and VKs just above 1800 kHz. Most DX will be tuning for Yanks from 1800 to 1810 kHz or so. . . . Kindly report Test results and other top-band DX developments to your favorite DX news source and/or W1BB. Stew offers a copy of his latest multipage 160-meter newsletter in response to your self-addressed stamped envelope. We intend to dwell on the 1.8-MHz theme at greater length next month, December being ARRL 160-Meter Contest time. Got all your copper hung for the fun?

W h e r e :

NORTH AMERICA — 'Alp! 'Alp! When bands drop dead, use your head, hunt cards instead especially those long overdue. If we all put our heads together maybe we can help each other with some toughies. The following parenthesized calls plead for a push in the direction of wallpaper from holdouts mentioned: (W7HPI) A35AF, DU3BS, HL9TG, KA8JN, KC6SK, KW6GO; (W7YF) FW8DA; (W9LBQ) OK1APV, 9E3USA '73; (K1RQE) P29s FH RJ; (K4IEX) FWØAB-VE6TP; (K6DR) AP5HQ '66; (WA1STN) VQ9R/d '72; (WA3DMH) HG5A, IZ3SRL, JT1AO, OH1AA, UJ8AC, VX2AB; (WA8GGN) EA9s EJ FE '68, FH8CG '71, HH2VA '68, JTØAE, KR6GM, '68, TR8s AH DG '67-'69, TT8AN '68, VS9s KRV MP '66-'67, YVØAA '73; (WA8YTL) VP2s EL VAS, 9M2RB; (WB2PCF) AX7SM '70, KR6UL '67, MP4BIA '70, UJ8AC '68, VQ9B '69, ZP3AB '66; (WB5IOQ) CEs 2EV 3LH, CO2BB, CX1NE, DM2AYK, HR2HHP; (WB8EOS) KC6SP and 4W1BS. Any clews for the needy? . . . VP2MCT specified QSLs via his new W6KXT address as published in the spring '75 *Callbook* supplement. (W9QUW) . . . After a year and a half on Andros isle as C6ABN I've returned to New Hampshire and will answer QSL requests from the home QTH. (WA1PZQ) . . . Much QSLing is frustrated by the fact that stations shut down without forwarding addresses, especially multioperated installations like those of U.S. military personnel overseas. I'd like to see "How's" make a special effort to pursue and publish such information. (K6DR) . . . To avoid the situation that WA8YTL describes – poor QSLing by individual operators of club-type stations — it is our policy at University of Michigan's W8UM to have one person accept responsibility for confirming all contacts. For the past two years this job has been mine and thousands of cards have been answered. The policy is prominently posted in the W8UM shack. (WA8GGN) . . . We have it that W4MYA can confirm ZF1VW QSOs for this June and thereafter. (VERON) . . . Those XJs and XNs are VEs and VOs respectively, remainder of callsigns the same. (SCDXC) . . . Accumulators of International Reply Coupons are not happy to learn that the old-style jobs will not be usable after the end of this year when a new IRC model takes over. Some of the DX gang hold fistfuls. (WCDXB) . . . Those 6D stations are XEs operating commemoratively. 6D1LLS is XE1LLS, etc. (DXNS) . . . I'm willing to act as QSL manager for overseas DX operators, the rarer the better. (WB6CEI) . . . WB8ABN signed ZF1CW in 1969 but points out that the call has since been reissued to K4SHB, a switch not yet indicated in the *Callbook* (K4WVT) . . . W/Ks QSLing KZ5 stations seem generally unaware that the Canal Zone must use its own postage. Self-addressed envelopes bearing U.S. stamps are not usable. Anybody still needing my KZ5WA card can now reach me at the address in the roster to follow. (WA8WWM/8) . . . With a fresh stock of cards on hand I assure all seekers of KV4IF QSLs thorough response to mail received direct or via the ARRL Bureau. (W2AAF) . . . Now "QSLers of the Month" applauded in "How's" mail from Ws 4LVP 7HPI 9LBQ, K4WVT, WAs 3DMH 3UPX 8YTL, WBs 4KTR 5IOO 8EOS VO1KE and one



SMs 7BGD and 5BNJ, here logging and operating in this year's Swedish field day, have teamed up for the event twenty times. They acknowledge radical changes in radio equipment that has accompanied them over two decades but their original 500-watt Onan generator is still going strong.

anonymous contributor, all for unusually snappy card comebacks: A35AK, CE0AE, CR4BS, DM2s BJD BPF, DUs 1REX 2EL 6BG, ELOP/mm, G3IAD, HKs 3DMD 0BKX, HL9s KZ TO, IS0SHU, JA0JR, KA6s BN GN, KH6HJF, KL7AIJ, LU4CW, M1C, OE5CA/YK, OJ0AM, P29s AJ FV,PJ9CDC, PY1MB, SV0WZ, TJ1AW, VP5MD, VR1PE, VS5MC, VU2ABC, W1AW, W6GBY/6Y5, WB4SHB/C6A, XP1AA, YB0ABV, YJ8BL, YS1SC, ZP5XU, 5W1AR, 5Z4LW, 6W8EX, 9I2BL, 9M8VLC, 9N1MM and 9V1SH, as well as QSL tenders Ws 3HNK 3KVQ 4MYA 6NJU 7PHO, Ks 4MPF 6DZL, WAs 3HUP 7LFD 7PEZ 7RFH, DK5JA, G4CHP, I4EAT, OEs 3NH 5REB and ON5YL. Any rapid repliers in your file?

EUROPE — About QSLing by U.S. hams in Germany, it appears that the DL5AY bureau no longer functions. I found four or five thousand incoming cards collecting dust there. The regular DARC QSL Bureau is recommended. We of the Wiesbaden club are taking it upon ourselves to try to clear as many of the stalled DL5AY collection as possible. Will Americans who operated in Germany since 1970 kindly supply their present addresses to me at Box 4744, APO, New York, New York, 09633, including DA-DL calls and periods of operation? We'll respond with claimed QSLs postpaid. (DA1DS) . . . U-stations do an excellent job via bureaus. I've received 135 cards from Russian amateurs in the past eighteen months for contacts made in the past two years. (W3OJS) . . . I hold the complete logs of PA9AAN (JA1OGX) and can issue his QSLs via the JARL and ISWL bureaus. Cards for 9M2BZ (JH1LKO) are similarly handled by JA1VDJ. (JA1RUJ) . . . Contest QSOs with 4U1ITU on September 13-14, 1975, may be confirmed via DL7RT through the DARC bureau. Direct response is available if self-addressed envelope and IRC are sent to my Berlin address. (DL7RT) . . . No logs from EA6BG since June, 1974, according to QSL manager W1RLV. Try your luck direct. (WCDXB) . . . New bureau address serving Switzerland and Liechtenstein: USKA QSL Bureau, P.O. Box 9, 4900 Langenthal, Switzerland. (VERON) . . . Romanian amateurs switch tags from YO to YR on occasion, YR3KAA being YO3KAA, etc. Likewise in Yugoslavia where YZ is a recent YU fad. The U0 label lately represents Russian polar expeditionary installations in the far north. Those ONT chaps you may soon see in the *Callbook* are vhf-only types. (DXNS)

OCEANIA — VR1AT advises he will be signing VR8A, location unchanged, after the first of the year when the Ellice group separates from the Gilberts and becomes known as the Tuvalu Islands. (JDXRC) . . . KJ6CF operator Duncan can be reached for QSL purposes via WA6QFO. (DXNS) . . . I have the logs of KS6DR and W7JK/KS6 for QSOs from the summer of 1970 to the summer of '72. Anyone still needing a QSL should try my *Callbook* QTH. (WA7SHW) . . . As a faithful fifteen-year reader of "How's" it's time I contributed to its pages. I'm handling the QSLs for K1MTJ/KG6-KG6JFY, self-addressed stamped envelopes only. Those not interested in direct replies should QSL Joe via the KG-6 bureau. (K1RQE) . . . Operator Marty of school station KS6ET will accept QSLs for his own QSOs via Box 581, Pago Pago. (DXNS) . . . As of September 10, 1975, and until further notice I'll be acting as QSL manager for 3D2AJ. (W6SC) . . . VR1AA contacts after August 7, 1975 can be confirmed by JA0CUV/1 at his Tokyo address in the listings to follow. (DXNS)

ASIA — The Korean bureau forwarded a batch of QSLs unclaimed by former HLs 1AH 1HJ 2CJ 3DP 4XX 5YIG 7GHF, HL9s BH BT HL EJ ID KC KE KG KH KK KQ KW OE PT QY ST TA TB TL TT UH UI UO US UU VB VC VF VH VI VK VL VM VO VR VT and VV. Will the operators of those stations please advise us of their present whereabouts? (WB2CHO, Membership Services, ARRL Hq.) . . . My management of VU2JE QSLs holds only for contacts with the U.S.A. and Canada for the present, s.a.s.e. or s.a.e. plus International Reply Coupon required. (WA7MUY) . . . After a tour as OA4DX I'm now operating 6P2OD in Tehran. QSLs should go via the Iran bureau, or to K4OD direct or via the ARRL Bureau branch for Fourland. (K4OD) . . . W1YRC stresses that his XV5AC QSL management includes only QSOs by op Chester before May 18, 1974. Contacts after that date by operator Robert Kegley may be confirmed via K4ASL. (K4WVT) . . . Thanks to DM3YBF here's a breakdown of HK

LA5QK gamely tackles tabulation of 1040 log entries received for a recent Scandanavian Activities Contest sponsored by Norway's NRRL. Enter those DX tests offered by overseas societies, gang, if you would have their members participate in ours. DX contests with insufficient DX are draggy affairs. *QST*'s regular "Operating Events" feature provides participation particulars for such activities as received and compiled by ARRL Deputy Communications Manager W1YL.

prefixes in rarish Russian regions: UK6C-D-K, UD6; UK6F-O-Q-V, UF6; UK6G, UG6; UK8B-E-H-W-Y, UH8; UK8A-C-D-F-G-I-L-O-T-U-Z, UI8; UK8J-S-R, UJ8; and UK8M-N-P-Q, UM8. (VO1KE)

AFRICA – Stations still needing QSLs for my more than twelve thousand Sierra Leone QSOs may consult manager W3HNK or contact me direct at my new California address in the following roster. (K4ZIN/6, ex-9L1JT) . . . The 5L tag often substitutes for EL in Liberia, 5L2FU being EL2FU, etc. (DXNS) . . . W1YRC expected TT5AC QSL stock from the printer by early September, output to follow. (WCDXB) . . . W4VPD confirms that he still manages CR3AH QSLing but reports logs running very late. (K4WVT)

SOUTH AMERICA – HC8GI responds well if supplied with mint Ecuador postage, not IRCs, and is also confirmable via manager W3HNK. (K4WVT) . . . YV5MO rushed back his card by direct airmail in answer to mine via the RCV bureau. QotM! (K4WVT) . . . Here comes your monthly QTH directory but remember that specifications are not necessarily either accurate, complete or official. . . .

A2s CRH GTF, P.O. Box 516, Gaberone, Botswana
CT1LV, P.O. Box 32, Oeiras, Portugal
FK8CJ, Box 42, Noumea, New Caledonia
FO8EL, J. Thomas, Box 2630, Papeete, Tahiti
G3LQP, R. Brown, 11 Fircroft cl., Tilehurst, Reading, Berks., RG3 6LJ, England.
G3NWQ, M. Caplan, 3 Malvern rd., Liverpool 6, England
GD5s AVR BLG (via DJ5UA)
HM0 CPO Box 1189, Seoul, Korea
HR1HD, Box 698, Tegucigalpa, Honduras
ex-HS2AKP, D. Pugh, K7VAY/6, Box 4023, Beale AFB, California, 95903
HS5AKW, P.O. Box 59, Chiang Mai, N. Thailand
I1WIJ, R. Soro, c/o Laminatolo, I-10050, San Didero (Torino), Italy
IH9s LAW XGQ (via IT9RAN)
IL7s ECV FUD, P.O. Box 4073, I-20100, Milan Italy
IT9SKO/IG9 (via IT9PUG)
IZ9AZS, P.O. Box 10, Trabia, Sicily, Italy
K1MTJ/KG6 (via K1RQE)
KZ5TC, Box 32, Gamboa, Canal Zone
LZ1CY/6W8/mm (via LZ1KSP)
PA9s TY YK (via DL0GC)
PY1ZBV, RM1 R. Kopplin (WA9EOO), NCTG Rio de Janeiro, New York, New York 09676
SV4IPT, RAUNG, P.O. Box 483, Thessaloniki, Greece
SV0WKK, Maj. T. Edler, P.O. Box 658, APO, New York, New York, 09291 (or via WA6AXY)
TY4H (via USKA, attn. HE9IJZ)
UK6CAA (via CRC, attn. UD6DFV)
UK7s NAB NAQ (via CRC, attn. UK7NAA)
VK5BS/YJ8 (to VK5BS)
VP2s DAJ DAL MAC MF (via VE3LSS)
VP9HP, D. Crooke, P.O. Box 1196, Hamilton 5, Bermuda
VR1AC, J. Dudek, Box 1158, Canton Island, 96736
VS9MDR, Sgt. D. Roberts, Sgts. Mess, RAF, Gan Island, BFPO 180, England
VU2DX, E. Saifudeen, 103 Eighth st., Gandhipuram, Coimbatore, 641012, India
ex-W7HJK/KS6 (via WA7SHW)
W7VAQ/HK2, S. Lee, Apto. Aero 222, Rio Hacha, Colombia
WA6WTD/KL7 (via WA6RUS)
WA8UZZ/4X (via IARC)
WB5LSU/CE3 D. Edger, Casilla 27-D, Santiago, Chile
WB8QMG/HK9 (via W8VHY)
XE1APA, P.O. Box 329, Merida, Mexico
YJ8DV, P.O. Box 179, Santo, New Hebrides (or via ZL3OJ)
YN7MHW, M. West, Box 327, Managua, Nicaragua
ZK1CS, W. Swoboda, P.O. Box 19, Rarotonga, Cook Islands
5Z4RT, P.O. Box 14425, Nairobi, Kenya
9L1AP, Box 673, Freetown, Sierra Leone
ex-9L1JT J. Trousdale, K4ZIN/6, Apt. 105, 159 S. Allen, Pasadena California, 91106

A35AG (via W6KNC)
A4XFX (via G3KQL)
A4XVH (via G3ZZN)
A6XR (via G4CHP)
C31EQ (to F5EQ)
C31GN (via DK3SF)
C31JG (via DK2BI)
C31JI (via DJ9EV)
C31JN (to EA3NE)
C6ABN (to WA1PZQ)
CT2BP (to WA6GKJ)
EP2OD (to K4OD)
EL0L/mm (via SM6NT)
F0BKI/p (to I2YDX)
FP0FC (to F6CED)
HB0ARC (to HB9ARC)
HL9VR (to WB4ZKG)
HS2AKO (to K3ZXL)
IF9EIS (via I1WIJ)
IH9KLV (to I0KLV)
JT0AE (via OK1AQW)
KC6CG (to WA2MPE)
KC6MW (to K7DDY)
KG6JFY (via K1RQE)
KJ6CF (see text)
ex-KS6DR (via WA7SHW)
KS6ET (see text)
KV4IF (to W2AAF)
OJ0MJ (to OH5MJ)
OX5BW (to WB8ONA)
PA9AAN (via JA1RUJ)
TA2SA (via DJ0ZG)
VP2MCT (see text)
VP2VC (via W9BNH)
VP5MC (to W4ZMQ)
VQ9Z (to WA6HNQ)
VR1AA (via JA0CUV/1)
ex-VS5MC (to G3NWQ)
VS5MG (via MARTS)
VS6DO (via K4CIA)
VU2JF (see text)
YR0A (via YO3KAA)
ZB2FX (to G3RFX)
ZD8AA (via W4USN)
ZD8TM (via ISWL)
ZF1AL (to WA4SVH)
ZF1VW (see text)
ZK1BS (to VK5BS)
3B8CD (via JA3DYU)
3B9DA (to 3B8DA)
3D2AJ (via W6SC)
4U1ITU (see text)
5A2NB (via IT9LR)
5L2FU (via SM4GTK)
5L4D (via WA5ZWC)
5L7F (via DJ5KH)
8P6GK (via G3ZPW)
9J2MH (via VE3AUM)
9L1JM (via W4BAA)
9M2BZ (via JA1VDJ)
9Q5SW (via JA8JN)

For the preceding rundown you should be grateful to Ws 1CW 3AG 4LDD 7HPI 7YF 9LNQ 9QUW, Ks 1HK 2YFE 4WVT 7VAY, WAs 1SQB 1STN 2RUD 3UPX 8YTL 9EOO, WBs 2GMV 4KTR, VE3MH, VO1EK, I2CBM, PY1ZBV, Columbus Amateur Radio Association *CARAscope*

(Continued on page 132)

PY1PY finds the DX game valuable realization between tense periods of surgical duty. Dr. Jack radiates from the Rio suburb of Niteroi. *(Photo via W3HNK)*

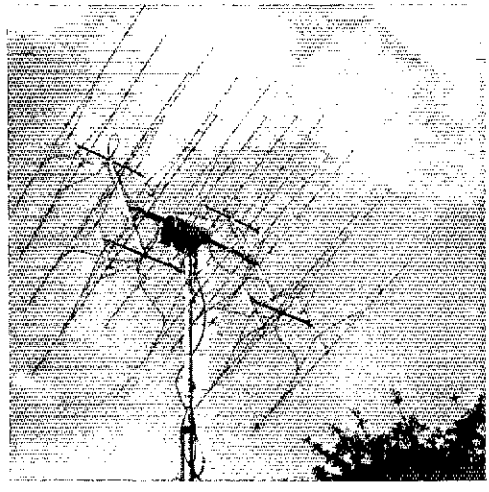
The World Above 50 Mc.

CONDUCTED BY BILL TYNAN,* W3KMV

AT THE recent Reston convention, a number of talks and equipment displays held special interest to those inhabiting the world above 50 MHz. Presided over by Tom Clark, WA3LND/WØIUF, the space and EME forum featured presentations by Bob Haviland, W4MB, and Chuck Dorian, W3JPT, on planning for the 1979 WARC in the frequency range above 27 MHz. What's ahead for Amsat was forcast in a discussion of Amsat's Phase III program by Jan King, W3GEY.

These plans include a satellite in a highly elliptical orbit which will put it in view of the entire northern hemisphere of the earth for hours at a time. Jan informed the assemblage that the question of up and down links for the Phase III spacecraft has been resolved in a way that should please everyone. Two transponders will be flown. One will receive on 2 meters and transmit on 70 cm, while the other will be the reverse. The two will be operated at different times under control of a microprocessor which will be aboard the satellite. Jan said also that work is underway to construct a 2 to 10 transponder and other modules which could be placed in a frame to form a satellite in a relatively short time if it should become necessary to replace Oscar 7. It is felt that, for the next five years at least, a satellite with 2 and 10 capability is necessary to support the ARRL Education Program as well as to provide amateur satellite exposure for the majority of the world's hams. The use of amateur satellites as teaching tools was illustrated in talks by Donna Cook, Marty Davidoff, K2UBC, and Al Katz, K2UYH.

* Send reports to Bill Tynan, W3KMV, Box 97, Burtonsville, MD 20730 or call (301) 384-6736.



The 70 cm EME array used very successfully at F9FT. Sixteen 21-element Yagis are connected with a "series parallel" matching system.

Experimentation in Radio Astronomy

The session's moderator, Tom Clark, WA3LND, presented a fascinating paper on radio astronomy for the radio amateur. A radio astronomer by profession, WA3LND reported on measurements which he made using his regular 2-meter equipment at his surburban Washington location. His theme was that we are missing out on some interesting experimentation by not paying attention to the signals which are continuously arriving from the deep reaches of space.

A little closer to home, but space related nevertheless, the subject of EME communication was addressed by a group of hams well-known in this pursuit. Dave Olean, K1WHS, and Dana Huhn, W4DFK, gave the attendees an idea of what it takes to make EME contacts on 2 meters while Al Katz provided some of the moonbounce secrets applicable to the 70 cm band.

Bill Hook, W3QBC treated the unpleasant but important subject of biological hazards from high-power transmitters. Bill's message was, "Be careful." He stressed the need for good shielding and antennas located well away from places of habitation. "Get it up and in the clear," he stressed. Fortuitous that both of these precautions are two of the most important steps to be taken for the best station performance.

Equipment Displays Viewed

In the equipment line, the Kenwood TS 700, 10 watt ssb, am, cw, fm 2-meter tranceiver along with a similar unit from Yaesu, the Model 221, looked very attractive. ARCOS was there with its commercial version of the well-known K2RIW 70 cm kW amplifier as well as special packages for working Oscar 7's Mode B, 70-cm to 2 meter transponder. Also on display was the KLM Echo 2 ssb, cw 2-meter tranceiver and the soon-to-be-available companion rig for the 70-cm band. The new ETO Alpha V74 high-power amplifier for 6 and 2 was especially interesting to many vhfers attending the Convention. Spectrum International and Vhf Communications also had displays of interest to those who operate the bands above 50 MHz.

No Answer? Try Again

The telephone number listed at the bottom of this page normally has an answering machine

connected to it. Unfortunately, several months ago the device malfunctioned and was returned to the manufacturer for repair. As luck would have it, the package failed to arrive at its destination. It is expected that all will be back to normal by the time you read this. We offer our apologies to those who have called and received no answer.

EME Standing

The promised EME box is appearing for the first time this month. It is obviously incomplete with many stations known to be active not listed. It does, however, contain all of the information provided. Possibly, its appearance will spur those not listed to send in their information. Please include number of different stations worked, number of states and number of countries. The U.S. counts as a country. There are also a number of past moonbounce accomplishments which should be listed. Help is solicited in compiling these records for inclusion the next time the list is presented.

On the Bands

50 MHz

The 1975 6-meter season went out in a blaze of glory. Usually rather mediocre, August this year produced many good openings. Some reports even characterize it as better than July. WA2TPR of Liverpool, NY, reports openings Aug. 1, 3, 5, 6, 9, 10, 18, 20, and 28. Carroll notes that the 20th was particularly outstanding. His complaint is, however, that there's no one around to talk to when the band is closed. Maybe the 2030 schedule plan mentioned earlier will help. K7ICW, Las Vegas, caught band openings on 7 days during August with the 10th producing signals from TG9KJ as well as U.S. call areas 4, 5, and 7. K2ZRJ in New Jersey was heard on the 23rd which is pretty late in the year for double hop. Al feels that the opening on the 10th was one of the best of the year with double hop stations from Maine coming in like locals. He also notes working K7CAZ, Seattle, who was using a 2-watt handi-talkie. WIHDQ agrees with K7ICW about that opening. Ed says that he has never before heard such a long and steady double hop opening so late in the season. Most of the far western states, with the exception of Washington and Oregon, were received at his QTH near Hartford. WIHDQ notes that the opening came at a time when the largest display of sunspots seen in recent years was spread across the solar disk. Two groups of spots, estimated to be over 60,000 miles across, were plainly visible.

This same opening was kind to several western stations. K7TUO and K7GWE worked KH6GRU, apparently after hearing the KH6EQI beacon and placing a call to alert KH6GRU to the opening. This makes 50 states for K7GWE who is now awaiting his award. K7TUO says that he also has worked all 50, but still needs a card from Delaware before being able to claim a WAS certificate. On the subject of 50 MHz WAS awards, certificate numbers 128 and 129 were recently issued. Number 128 went to Bud Evans, WB6UWY, on August 18 while 129 was dispatched August 25 to Joyce Seguine, WA6KLR. Congratulations are in order to both of these vhf operators. I guess we Easterners will have to move to the West Coast if we are ever to collect that particular piece of wallpaper!

WIJAA, well-known to the 70-cm gang, has been trying his hand at 6 meters this summer. Joe reports working his 35th state in the form of

2-METER STANDING

K1HTV	36	8	1310
K1ABR	35	8	1478
W1AZK	34	8	1412
WA1FFO	34	9	2624
K1WHS	33	10	10749
K1UGQ	30	8	1370
W1VTU	29	8	1296
K1BKK	29	8	1275
W1JSM	29	8	1100
K1PXE	28	7	1250
W1FZA	28	10	2750
W1AAI	28	7	——
K1MTJ	26	7	1250
W1FZA	25	9	2750
W1HDQ	24	7	1040
K1RJH	22	7	1450
K2RTH	39	10	2590
W2AZL	38	9	2500
W2NLY	37	8	1300
W2CXY	37	8	1360
W2ORI	37	8	1320
W2BLV	36	8	1150
WA2FGK	33	8	1340
W2CUX	33	8	1334
WB2WIK	32	8	1080
WA2BIT	31	10	10,000
WA2CJK	31	8	1160
W2CRS	30	8	1270
K2EVW	29	8	1232
K2CEH	29	8	1200
W2CNS	27	8	1150
K2DNF	27	7	1200
WA2PMW	25	7	1245
WB2SIH	25	6	1000
WA2UDT	24	7	1020
WA2EMB	23	6	1335
K2BWR	23	7	1350
W2DWJ	23	6	860
K3CFY	37	8	1237
W3RUE	36	8	1250
W3BHG	36	8	1260
WA3QVN	33	10	——
WA3TMZ	30	9	2410
W3BDP	30	8	1225
W3LNA	27	8	970
W3OMY	26	8	800
K3CFA	25	8	1200
W3TMZ	26	9	2410
K3QCQ	24	8	1000
W3ZD	22	8	950
W3TFA	21	8	1342
K3OBU	21	7	930
K4GL	40	10	2340
W4HJQ	39	9	1150
K4IXC	38	10	4850
W4WNH	38	9	1350
W4HHK	38	9	1280
K4EJQ	37	8	1125
W4VHH	36	8	1125
K4VW	35	8	1440
K4QIF	35	8	1225
W4FJ	34	8	1150
WA4CQG	34	8	1170
W4ISS	31	8	1000
W4AWS	29	8	1350
W4DFK	28	9	2400
K5BXG	44	10	4500
W5ORH	44	10	1715
WA5UNL	42	10	1725
W5UGO	43	10	1398
W5ORH	42	10	1507
W5RCI	42	9	1289
W5WAX	39	10	1370
K5WXZ	38	10	1450
W5HFV	38	10	1285
W5AJG	33	9	1360
W5UKQ	33	9	1290
K5VWW	33	10	5200
W5LO	32	7	1325
WB5LUA	30	8	1456
K5PTK	29	9	1330
WB5BKY	28	9	1407
W5SXD	25	6	1265
W6PO	32	10	8000
K6QEH	18	7	5500
W6GDO	18	5	1326
W6WSQ	16	4	1390
K6QEH	13	4	2580
K6HAA	13	4	2580
K6JYO	13	4	1240
K6HMS	11	4	1258
WA6JRA	6	3	2591
K6GAO	5	4	1276
K7NII	29	8	2289
W7JRG	28	6	1320
WA7BBM	20	7	2175
WA7KYZ	18	10	6000
K7ICW	18	4	1278
W8KPY	42	10	2050
K8AXU	38	8	1275
W8IDU	36	8	1150
W8YIO	36	8	1100
W8IDT	36	8	1150
K8DEO	35	8	1200
K8HWW	34	8	1164
WA8PIE	32	8	1000
W8NOH	31	8	1165
WA8LLY	28	8	820
W8TIU	24	8	1000
W8KBC	24	7	900
K8ZES	22	8	675
W9YYF	43	10	4500
K9UIF	43	9	1575
K9UGD	42	9	1300
W9AAG	41	9	1200
K9AAJ	41	9	1200
W9OII	37	8	1075
W9BRN	36	9	1260
W9PBP	34	8	820
K9HMB	33	10	1820
K9UNM	33	8	930
K9KQR	31	8	1105
K9UYK	29	9	1600
W9JDJ	29	8	1000
K9OXY	24	8	1082
KØMQS	46	10	10605
WAØCHK	44	10	1650
WØLER	44	9	1440
WØDQY	41	9	1300
WØLFE	40	9	1100
WØRLI	39	9	1293
WØEMS	34	10	1320
WØPW	35	9	1380
WØENC	35	9	1360
WØLCN	34	9	1100
WØPMN	30	9	1244
WØDRL	27	9	1295
WØMJS	26	8	1118
VE1ZN	7	2	500
VE2DFO	41	10	10600
VE2YU	32	8	1200
VE2BZD	23	7	1309
VE2HW	18	6	800
VE3ASO	38	9	2140
VE3BQN	37	8	1250
VE3EZC	33	8	1283
VE3AIB	29	8	1340
VE3EVW	29	8	1100
VE3EMS	27	10	1100
VE3DSS	27	8	1200
VE3CWT	27	7	1072
VE7BQH	12	3	7920
KH6NS	3	2	6000
SM7BAE	1	1	11055
VK3ATN	4	4	10417
VK5MC	3	3	10000
ZL1AZR	2	2	11055

Figures are states, call areas, and best DX in miles.

220 MHz (1-1/4 Meter) STANDING

WA1MUG	15	5	450	W2DWJ	16	4	570
K1PXE	13	6	700	K2OVS	15	5	734
W1HDQ	13	5	450	K2YCO	15	6	675
K1JIX	12	4	600	K2LGJ	14	7	650
W1JAA	12	6	2670	K2YCO	14	6	675
W1AZK	10	3	375	W2CNS	14	6	525
K1BFA	10	3	225	K2BF	11	4	325
K2CBA	19	7	2650	WA2EUS	10	4	330
W2DWJ	15	5	740	W3RUE	20	7	850
W2CRS	14	5	600	K3IUV	18	5	720
K2RTH	13	5	960	W3HMU	16	5	700
K2DNR	13	5	600	W3TMZ	15	5	400
W2SEU	13	5	325	W3OMY	11	7	850
W3UJG	14	5	460	W3CJK	10	5	450
W3RUE	11	6	480	W3UJG	9	4	400
K3IUV	11	4	340	K4QIF	23	7	1065
W4UCH	9	5	543	W4NUS	22	8	2400
K4IXC	5	3	1115	W4FJ	22	7	995
K4GL	4	2	485	K4EJQ	20	7	800
W5RCI	10	5	910	W4HJZ	15	5	560
W5ORH	6	4	1178	K4SUM	15	5	462
W5AJG	4	2	1050	W4VHH	15	4	750
WA5MFZ	3	3	1100	K4GL	11	5	720
WB6NMT	10	6	2650	K4NTD	9	2	963
W6WSQ	6	4	1178	K4IXC	5	2	800
W7CNK	6	3	923	W4AWS	4	2	750
W7JRG	5	3	959	W5RCI	19	6	880
K7ICW	4	2	250	W5ORH	15	5	1200
K7HSJ	3	2	400	W5AJG	9	3	1010
W8PT	11	6	660	W5LDV	7	2	950
K8HWW	11	6	550	W5GVE	7	3	963
K9HMB	20	9	1785	K5LLL	6	2	860
WØPW	14	6	1600	W5UKQ	6	2	590
WAØQLP	4	2	923	K5UGM	5	2	956
VE2YU	8	3	300	W5SXD	5	2	850
VE2HW	5	2	325	WA6HXW	6	4	7500
VE3AIB	7	4	450	W6DQJ	4	2	360
420 MHz (70 cm) STANDING				K7ICW	4	2	225
				W7JRG	3	2	420
K1PXE	18	7	1210	K8DEO	24	8	775
K1HTV	17	5	610	K8UQA	25	8	6500
W1AJR	16	5	680	W8YIO	22	7	650
W1SL	15	7	2600	W8HVX	19	7	660
WA1MUG	15	5	740	W8CVQ	13	7	625
K3EAV/1	14	6	700	W8MNT	13	7	600
K1BFA	13	5	710	W8RQI	10	6	425
K1JIX	13	5	620	WA8VHG	10	6	625
W1JAA	12	6	2670	W8QOB	8	5	500
	12	4	410	W8FWF	8	5	450
WA1JTK	11	4	715	W9WCD	22	9	1725
W1HDQ	11	4	380	K9HMB	21	8	836
K2UYH	24	9	2500	WA9HUV	19	7	780
K2ACQ	24	8	925	W9JIY	15	6	550
W2AZL	21	7	1000	W9AAG	15	5	800
K2CBA	20	8	2670	K9AAJ	12	5	425
W2CLL	20	6	790	WØDRL	24	9	1425
K2RIW	19	6	812	KØTLM	19	6	1250
K2VDK	18	6	750	WØLER	18	6	1000
W2OMS	18	6	725	WØPW	15	5	1700
WA2EMB	18	6	720	WØLCN	13	4	700
WA2FGK	17	6	745	WØYZS	9	4	8000
K2ARO	17	6	740	VE2HW	6	3	750
W2BLV	17	6	732	VE3DKW	19	7	940
				VE2EVW	11	6	520
				VE3AIB	9	5	600
				VE3EZC	7	5	510

Figures are states, call areas, and best DX in miles.

WA7KYM, Wyoming. This was done in one month's time using 15-watts input.

What we all hope will portend good things to come was observed by WA5IYX, San Antonio, TX. On Sept. 9 and 11, Pat heard Spanish speaking signals up to about 46 MHz. Unfortunately, CQ's on 6 brought no results.

144 MHz

The Perseids appear to have been better than initial comments would have led us to think. Numerous reports cite working a half dozen stations or more. WØPMN submits the following list: W4WDH and W4ISS, GA; WB6NMT and WB6OKK, CA; WA4CQG, AL; WA8MEC, MI; WA3QVN, MD, WA2BIT, WA2CJK, and K2RTH, NY; W8KPY, OH; and VE3DSS. Bill says that many of these were on random CQ's. WB5LUA comments this year's Perseids were an all or nothing at all situation. Either you heard nothing or you heard strong bursts. Al's list of stations worked is : W3BHG, DE; W7JRG, MT; K6QEH, CA; W9SKD, IL; and W8BKI, WV. All were new states bringing Al's total to 35. K9KQR managed QSO's with WØWYZ, CO; WIFZA, NH; W5LO, NM; and KIHTV, CT; although he did not think conditions were up to par. K1WHS echoes the diagnosis of so many others on this year's Perseids. Relatively close-in stations were often quite loud but those further away were weak or absent. Between skeds and random calls, Dave contacted 10 stations. One was W2CRS/8 who was running 10 watts of ssb from a Multi 2000. Who says you need high power for ms?

Bucking the crowd is WA4CQG. Dale feels that this year's Perseid was better than last year's. Maybe this opinion is influenced by his working 4 new states. He puts in a plea for more people to try ms. The state total for W3BDP now stands at 32 after having Perseids contacts with WØEMS, NE, and K5MWH, AR. Despite it being his first attempt at ms, WA1OUB did very well indeed. Bob worked 5 stations: KØMQS, IA; W9YYF, IL; W4LNG, GA; K4IXC, FL; and K4EJQ, TN. This brings Bob's state total to 25. Another first time ping jockey is VE3FKX who, after numerous tries, made a contact with WØLER, who kindly stuck with him until success came.

Tropo was good from Aug. 7 through 10 according to K9KQR near Chicago. On the morning of the 8th, Dick worked WØMJS, Duluth, MN. The night of the 8th (9th Z time) was particularly good with QSOs being held with WØKRX near Minneapolis; WA8MEC near Detroit; W3RUE, Pittsburgh; WA8OJP near Cleveland; and WA2BIT and K2RTH on Long Island. The next night brought contacts with WA2DIR, Long Island and KIHTV, CT. W9UNM bears out the fact that this was a good period for tropo throughout a large portion of the country. Jim reports QSOs on Aug. 8 with K5MWH, AR, and WØKRX, MN. On Aug. 13 from 0200Z, W9LXM near Chicago had a field day on fm simplex. Ric says the session started with a QSO with VE3ACL/M in Windsor, ON a distance of 230 miles. The mobile signal was full quieting for some time. Other stations contacted were W4SMU of Erlanger, KY; WB8LYJ near Cleveland; and WA3JIP in western PA. The rig at W9LXM runs 1 kW to 4, 11-element Cushcraft beams up 50 ft.

A letter from VE8OO Fort Smith, NT., tells of a very interesting 2-meter opening which occurred Aug. 8 starting at 0410Z. For about 15 minutes, Frank worked WØJWL and KØCLD, Minot, ND on 146.94 simplex. Signals had QSB but were Q5. Following that, VE6AOO/M was worked via the VE6HAT repeater at Medicine Hat, AB, and finally WA7PZO Walkerville, MT, was contacted through a repeater believed to be WR7ADO. In addition, many other Øs and 7s were heard and TV signals up through Channel 6 were received for 3½ hours. Note that this opening came just one day before the big 6 meter opening reported above and coincided with the high solar activity mentioned by WIHDQ.

1215-MHz (23 cm) STANDING

W1ALP	9	4	500
K1PXE	7	4	500
K9AQP/1	7	3	300
WA2LTM	16	6	770
W2OMS	13	5	537
K2UYH	10	5	520
K2JNG	10	4	305
W2DWJ	10	4	200
WA2VTR	6	4	330
K2YCO	6	4	570
WA2EUS	4	5	330
K2OVS	3	2	135
W3HMU	10	5	260
K3IUV	7	4	320
K4QIF	12	5	551
K4SUM	5	3	220
K4NTD	2	1	350
W4VHH	2	1	350
W4LDV	1	1	290
K5LLL	2	2	847
W5LDV	2	2	838
K5PUF	1	1	290
W5AJG	1	1	235
W5HPT	1	1	235
WA6UAM	1	1	112
K8UQA	6	3	448
W8YIO	5	4	551
WA9HUV	5	3	525
W9JIY	5	3	300
W9WCD	3	3	770
W9JTP	3	2	165
VE3HW	1	1	260

Several letters comment on very good tropo conditions over the Labor Day weekend. WØKRX worked a total of 42 stations including K5MWH and W5ST, AR; WØPMN, KS; WBØIUT and WBØOHP, NE; W5WAX and W5HVF, OK; W5SID, Dallas, TX (837 mi); K8GMR, MI; and W8KPY, W8ULC and W8FEH, OH. Bob also heard but was unable to work WØPW, Boulder, CO. All of this took place between 0330Z Sept. 1 and 0430Z Sept. 4. KØDAS in Iowa reported the same opening working many of the same stations. Those worked by Rod, not reported by WØKRX, include: K8III near Cleveland; K8RYU; W8BKI, Charleston, WV; VE3AFT, London, Ont.; and W3TFT, McKeesport, PA. WB5LUA's report lists WAØCHK, MO; WA9EUA, WI; K9OYK and W9YYF, IL; and WØEMS, NE. This massive opening moved on east as witness the midwest contacts made by WA3NZL, 20 miles north of Washington, DC in the wee hours of Sept. 3.

432 MHz and Up (70 cm and Down)

A coastal tropo opening on Aug. 3 is reported by K1WHS in Maine. On this occasion Dave worked K4QIF and W4FJ an both VA with very good signals. The widespread tropo opening around Labor Day, reported in the 2-meter section, made itself felt on the higher bands as well. K2UYH, Trenton, NJ, writes that on his nightly schedule with K8RYU at 2130 EDT (0230Z Sept. 3) he noticed that Ralph's signals were better than normal on peaks but exhibited deep fades. After trying an unsuccessful sked with W4ISS, Al called a long CQ to the west at 0330Z. This was answered by WAØTXV, St. Louis, MO, who peaked about S-6. Later Al worked WØYZS in Kansas City who at times was peaking S-8 to 9. Feeling that the good conditions should extend higher in frequency, Al phoned WA2LTM and suggested that he call WØZJY, Lenexa, KS, known to be active on 1296. This Doug did and was rewarded by hearing signals from WØZJY, who was running just 30 watts. Unfortunately, no QSO was made over the 1,000 mile path. If contact had been established, it would have been a new terrestrial record on 23 cm.

On the same opening, KØTLM, Kansas City, MO worked WA9EUA and W9GAB, WI; WØWMP, IA (5 watts); K9ZZH and K9HDE, IL; WAØTXV, St. Louis; and K8UQA, OH. Tom heard W5HN and W5UND, Dallas, but was unable to contact them.

Tropo work on 70 cm is by no means confined to the U.S. and Canada. The VERON Vhf Bulletin carries an account by LA9T in Norway about openings July 6 and 7 as well as August 4. On the first of these sessions, LA9T worked PAØLNP, PAØJPA and G3LQR. The August session brought contacts with G3LQR again plus PAØVZL, PAØJOZ, PAØVV and ON4DH. It is believed that this last QSO may be the first 70-cm work between Norway and Belgium. When F9FT is not busy working EME, Marc and Franck are active on 2 meters with tropo or ms as well as looking for tropo on 70 cm. In this latter pursuit, the VERON Bulletin credits them with QSOing during late June: G4BRT, G3XBY, OZ9NI and 5 German stations.

According to the 432 EME newsletter put out by K2UYH and VE7BBG, August was quite productive for the 70-cm EME boys. JA1VDV worked VE7BBG, W1JAA, W3CCX, WØOQI and K8UQA. VE7BBG worked VK2AMW with strong signals (10 to 12 dB over noise). Cor also worked F9FT with similar strength signals. This QSO was completed on ssb. Just afterward he heard VE4JX about 5 dB over noise but could not make a contact because of QRM caused by someone

(Continued on page 86)

EME STANDING

50 MHz (6 Meters)

Station	*Stations Worked*	*States*	*Countries*
WB6NMT	2	2	1
K5WVX[1]	2	2	1
WA5HNK[2]	1	1	1
W7FN	1	1	1

[1] Combined effort of W5WAX and K5WVX
[2] Combined effort of WA5HNK and W5SXD

144 MHz (2 Meters)

WA7KYZ	25	18	4
K1WHS	25	11	4
K8III	22	11	5
WA2BIT	21		
VE2DFO	20	9	5
WA7BJU	14	9	1
K6QEH	10	6	4
W4DFK	10	6	3
K5VWW	6	5	3
K7NII	8	6	1
WA7BBM	5	4	2
WB5LUA	4	4	1
WA6UAM	4	4	1
WA3QVN	4	3	1
WAØCHK	4	3	1
SM6CKU	3	2	2
W3BHG	1	1	1

420 MHz (70 cm)

W3CCX	11	5	6
W4NUS	9	6	2
F9FT	9	5	4
K8UQA	8	5	4
W1JAA	6	3	3

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* W3WRE

Women at Reston

UNDER THE chairmanship of Irene Akers, W3RXJ, WAYLARC hosted the YL program at the 1975 ARRL National Convention in Reston, Virginia. Representation from YL radio clubs across the country included WAYLARC, WRONE, YLRC-LA, NYCYLRL, Portland Roses, BAYLARC, PJ-YL, MINOW Net, and Buckeye Belles.

These clubs also represented the membership from the two worldwide women's organizations, YLRL and YLISSB. YLRL founder and first president 36 years ago, Ethel Smith, K4LMB, attended as well as several other past presidents: Liz Zandonini, W3CDQ; Martha Edwards, W6QYL/4; Kay Anderson, W8DUV; and 1975 President Chris Haycock, WB2YBA.

As with all forums it was a time to present further plans, subject to approval by the entire membership. The inability of many women to attend the major YLRL quadrennial conventions because of distance sparked the discussion of planning two mini-conventions, one in the east and one in the west.

A striking YLRL banner at the booth suggested that eventually banners will be made available to accompany convention kits for each of the YLRL Districts for use at hamfests, division and state conventions, or wherever YLRL is represented at amateur radio meetings.

On the international level the Adoptee Program is increasing. Over 30 women listed with the club's International Correspondent await sponsors. Plans are still progressing for the YL to YL net that has been requested by DX women in particular. These YLs are anxious to be able to meet and talk with women in this country with more than the very impersonal contest contact.

Women amateur radio operators were there to enjoy their own activities, to discuss their problems, as well as to attend the technical sessions that covered every facet of the hobby.

1976 YLRL Officers

Beulah Barrick, W6NLM, 1975 secretary, announces the results of the election of the club officers for the year 1976: President Myrtle Cunningham, WA6ISY; Vice President Beth Newlin, WA7FEG; Secretary, no candidate; Receiving Treasurer Rose Ellen Bills, WA2FGS; Disbursing Treasurer Rosemary Davidson, WA8VXE.

1976 district chairmen for the 13 YLRL districts will be: 1st District, Edna Bennett, K1VEB; 2nd District, Roberta Newman, WB2BHS; 3rd District, no candidate; 4th District, Nancy Hickman, WB4NTW; 5th District, Myrtle Stinnett, WB5FGM; 6th District, Mildred Stine, WB6KHM; 7th District, Gerry Johnson, K7YDO; 8th District, Rosalene Victor, WB8DQX; 9th District, Dori Leiser, W9VNG; 10th District, Glenda Lacher, WAØTNI; KH6 District, Mary Alton, KH6HPS; KL7 District, no candidate; VE District, no candidate.

Net Searching?

Looking for a net in a special area or to complete requirements for one of the many certificates offered by the many clubs? The following YL nets have been announced for the year 1975-76: (day-time-frequency-net name). *Daily* 1600, 14,333, MHz, YLISSB System; *Monday* 1200, 3,950, Buckeye Belles; 2200, 3,917, Honeybee Net; 2300, 3,930, TASYL (1st Mon.); 2330, 28,650, PJ-YL.

Tuesday 0000, 3,972, Buckeye Belles; 0030, 7,280, YLISSBers; 0130, 3,775, Clara (4th Tue.); 1400, 3,933, Floridora; 1430, 3,930, Jay Hawker; 1530, 3,670, MINOW; 1600, 7,235, Ironing Board;

* YL Editor, *QST*. Please send all news notes to W3WRE's home address: 305 N. Llanwellyn Ave., Glenolden, PA 19036.

Members of WAYLARC held a picnic in honor of the visit of the club's adoptee, Christa, DJITE. Seated l-r: Peg, W3HSS, Irene, W3RXJ, Ruth, WA4FEY, Maxine, WA4UWK. Second row: Meg, W3UTR, Christa, DJITE, Ginny, K4SHE, Claire, W4TVT. Third row: Sandy, K3SQX, Mary, W4HRD, Janie, K4BNG, Ethel, K4LMB, Vi, K4EAM, Martha, W6QYL/4. *(W4QVL photo)*

HC2YL, Darleen Magen, is the first YL of Ecuador to receive the 5BWAS, l-r, Diane Magen, Joe HC2OM, Darleen, HC2YL.

1800, 7.125, Georgia Peaches; 1900, 14.160, CLARA.

Wednesday 0030, 7.280, YLISSBers; 1330, 3.910, Yankee Lasses; 1400, 3.930, The Harem; 1500, 50.335, Buckeye Belles; 1700, 3.955, GAYLARK; 1800, 14.288, YL Open House; 1900, 50.650, New Englanders.

Thursday 0100, 28.673, YLISSBers; 0100, 3.978, West Virginia Net; 0130, 3.970, PI-YL; 0500, 3.935, Working Girls Net; 1300, 3.950, TASYL; 1400, 3.940, TYLRUN; 1400, 7.277, Georgia Peaches; 1500, 21.373, YLISSBers; 1600, 7.280, Tangle Net.

Friday 0300, 7.280, YLISSBers; 1400, 7.270, Midwest YL; 1600, 3.913, MINOW; 1830, 14.140, MINOW.

Saturday 0300, 14.333, YLISSBers (ZL/VK System); 1400, 3.910, Hawk Roost; 1600, 14.140, Ontario Trilliums; 2000, 3.770, Ontario Trilliums.

Sunday 0000, 7.280, YLISSBers; 1330, 3.990, Western Pa. YL (1st Sunday); 1800, 28.673, YLISSBers.

YL Contest Suggestions

The DX women have requested that in the DX YL to North American YL Contest – as well as during contacts for the many YL certificates – we speak slowly and not at a normal contest speed.

Retiring editor of *Auto-Call* Ethel Smith, K4LMB, turns over the job to the 1975 editor, Ginny Pinkerton, K4SHE, who assumed the editorship with the July issue of the magazine. *(W4QVL photo)*

Women amateur radio operators from 125 countries are anxious to work and participate with us in contests. Lack of language facility makes such exchanges difficult. On cw and RTTY sight translation is possible as the contact proceeds, but on voice often much is lost.

A request has also come from the gals with the deep voices who have been asked to move out of a contest because the voice is mistaken for an OM. These YLs ask that we please make sure the call is from another YL before writing off the sound of the voice. With the many club directories this should take very little time.

WB2YBA To Be Eligible For Brigadier General Rank

Christine Haycock, WB2YBA, 1975 YLRL president and active army reservist, has been accepted at the War College in Washington DC. Well-known as a medical doctor and professor of medicine, Chris holds the rank of Colonel in the Army Medical Corps. After completion of her studies at the War College, she will be eligible for the rank of brigadier general. Though the sixty year history of women in amateur radio has been marked by many who have been members of the armed services, Chris will be the first YL to hold this high rank.

YLRL Membership

"YL News and Views" has received a number of letters asking for information about YLRL membership. All women amateur radio operators of any class license are eligible for membership in this oldest of radio clubs for women. Membership information and application forms may be obtained from the membership chairmen: in the eastern United States, Marge Campbell, K4RNS, 65 North Arbor Drive, Ormond Beach, Florida, 32074; in western United States, Beth Taylor, W7NJS, 14637 S.E. Fair Oaks Avenue, Milwaukie, Oregon, 97222; and from International Correspondent Ione O'Donnell, WA2DMK, Newcomb, New York, membership chairman for DX women.

QST

Operating Events

de W1YL

NOVEMBER

1-2 ***RSGB 7 MHz DX Contest phone, Worked-all-El-Paso Contest, North Carolina QSO Party,*** p. 92 Oct.

6 ***West Coast Qualifying Run*** (W6OWP prime, W6ZRJ alternate), 10-35 wpm at 0500Z on 3590/7090 kHz. This is 2100 PST the night of November 5. Please note that dates are always shown at least 2 months in advance and times are always the same local "clock time," i.e. 9 PM local Pacific time. Underline one minute of the highest speed copied, certify copy made without aid and send to ARRL for grading. Please include your full name, call (if any) and complete mailing address.

8 ***Frequency Measuring Test*** p. 92 Oct.

8-9 ***SWEEPSTAKES cw,*** rules this issue! ***Trillium Weekend Contest,*** p. 92 Oct. ***European DX Contest RTTY,*** p. 106 July.

9 ***OK DX Contest,*** p. 92 Oct.

14 ***WIAW Qualifying Run,*** 10-35 wpm at 0230 UTC transmitted simultaneously on 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. This is 2130 EST (9:30 PM local Eastern time) the night of Nov. 13. Underline one minute of top speed copied, certify copy made without aid, and send to ARRL for grading. Please include your name, call (if any) and complete mailing address.

15-16 ***OE Contest, Missouri QSO Party,*** p. 92 Oct.

22-23 ***SWEEPSTAKES phone,*** rules this issue!

29 ***Ten-Meter Groundwave Contest,*** sponsored by the Breeze Shooters Inc. of Pittsburgh, from 9 PM Nov. 29 to 1 AM Nov. 30. Points are determined on a distance and input power basis with separate awards for leaders in four circular zones centered on the point in downtown Pittsburgh. Mobiles and Novices also compete for separate awards. Logs must be postmarked by Dec. 8. (Logs and rules available from Kenneth E. Beal, W3ZCO, 428 Nantucket Dr., Pittsburgh, PA 15236.)

29-30 ***CQWW cw.***

DECEMBER

3 ***West Coast Qualifying Run.***

6-7 ***160-Meter Contest,*** rules this issue. ***Delaware QSO Party,*** sponsored by the Delaware Amateur Radio Club (W3SL), the full period UTC. Open to all. Stations may be worked once per band, per mode, for point credit. Delaware stations give QSO no., RS(T) and county. All others transmit report and ARRL section, province, or country. Suggested freqs.: cw, 3560 7060 14060 21060 28160; phone, 3975 7275 14325 21425 28650; vhf, 50.110 146.52; novices, 3710 7120 21120 28160. Phone on the even hours, cw on the odd hours. Del. stations score 1 point per QSO, times no. of sections, provinces or countries. Outside Del., 5 points per Del. QSO times 1 for one county worked, 3 for two counties, and 5 for all three Delaware Counties (New Castle, Kent, Sussex). Awards, and certificate for working all three Del. counties. Mailing deadline is Jan. 15. Send logs to John Low, K3YHR, 11 Scottfield Dr., Newark, DE 19713, S.a.s.e. for results or W-DEL Award. ***Hong Kong Activity Day,*** sponsored by the Hong Kong AR Transmitting Soc. (HARTS), Starts/ends 0900Z. This is an annual event to encourage VS6 activity. HARTS, Box 541, Hong Kong. ***Telephone Pioneer QSO Party,*** sponsored by the Stanley S. Holmes Chapter No. 55, open to all Telephone Pioneers. Starts 1900Z Dec. 6 and ends 0500Z Dec. 8. All bands may be used and the same station may be worked on more than one band. Call CQ Telephone Pioneers on phone, CQ T P on cw. Suggested freqs.: phone; plus/minus 20 kHz from 3965 7206 14295 21365 28675 50,100-50,250 144,275-145,500; cw, plus/minus 20 kHz from 3565 7065 14,065 21,065. Score 1 point for exchange with a Pioneer in any chapter, 1 point for an exchange with a different chapter. Exchange report, QSO no., chapter name and no. Usual log extract postmarked no later than Jan. 10, 1976 to: Gene Przebieglec, WB2ZMU, Stanley S. Holmes Chapter 55, Telephone Pioneers of America, 100 Central Ave., Kearny, NJ 07032.

13-14 ***10-Meter Contest,*** rules this issue. ***EA Contest cw,*** sponsored by the EA Society, the URE (Union de Radioaficionados Espanoles), from 2000Z Sat. to 2000Z Sunday. Non-EA stations try to work as many EA stations on as many bands as possible in EA districts 80-10 meters. Send a 6-digit no. representing RST plus QSO no. starting with 001. Two points for each EA QSO, repeat QSOs with EAs on different bands permitted. Total points times the sum of EA districts on each band represents final score. Full log info. should be sent to the URE, along with the call of the station, the operator and full mailing address. Usual declaration. Report within a month following the contest to: URE International CW Contest, P. O. Box 220, Madrid, Spain.

16 ***WIAW Qualifying Run (plus 40 wpm!).***

18 ***WIAW Morning Qualifying Run.***

28 ***HA5-WW Contest*** full period UTC, single ops, multiops, SWLs. Call WW Test de, Exchange RS(T) and ITU Zone no. Contacts within continents count 1 point, between continents 3 points, with HA/HG5 stations 4, with HA5 stations 5 points. Multipliers are the different ITU zones contacted. Final score equals the sum of QSO points multiplied by the sum of different ITU zones. Usuals logs, declarations, postmarked no later than Jan. 15. Send to: SRAL, Contest Committee, P. O. Box 2, Budapest 144, Hungary.

31 ***Straight-Key Night.***

JANUARY

3-4 ***VHF Sweepstakes.***

10-11 ***CD Party, cw.***

17-18 ***CD Party, phone.***

24-25 ***SIMULATED EMERGENCY TEST.***

Feb. 7-8, DX Competition phone.

Feb. 15, Frequency Measuring Test.

Feb. 21-22, DX Competition cw.

Mar. 6-7, DX Competition phone.

Mar. 20-21, DX Competition cw.

June 26-27, Field Day.

World Above

Continued from page 83

calling CQ on 432.002. Cor strongly suggests that those stations wishing to call CQ on a non-schedule basis do so on 432.010. VE7BBG noticed Aug. 4 that sun noise was up about 2 dB from its normal value. He reminds us that W1HDQ, in connection with his studies of solar activity, is interested in receiving any such data from moon-bouncers. QST

Strays

Gathered at a luncheon honoring Dick Turrin, W2IMU, are members of the Eastern VHF/UHF Conference. Dick received a plaque for his work in uhf communications. Seated around the table (l to r) are Dick Turrin, W2IMU; Ed Chinnock, W2FZY; Roger Abson, WA2AHW; Pete Arnold, WA2DMT; Bill Legg, W2VE; Carl Scheideler, W2AZL; Vic Colaguori, W2OMS; and Bob Buus, WA2HVA. Tony Rustako, K2KII, is behind camera.

Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YL
Deputy Communications Mgr.

ASST. COMMS. MGRS.: *DXCC*, R. L. WHITE, W1CW; *Hq. Station*, C. R. BENDER, W1WPR; *Contests*, JIM CAIN, WA1STN; *Public Service*, BOB HALPRIN, WB2NOM
Affiliated Clubs, ROSALIE CAIN, WA1STO

What Point to Appointment? In these days of repeaters, satellites, sophisticated technology and monitoring service nets, we suspect that a large segment of the amateur fraternity may be unaware that there exists a solid core of over 5000 amateurs dedicated to setting the example and rendering service in a number of basic operating activities. We refer to the ARRL Field Organization supervised by the Communications Department (CD) and 74 Section Communications Managers (SCM) – a structure almost as old as the League itself, and an important part of it.

Yes, the elected SCMs do the appointing while the CD keeps the records, sends supplies and in general supervises the various specialties through its several branches. In the plethora of today's amateur radio potpourri, many seem to have overlooked or forgotten some of the basic principles on which the League and the CD appointment structure are founded: "the relaying of messages by radio," "the advancement of the radio art and the public welfare," "the maintenance of fraternalism and a high standard of conduct," and "service to the membership." Route Managers, Phone Activities Managers, Official Relay Stations, and Official Phone Stations perform the message-handling functions; Section Emergency Coordinators and Emergency Coordinators lend their primary attention to the public welfare; other leadership and station or individual appointments serve the spirit of fraternalism and high standards. An appointment not only is a recognition of high standards on the part of the appointee, but also constitutes a pledge on his part to be an example-setter in his continuing on-the-air activities in the field indicated.

Thus, an SCM by issuing an appointment is not so much saying "I reward you" as he is saying "I recognize you as a standard-bearer in this phase of amateur operating and acknowledge your pledge to bear this responsibility." We'll leave it to you, OM, whether this is as good as an award for an individual operating achievement.

Down through the years there have been many looks taken at the appointment structure and the field organization, and various proposals have been made to change it. So far, the changes have been slight. Four appointments in the traffic-handling field still exist. The newest appointment is in the vhf field, and while even that one is ten years old, it covers operation in the popular field of repeaters. Overtures to create new appointments have fallen through for various reasons, mostly because not enough members seemed to want them. Some have even suggested that the whole concept is obsolete and should be replaced by something more in keeping with today's amateur radio. A study by a Board committee is even now being conducted to determine how the CD and the field organization can best serve amateur radio.

Perhaps too many members, when faced with the prospect of applying for an appointment, are prone to ask: "What do I get out of it?" We could answer that by pointing out that you get to participate in four CD Parties a year and to receive the quarterly CD Bulletin and many other headquarters mailings, some written for your appointment specialty. But good heavens, that's not the point of appointment at all! You're not supposed to get something out of it; you're supposed to put something into it. You're supposed to make a contribution for the betterment of all amateur radio by meeting and following the requirements. And having contributed in this way, what you get out of it is the satisfaction of having done so, and the respect of your fellow amateurs.

Some amateurs run for office. Some serve on committees. Some volunteer as QSL managers, intruder watchers, or to perform various club functions, or as convention organizers, or serve as assistant directors. Each of us can make a contribution in his own way, doing his own "thing." If you aren't now making any specific contribution but would like to do so, consider qualifying for and serving in an SCM appointment capacity. You'll find your SCM's name and address on page 6.

New W1AW Schedule. We get occasional complaints, both by mail and telephone, that the W1AW operating schedule is too complicated, is hard to decipher, doesn't make sense. In this issue we present a modified version which highlights the kind of activity and eliminates the "general operating" schedule, with the aim to simplify without reducing the amount of useful information. Note the new (trial) 0500 UTC bulletin at 10 wpm. Let us have your comments.

Bogus W1AWs. We appreciate receiving reports of reception of stations signing W1AW, using obscenities and ordering other amateurs off the air, but it hurts us when the reporter assumes that the station he heard actually was W1AW. While some of the operation of the headquarters station is by

visitors, especially during the summer, it is all closely supervised by regular staff. Visitor operation may not always be perfect, but every effort is made to insure that it is at least legal. Keep the reports coming; all such will be acknowledged.

More Staff Changes. Along with the departure of Bill Mann from the staff (announced last month), we should also record the departure of Judy Mann, WA1JCN. Judy handled our "miscellaneous awards" desk in the Administrative Branch, mostly *in absentia*. Replacing her on a full-time basis is Jean DeMaw, W1CKK, in a lateral transfer from the Circulation Department, where she has served for ten years. Is the name familiar? That's right, Jean's OM is *QST*'s Technical Editor.

Also, congrats to Arline Bender, now WN1VMC! – *W1NJM*

W1AW – THE MAXIM MEMORIAL STATION

Operating-visiting hours are Monday through Friday 1 P.M. to 1 A.M., Saturday 7 P.M. to 1 A.M. and Sunday 3 P.M. to 11 P.M. (all local Eastern time). The station address is 225 Main St., Newington, CT 06111 (about 7 miles south of Hartford). Maps with local street details and the general contact schedule are available upon request. All frequencies shown are approximate. If you wish to operate you must have your original operator's license with you. The station will be closed Nov. 27 and Dec. 25-26, 1975; Jan. 1, Feb. 16 and Apr. 16, 1976. *Staff:* Chief Operator/ARRL Asst. Communications Mgr. C. R. Bender W1WPR; Alan Bloom WA3JSU; Chris Schenck WB2SEZ. *Note:* There are no bulletins or code practice transmissions on 15 and 10 meters between 0230 and 0600 UTC.

DX CENTURY CLUB AWARDS

New Members

Radiotelephone listings follow the general-type "New Member" and "Endorsement" listings – April 1-30, 1975.

297	173	133	128	SM6BXV	OH6XY	FG7AM	UT5BW	W3FAF
17HH	WA2FNY	DL9TD	WA8JPX	WA6GGK	WB6CKO	103	W6KHI	W4DZZ
243	142	WB4OPL	119	110	105	VP2EEA	WB9JLL	WB4WHK
WA4CQD	YU2CBV	YU2RBK	JA1BMA	EY7AQ	VE2JR	WB4LYU	100	WB9KTA
175	136	131	JH1CRF	HB9AIB	WB2ABD	YU1NFT/X	K4JNM	
WB9ELB	18RFD	OH5MJ	114	106	104	101	KH6BTH	

Radiotelephone

296	K4JPD	103	WA1GUH	K1CPI
17HH	109	WA9UEK	101	K7DS
172	EY7AQ	102	13HN	K7NFB
WB9ELB	107	EA8HG	100	WB2SZH
116	OA4AIW	W1UE	G4BZR	WB4UHN

CW

103	100
OE1ZGA	K9KEV

Endorsements

In the endorsement listings shown, totals from 120 through the 240 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

330	310	290	YU4EBL	240	WA0TAS	W8PBO	140
VE3AAZ	WB8HAT	JA1HHM	260	K5TSR	180	WB8EOS	I3EIN
YV5BX	305	W1EW	SM5BEJ	W4BAA	JA1VP	YU2QK	IA2IU
325	K9TZH	WA1GUH	250	220	K6AG	160	W4BTZ
YV5BZ	300	W3LB	DK5WL	WA1JHQ	KA6DF	VE3WW	120
315	K4EKJ	270	JA3MXR	W4LF	WB2FBF	W2TKZ	HB9EO
K1RGD	W4ORT	G3KAA	W4AES	200	WA6EYK	WA4LPX	WA9EUD
W6ANB	W5EJT	HB9NL	W5KFN	K5KLA	W7OK	WA9MOE	VP2LAW

Radiotelephone

315	300	OE3SAA	220	W0UQD	W8FTS	160	140	WA2UVO
K3UZY	VE3AAZ	250	DK5WL	200	180	I0AG	VO1RT	WB0NHG
310	290	K9TZH	WA1JHQ	W1EW	KA6DF	JA3AEV	120	
YV1KZ	17SOA	W2GA	W3AXW	W4BAA	WB2FBF	PY4KB	W5ULN	

In the September, 1975, DXCC Honor Roll listings, three listings for CW/F were inadvertently omitted. They were W2OKM. . 321/348, W4HOS. . 314/324 and W9GB. . 312/332.

Code Practice

Approximate frequencies: 1.805 3.58 7.08 14.08 21.08 28.08 50.08 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references. Details on Qualifying Runs appear monthly in *QST* Operating Events. The 0230Z practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period.

Speeds	*EST*	*UTC*
5-7½-10-13-20-25	9 A.M. MWF 9:30 P.M. TThSSu	1400Z MWF 0230Z MWFSu
10-13-15	4 P.M. M-F 7:30 P.M. Dy	2100Z M-F 0030Z Dy
35-30-25-20-15	9:30 P.M. MWF 9 A.M. TTh	0230Z TThS 1400Z TTh

To improve your fist by sending in step with W1AW (but not over the air!) and to allow checking the accuracy of your copy on certain tapes, note the UTC dates and *QST* practice text to be sent in the 0230Z practice on the following dates, from the September issue of *QST*.

11/10 It Seems to Us	11/21 Pub. Svc.
11/13 Correspondence	11/24 World Above
11/19 League Lines	12/3 YL News

BULLETINS

(Columns indicate times in EST-PST-UTC.)

Phone Bulletins: (1.82 3.99 7.29 14.29 21.39 28.59 50.19 145.588 MHz):

2100 Dy	1800 Dy	0200Z Dy
2330 M-S	2030 M-S	0430Z T-Su

CW Bulletins at 18 wpm (1.805 3.58 7.08 14.08 21.08 28.08 50.08 145.588 MHz):

1630 M-F	1330 M-F	2130Z M-F
2000 Dy	1700 Dy	0100Z Dy

CW Bulletins at 10 wpm (same frequencies as above):

0000 M-S	2100 M-S	0500Z T-Su

RTTY Bulletins at 170 Hz shift are repeated at 850 Hz shift when time permits (3.625 7.095 14.095 21.095 28.095 MHz):

1730 M-F	1430 M-F	2230Z M-F
2300 M-S	2000 M-S	0400Z T-Su

Oscar Bulletins (18 wpm on cw frequencies):

0840 M-F	0540 M-F	1340Z M-F
1400 M-F	1100 M-F	1900Z M-F
1600 Su	1300 Su	2100 Su

Oscar RTTY:

1700 Su	1400 Su	2200Z Su

In a communications emergency monitor W1AW for special bulletins as follows (times in UTC):

Phone: On the hour.
RTTY: At 15 minutes past the hour.
CW: On the half hour.

5-BAND AWARDS

(Updating the October 1975 listing.)

5BDXCC: (Starting with number 453), DK5WL KZ5JM ON5KD K9WEH K6GA WAØCPX W8LBM.

5BWAS: (Starting with number 226), WA6TLV WA7PVU.

JULY 7 FMT RESULTS

Reported by W1YL

Reading the Frequency Drift in the section to follow will give you a fairly accurate appraisal of the summer FMT. The new system of measuring in reverse order was well received and will be kept on in upcoming FMT's. Participation was a reported 144 with 2209 measurements with 35 achieving Honor Roll standing. Here are the official measurements used in calculating the averages: early run, 14117.106 7077.803 and 3542.410 kHz; late run, 7062.349 and 3539.834 kHz. The umpire (and just about everyone else!) could not hear the late 20 transmission. Next FMT is November 8, rules in the October issue (Operating Events). For info., WA6INF/7 suggests those not meeting the minimum criteria be notified separately. Good idea, we'll do it. Thanks to all participants for their helpful suggestions and prompt reporting.

Honor Roll

This top listing is the standing of the frequency measuring leaders. In consideration of the minimum possible error due to Doppler and other unavoidable factors, we accredit as of equal merit all those reports computing 4/10ths parts per million (or better) accuracy. Please note that a participant must submit a minimum of 2 measurements to qualify for this listing.

W1BGW WIJH KIVHO WA2CCF W2JDC W3BFF K3WIK K4BE K4FUP K4KA W4NTO W4VWS WA5ACA W5EMO K5LAZ W6CBX WA6CKD W6CRF W6KT WB6MZP WB6OFX W6OQI W6RO W8CUJ W8OK K9WGN WØBJ WØBVK WØDJV WØDRV WØIHI WØMTA/5 WNØQJ-Z VE3AC Ireland.

Better than 35 parts per million

(.6) KIBWB KIKQJ W9KO K9WMP, (.7) WIPLJ WA5NYY W9FKJ, (.8) W6MF W7DY K9BGL, (.9) K2EK WB2NYK WBØHVQ, (1.0) W1AYG WAIQJF, (1.1) W9HPG DJ8WL/W2, (1.2) WA1MKP, (1.3) K6MZN K7CC, (1.4) K3HJI K9UON, (1.5) WA5QMI, (1.6) W6DLL, (1.7) W3GN/8, (2.2) W2AIQ WB4BAP, (2.3) WIDDO, (2.5) WA2LLP W9AG, (2.7) K2JFJ, (3.4) KIEUM, (3.6) W7HVB, (4.1) K2KTK, (5.2) W4QN, (5.4) W1ECC/3, (5.6) WA1MSK, (5.8) W4RHZ K7DUF, (6.2) W4HU WB4RUA, (6.5) WA5ROU, (6.8) WA2MID, (7.4) WB4RCL KØAZJ, (7.5) WIVH, (7.7) W9WYB, (8.4) W9REC, (9.0) Bill Bingham, (9.2) W3PYW, (9.7) Dick Bingham, (9.9) VE6MJ, (10.2) WIVZ, (10.9) W4UCI, (12.0) WA1MHJ, (12.9) WBØHBM, (13.0) Andi Bingham, (13.7) W8DPW, (14.5) W3ADF, (15.2) K6HI, (17.0) ex-7HM, (17.7)WB2TFH K4VI, (18.1) WB2GWB, (18.2) K5DFG, (18.6) WA3ISZ, (18.7) W6KDJ K8DIU, (19.1) W2MDM, (19.4) W7FIS, (19.7) WIPL W2SGI, (22.4) W6NAL, (25.2) WAISSH, (26.9) K6GG, (28.0) WAISQB, (28.4) WB6UAX, (29.0) WAIRFT, (29.5) K4IQC, (31.3) W6GBF, (32.9) WA6INF/7, (33.1) WØKL, (34.6) W6OKK.

Better than 179 parts per million

(37.2) VE6XU, (37.4) K6QPG, (40.0) W4AWS, (41.3) WB9BUV, (42.0) W6AFE, (42.8) WB5EMA, (43.4) K6EPX, (47.4) VE1BBE, (49.7) WB2FDW, (54.0) W2IAM, (69.1) WB2MDR, (71.0) WB8PSK, (71.6) WA8AWU, (85.1) WA6SUY, (85.2) WA8UEG, (88.1) WA4BAX, (88.5) K6DRI, (92.4) WB2EPG, (100.7) W5OXQ, (101.5) W2SBI, (109.5) WA4ZFN, (128.2) WA3GYT, (149.7) WA3YIV, (168.8) K3YHR.

Feedback

Under the heading of "there's many a slip, etc." we must apologize for several goofs in the July report of the May 10 FMT. K6MZN didn't show but did indeed make the Honor Roll. A line was dropped which should have read: (2.5) VP9BK, (2.8) W2SBI WA5QMI (3.1) W4QN, (3.2) WIDDO. Apologies to all.

Frequency Drift

Aside from the usual QRM which seemed quite heavy this time (particularly on 40) it was pretty good. I was quite surprised to be able to hear the signal on 80 meters on the early run. It was weak of course but readable. Twenty on the late run was non-existent. – K6DBI. Standard Heath HW-101, 400-Hz filter, 100-kHz calibrator, special dial with wide 1-kHz readout. No fancy digital equipment, just interpolated by eye. – WA4BAX. This work was done in a triple beat method using a transfer oscillator to sub-audio, then adding a free running BFO several hundred cycles away and finishing the standard beat with the audio product. The transfer osc. was an old homebrew beast that should have been thrown out. Depending on the

results of this contest it may be! The transfer osc. was counted by my little Heath modified to 10 second gates. – WA8ULG. First time for FMT using old BC-221. What fun! – WA6SUY. Have got to figure out a noiseless way to measure frequency. My ears are still ringing at 1 kHz at 40 dB over. – WB2FDW. Good idea running 20 meters first. – WB9BUV. I approve of high frequency readings first. – W2MDM. Got counter the day before and a friend said to try it out this way.

WA1MHJ. Thanks for this activity. – W4UCL. Developed sick audio osc. about half hour before test. Ran all measurements by zero beating sig. and reading VFO freq. with homebrew counter, after correcting for osc. xtals. Will be better prepared next time. – WB2CC/3. My first effort at any serious measurements at frequency. Amazing how the scatter effect on 20 and even 40 causes readings to vary. 80 was the only band WIAW was rock stable on and of course accuracy was more difficult there because of less "millions" to work with. – K2KTK. I measured 10 identical readings on 80 using my FT-101 receiver and a homemade vernier scale on the main frequency dial. This is the limit of accuracy attainable with this method of measurement. I hope this will be within the 35 ppm. – WA2LLP. (Note: Henry scored 2.5 ppm!) Much better putting the 20 meter run first. – K9UQN. The Sept. FMT was interesting for several reasons: copied WIAW on all three bands on both runs, more QRM and phantom carriers noted than last May, curious propagation on 20 late run. On 20, late run signals were S3-S4 with almost periodic bursts of increased signal strength at 5 to 10 second intervals. These bursts lasted roughly 1 to 3 seconds each and were 40-50 dB or more above the S3 level. It was particularly noticeable with the age turned off. It was as though a focusing mirror were being wiggled back and forth reflecting the signal periodically right at my dipole. The astonishing thing was the rate of change of signal strength. Several times the changes were so fast it could literally be described as switching between the signal strength levels. Band was generally dead, with a few weak signals although it has been open on the early run to S.A.; sky was clear with Jupiter prominent in the east, temps. in the 50s locally under the influence of a high pressure area. I wonder if anyone else reported on this. Strangest thing I've ever heard. – K3HJI. Conditions were terrible! – WB0HVQ. This time there was considerable trouble during the late run from hams, seemingly test participants, trying to zero beat the WIAW signal with their own gear. Transceivers only, no doubt, with dummy antenna use not possible. – W7DY. I like the reverse order of measurement.

WIPLJ. It's always fun matching skills with the umpire. I like the change in sending the high frequency first. – K4BE. Last-up here uses BC-221 counted with Heath IB-101. Counter time base is sampled and compared with station clock using Tektronix 315-D scope. Station clock (all homebrew) consists of a 1-MHz crystal osc. in proportional oven, phase comparator driving Rustrak chart recorder and WWVB receiver with attic loop antenna. Thanks for the opportunity to participate. – W0BKV. Evidently some people don't know how to measure frequency without radiating their own signal. My rig is completely homebrew, I use a counter and tune the receiver so that the audio note beats with a local audio osc. at 850 Hz. I measure the frequency of the audio osc. accurately and since I have tuned on the high side of the incoming signal I subtract the 850 Hz from the indicated frequency. It is much easier to detect zero beat this way. Thanks. – W0MTA/5. Reversing the frequency order was a good idea. – *W8AC.*

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

K1AXB, Flora B. Hale, Norfolk, MA
W1BNC, Perley E. Woodman, Skowhegan, ME
K1COJ, Roy L. LaDuke, Concord, NH
WA1DYS, Maynard M. Mitchell, South Portland, ME
W1GID, Ralph W. Tedford, Salem, MA
K2ARB, Nicholas G. Geracimos, Jamestown, NY
K2CPB, Warren W. Fenton, Elmira, NY
W2FWZ, Walter J. Grumbacher, Yonkers, NY
WA2LNB, Bernard J. Kerr, Kearny, NJ
W2LSH, Samuel Shaw, Ocean Grove, NJ
W2OKL, Rev. Harold Malloy, Syracuse, NY
W2PKK, Adolph A. Bober, Elizabeth, NJ
WA2TDF, Arthur T. Brown, Irondequit, NY
W2ZOY, James J. Hennessy, Albany, NY
W3BZ, Barrie R. Barker, Gladwyne, PA
W3CJP, Harold A. Stoudt, Reading, PA
Ex-WN3DUQ, Raymond A. Zavatsky, DuBois, PA
WA3DLY, Homer J. Lander, Pittsburg, PA
Ex-3FM, Edward B. DuVall, Sr., Mitchellville, MD
W3HFK, Emmett P. Bonner, Chevy Chase, MD
K3HQM, Michael Balog, Jr., Belle Vernon, PA
W3IBX, Whitney S. Gardner, Baltimore, MD
W3QU, Donald B. MacDowell, Kensington, MD
W3VQQ, Harold L. Schwartzberg, Holland, PA
W4BNP, James M. Dean, Lexington, KY
W4CME, Floyd M. Thomason, Memphis, TN
W4EAL, Richard D. Stansfield, Knoxville, TN
WN4IKL, David A. Cohen, Lauderhill, FL
WN4JAN, William D. Harris, Gainesville, FL
WA4JUT, David C. Hubbard, Richmond, VA
W4KUA, Arthur R. Brigham, Fort Lauderdale, FL
W4NXD, Dr. Joseph M. Blasi, Memphis, TN
WB4SGW, Edward R. Gehr, Jr., Jacksonville, FL
K4SUO, Thomas A. Sperry, Middletown, VA
K4YD, George E. Potter, Pensacola, FL
W4YY, Rhea S. Johnson, Tampa, FL
W5FGE, Louis E. Wicht, Hattiesburg, MS
W5HCJ, William E. Ross, Sr., New Orleans, LA
WB5JAX, John A. Kratz, Houston, TX
W5JJC, Gus Giotdasis, Lubbock, TX
W5KMD, Robert G. Ramsey, Biloxi, MS
WA5NLH, Lee R. McMahon, Beaumont, TX
K5YWI, Willard W. Parker, Naples, TX
K6CBK, Stanley R. Benson, Sunnyvale, CA
Ex-W6JJZ, Edward L. Krumplemann, St. Paul, MN
W6SWD, Lloyd L. Lent, Napa, CA
WB6YNL, Fred S. Krug, Rancho Cordova, CA
W7AWB, Laird E. Simpson, Temple, AZ
Ex-W7COU, Edward R. Semmes, Warrenton, OH
W7EFP, Glenn L. Briedwell, Jr., Portland, OR
Ex-W7HCY, David B. Newman, Astoria, OR
W7MBW/W7MBX, Lester L. Hunter, Portland, OR
W8AKA, Melvin W. Johns, Aurora, OH
W8ELB, Herman M. McNay, Cincinnati, OH
K8EME, Dr. William C. Van Gelder, Muskegon, MI
W8IM, Joseph C. Fountain, Port Huron, MI
K8LIS, Robert B. Meaker, Grayling, MI
WB8NLA, Edward A. Drumsta, Fair Haven, MI
W8NUR, James W. Dennis, Washington Court House, OH
W9CCG, LeRoy A. St. Arnaud, Munster, IN
K9DOF, Guy C. Long, Elkhart, IN
WA9EQG, John B. Watson, Indianapolis, IN
WB9ETY, Carl R. Thornrose, Downers Grove, IL
K9ICT, June M. Seamans, Chicago, IL
Ex-W9INA, Lawrence C. Rosenberger, Culver City, CA
K9ITL, Harold F. Schatz, Terre Haute, IN
K9IYV, Frederick Thayer, Jr., Western Springs, IL
K9KVS, James H. Roussel, Chicago, IL
W9LEW, James O. Hammer, Kendallville, IN
K9LVC, Mercer E. Hopper, Springfield, IL
WN9NJG, Tom R. Stelloh, Milwaukee, WI
W9PPQ, William J. Burda, Clarendon Hills, IL
W9PXW, Karl R. Hassel, Evanston, IL
WA9RRH, Merritt E. Cox, Fort Wayne, IN
W9UAR, Harry M. Devience, Chicago, IL
W0HCH, Carl A. Mathiasen, Onawa, IA
K0JDI, Jack C. White, Shawnee Mission, KS
WA0KBE, James R. Kleff, St. Louis Mo
W0KZJ, Russel L. Ridnouer, Knoxville, IA
W0NPE, Arthur V. LeClair, New Brighton, MN
W0OJK, Byron F. Kurtz, Aitkin, MN
VE1ASC, Dr. Raymond Savoie, Caraquet, NB
VE3ON, John S. Harris, Hamilton, ON.
VO1IR, Allan D. Rowe, Glovertown, Newfoundland
XE1SR, Alberto Saltiel, Mexico
KP4CNX, George F. Alich, Rio Piedras, PR

Station Activities

All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE – SCM, Roger E. Cole, W3DKX – SEC: K3KAJ, PAM: WA3DUM, RM: W3EEB, PSHR: WA3DUM 61, WA3WPY 44, K3YHR 44, K3KAJ 39. Field Day awards from club scores submitted: Multiple Transmitter, Delaware ARC 2470; second Delmarva ARC 2096; Single Transmitter, U of Del. ARC 2130; VHF Del. ARC 144. Delmarva Hamfest prize winners, 1st, WN3ZWX, 2nd K3UIZF/3. W3HGA and W3MDJ were presented a gold serving tray in honor of their 50th Wedding Anniversary at the Aug. Del. ARC meeting. The Del. QSO Party will be held Dec. 6th & &th 0001Z Sat. to 0001Z Mon. It was Amateur Radio Day at Wilmington Gen. Hosp. with K3TVI serving as Attending Physician when WN3VIT gave birth to a daughter, Bonnie Sue with Dad, K3YHR present. WA3TNP back in the hospital with recurring hepatitis while WA3UHV underwent throat surgery. DTN QNI 341, QTC 72; DEPN QNI 7, QTC 14, Traffic: W3FEB 79, WA3DUM 72, WA3WPY 68, K3KAJ 50, K3YHR 43, WA3WUI 41, W3DKX 35, WA3KDR 26, WA3UUN 25.

EASTERN PENNSYLVANIA – Acting SCM, Paul D. Mercado, W3FBF – SEC: W3FBF. PAMs: WA3PZO, W3AVJ. RMs: K3DZB, W3EML, WA3PHQ, K3MVO, WA3WOF, WB2FWW/3. We may or may not be writing this column for next month. Be as it may, but this humble person is thankful and grateful for the splendid cooperation, esprit de corps and friendliness generated by the Eastern Penna. Section, members and appointees, during our tenure of office. We learned, worked, joked, and enjoyed every moment. Thanks for everything. W3CUL and W3VK are still working hard towards high traffic totals. WA3ATQ and her boss, K3YJK visited ARRL hq. and had a good time. WA3QOZ is back in college. WA3QOZ received CP40 endorsement. Congratulations, WA3PHQ and WA3PZO and others for a fine EPA picnic with Penn Wireless as host. WA3QLG is college bound with Extra in his mind come Nov. W3EML sad because of summer traffic slump. WB2RBA/3 is happy for ORS renewal. W3FWW/3 is looking for a cheap but good keyer. K3MVO says "nothing new." W3WRE was guest speaker at AWA Conference and added more keys to collection. WA3VDQ reminds your SCM that most section appointments run out in Sept. Thanks. W3BUR enjoyed FD with KE Hill Radio Club. W3BNR still traveling. Wants a rest. WA3CFU/3 is in new QTH with ample room for sky hooks. W3CL enjoyed recent BARCC meeting in Newtown Square. WA3NDQ was radio councelor for this summer at Camp Emerson in Mass. Says he made many friends. W3HK is unhappy about something, but enjoying himself with XYL. WA3BJQ, W3BSV after 3 years is again active on all bands. W3GOA thinks summer was too slow. W3FU is ready for the contests. W3GMK is also back with RTTY on 3620 kHz. Next month this column will publish a complete list of EPA Traffic and Training Nets. We are running short of space this month. Traffic: W3CUL 4369, W3VR 1384, WA3UKZ 693, W3AVJ 648, WA3ATQ 362, W3QOZ 254, WA3KEY 231, WA3PHQ 204, WA3QLG 156, W3EML 135, WB2FWW/3 109, WB2RBA/3 82, K3MVO 81, W3WRE 56, K3BHU 23, WA3VDQ 23, W3BUR 21, W3BNR 18, WA3CFU/3 10, W3ADE 9, W3CL 9, WA3NDQ 6, K3HXS 5, W3LC 4, W3HK 3, WA3BJQ 1, WA3BSV 1.

MARYLAND-DISTRICT OF COLUMBIA – SCM, Karl R. Medrow, W3FA – W3QU became a Silent Key Aug. 17, after a prolonged illness. MDD members are particularly saddened. This is the month of vacations, and the pause while getting ready for the new operating season plus school. Every night at 6 PM local time on 3920 kHz a tone net meets either MEPN or the MDTCN. On 3643 kHz daily at 7 PM and 10 PM local time the MDD net meets. Join us. The PVRC slate for the coming season is led by W3GRF, prexy. Veep and activities, W4WSF; secy, W4ZM, and treas, W3AZD. W3IN was elected dir. W3FZT, W4BVV, W3BQV and K3WX head up the repeater group. Team Captains to whip up frenzied activities are W3LPL, W3BQV, W3RWZ, K4GKD and K4CKB. The new dir. for the MEPN is WA3IHW, and W3UDD becomes alternate. W3BHE and the Mountain ARC provided amateur communications between Cumberland and the handicapped group on a camping expedition. W3ARC and WA3JSZ found a couple of discrepancies. W3MWD is a MARS member. W3EBK joins the OO ranks. K3DFW is home for good after his sojourn in Tex. WA3WRN had the highest point total so far recorded on the MDCTN. Other top Honor Rollers were WA3PRW and W3AUQ. In the MEPN W3JQN was the topper with others W3FA, W3HWZ and W3LDD. MDDs Top Brass was W3FA, W3FZV and WA3UYE. K3ORW is again active with SB220. W3EZT vacationed in Atlanta and is the new coordinator of the T-MARC. WB2ZYY/3 is back in full swing. WA3UYF is fixing up ham friend's transceivers, and studying schematics of audio foreign language. WA3PRW also a gourmet cook. W3FZV was found in the NI and WAE DX texts. WA3UPH was surprised at his traffic total. W3FCS is pleased with the extra 300 fet elevation for his DX work. WA3ZAS is climbing all over W3FA's towers. WA3MJF and WA3MSW are back in college. W3OKN is getting down to the short strokes. K3RUQ climbs talls towers for profit. Net/Sessions/Traffic/QNI average. WR PON 14/25/11.6. MDCTN 18/45/13.3. MEPN 22/74/19.7, and MDD 52/224/6.9. Traffic: W3FA 160, WA3WRN 147, W3MWD 134, WA3UYF 105, WA3UPH 101, W3FZV 94, WA3EOP 47, WA3PRW 20, W8BZY/3 14, W3FCS 10, W3BHE 4, K3ORW 3.

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ – Burlington Co. Radio Club has a Heath 40 for loan to any interested prospective ham. WA2KAP made this equipment available to the club. K2BG reports WA2NEQ now a club member. Bob passed his Advanced Class exam. W2ZI reports QSO with an "old buddy" of 50 years back during Straight Key Nite on July 3, '75, on 3520 kHz. K2QOS very happy with his new 80-ft. tower and antenna systems. WB2RMK, mgr. of NJSN informs us of continued activity and increasing interest in this net. Gary has provided helpful checkin procedures in the Sept. bulletin. Emergencies can strike any moment – are we prepared? Traffic: WB2LCV 122, WB2FCD 55, WB2LCC 20, W2JI 8, W2YPZ 7, K2BG 6, K2JOC 2, W2IU 1.

WESTERN NEW YORK – Acting SCM, Richard M. Pitzeruse, K2KTK – SEC: W2CFP. As most of you probably know by now, K2KIR has resigned his position as SCM because of the pressures of work. Bud will remain on as mgr. of the Eastern Area Net and will remain active as time permits. Thanks for a job well done. Meanwhile the mechanics of a new election have by now also begun. Operating News for Oct. QST will have complete details on how to nominate the candidate you think will do a good job for WNY. In the meantime, its nice to be back! W2RQF busy on 160 with a new FT-101E. A new SB-102 to W2FZK. K2IMI struggling with the Adirondack weather to keep her antennas up. WB2KUN doing basic training at Great Lakes. WB2KNZ up to 96/57 towards DXCC with his HW-16. WB2FXY reports the WNY Emergency Net going super well. Most clubs report activity on the upswing. Don't forget to support your local radio club. WB2BAM sports a Yaesu FLDX400 and HQ-215. K2KTK, WA2ICB, W2FR and K2KIR still looking at stars, nebulae, comets and novae. BPL for July to WB2RSF/2. PSHR for Aug. to W2MTA, W2FR, and W2OE. Traffic: (Aug.) W2FR 349, WB2RSF/2 232, W2OE 156, W2MTA 147, WB2VND 89, WB2THS 69, W2FZK 53, WA2ICB 52, WB2KUN 49, W2PZL 40, K2UIR 36, WB2QIX 31, W2HVM 29, W2RQF 29, W2RUT 23, WA2DRC 19, WA2TPC 19, W2UYE 10, K2KTK 9, WA2KUV 8, K2OFV 8, W2EAF 7, K2IMI 4, WA2LUF 1. (July) WB2RSF 232, WA2ICB 132, W2FZK 51, WA2KUV 23, K2OFV 23, W2PZL 23, WA2TPC 14, W2EAF 10, W2UYE 5.

WESTERN PENNSYLVANIA – SCM, Donald J. Myslewski, K3CHD – SEC: W3ZUH. Asst. SEC: K3SMB, PAM: K3ZNP. RMs: W2KAT/3 W3NEM W3LOS W3KUN. WPA CW Traffic Net meets daily on 3585 kHz at 7:00 PM local time. Pa. Traffic Training Net meets daily on 3610 kHz at 6:30 PM local time. Pa. Phone Net meets Mon. thur Fri. on 3960 kHz at 5:30 PM local time. Recent appointments: K3JCX as EC for Greene Co., KJCWE EC Indiana Co., WA3IPU ORS. The following counties need ECs: Potter, Clinton, Fulton, Bedford, Somerset, Fayette, Butler, Jefferson, Elk, Clearfield. Westmoreland and Allegheny Co. AREC net will meet separately each Wed. Contact WA3SSU or WA3IBQ for details. The National Weather Service has praised the AREC members of the WPA Section for the fine job done this past summer tracking storm activity. Keep up the good work fellows. K3QYB upgraded to Extra Class and WA3VJL to Advanced Class. WA3RVD WA3VDP and WA3TVG participated in the Westmoreland Co. Fair by setting up an amateur radio display and handling radiograms. WA3VUP, EC Blair Co., has coordinated AREC activities with the Pa. State Police so that there would be no confusion with the CBers. WA3ESH has erected a new tower at his QTH. The Amateur Transmitters Assn. of WPA elected W3OJW, pres.; WA3ZCL, vice-pres.; W3DHL, treas.; W3NJI, secy.; WA3UEN, K3RAD, W3OVM, dir. The Breeze Shooters of Pittsburgh elected WA3TFS, pres.; WA3PHY, treas.; WA3ZCO, checker; WA3QER K3SMB K3DE W3OVM, dir. Steel City ARC repeater WR3AGB 147.63/.03 should be operational by Sept. W1GL/3 and WA3KSA are proud owners of new towers. Good DX fellows! Get well wishes to W3PHD. The annual WPA picnic was held at Cook's Forest. It was a pleasure to eyeball with all those who attended and special thanks to W2KAT/3 for making the arrangements. The WPA CW Traffic Net had 31 sessions for July, 290 stations checkin and handled 114 messages. Aug. 31 sessions, 289 stations checkin, and 90 messages handled. PSHR: WA3VBM 42. Traffic: W2KAT/3 290, WA3VBM 119, W3EGJ 54, K3CHD 41, W3LOS 25, K3SMB 23, K3ASI 20, K3VQV 20, W3ATQ 12, W3KUN 12, K3OYB 9, W3IDO 8, W3SN 8, WA3PMT 6, W3HDH 4, K3SJN 3.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – Asst. SCM: Harry J. Studer, W9RYU, SEC: W9AES, RM: K9ZFV, PAM: WA9KFK. Cook County EC: W9HPG.

Net	*Freq.*	*Times(Z)/Days*	*Tfc.*
ILN	3690	2330 Dy	289
Ill Phone	3915	2145 Dy	339

NCPN	3915	1200 M-S	
NCPN	3915	1700 M-S	
IEN	3940	1400 Su	

WB9GIU has a new FT 101B for AC-DC portable use. K9DI passed the 2000 confirmed county mark on cw only on the US county award, WB9IMV working to get the Univ. station W9Y active on the traffic nets, WN9RIJ is a new call in the Peoria ar Our sympathy to the family and friends of W9DZB who recen joined the ranks of Silent Keys. An Ill. Bell Telepho representative spoke at the Aug. meeting of the Northwest Amate Radio Club and gave an illustrated slide presentation of the vacati and sightseeing spots in Ill. The Six Meter Club and also Hamfest staged their annual Hamfests in Aug., both were very successful wi large attendance. K9UXC is on with two-element quad. The Stary Rock Radio Club has announced the June 6, 1976 is the date their Hamfest. The Westminister Amateur School, PO Box 37 Montreal Int'l Airport, AMF, has announced a 1976 Summ Olympics award by working 10 Montreal Island stations. Conta them at the above address. WB9HVD and WB9MWQ have pass their Advanced Class exam. The Jacksonville Amateur Radio Cl has increased its repeater output power. WN9NHP has passed General and waiting for his FCC endorsement. WB9MRR/9 W9NC WN9PGQ WN9NHP and W9LBQ have formed a Novice adviso committee. If your club is sponsoring code and theory cours please notify the League so that inquiries to them can be referred the clubs. The list is too long to be reported in this colum WA9VGW a BPL recipient for Aug. Traffic: WB9NVN 6 WA9VGW 491, WB9NOZ 296, W9NXG 204, K9ZLV 120, WB9O 120, W9NJF 117, W9IXV 109, W9OYL 81, WA9KFK 70, W9H 69, W9LNO 65, W9KR 64, K9KHI 46, WA9UIP 43, W9AES WB9DED 29, W9HOT 24, W9PRN 24, WB9IMV 26, WB9GIU WB9NIO 12, WA9LZA 7, W9VEY 5, WB9LQC 4.

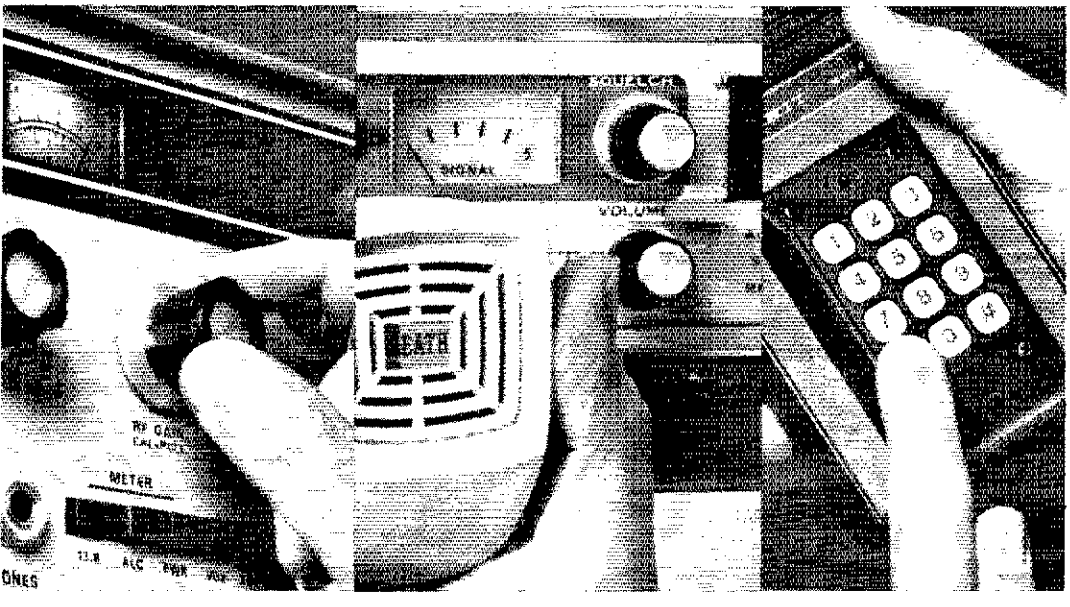
INDIANA – SCM, M. P. Hunter, WA9EED – SEC: W9UMH, good to see a few inquiries from the members pertaining to possi appointments. The annual IRCC picnic was a huge success this ye Our congrats to W9UMH for a well deserved recognition as Ham the Year by the IRCC and to K9RGF upon receiving the Hoos Courtesy Award. We wish a speedy recovery to W9PWH who suffering with pneumonia. The last minute antenna work beginning throughout the state. WB9LHI is sporting a new Magnu Six. The WVARA repeater is presently operational using the WB9AEO. The Indy Radio Club has begun its meetings after summer and has some fine programs set up. WB9PNP reports he w put the Rose Hulman ARC on the air this fall. WB9LID has be appointed new EC for Marion Co. by W9UMH. Many apologies the lack of a column in the Sept. issue. Guess it got gobbled somewhere. Nets reporting traffic: IPON 6, QIN 163, ITN 5 Hoos. vHF 2. Traffic:K9EZX 216, WB9EOT 101, WB9MDS W9QLW 76, WB9KTR 73, W9HUP 72, W9UFM 71, K9DCX W9UMH 60, WB9IHR 56, W9EI 58, W9IGF 40, K9EQT 38, K9L 38, W9ENU 38, WA9OKK 33, W9PMT 25, W9DKP 24, K9RPZ W9KWB 20, WB9HCH 19, W9MCJ 19, WA9OHX 19, WA9TJS K9RWQ 18, K9CBY 16, WB9DIX 12, WA9OLM 12, WA9CYG/9 WA9OAD 8, WB9OZW 8, W9EC 6, W9BDP 5, W9LTU 5, W9FAJ K9HMG 4, W9CMT 3, K9TKE 3.

WISCONSIN – SCM, Roy A. Pedersen, K9FHI – SEC: K9PK PAMs: W9AYK, WA9LRW, K9UTQ. RMs: WB9ICH, W9MF K9LGU, K9KSA. Nets, freq, Time, ONI, QTC, Mgr.; BWN, 39 1145Z M-F, 388, 289, W9AYK; BEN, 3985, 1700 Dy, 729, 2 WA9LRW; WNN, 3725, 2215Z Dy, 77, 30, WB9UCH; WSBN, 39 2230Z, 1094, 204, K9UTQ; WIN-E, 3662, 0000 Dy, 139, 2 W9MFG; WIN-I, 3662, 0300Z Dy, 293, 231, K9LGU. BEN ce endorsed WB9LSS. BEN cert. to WA9ZPC. ARRL Convention J 9-10, 1976, Milwaukee Red Carpet Inn, WIPON now called X net. OPS renewed K9FYA, WB9QXO a General Class. WSBN ce to WB9IDU. K9OXY worked K8III, W8KPY, K8RYU in Oh K8LZF in Mich.; WBØIUT, WØOHP Neb.; WØPMN, WØFIY Ka WBØCHK, KØTLM, WBØEIC Mo.; K8MWH, K8WAX, W8ST Ark. 2 meters. K9KHH on with an SB-401-SB-300 all band doubl homebrew 20 watts A-1, A-3 on 6 and 2 meters; just starting work on E-L WIN, welcome to the group. WN9QZA 78 years from Merrimac has made contacts. WB9EWR building transis projects from *QST* by W1ICR. WB9MSM went to Ireland. W9S replaced $2.16 tubes in SR-500 with pair of 6DQ8s, saved $58. bias must be set at voltage that eliminates color on plates, outp slightly lower. Traffic: (Aug.) K9CPM 840, WB9KPX 320, W9DI 248, WB9ICH 214, WA9QVT 183, W9CXY 159, W9PVH 1 WA9GJU 153, WB9NME 145, K9LGU 124, KU9EAA 121, K9F 103, W9MFG 91, WA9PKM 83, WB9KRR 68, K9KSA 64, WN9P 54, WA9LRW 52, W9AYK 34, WB9LSS 29, K9UTQ 29, K9JPS WB9JSW 25, W9SQJ 25, WB9LKC 24, WB9KMQ 21, K9ANV W9BKD 15, WB9NKC 13, WB9HLS 12, W9KHH 10, WB9PYG WB9NLS 7, K9MZO 4, WB9HRP 4, K9GSC 3, K9FYA 1. (Ju K9KSA 22, WB9HLS 10.

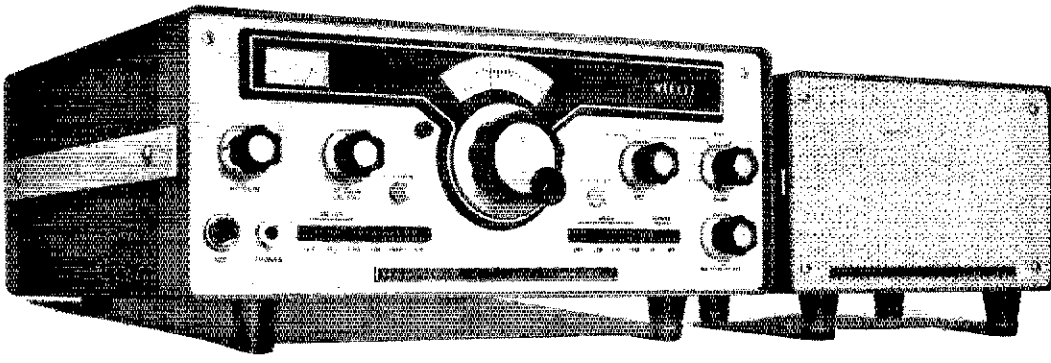
DAKOTA DIVISION

MINNESOTA – SCM, Frank Leppa, KØZXE – SEC: WAØO PAMs: KØFUT, WAØYVT, WBØOCT. RMs: KØCVD, KØR WAØYAH. Chief OBS: WBØLOR. Chief OO: WAØPRS. The Mi calling frequency is 3925 kHz. SEC WAØOFZ has organized counties for AREC and would appreciate your ideas participation. Our section nets are a great asset during times emergency; let us tie these two groups together. Congrats WNØOAG WNØOLL now General; WAØKFM WAØPCO WAØY WNØMEB now Advanced; and to new appointees KØCVD, C RM; KØRYU, RM MSSN; WBØOCT, PAM MSPN evening; WAØGLI, OPS. Thanks go to school bound WBØFTL as reti PAM. The Fred Weyerhaeuser estate has generously provided a of Thirty-Six thousand dollars to the Minn. Handi-Ham System the establishment of a National Handi-Ham system. S benevolence is deserving for such an active cause. KØUP KØS WAØGLI and WAØZSN relayed to the news media race informat during the Transuperior sailboat race for four days. WAØLMT was with the fleet. State Fair stations WØAA and WAØQWE we

3 new money-saving reasons to build a Heathkit transceiver...



"...there's something almost sinful about turning the bandswitch, dialing up a frequency and just hitting the key or talking into the mike."



NEW HEATHKIT HW-104 CW/SSB TRANSCEIVER — now the latest broadband technology costs less

The reviewers and hundreds of customers have fallen in love with our SB-104's instant QSY. It's easy to understand why — you just pick the mode and band, then dial the frequency. It's that easy. Advanced broadband circuitry keeps you in tune — without preselector, load or tune controls.

Now Heath offers the same basic circuitry in our lower-priced HW-series. Like the SB-104, the new HW-104 is 100% solid state — cool and quiet — with an output you can instantly switch from 100 watts to 1 watt. Its coverage extends from 3.5 to 29.0 MHz. And, if you need the top end of 10 meters, add the optional HWA-104-1 accessory. Its coils and filters fit on existing circuit boards and take you up to 29.7 MHz.

The HW-104's performance is superlative. Transmissions are clean and crisp — at 100 watts third-order distortion is 30 dB down and unwanted sideband suppression is 55 dB. In the receiver, broadband design virtually eliminates adjacent signal overload, yet sensitivity is less than 1 μV. And because cross-modulation and intermodulation have been dramatically reduced, signals seem to "pop out" of a quiet background.

The HW-104 also has the convenience you want — a 15 MHz WWV position on the bandswitch, a 15 MHz per turn spinner, 5 kHz markings on the circular dial, and a built-in 100 kHz/25 kHz calibrator for accuracy to 2 kHz. Since it's 12 VDC powered, the "104" is an ideal mobile rig and the optional noise blanker provides up to 50 dB of effective blanking. For base station use, buy the optional HP-1144 AC Power Supply.

Plug-in phenolic circuit boards and two wiring harnesses simplify construction. Alignment requires only a VTVM, mike and dummy load.

The new HW-104 — engineered for value

In the value-conscious tradition of the Heathkit HW-series, the new HW-104 offers state-of-the art performance at a new low price. Even though it shares the same basic circuitry as the world famous SB-104, it costs $160 less!

Kit HW-104, Transceiver .....539.95 (plus 5.56 postage)

Kit HWA-104-1, 10-M Accessory ..16.95 (plus .76 postage)

Kit HP-1144, AC Power Supply ...89.95 (plus 5.08 postage)

Kit HS-1661, Matching Speaker ..19.95 (plus 1.40 postage)

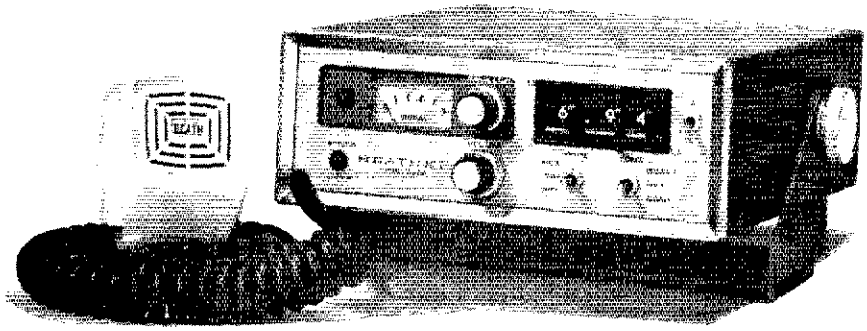
Kit SBA-104-1, Noise Blanker ....26.95 (plus .76 postage)

Kit SBA-104-2, Mobile Mount .....36.95 (plus 1.56 postage)

Kit SBA-104-3, 400 Hz CW Crystal Filter .....39.95 (plus .76 postage)

Send for *free* Heathkit Catalog — see order form!

"it's almost unbelievable... a frequency-synthesized two-meter transceiver with continuous/burst encoders, yet it measures 2¾ x 8¼ x 9⅞" and sells for just $289.95!"



NEW HEATHKIT HW-2026 — transmit & receive on any 2-M channel with no crystals to buy!

A true 5 kHz per step synthesizer opens every 2M channel from 144 to 147.995 MHz. The lever switches on the front panel are much easier to use than thumbwheels and a 0/5 kHz toggle switch permits split channel operation.

Ten watts minimum output and frequency modulation put real punch into your signal. And the transmitter is fully protected — even operates into an infinite VSWR without failure!

The receiver is tops in features and performance. "Hot" 0.5 μV sensitivity for 12 dB SINAD, Schmitt-trigger squelch with a threshold of 0.3 μV or less, a diode-protected dual-gate MOSFET front-end, IC IF, dual conversion and an 8-pole crystal filter for superior IF shape and excellent adjacent channel rejection. Linear audio response and a built-in 2"x6" speaker may make you think the op you're working is in the room with you and there's even an external speaker jack.

There's also much more. LEDs indicate that the synthesizer is locked on-frequency and warn if the channel is already in use. A mode switch selects simplex, —600 kHz offset or an "aux" crystal with a different offset frequency. A built-in continuous/burst encoder accesses most closed repeaters.

The HW-2026 is one of the smallest synthesized rigs you can buy, but it's not difficult to build — just 5 circuit boards to wire. Alignment requires only a VTVM, although a frequency counter would be helpful.

Save up to 50% over comparable transceivers

At just $289.95 our new HW-2026 is one of the lowest-cost synthesized two-meter rigs around. And it has standard features others charge extra for — built-in continuous/burst encoder, automatic transmitter offset, PTT mike and gimbal mounting bracket. The only options are an antenna and an AC power supply for base operation.

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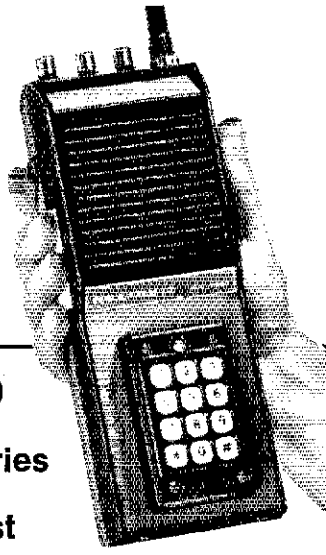

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great success. WRØADW was used for relaying traffic. Thanks to WAØEFW, WØGLU, and all who were active. The St. Cloud hamfest was a great success. Radio Week at Camp Courage was again an active place with FCC giving exams. WØQMY and KØRYU are soon going to QSK on the cw nets. WØKFF and WNØAOG active with TS520s and WAØIUK has a new Genave. BPL: WAØVAS, WØAA/Ø. Traffic: WØAA 392, KØCVD 333, WAØVAS 255, KØZXF 234, WAØYVT 204, WBØLJH 123, WBØOCT 120, KØZRD 103, WBØHOX 94, WØQMY 81, KØZBI 76, WAØYWA 71, WAØTFC 59, WBØKTH 59, KØJTW 53, WAØWDV 49, WBØCPC 42, WAØURW 40, KØFLT 39, WAØYAH 34, WBØLDW 31, WØNO 31, WAØCCA 30, WAØJPR 20, WØRQJ 19, WBØJYT 17, WBØEKC 16, WAØGLI 16, WBØNGX 14, KØUPQ 9, WØUMX 8, WAØADX 2, KØSXQ 2.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – OBS: KØPVG. OO: WØBF. The 3rd Annual Bismarck and Minot Picnic held at Lake Sakakawea in mid-Aug. The MARA planning to run code classes this fall – one at the MAFB and one in the city with KØBWN/Ø in charge. MARA has a new vhf Engr. Repeater being readied to replace the old tube type. The XYLs of WAØLRE and WAØAYL have started learning the code. Nice going. WØDM will be having classes again at Valley Jr. High in Grand Forks this fall and winter. WBØNEJ a new conditional in Grand Forks, is on 40m fone and cw. WBØKSD was on 2m fm while getting the 75A4 repaired. WNØQBW with a DX 60B and Superpro is a new Novice in GF. His son is WBØQBV. He is putting an SB102 together and expects to have it going soon. Good luck fellows. WNØQAS got his too after 2 months. WAØLRE and KØPVG have been working on the Grafton and Petersberg installations. WØDM spent the past month in Minot attending his son who has been in intensive care at St. Joseph Hospital. He was injured in the hand while operating a high pressure paint spray gun. RACES Net, 3996.5, 1830 M-S, 31 Sess., 405 QNI, 67 QTC, WBØATJ, WAØSUF. Traffic: WAØSUF 89, WBØHHC 47, WBØBMG 8, WAØJPT 7, WØMXF 7, WØHSC 6.

SOUTH DAKOTA – SCM, Ed Gray, WAØCPX – WBØMUK is stationed at Keesler AFB, Miss. His address is PSC. No. 4, Box 14441, Keesler AFB, Miss. 39534. Barney is on from K5TVP. WRØACK repeater Sioux Falls has added cavities and went to one antenna which has improved their coverage. WØNRW is pres. of the Sioux Valley Repeater Assn. and the Sious Falls ARC. Net reports: Morning Net, QNI 392, QTC 53; NJQ Net, QNI 639, QTC 51; Evening session QNI 1049, QTC 42; SDN CW remains active. Traffic: WAØKKR 207, WØHOJ 96, WAØNZA 84, WAØVRE 72.

DELTA DIVISION

ARKANSAS – SCM, S.M. Pokorny, W5UAU – SEC: W5RXU. PAM: W5POH, RM: W5MYZ, Net KHz, Time/Day, QNI, QTC, Mgr. OZK, 3765, 0000/Dy, 174, 24, W5MYZ; APN, 3937, 1100/M-S, 672, 35, W5POH; M-Bird, 3925, 2130/M-F, 465, 20, WA5ZWZ; ATN, 3995, 2230/Dy, 314, 131, WB5IGF; ARN, 3995, 2330/Dy, 313, 30, WB5FDP. New EC White Co. WB5IGF. Welcome new hams WN5OUV & WN5OWH. During Aug. your SCM attended the Jonesboro ARC & Paragould ARC joint Hamfest and Ozark ARC club meeting. The film HAMS WIDE WORLD will be shown at Ole Main HS, N. Little Rock on Dec. 3 and THIS IS HAM RADIO on Dec. 10. If interested contact Sylvia Chudy, PSHR: W5MYZ 49, W5POH 27, WB5OHD 16. Traffic: W5UAU 117, K5AO 64, WB5IGF 52, W5MYZ 50, W5POH 17, WB5GWU 15, W5KL 6, WB5OHD 5, W5EIJ 2.

LOUISIANA – SCM, Robert P. Schmidt, W5GHP - Asst. SCM: John Souvestre, WA5NYY. SEC: W5TRL RM: WA5PRI. PAM: WB5EKU, VHF PAM: WA5KND. Regret to announce that W5ACJ, Charter member of the New Orleans DX CLUB, has become a Silent Key. Congrats to WA5PRI our new RM, and LAN Mgr. Don replaces WA5ZZA, who resigned to be the mgr. of the Central Area Net Daytime. Also congrats to WA5IQU who has been made mgr. of RN5. Our new slow speed (LSN) net mgr. is K5TTC, Southwest LA. Club Hamfest to be Oct. 5 at Pecan Grove. Congrats to the Lafayette Club on receiving the La Council Award for FD. WB5IKT received new Advanced ticket with new call letters WB5PEP. WN5NAA passed General. WB5JJT made Extra. New club being organized at Northwest State Univ. at Natchitoches by K5FMM. Another new club is the North LA DX Soc. of Shreveport. For info contact WB5JJT. New 2-meter net started by Southwest La club to be on .94. W5HGT club station in Ruston again active with the start of School.

Net	*kHz*	*Time (PM)/Days*	*QTC*	*QNI*	*Mgr.*
LAN	3615	7:00/10:00 Dy.	134	294	WA5PRI
LTN	3910	6:45 Dy	63	254	WB5EKU
LSN	3703	8:30 M-F	35	99	K5TTC

Traffic: WA5ZZA 307, WA5IQU 261,W5GHP 201, WA5TQA 105, W5MI 88, WB5NWO 23, K5TTC 15, WB5PEP 11, WB5LBR 10, WB5KQJ 4, WB5DVS 3.

MISSISSIPPI – SCM, W. L. Appleby, WB5DCY – W5WWJ and K5CJJ heard Areo Mobile, WØBUO & WB4GYS heard passing thru section. Middle Miss. Amateurs are finally stirring with Echo, JARC & Pearl River ARC trying to form up a Miss. Council of Arcs. Vicksburg ARC turned out 44 persons last meeting. WB5MLF in Germany as DA1PL, WB5KUJ & W5BW continue FB jobs as our OBSs, W5SBM heard as NCS MTN. WB5FCO recd Trophy & Cert. for 1975 Mich. QSO Party. WB5LXW has new HW202. K5OAF had chance to QNI MTN over Labor Day. W5BW & WA4EGP/5 have new Brimstones. Vicksburg ARC has Novice Class in session. W5WRE continues with Novice Class in Gulfport. WB5s FCO FZJ FML BNV HNZ OMZ NSC, LXW; W5RUB & K4EOH/5 heard on MTN. K5CFQ back on Coast. Don't forget to get your AR Auto Tags this month. MV Comp. P.O. Box 1140 Jackson, 39205 for info. Miss Traffic Net had another record month in Aug. for QTCs & QNIs. WB5FHA is net Mgr. WB5OAV recd. WAS. WB5HVY has 5BWAS except for VT 80 Meters. WB5FCO has DXCC. I still need OO applications. Welcome to new Miss. Amateurs WN5s OXU OXM OXA OWY OWZ; WB5OYX WN5OWX & WN5OWW. K5KDL now

K4JLS. WB5LFQ now Gen. Heard on MSBN WB5LFQ, WA5WK WB5s GOI HJY, LXX, LVA. WB5OAV now Adv. WB5GOI has n Icom VHF-FM and New Yaesu HF Rig. MSN, QNI 52, QTC MSBN QNI 942; MTN QNI 208, QTC 88, CGCHN QNI 1938, Q 94. Traffic: (Aug) WB5MTQ 100, W5EDT 85, WB5DCY WB5KUJ 62, WB5FHA 37, WA5YZW 36, W5SBM 26, W5WZ WSNCB 20,WB5BUE 17, W5BW 8, W5LL 4, WB5NSC 3, WB5NE 3. (July) WB5BUE 21.

TENNESSEE – SCM, O. D. Keaton, WA4GLS – SEC: WB4DY PAMs: WB4PRF, K4LSP. RM: WB4DJU.

Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	Mg
TPN	3980	1040 M-F	81	3088	189	WA4EW
		1145 M-F				W4PE
		2330 M-S				WB4YP
		1300 SSuH				
TWN	3980	2100 S	4	94	0	WB4DY
TN	3635	0000 Dy	25	140	109	K4YF
TNN	3707.5	2300 Dy	15	80	8	
ETVHFN	50.4	0000 ThS	12	85	0	WA4YK
ETVHFN	145.2	0000 WF	10	42	0	WB4DZ
ETTMN	28.7	0100 WF	10	111	4	WB4NI
MTTMN	28.8	0100 TF	9	68	0	W4EA
ACARECN	146.28 146.88	0000 T	4	64	0	WA4DE
KCARECN	146.52	2130 F	4	50	3	WA4IP
WTVHFN	146.37 146.97	2000 S 0130 F	9	114	1	WA4VV

The Cedars of Lebanon Hamfest was a success as usual. We we certainly happy to have all the out-of-state visitors. WB4KDN, o Ala. friend won first prize, K4RTA, our local friend won seco prize. WA4DPF handled 107 phone patches. Commendations go WA4BCS WA4HXG W4CYL WA4IKH WB4TGS W4VNS WB4TE & K4RTA for their assistance in the MD Telethon on Labor Da Traffic: K4CNY 374, W4OGG 119, K4YFC 110, WB4DDV 2 WA4HFW 25, WB4YPO 25, W5RUW 20, WB4ZSZ 19, WB4DYJ WA4GLS 15, WB4PRF 12, W4SGI 12, WH4ANX 10, K4TAX K4AMC 7, WA4DPF 7, WB4GTW 4, WB4YXC 1.

GREAT LAKES DIVISION

KENTUCKY – SCM Ted Huddle, W4CID. SEC: WA4GHO.

NET	QNI	QTC	NET	QNI	QTC
KRN	249	28	KNTN	118	5
KEN	1054	121	SDAREC	42	4
KYN	253	143	80AREC	80	

Some have commented recently on the size of this column as appears in *QST*. Sections are assigned space based on membersh and these were recently changed, with KY losing a few lines. K4T running phone patches regularly for the KC4 boys, also putting up new beam. The annual section meeting will be held the 3rd we end in Jan. in Louisville and will be oriented toward nets, traff coordination AND the SET. Plan to attend! K4CEJ passed the t exam, WN4DEJ and WN4HRA are awaiting their General ticket. of this date, mid Sept., call letter license plates are on hold awaiti court action, for 1976? Traffic: WB4BYV 126, WB4ZML W4BAZ 83, W4CID 64, WB4EOR 55, WB4EXQ 46, WB4QVS K4DZM 32, K4TXJ 32, WA4FAF 27, WB4NOE 24, K4HOE W4VWQ 14, WB4NHO 11, WA4AGH 10, K4HFD 2, WB4SIJ 1.

MICHIGAN – SCM A. L. Baker, W8TZZ

Net	Freq.	Time/Days	QNI	Tfc	Sess.	Mg
QMN	3663	2300/0200 Dy	601	229	62	W8IY
GLETN	3932	0130 Dy	611	81	27	WB8OH
MACS	3953	1500 Dy	878	392	35	K8LN
MNN	3720	2230 Dy	112	39	24	WB8NC
UPEN	3922	2230 Dy	689	44	35	K8VO
WSBN	3935	2300 Dy	620	81	31	WB8J
Mi.6M	50.4	0000 MS	163	18	23	WA8VY
BR/MEN	3930	2130 Dy	710	138	31	WB8BY

W8CVQ reports SW Mi 2M net QNI 46 in 4 sessions. 2M catfish n had 56 in 5 sessions as reported by WA8WVV. K8MJK reports ne signal from Gladstone, WB8VKR. Heard that W8KPO has a ne Kenwood TS-520 transceiver and WB8PLQ has an HD 1410 Keye K8SWW reports 17 hams using WR8AAA and micro processor W8SWQ with video readout worked two days on Mich. Champio ship Canoe Races. Further aquatic activities are reported WB8ESK, about ten amateurs provided communications for offici of the WLAV raft race down the Grand River. WB8IEH advises change of mgrs. for UPEN. New mgr. is K8VOA. New licensee Novice WN8UVP; General WB8TUL, WB8OZX; Advance WA8PDN, WB8HAB, WA8YOZ; Tech WB8VDB, W8ONW no retired and active on fm, VE3SJI is a second repeater for Sault St Marie Ont., Canada. It will serve both Soo Mi and Soo Canada are on a frequency of 146.28/88. The repeater is now in operation a open to all who wish to use it. No Silent Keys reported for t month of Aug. Traffic: (Aug.) W8PDP 427, K8LNE 266, K8KM 241, WB8DKQ 203, WB8ITT 193, W8MO 160, WB8BPY 15 WA8WZF 126, WB8NII 106, WB8NCD 99, W8TZZ 77, K8DY1 7 W8NOH 67, W8UFS 64, W8YIQ 63, WB8JIX 60, WA8TBL K8IED 47, WB8POL 46, K8VOA 38, W8LOU 35, WB8BYB WB8OBR 32, K8WRJ 29, WB8DJS 19, W8OW 19, W8ORE W8SDB 15, W8EU 14, W8GLC 14, W8IUP 12, W8POZ 12, W8RT 12, WA8CUP 10, K8JHA 10, W8VIZ 10, K8AMU 9, WB8APN W8RNQ 9, W8DCN 8, K8MJK 8, K8RNP 8, WB8FBG 7, WB8GK 6, W8HKL 6, K8WLE 5, WB8RXS 4, W8TBP 4, WA8WVV W8JAX 3, W8UIC 3, W8WVL 3, K8GXV 3, W8BEZ 2, K8PYN WB8TTL 2. (July) WB8NCD 35, K8MJK 10.

OHIO – SCM, Hank Greeb, W8CHT –

Net	Freq.	Time	QNI	QTC	Sess.	Mg
MASER	146.34 /94		102	10	5	WB8GG
BRTN	146.46		81	39	35	W8IB
OSN	3.577	2310	124	80	25	WB8KI
BNR	3.605	2300	139	212	31	K8NC

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270B/SS-16B 389
1200W Linear 199
350 Xcvr 269
350C Xcvr 299
500 Xcvr 309
500CX Xcvr 389
717CX Xcvr 459
117C AC supply 65
512 DC supply 69
117XC AC supply 95
14X DC module 39
14C DC module 49
117X Basic AC PS 65
14-117 DC supply 99
Mark I Linear 395
250 6m Xcvr 239
250C 6m Xcvr 349
NS-1 Noise silencer 24
FM-2A 2m FM Xcvr 169
FM-1210A 2m FM Xcvr 249
VX-1 VOX 12
VX-2 VOX 15
FP-1 Phone patch 49

TPL
502B 2m FM amp $109

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Tempo One Xcvr $299
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TX-100 Transmitter 59
KR-40 Keyer 79
210 AC supply 15
215 Microphone 12
200 VFO 49

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PA-50 2m FM amp $ 49
HT-2 Mk II 99

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FR-101B Receiver $179
FT-401B Xcvr 499
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FTDX-400 Xcvr 399
FRDX-400SD Receiver 319
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9-26-75

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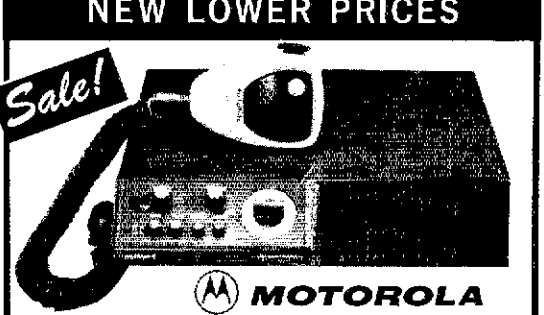

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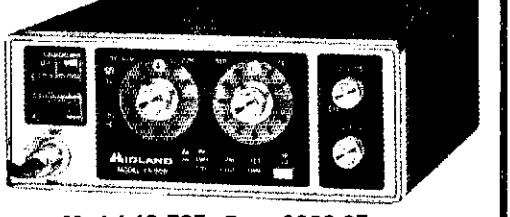

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O6N	50.16	0200	187	106	31 WA8VWI
OSSBN	3.9725	1530/2100 /2345	2440	828	83 W8MOI

Apricot Net (Cleveland) sponsored a ham radio booth to Cleveland's 179th Birthday. K8YUW was active during Hurrican Caroline, and during flooding in Cleveland, K8MLO has a brand nev WB8TTP is new General in Cleveland; W8CHT/8 was heard fron Vinton County during Ohio QSO party. Incomplete reports fron flooding in Cleveland on Aug. 31 include activity by WR8ABC WR8AGA WA8EYF W8GRG W8HFE WA8HIN WB8HNX WB8JYI K8MBV W8NRI W8PTI K8PXR WA8SIF K8VZK K8YUW Reminder that W8CHT welcomes reports – I can report only wha gets reported to me. Don't count on your local EC or club secy. o other official – redundancy is not discouraged, and sometime officials forget to report. So send in those individual reports with a much info, as YOU have. Traffic: WB8MZZ 565, W8PMJ 496 K8NCV 466, WA8MCR 416, W8DIL 348, K8YUW 306, WB8KWI 186,W8ENI 159, W8IBX 152, W8QZK 116, W8MOK 98, K8LGA 94, WB8OZA 79, WB8KQJ 91, WA8VWH 88, W8JD 73, WB8KK 66, W8CHT 62, W8OE 60, WA8SSI 45, W8ALS 44, WB8CJU 41 WA8SED 41, W8WEG 40, WB8MRL 37, WB8EFZ 36, WB8JGW 36 K8BYR 32, WB8AYC 30, W8GOF 19, WB8PIY 19, W8GGR 18 K8LXA 18, W8FGD 16, K8MLO 16, W8LZE 15, K8ONA 15 WA8RQO 15, WB8RTY 15, K8VMI 14, WA8MAZ 12, K8CKY 10 WA8HGH 10, WA8BOV 8, WA3BGE/8 7, W8QUD 6,WB8TFM 6 WA8ETX 4, WB8PGW 4, K8BNI 3, W8DCX 3, K8JPF 3, WB8QXN 3, W8DPW 2, K8GRO 2, WA8DWL 1.

HUDSON DIVISION

EASTERN NEW YORK – Acting SCM, Gary J. Ferdinand WA2PJF – SEC: W2KGC. Asst. SEC: K2AYQ. RMs: WA2FB WB2IXW K2DN (RTTY). PAM: WB2QEL. Traffic nets: ESS (3590 6 PM), NYS (3675, 7 & 10 PM), NYSPTEN (3925, 5 PM), PON (3913, 4:45 PM). Also, every 2nd and 4th Sun. at 5 PM, 3925, th Hudson Division Public Relations net meets. Give a listen if yo would like to get some PR for your hobby. Both the Schenectad and New Rochelle clubs report greater than 1400 QSOs in the 197 Field Day! SARA might hold the record for capacitor banks in Fiel Day – .05 FARADS! W2DW reports good results on 40 and 20 wit a 40-meter full wave loop. Congrats to WB2EKM on his ne Advanced, and to WN2ABW, an Albany club graduate. Now here one for you VHF hawks – WA2PVV reports hearing buzz from BB I (England) on 6 meters. WB2TDX completed his summer project, 2-meter repeater. SARA and Hall of Science RC beginning radi classes. W2ICE is looking for old QSL cards from U.S. stations NY whose call had no alphabetic prefix. Schenectady Co. ARE nets are on Sun.: 50.64, 1 PM; 146.94, 1:30 PM; 3.950, 2 PM WB2CEE had fun with an HW7 on vacation at the Cape. WB2YP now on 160 with an inverted vee. OVS W2CXC reports working o converting a Motorola rig to 220 cw. WB2TGL enjoying a bigge signal with new 80-meter wire strung by him and W2HVA. Ne totals for Aug.: NYS (QNI/839, Tfc/329); NYSPTEN (QNI/93 Tfc/154. New appointments: WB2RUZ, WB2TDX as OPSs. reminder to those holding appoints – regular monthly reports ar required for renewal. Traffic: WA2PJL 187, WA2YPO 150, W2AC 65, WB2EMU 62, WB2TGL 61, WA2PAU 54, WB2TDX 3 WB2RUZ 28, W2ECV 24, WB2VVS 23, WB2EKM 21, W2TTG 2 W2WSS 20, WB2ELA 14, WA2CJY 10. K2OUA 6.

NEW YORK CITY – LONG ISLAND – SCM, John H. Smale WB2CHY – Asst. SCM/PAM: Art Malatzky, WB2WEJ. SE K2HTX. RM: WB2LZN. The following are major AREC/RACE Nets: Join one.

Bronx	28.64 MHz	50.35 MHz	146.88 fr
Kings	28.64 MHz	50.35 MHz	146.88 fr
Richmond			146.88 fr
New York	29.5 MHz	50.48 MHz	146.88 fr
Queens	29.5 MHz	50.52 MHz	146.20 fr
Nassau	28.72 MHz		145.68 fr
Suffolk(West)	28.73 MHz (Hunt)		145.59 a
	28.64 MHz (Smith)		146.94 f
	28.610 MHz (Babylon)		147.21 f
Suffolk (East)			146.82 fr

Note: Net times between 2000 and 2100 local Mon. Congratulation to WB2EDW on making BPL. Jim also announces that NLS is no on 3728 kHz and meets every day. W2EC and WB2CHY both bac from vacation, both had 2-meter fm mobile and enjoyed QSOs wit the local people. A reminder to all aspiring ATV people; there is a ATV Net, run by LIMARC on WR2ADM 146.85 MHz and transmi video on a simplex basis on 439.25 MHz every Mon. from 2200 t 2300 local. WB2OYV now attending Boston Univ. W2PF attende the National Convention in Reston; he also attended the meeting the Washington Chapt. of Radio Club of America. Welcome to ne Novice WN2BLO, who expresses his appreciation to WB2WTJ fo making it possible. Hall of Science started its fall licensing classe with a large turnout as did Wantagh ARC. The Hall of Science als offers a course on solid state electronics. W2CJN now retired an has a new Wilson HT. Suffolk County RC had K1PLP as its gue speaker for Oct. He is the editor of the Antenna Handbook and gav an interesting talk. Plans are being made to set up a station for th Democratic Convention to be held in NYC in the summer of '7 Even if it's not listed in any headings of the columns, don't forg the LIMARC Public Service Net on WR2ADM on Mon. nights 2000 local. With the approach of the Christmas Season, the amoun of traffic will increase. All nets will be needing help in the form stations checking in; why not check in once or twice to see if yo could lend a hand. It would be appreciated. I also will be handlin station activity reports for APO/FPO New York. DA1PK/WB6AP reports that he participated in the European version of Field Da and has been temporarily assigned to a base in the Eifel Mountai near Luxembourg. K2JFE has been checking into the NYC Phone Net whenever his schedule permits. Traffic: WB2EDW 56 WB2LZN 211, W2EC 151, WB2WRT 131, WB2OYV 120, W2ML 116, WB2HTM 103, WN2YAY 61, W2EC 57, K2JFE 49, WN2YK 26, WA2USJ 17, W2HXT 16, W2PF 14, WB2WEJ 5, WN2ZPV

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WB2WBH 1.

NORTHERN NEW JERSEY – SCM, William S. Keller, 1I WB2RKK

Net	Freq.	Time(PM)/Days	Sess.	QNI	QTC	M
NJN	3695	7:00 Dy	31	403	181	WA2DS
NJN	3695	10:00 Dy	31	248	66	WA2DS
NJPN	3950	6:00 Dy	31	430	235	WA2DV
NJPN	3950	9:00 AM Su	5	61	10	WA2DV
NJSN	3730	8:15 Dy	31	309	88	WB2RM
PVTEN	145.71	8:00 Dy	31	177	8	WA2OP

(July PVTEN report: 31 sess., 182 QNI, 12 QTC). New appoints W2GJB as EC for Beach Haven and vicinity, WB2TDI as OPS, an WA2WDT as ORS. OO reports received from WB2CST K2JFJ an WB2IEC. Appointees: please remember you must send me monthly report to maintain your appointment. The Knight Raider VHF Club, K2DEL, elected WA2CRS, pres.; WA2CRF, vice-pres. WB2VLC, treas.; WA2BSU, secy.; WA2DJM, sgt.-at-arms. K2YP reports the Kearny ARC, K2BDX, will offer a bicentenni certificate to any station who works and confirms all of the thirtee original states between Jan. 1, 1976, and Jan. 1, 1977. The Bayonn Civil Defense RC, W2ODV, meets each Sat. morning at the Bayonn fire house. The NJDXA's recent meeting, sponsored by W2DEC featured an excellent presentation by W2JIO. WB2HJW has finall won approval for a tower variance, with the assistance of K2BZ W2REH WB2VIF and W2YD. WN2QHN and WN2YNG recentl passed the General Class exam. WN2QHN has been elected pres. his High School RC. State Civil Defense has appointed WB2VTT one of the operators at the state communications center in Trentor WA2QNT graduates from Penn State this month. Congratulations fellas! WA2UDT keeping skeds on 145 MHz; promises more activit upon receipt of his M.A. degree. Meanwhile, K2QBW continues t shag goodies like C6A, SM, OE, and SP on Oscar 7. Ray als working quite a bit of DX on 75 ssb. WN2QNH now has a TA33 an an eight-element 2-meter yagi. Maybe he will work WA2WDT wh now has a Communicator II and an eleven-element yagi on two W2ODV broke the QRM barrier with their new FH6 and SB22 WA2WDT is able to pull the weak ones through the QRM with hi new receiver filter. K2JFJ reports a big effort in the recent Ari QSO party. I would like to thank all those who participated in thi Sear's NJ QSO party, making it the unprecedented success that was. Good show, gang! Traffic: (Aug.) WA2DSA 383, WB2RK 340, K2BHL 200, WA2ELW 126, WB2VTT 124, WB2RMK 11 WA2PCF 104, WB2AEH 78, WA2TLA 65, WB2UJD 65, WA2WD 57, WB2HSG 43, WA2DIW 29, WA2UOO 29, WB2KNS 26, W2SW 24, WA2RZP 22, W2CU 16, WA2GYB 15, WA2OPY 13, WA2SL 13, WB2CSL 12, WB2HSD 12, K2ZFI 12, WA2KFF 11, WB2BK 10, WB2PBO 9, WA2CCF 8, K2OQJ 8, WA2SRQ 7, WB2TDI W2ZEP 7, WA2BSU 6, WA2QNT 5, K2KB 3, WB2RJJ 3, W2ODV WB2VUF 2, WA2FUI 1, W2WOJ 1. (July) WA2OPY 26, WB2BK 2, WA2BSU 1, WA2QNT 1. (June) WA2PCF 90, WB2VTT 8 WN2UDT 9.

MIDWEST DIVISION

IOWA – SCM, Max R. Otto, WØLFF – Congrats to WBØJGS WØPFR and WØBUA on obtaining their Extra Class tickets. 2-mete nets in eastern Iowa are active Sun. evenings. Cedar Rapids 16/7 and Iowa City 28/88 at 7 PM, and Muscatine 94/94 at 8:30 PM OBS WAØKHF and WBØDGF will resume schedules on Des Moine 34/94 Sun. evenings and Ames 16/76 Thurs. evenings. WAØYJV now operating from WØIO. WØEMA reports WBØAID should no have a permanent location. The Marshalltown ARC again sponsore a very successful Iowa 75-Meter Picnic. Yours truly received th Annual Net Merit Award which was a pleasant surprise. Whil WBØDGF is sweating out his EE degree at ISU, his Dad KØDVO ge his the easy way by taking delivery on a FT-101EE. WBØMM WBØOET and KØFLY were at the 500-ft. level for over 8 hours, an by getting help from KØOKZ WAØVUY WAØYRX WAØTV WBØDGC KØFSC KØQVE WBØPXX WØHUP KØVOM WBØFH WBØJKI KØIOH WAØLNF WØYFY WAØCZO KØPDA the antenns were raised, coax replaced, thus WBØAEH is 7.2 db better tha before. The Cedar Valley ARC helped with a 100 mile bike rac and were seen in action on TV. WAØDXZ is keeping 2 meters h with his ssb-ew KLM rig. WBØIOG will be sharing his shack wi the XYL soon. She is waiting for her Novice call, which probabl will be WNØSOW. WBØJYK is a new OO Class III. (Net, Fre Time(Z)Days, QNI, QTC, Sess., Mgr.): Iowa 75 Meter, 3970, 173 M-S, 1311, 78, 26, WAØVZH; Iowa 75 Meter, 3970, 2300 M-S, 85 37, 26, WAØACX; Tall Corn, 3560, 2330/0300 Dy, 253, 84, 6 KØAZJ. Traffic: WØYLS 66, WØOMV 25, WBØDGF 18, WØMO 16, WBØAVW 9, KØKOJ 6, WØLFF 5, WØJAQ 2.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: KØJM RM: KØMRI, PAMs: WAØSEV WBØBCL, VHF PAM: WAØED Many thanks to those of you who cast your vote for me in th recent SCM election. For those who did not vote my way, WBØCZ thanks you. A request to FCC for a special authorization demonstrate SSTV on fm has been submitted by a group headed b WAØWCD. Others who might be able to give you more info a WAØGZO WØOF WØTEC WØBYC WØCIK WØOQC WBØIY WØAKT and WØYMG. WØHIJ came to the aid of a young woma left stranded on a lonely country road in or near Salina. Thru th WKØAIP repeater and with the help of WBØJJX Police were notifie and necessary help was obtained. WØKL provides liaison for th Home Town Net which meets Wed. and Sat. 8:30 CDT on 729 Sun. 4:30 PM 14283. Involved are 5s, 6s, 9s and 0s. With dee regrets we report the passing on of the OKS-SS net. WØOYH gave u as mgr. and no one has volunteered to replace him. KPN no meeting another sked 8 AM Sat. 3920. Net reports Aug. QNI/QT KPN 158/9, KSBN 993/190, KWN 425/142. MMM 540/47 servi 32 mobiles. QKS 509/292. WØHS awarded the RE Baker Memor Trophy as the Kansas Amateur of the Year at the Concord hamfest. Awarded the A1 op cert. recently was WØCHJ. Traff (Aug.) WBØKWJ 420, WØOYH 201, WØFIR 169, KØMRI 11 WØOF. 110, WØCHJ 104, KØBXF 94, WØNEE 94, WØINH 8

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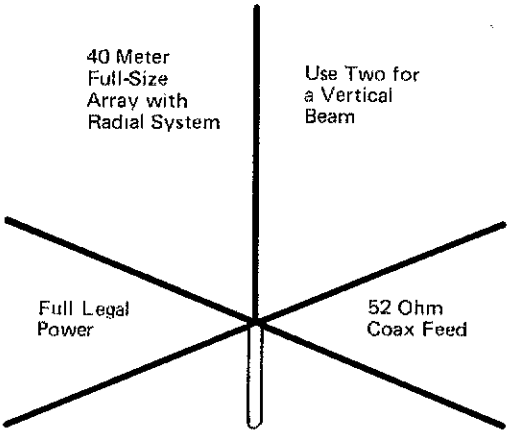

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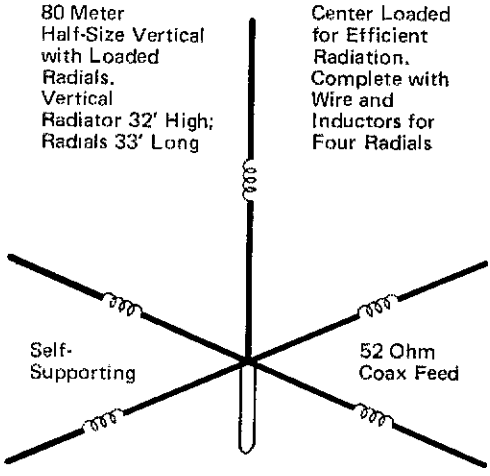

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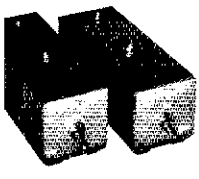

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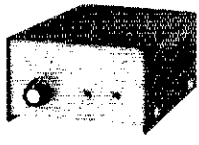

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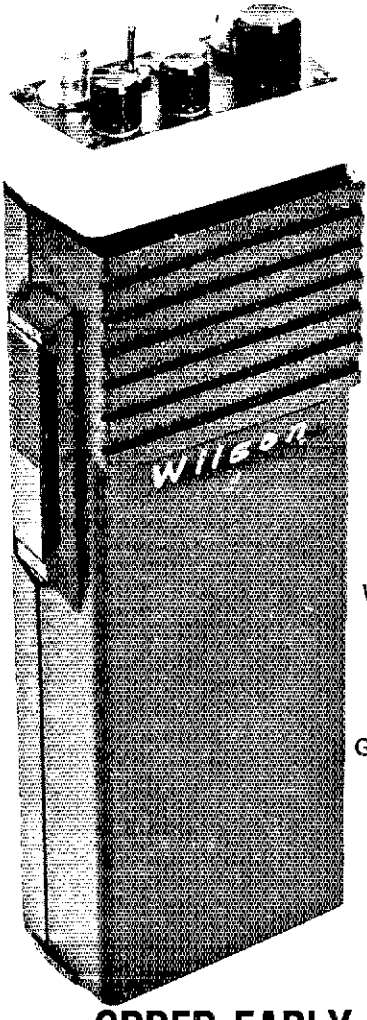

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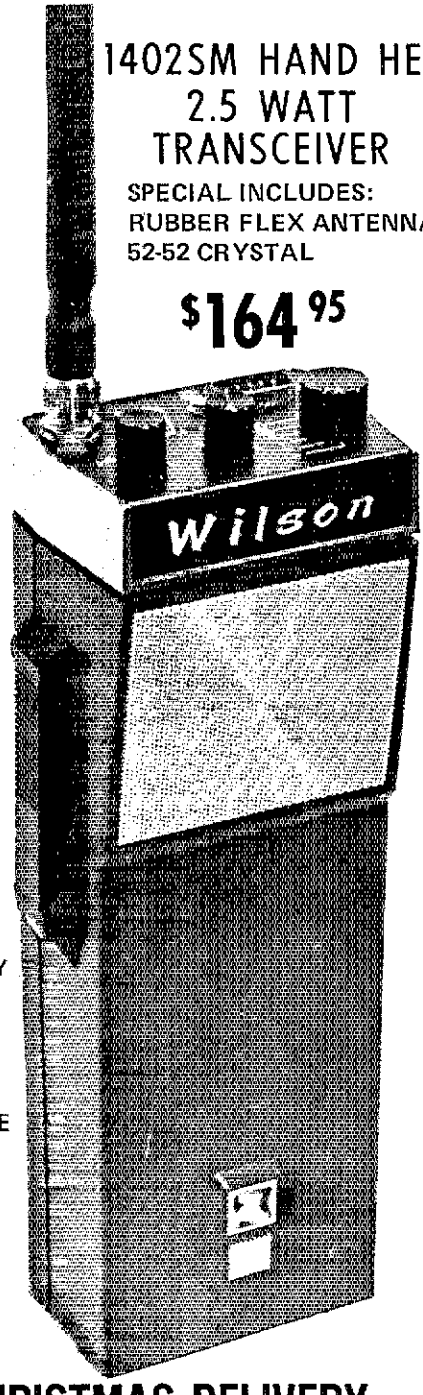

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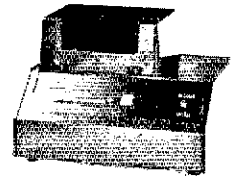

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QST

WAØLBB 72, WAØMLE 65, WAØSEV 60, WØGCJ 58, WBØHBM 50 WBØCZR 47, WBØGVR 42, WØPB 39, KØJMF 36, WAØOWH 28 WAØVCE 19, WØKL 14, WØPCL 12, WØBLI 8, WØFDJ 8, WØNYC 7, WBØLKA 4., WNØOLA 2, WAØWJX 3. (July) WØOF 50.

MISSOURI – SCM, B. H. Moschenross, WAØFMD – Asst SCM/SEC: Cliff Chamney, KØBIX. PAMs: KØBIX WBØER WASKBH/Ø WAØKUH WØNUT WAØRVT. RMs: KØAHL WØBV KØONK KØRPH WØQTF Acting. NET, QNI, QTC: MOSSE 997,114; MEN 376, 52; HBN 239, 18; MSN 221, 51; MON 179 139; MON2 134, 67; STLAREC 69, 3; SCEN 63, 5. An MSN Ne certificate to WNØOKA. Welcome. It seems a reminder is in orde due to the number of certificates I have been receiving fo endorsement. Certificates issued after Feb. 1974 are valid for two years. NEMO ARC operated WØCBL at the Northeast Mo. Fair KFØSM at MO State Fair again a big success. Many thanks to al who participated in the operation. WBØPZR is a new General an WBØLMW and WAØYNC are new Advanced. WAØLGW has enough QSLs for DXCC. It is with regret that I must report KØGYE as Silent Key. Congrats to PHD Amateur of the Month, WBØMPH wh also passed her Advanced Class exam. WØDYI has a new three-element Telerex for 20 DXing. WØGBJ who was first licensed in 1922 as 9CFK has been an ORS for most of that time. Anyone top this? KØLIR reports the Mo. QSO Party will be held on Nov. 1 and 16. Let's support it and have a lot of Mo. activity. Traffic (Aug.) WØOTF 187, WAØYEF 105, WBØHSP 87, WAØFMD 84 WØBV 60, WAØQOA 57, WØOUD 53, KØENH 48, WBØLMW 40 WBØMEO 36, WØNUB 34, WØEPI 27, WBØLRX 24, WBØFQM 19 WAØYNC 16, KØAHL 13, WØGBJ 11, KØRWL 10, WØPEV 9 WBØNXX 7, WAØMOF 5, WNØNPC 4. (July) WØRTW 8.

NEBRASKA – SCM, Dick Dyas, WØJCP – SEC: WAØASM KØVKD a Silent Key. The Lincoln ARC again operating a booth a the Neb. State Fair. Booth emphasis on public service and how to get started in amateur radio. Omaha now has a 6-meter repeater Omaha HAMS busy over labor day week end with communications for the Missouri River boat Regatta. Several days of 2-meter band openings occurred late Aug. WØDMY and WØFJN both hospitalized in Aug. Repeater usage continues to increase. Nebr. Morning Net QNI 1070, QTC 31; Western Neb. Net, QNI 456, QTC 13; Sandhill Wx Net, QNI 162, QTC 3; AREC Net, QNI 213, QTC 1; QCWA QNI 80; Cornhusker Net, QNI 1395, QTC 207; Neb. Storm Net I QNI 1015, QTC 45; Storm Net II, QNI 775, QTC 13; Eastern Neb 2-Meter Net, QNI 275, QTC 30. Traffic: WØVEA 52, KØSEA 38 WAØCBJ 36, WØHOP 35, WØQFB 34, WØGKK 28, WØJDJ 25 WØGOQ 21, WØJCP 20, WØSGA 18, WAØGHZ 15, WØMW 11 WØWKP 8, WØLJO 7, WØVYX 7, WBØIWQ 5, WAØPCC 5, WAØQEX 4, WØIXB 3, WBØKCV 3, WØDJU 2, WAØEEI 2, WAØHFH 2 WAØHQO 2, WØHTA 2, KØMUF 2, WØNIK 2, WØRJA 2, KØUDW 2 WØYER 1.

NEW ENGLAND DIVISION

CONNECTICUT – SCM, John McNassor, W1GVT – SEC W1DGL. RM: K1EIR. PAM: K1YGS. VHF PAM: WA1ELA.

Net	*Freq.*	*Time/Days*	*Sess.*	*QNI*	*QT*
CN	3640	1900-2200 Dy	62	393	29
CPN	3965	1800 M-S 1000 Su	31	456	16
VHF-2	28/88	2130 Dy	31	319	7
CSN	3725	1830 Dy	18	81	4

HIGH QNI: CN – W1CTI and WA1UAX. CPN – W1NQO WA1RU WA1RXA and WA1TFA. SEC W1DGL (also NE Vice Dir.) hopes t see you at the Convention in Hartford. EC reports from WA1NG WA1RXA WA1IKN and WA1OPB. Dir. W1HHR letter to all N ARRL members is very informative and of interest to all – h would appreciate meeting you at the Convention in Hartford. ICR WR1ABM Bulletin includes a Memorial Tribute to Silent Ke WA1OYE, an officer of the Club and our VHF PAM. D1RN Bulleti notes change to 3950 kHz, also includes net procedure info. CS Bulletin includes roster and WA1UAX invites to join and brin originations! Congratulations to: WN1UOT for General Clas WN1VMC for Novice Class; K1EIR for Aug. high traffic; and t WA1SOB now at ARRL! Sept. QST "Operating News" (pg. 8 deals with Club Training Programs – is "must" reading for all clu officers and bulletin editors; could be a big help to the success o your club. June VHF QSO Party results indicate considerabl activity even though not the best of conditions. WA1SFN suggest more pictures with added writeup along with your Logs; goo advice for all contests! Hope to meet you at the Convention Traffic: (Aug.) K1EIR 312, W1EFW 171, WA1FCM 170, WA1GF 141, WA1RYL 129, W1CFI 123, WA1UAX 106, WB2NOM/1 84 W1AW 67, WA1SOB 53, WA1RUR 49, W1GVT 41, K1YGS 3 WA1RXA 28, WA1HLP 23, W1DGL 16, WA1OPB 15, WA1SWJ 14 WA1JCN 11, WA1JYP 8, W1QV 8, WB2SEZ 8, W1KV 7, W1CUH 4 W1BDI 3, (July) WA1SWJ 2.

EASTERN MASSACHUSETTS – SCM, Frank Baker, W1ALP – SEC W1AOG received reports from WA1RTR W1BAB K1ZU K1NFW WA1QKD K1PAD WA1KZT. New ECs: WA1SXU W1JHU K1SOP new OVS OO. K1AXB W1RNG are Silent Keys. K1WK now in Calif. W1ANB moving to Halifax. T9 Club had a cookout a W1MNK's. I would like to get my list of ROs up to date, please le me know who they are. WA1SXU has Swan 500. W1UF moved t Chestnut Hill, has DXCC fone & WAC tone all on 75 ssb. W1LRM now in E. Harwich. K1TCO has SB104. WA1MKP going to G- an HB-land. K1CLM busy with Intruder Watch. WA1PLK back to Univ of Lowell. WR1ADR mast going up to 160-ft. K4BQ, ex-W1CPD is Silent Key. WA1QKD has new Wilson 2-meter Walkie-Talkie. W1UJ using NCX3, waiting for tube for SB401. W1DMS visited W1SDU/ in ME, also meeting in Charlotte, VT. K1PAD had a meeting o hams in Billerica. W1OJM in hospital for a week. K1PNB on 2 wit Regency 2A fixed & mobile, he will speak at any club. WA1JWE ha Swan 700. WA1UQE built Digital Synthesizer. W1EQH has Ports Pak for 2-meter portable. WN1UGJ finished WA9BLK keyer W1QEJ moved to NY state. W1CFU busy with trips to the Cape

CW FILTER

The IMPROVED CWF-2BX offers RAZOR SHARP SELECTIVITY with its 80 Hz bandwidth and extremely steep sided skirts. Even the weakest signal stands out.

Plugs into **any** receiver or transceiver. Drives phones or connect between receiver audio stage for full speaker operation.

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CWF-2, PC board, includes 4 position selectivity switch $18.95
CWF-2, kit $15.95

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W1EMU on 6, W1DYS getting married. WA1AFU now retired. W1LMU has his 40-year pin from ARRL and back on am. W1EE visited West Point. W1IG on 75 mobile, WA1DDN now pres. of Whitman ARC. WA1LXP showed his slides of FD. The Pi-Net of the Middlesex ARC has moved to WR1AEM 96-36 repeater on Wed. at 2000. WA1RVZ mgr. WA1PAZ going to MIT. WA1QYM vacationed in W8-Land WA1FNY in new house he built, in Pepperell. MT&RN had 70 QNI and 7 QTC. EMRI had 369 QNI, 250 QTC. EMRIPN had 197 QNI, 127 QTC. EM2MN had 33 QNI, 19 QTC. WA1TOL has a new HR-2B. WA1OMM up in VO1-Land for a week. Norwood ARC buying a Kenwood TS-900. WA1IEB has a TS-520. W1CUY showed his slides of his trip to Africa & Spain at the Massasoit ARA. NFNN had QNI 78, QTC 56. K1PNB is secy-treas. of the Montachusett Repeater Assn. If you are interested in joining the International Amateur Radio Hosts (IARH) write to W5QPX/YN4IM in Amarillo, Tex. Quite a gang from our Section went to the annual gathering at Saunders Bay, Gilford, NH, held by the Central New England Net. W1GRN said the Minuteman Repeater Assn. held a meeting in Waltham. We have many towns where an FC is needed. If you have a Tech. license or better and belong to ARRL, we need you — Framingham, Wayland, Sudbury, Reading and many others, drop W1AOG or myself a card. Traffic: (Aug.) WA1MSK 351, WA1QKD 218, WA1RUR/1 193, W1UX 153, W1DMS 146, K1PAD 98, W1CE 93, W1QM 82, W1MX 72, W1EIH 68, K1PNB 51, W1EMG 50, WN1UGJ 36, WA1OWQ 30, WA1PQV 22, W1EQH 10, WA1IFE 9, W1GJK 7, W1AOG 6, W1DMH 4, WA1FNM 1. (July) W1QVY 167, WN1UGJ 86, W1QJM 82.

MAINE — SCM, Peter E. Sterling, K1TEV — SEC: K1CLF. PAM: K1GUP. RM: K1MZB, W1BHO K1GAX W1UOT W1GZS attended Dayton Hamvention. The Northeast Area Barnyard Net reports 872 check-ins for July; (June) 25 sessions, 808 check-ins. W1ROM again active. Sorry to report the passing of K1RNR, WA1DYS and W1QUI. New hams in Maine are WA1VBF WN1VBX WA1VAZ WN1VBW WN1VCV WN1VER WN1VEV WA1VGC WA1VFF WN1VGB WN1VHB WN1VGJ WN1VHA WA1VID WN1VHZ WN1VHS WA1UZJ WA1UZG WN1UZL WN1UYV WN1UYS WN1UZA WA1VAI WN1UZR. WA1MUX is going to be the next SCM for the state, so everyone can send their reports to him. K1MTJ still operating portable KH6 on Guam, awaiting his KG6 call. WA1GKA had a good turnout at his outing this year. K1AXO has moved to a new QTH. W1JRM is on 2-meter fm. K1SRF building new ham shack. W1PWD using wind power. WA1FCM and XYL WA1ICN are returning to Maine. Traffic: (Aug.) W1CTR 1. (July) WA1IOG 142. (June) WA1IOG 28. (Apr.) K1MZB 51, K1GUP 33, K1TEV 2. (Mar.) K1GUP 61, WA1JHT 52, K1MZB 48, WA1IOG 40. (Feb.) K1MZB 83, WA1JHT 41.

NEW HAMPSHIRE — SCM, Robert C. Mitchell, W1SWX — SEC: K1RSC, RM: WA1GCE, PAM: K1YSD. Welcome new hams WN1VEZ WN1VIK WA1VIB and WN1VHT. New OO WA1PSL. The last male ham in Rye is K1YSD since K1RSC moved to Brentwood. WN1TIR was WB9FXU's 50th state. K1PQV on 2 fm with a Midland 15-300 and has QSOed K1BCS & K1ACL. The NHVT Net report from RM WA1GCE shows 151 check-ins, 27 sessions & 56 traffic. K1GUC's son now WN1VHT. New officers of Port City ARC are WA1UZJ, pres.; WA1UTO, vice-pres.; W1DZZ, secy; K1SDL, treas. WA1FSZ finished his 6-meter kw, did great in the VHF party. WA1JSD & family vacationed to & from Ariz. on 80 thru 2 mobile. The GSPN report courtesy of K1YSD shows 388 check-ins, 82 traffic. Heard on repeater K1BCS K1APQ and K1PQV. PAM K1YSD NHEPN reports 109 check-ins, 17 traffic. WN1UAV has his 25 wpm code proficiency, needs 3 more for 80-meter WAS. Happy Thanksgiving. Traffic: (Aug.) K1BCS 58, WA1GCE 34, K1LMS 31, K1PQV 29, W1SWX 5. (July) K1PQV 14.

RHODE ISLAND — SCM, John E. Johnson, K1AAV — SEC: W1YNE, RM: WA1POJ, PAM: WA1RET. The Newport County RC reports WA1KHH has become a member. The Annual Club picnic was held on West Main Road near the repeater site. The WA1RFY repeater now in operation with a twenty watt transmitter power. W1AM of the Club has written articles for the Club newspaper called the Modulator, W1YNE has passed his Advanced Class exam. WA1RET continues to be active on Oscar 6 and 7. Now that the summer is over we can get back once more to our ham shack and start the fall and winter projects. Don't forget to drop your activities report to the SCM for the RI Section. Traffic: WA1POJ 146, W1YNE 89, WA1RET 54.

VERMONT — SCM, James H. Viele, W1BRG — SEC: W1VSA.

Net	*Freq.*	*Time(Z)/Days*	*QNI*	*QTC*	*Mgr.*
VTSB	3909	2300 M-S 1230 Su	633	78	WA1PSK
Carrier	3935	1300 M-S	544	22	W2DSK
Green Mt.	3932	2130 M-S	459	30	W1JLZ
Vt. Phone	3909	2130 M-S	86	4	W1KKM
VFRED	3909	2200 Su			

WB2RKF/1, age 15, holds Extra Class ticket and is active on 80 and 20. Congrats! We mourn the passing of K1PSY of Montpelier, deceased Sept. 8. WA1KAH has his First Class phone license and is operating for WCAX-TV. WA1PSK planning to run in the election as SCM of Vt. section. WA1QOP attended 1RN picnic at Seekonk, Mass. Traffic: WA1QOP/1 81, W1LMO 9.

WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1BVR — Organized net activities: CW RM W1DVW; PAM WA1MJE (traffic nets) & WA1DNB (ARES); Repeaters W1KZS of WA1PLS, County ECs: Berkshire W1KZS; Franklin K1RGQ; Hampshire W1CSF; Hampden W1SIR; Worcester K1SSH. It is not necessary to be a League member to join the ARES. At the NOBARC Hamfest the following ARRL meetings were held (with attendance as listed): WMN 20, WMEN 20, DIRN 20, AREC 6. Worcester Tech Club W1YK now has a Kenwood TS-599A and R-599A, W1DOY has an SB500 on 2 meters. WMN (3562 7:00 PM dy) held 31 sessions with QNI 142, traffic 132. WMPN (3935 4:30 PM M-F) held 21 sessions with QNI 210, traffic 30, 55 differen

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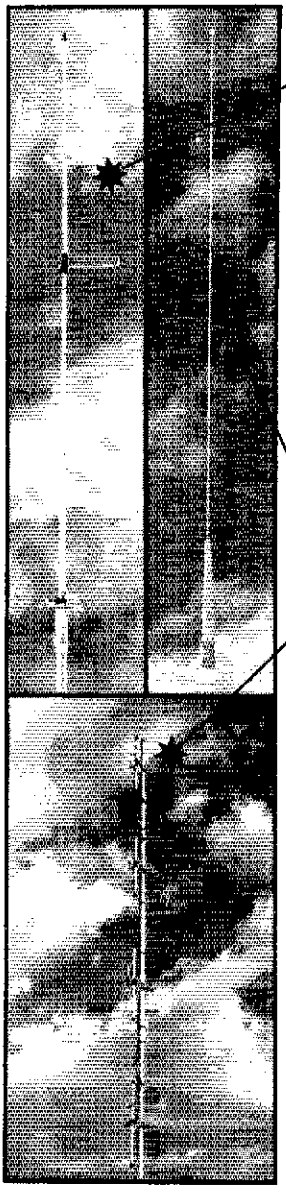

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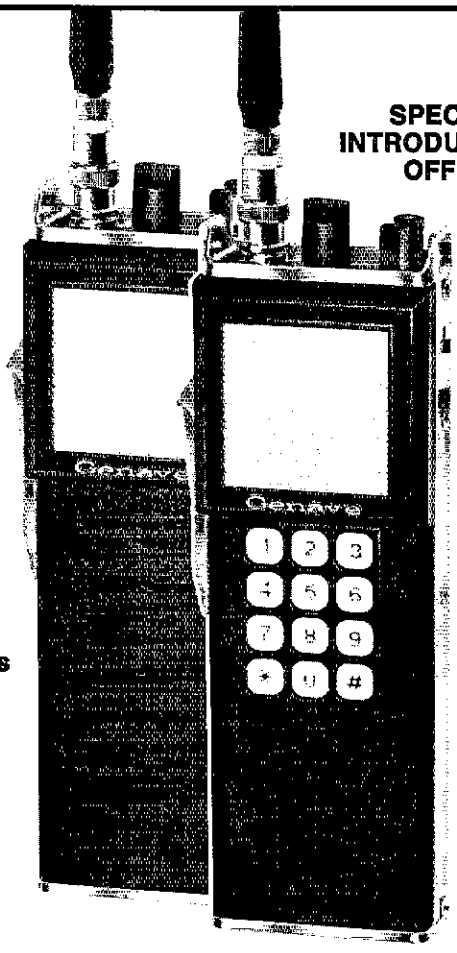

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- **6 Channels**
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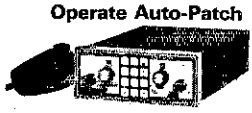
☐ 
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☐ **ARX-2 2-M Base Antenna**	@ $29.95	$
☐ **Lambda/4 2-M Trunk Antenna**	@ $29.95	$
☐ **TE-I Tone Encoder Pad**	@ $59.95	$
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stations, WMEN (3935 Su 8:30 AM) held 5 sessions with QNI 5 plus QNI 37 by liaison from 2 mtr. repeaters. WM AREC Repeate held 21 sessions with QNI 138, 23 different stations. Bulletins fro following clubs are acknowledged with thanks: CMARA, HCR/ NOBARC and WM AREC Repeater Assn. Traffic: (Aug.) WITM 135, W1BVR 119, WA1MJE 74, W1DVW 70, WA1RLP 56, W1KI 39, W1DWA 34, W1STR 25, WA1OUZ 18, W1DOY 3, WA1PLS (July) WA1KHP 388.

NORTHWESTERN DIVISION

ALASKA – SCM, Roy Davie, KL7CUK – KL7HG now a Silen Key. The Snipers Net members and guests enjoyed a picnic at th SCM's QTH with over 40 people signing the log. KL7APV anothe OT in Alaska has retired and moved to W9-Land. We have a nev station on Adak, WA4DOX/KL7 look for him on 20 cw. A new E appointment is KL7HMK for the Eagle River area. KL7JDO, hi XYL and KL7GCH from Kodiak spent some time on the mainlan and attended the picnic and at this QTH. KL7HDX back on the air KL7HLC now in Fairbanks. KL7HOV reports the Snipers Net 46 check-ins, 31 sessions, 1 emergency 11 P.P. 3 OBS. Chuck wa presented with a plaque at the picnic for his untiring work as PAM KL7APV also received a similar plaque for his traffic handling fo the public. I am starting my second term as SCM, please get you reports in early and I need many more from many more stations Traffic: KL7JDO 8, KL7HMK 6, KL7GCH 3, KL7HDX 2, KL7HL 1.

IDAHO – SCM Dale A. Brock, WA7EWV – SEC: W7JMH, PAM: WA7HOS.

Net	*Freq.*	*Time/Days*	*Sess.*	*QNI*	*QTC*	*Mgr*
FARM	3.935	0200 Dy	31			W7TW
IMN	3.635	0300 M-F	21	202	77	W7GH
RACES	3.99	1415 M-F	21	399	11	W7KD
Id.Silver	3.93	0115 MWF				W7I

WA1PID/WA7WXY is new OO in Idaho. As indicated elsewhere i QST, nominations are open for the office of SCM of Id. Summer ha made report cards and news scarce. OOs W7KDB and W7FE refrained from issuing warnings. WA7IFC returned to Nev Meadows, W7KDB changing jobs, will not be able to continue as N for RACES; thanks for a job well done. Traffic: W7GHT 222 K7NHV 76, W7KDB 22, W7GBO 15.

MONTANA – SCM, Harry A. Roylance, W7RZY – Asst. SCM Bertha A. Roylance, K7CHA. SEC: WA7IZR. PAM: WA7PZO. have received a letter from the National Oceanic and Atmospheri Administration (WX Bureau). They are desirous in establishing weather reporting service via amateur radio into areas not served b Federal weather reporting stations. I have discussed this with severa and would like to have your opinions if so interested. 1MN for Aug was 21 sessions, 77 QTC and 202 QNI. W7CT took a nice vacatio west and south and is now home. Silver Bow County Emergenc Net will again be on via the WR7ABY repeater. Traffic: W7TGU 29 W7NEG 16.

OREGON – SCM, L. R. Ray Perkins, WA7KHI – SEC: W7HLF RM: K7OUE. PAM: K7RQZ.

Net	*Freq.*	*Time(Z)*	*QNI*	*QTC*	*Mgr*
BSN	3908	0130			WA7MH
OSN	3585	0245	155	108	WA7TX
AREC	3993	0300	392	4	WA7RW
NUCLEAR	50.250	9:30 AM Su	17		W7FE

Meter AREC Nets – Portland area AREC 04/64 at 0330Z, Jackso Co., 0315Z, Josephine Co. on .76 at 0330Z. There may be more have not heard of, if not, why? If your cw speed worries you wh not QNI Northwest Slow Net, 3702 kHz at 0300Z, Word from BS seems to be troubles from lack of traffic. Licensing and upgradin classes are now being planned. Check the following. Salem, P. O Box 61, Zip 97301. Portland, check OMSI Eugene, both clubs hav plans, call me, 689-6897. Medford, call Dwight Albright, Grant Pass, call F. E. White, in Bend call Alice McCullough. Vote! SCM election. Traffic: K7IWD 121, K7OUE 98, WA7TXV 87, WA7UJC 66, W7HLF 38, W7DAN 36, WA7YEU 35, WA7MHP 17, W7LT 10 WA7QDC 7.

WASHINGTON – SCM, Mary E. Lewis, W7OGS –

Net	*Freq.*	*Time*	*QNI*	*QTC*	*Sess.*	*Mgr*
WSN	3590	2045			31	W7LC
NSN	3702	0200Z			31	WA7ND
NWSSB	3945	1830	631	57	31	W7EM
NTN	3970	1130	1662	117	31	W7PW
WARTS	3970	1800	2489	305	31	W7QG

Tacoma ARC outperformed their 1974 Hamfair with excellen attendance and seminars. ARRL's Vice President's Forum was wel attended. Visit us again, Vic. All this activity report time finds me i Reston, Va., at the ARRL National Convention compiling data fo the Northwest Division Convention July 29, 30 & 31, 1977. A Dat To Remember. I also secured National QCWA Convention fo Seattle to run concurrent and with the Northwest Divisio Convention in 1977. NW QCWA's see you there. Our plans ar starting to shape up but the planning committee needs ideas fro you. This will be a Northwest Division Convention, YLRL's contac any member MINOW's, she will assist you. W7QGP had intervie with several members of FCC on M Street in Wash., D.C. The inf was too long for this column. An s.a.s.e. will get you a copy of thi report. Large attendance at Walla Walla Hamfest Sept. 20-23. VH activities on the increase with 2-, 6- and 10-meter openings. Severa members of the Mike and Key ARC worked Muscular Dystroph Telethon. PSHR: W7LG 41, K7CTW 42. Traffic: (Aug.) W7DZ 290, WA7BDD 129, K7CTW 88, W7LG 83, W7APS 78, WA7EDC 52, W7EBU 33, W7KEI 32, W7BQ 31, W7PWP 23, W7IEU 19 W7BUN 12, W7AIB 8, WA7OJI 8, W7BCS 2, WA7GZB 1. (July

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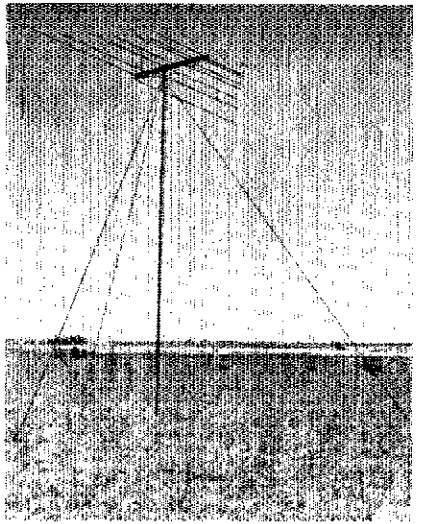

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PACIFIC DIVISION

EAST BAY – SCM, Charles R. Breeding, K6UWR – Asst. SCM: Ronald Martin, W6ZF. SEC: WB6RPK. Asst. SEC: WB6DSL. The Lake Co. ARS had a very busy month with a successful picnic at the home of the pres. W6IXK. Even more successful was the radio booth at the Lake County Fair. The Mt. Diablo ARC also had a fine picnic with your very busy Dir. and Vice-Dir. present. The Northern Calif. Contest Club has relocated their 450 Mhz repeater in the hills above San Leandro. It was my pleasure to attend the Sierra Hamfest in Reno. It was good to see so many attending from the East Bay Section and our thanks to the Reno gang for an FB job. WB6YBE has his Advanced ticket. WA7QVF visiting the Napa group. W6ELW had a bout in the hospital. WA6VEF is an ORS. With 5BDXCC under his belt, WA6AHF is hard at work on 5BWAS with only a few states left. WA7WMR/6 living in Walnut Creek and attending Cal State at Hayward. From CCRC the following were listed as new calls in the Section. WA6MOO WA6ABE WN6MOI WN6LOP WB6LRK WN6LOW WB6LRI; WN6s LRB LQZ LOY LPR LKZ LLY LMU LMY LLS LLQ LJP LJY LJM LGR LGP LGT LFB LGO LGX MFO MCS; WA6LGI WA6MGO;WN6s MDO MEM MON MLG. Good luck to all. Traffic: K6HW 441, W6JXK 160, W6TYM 132, WB6VEW 76, WA6CAZ 18, WA6VEF 2, WB6WBG 2.

PACIFIC – SCM, Pat Corrigan, KH6GQW – EC Windward Oahu, KH6HOU; Asst. EC WW Oahu, KH6HPQ. Ex-KH6HCM now W7MRS. KH6IAC's prop. predictions continue very accurate. KH6BZF says he now has kw on 6 & 2. Lee also reports JH1VMQ visited KH6FGA. KH6GMP had big score in SEA Net Contest. EARC sked soon to put more new equip. at rptr. sites. KH6IGJ/KSCIT moved in time to make the ARRL National at his new QTH, Reston, Va. KH6GDR saw W6 friends during recent W. Coast trip. WA6IQM reports trip to Kauai was most pleasant. Div. Dir. W6ZRJ wrote he really enjoyed visit and chance to meet Pac. Sect. members. Oahu cable TV stations carrying ads about Am. Rad. Serv. KG6JAQ, WPTN Net Mgr, continues to ramrod tfc in Pac. KH6HGP getting settled in New Ewa Beach QTH. KH6IAC says DL7TR recently enjoying islands. HARC auction had great turnout. KH6IPN/W4HJL having good success on 2m from his Laie QTH. KH6AHZ staunchly performing Intruder Watch duties. Grateful for many fine comments sent to Hq. re Sect. Traffic: KH6IAC 558, KG6JAQ 367, KG6IEU 57, KH6BZF 17, KH6GQW 6.

SACRAMENTO VALLEY – SCM, Norman Wilson, WA6JVD – SEC: W6SMU. WA6RVR reports his mother, father and best friend became WN6AOJ, WN6AOL and WN6ATT respectively through efforts of W6AJY and his recent radio class. A new class is being offered by W6AJY at this time. K6RWN at Lake Almador in Plumas Co. building a new 400 watt amplifier for use in the upcoming contest season. K6ZY (ex-W6NHA) took a vacation from retirement and put his station back on the air after extensive house remodeling. WA6BRV, pres. of the Lassen ARC reports a small but active group in the Susanville area. K6SG completed his new amplifier. WB6MDP and WA6JVD recently passed their 2nd Class Radio Tele. exam. Traffic: K6RPN 10.

SAN FRANCISCO – SCM, Rusty Epps, W6OAT – Marin Cty Bd of Supervisors issued a Resolution of Appreciation and Commendation to the WR6ACS group for participation in last May's "Bay Shake" simulated area-wide disaster. W6RNL and WB6BDL made PSHR in Aug. WA6ICB is new EC for Humboldt Cty. K6SRM and WB6UPV new ORSs; WA6IQJ and WA6LLX OBSs; and WA6HPF OO. Mendocino and Lake Cty hams trying to activate a repeater in Ukiah. HARC (Eureka) held its annual picnic, swapfest, and football game Sept. 28. Congrats to WA6HPF on his General; WB6EUG from Novice to Advanced; and to SBs own JA3USA who now signs WA6MBB. FWRA (Humboldt Cty) provided communications along the 40-mile course for the March of Dimes Bike-A-Thon. WB6MOV received his OTC certificate. FB OM! W6GGR building RTTY equip. and W6RNL building AFSK and terminal unit for 2m RTTY. WR6ACS started a bulletin service presenting news and info of interest to No. Cal. hams at 8:00 PM on Mon. nites. K6TP helped conduct NPEC's Aug. hidden transmitter hunt. The navy decided to leave WB6HYQ/6 stationed in Marin Cty a bit longer. Traffic: (Aug.) W6RNL 224, WA6BYZ 162, K6TP 131, WB6BDL 88, WB6UPV 39, WA6BTF 23, WB6ITN 9, W6OAT 2, W6GGR 1. (July) WB6UPV 10.

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JPU – The new SEC for San Joaquin Valley is WB6FPV, and you (the EC) will be hearing from him. WB6EHH has a new L4B amplifier and is on all bands ssb. WB6RJN on 2 meter fm. The FARC is updating their repeater with some solid state equipment. WA6QWE on 2-meter fm. W6OWL on 20 and 40 cw working DX. WA6HMB has a TS520 for the low bands and is on 2-meters am. WA6JJA has a new Clegg fm DX. WA6ONI has an NCX-5. WB6RCN and W6TVC are conducting 2-meter hunts in Bakersfield. WB6ZWG conducting code classes at the Bakersfield High School. WN6YAB has an HT46 and SX146. WB6UKB passed his General Class exam and is NCS on WPSS. WA6GXO passed his Advanced Class exam. W6DPD need Dela. for his WAS on 6 meters. WB6ITM on RTTY. The Kern Co. Radio Club boasts 70 members. The Kern Co. Radio Club participated in the Jerry Lewis Telethon with W6OQO in charge. WB6FPV has a TR22 and an HW101. WA6SHO being transferred to Guam. WA6CPP worked all 5 Hawaiian counties. Traffic: WA6RXI 60, WA6JDB 5, WA6CPP 1, WB6FPW 1.

SANTA CLARA VALLEY – SCM, Jim Maxwell, K6AQ/W6CUF – W6RSY made BPL; W6RFF WB6TYA made PSHR. WB6IZF now QRV with a vengeance after his overseas work, as evidenced by his new OPS, OVS and EC appointments. Welcome to new NCN member WB6YIN now QRV from San Mateo. It's back to school for WB6TVA and WB6VBG, after a summer full of tfc handling. WA6TUF now had 43 states and 10 countries worked through Oscars 6 and 7, plus an Oscar SSTV QSO with KH6HJF. Also

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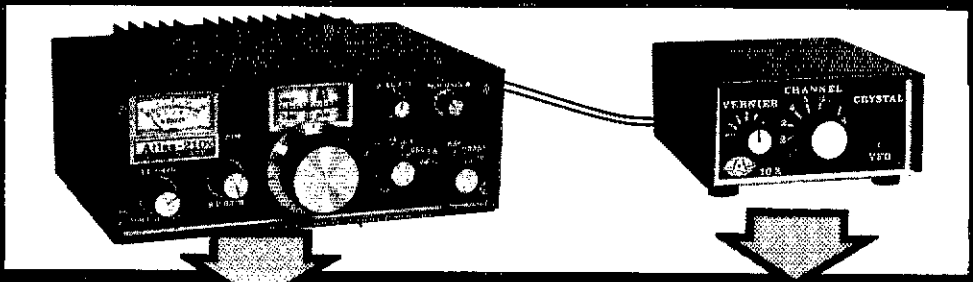

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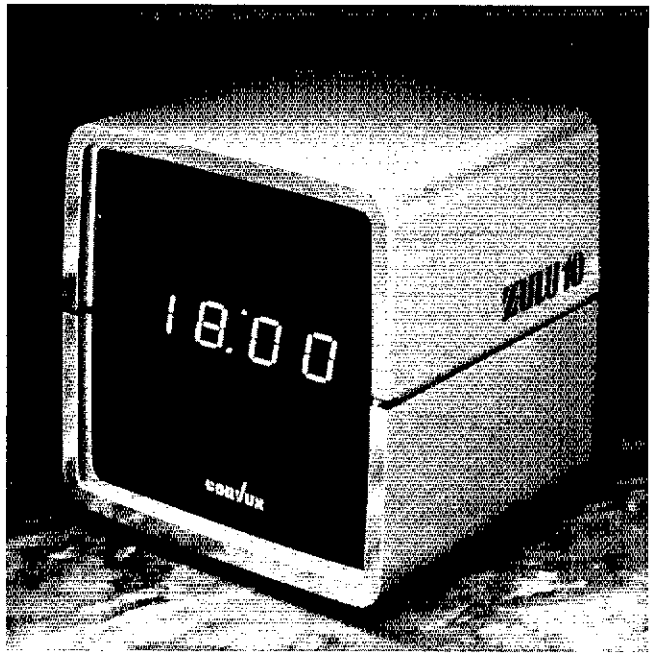
recently QRV on Oscar are W6ASA, WB6OVH, W6ISQ, K6AC W6AUC has been pushing phone patches via his new FT101 W6KHS and K6LFH also report new rigs, with each on 2 with a ne Multi-2000. K6LFH expects to use his also on an upcoming trip EA8. Congrats to WN6FLD, who passed his General Class exam, new SB102 is on idle, waiting for the QSY to General frequencie WA6HAD is QRV with the Ten-Ten net. WB6JNN reports uniq mobile in motion QSOs through an Oscar 6 and 7 linkup! Two wa resulted with VE7BBG and W9TGY, with the VE7 and W9 in Oscar 7 432, out on Oscar 6 28 MHz. WA6TUF has heard Japan v Oscar, but no two way thus far. W6ANX, now retired fro teaching, is picking up the chalk again for a two year stint teachi in DL. A successful NCN-SCN picnic was organized by WB6IYA Lake San Antonio. Among those on hand were WA6BMV WB6D WB0HYQ/6 WB6OYN WB6QNG K6TP WB6TYA WA6UO K6UYC WB6VBG WA6VBS and WB6ZVC. The Santa Cruz Garde repeater WR6AJB getting an antenna facelifting, reports WB6PC Traffic: W6RSY 1285, W6YBV 276, W6BVB 126, WB6VBG 12 W6RFF 105, WB6TYA 101, W6AUC 52, W6NW 39, W6DEF 1 WB6ESF 14, W6KZJ 13, WA6HAD 3.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Chuck Brydges, W4WXZ SE W4EHF, PAM: W4OFO, RMs: K4MC WB4FTF, VHF PAM: K4GH EC of the month is W4FMN and Bert is your contact in Wake Co. get listed in his organization. New SEC for NC is W4EHF replaci K4FBG who stepped down because of heavy schedules. K4FBG a grand job as SEC and we are all sorry to see you go, Herb. contacting W4EHF use 818 Emeline Ave, Fayetteville, NC 2830 Congrats to W4OFO who takes over as PAM. Burt is super-active our phone nets and will be standing by for your inquiries and he A big thank you to WB4IMG who carried the PAM banner the past years. Reminder: The NC QSO Party starts 1900Z Nov. ending 0100Z Nov. 3, check Operating Events section of QST details. New Novices in Raleigh area are WN4s AEV AFW ALT AC and APK with last two a husband-wife team, congrats. WB4VE will be back at UNC and passed Extra, congrats. WA4LWO awa new SB104 and passing tfc. W4EMV & WA4SJY on 2 with new r and WR4OYO has new tower/tribander. K4KH visited 4X4-land July and had great trip. K4FTB reports state fairs building up traf arteries. WB4MXC continues his fine Newsletter for the Six-Meter Assn. (NCSMA) and reports over 47 members with go six-meter contest activity with K4GMJ taking first place honors t times straight in 2 month long 6-meter contest. Repeater Journ voice of the Carolinas-Virginia Repeater Assn. (CVRA) reports repeaters in operation or getting ready. Support your local repea and CVRA, write W4IZI, PO Box 3325, Burlington, NC 2721 Cape Fear ARS is completely moved to Methodist College with station on five bands, under pres. K4NUG is very active with AR and helping local State Highway Patrol. Last minute reminder: to nearest Motor Vehicles office and get form MVR-35 and file Nov. for call-letter license plate for '76 at cost of additional $4.(Traffic: (Aug.) K4FTB 185, K4EZH 138, WB4PZU 114, W4OI 86, K4MC 45, WB4KHZ 34, W4WXZ 30, WB4MXG 27, K4AIH WB4JMG 14, WB4CES 6, W4EHF 3, W4FMN 2. (July) WB4O 36, WB4JMG 10, K4DJ 2, WA4LWO 2.

SOUTH CAROLINA – SCM, R. H. Miller, WA4ECJ – SE W4ZMZ, RM: WB4OBZ, CN News, a monthly publication WB4OBZ, serves both the SC and NC contingents of the Caroli (combined Section) Net. This enterprise fills a long-felt need, an worthy of your support. Winner of the Code Proficiency Contest Charlestowne hamfest was W4IOC, copying solid at 45 wpm a 75% at 50 wpm. With a pencil! The SC Novice Net now in operati on 3718 kHz at 2130Z daily. The Novices are our Gener Advanced, and Extras of the future, so lets give them a help hand. We understand the net needs a mgr. Capable volunteers ple contact RM WB4OBZ. The SEC AREC is long overdue for complete reorganization. Please give your full support to new SE W4ZMZ. A hearty welcome to WN4UKU, a new Novice Spartanburg. SSBN reports 27 sessions, 47 messages, 603 check- for Aug. (June) SSBN 82, CNE 30 sessions, QTC 126, QNI 237 Aug. (July) CNE 118, (June) 135. Traffic: (Aug.) W4NTO WA4UZA 1, (July) WB4OBZ 113, W4NTO 70, K4FRX 8, (Ju W4NTO 55, W4WQM 46, WB4OBZ 45, K4FRX 12, WA4LOU WA4UZA 1.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM: A. Martin, W4THV. SEC: WA4YIU. Asst. SEC: WA4PBG. RI W4SHJ K4IAF WB2VYK/4 WA4AVN WA4DHY. PAM: WB4VK Our Grand Old Man, WA4JUT is now a Silent Key. W1AW ran VN one night! (WB4FDT op). I wish you all could read the O reports of WA4MMP – there's real adventure in the World Above MHz! The Norfolk/Va. Beach AREC News and the Tidewater SS report are fine examples on how one locality can get themsel together! W4DM promises more activity next season as ust WA4YIU and K4VWK operated KF4FCF at Five County Fair Farmville week of Sept. 8. WA9NEW/4 active from Raleigh, New PVRC officers: W3GRF, pres.; W4WSF, vice-pres.; W3A treas.; W4ZM, secy. ARRL First VP, W4KFC, roamed from She to Takoma Wash. hamfests. WA4CLK added to traffic count dur vacation in Minn. We welcome W4LXB, ex-K2EOP, to Callawa, WA4DOX active at KL7AIZ, NAVFAC, Box 71 (170), FPO Seat Wash. 98791. WA4AJF getting his feet wet NCSing VSI W5VZO/4 back from Maine vacation. WA4HHG on with new K and T4XC and SB 200. Congrats to K3DSQ/4 on getting his M W4DYV on with Atlas 210. W4KAO reports work interfering aga Son of W4TZC passed General; one more son to go! W4YZC gett organized in new QTH in Centerville. WA4HUB forming counci Asst. ECs in Richmond. WB4WUX on with SB 500, WB4GMC of college. K4GQS passed Advanced – and moving to Tokyo! WN4 is now WB4NBI! WA4WQG has rig problems. K4KA had first Q via satellite. K4MLC back from vacation in Phoenix at sc wedding. WB4DRB in new Charlottesville QTH overlooking c County hunting slow for W4JUJ (3029). WB4WDQ/4 reports n "C" Line at Winchester ARC's W4RKC. Net reports (QNI/QTC



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VFN (July) 777/34, VSN 344/100, CV2FMN 491/87, V
Beach/Norfolk AREC 45/?, Tidewater SSBN 40/?. Va. PON 33/2
K4EZL passed Extra, visited W1AW and W3CUL. Just learned th
W4QDY is our new SCM, so start shifting your wonderful suppo
from me to him. I will do my final column in next issue. Traffi
(Aug.) WA4EPJ 189, WA4CLK 121, W4YZC 95, WB4YKM 9
K4GR 84, WB4FLT 81, W4SUS 81, K4JM 79, WA4YIU 70, W4U
64, K4MLC 57, WB4KIT 55, WB4DRB/4 38, WB2VYK/4 3
WA4AJF/4 26, WA4HUH 25, WA4SMR 24, K4KA 19, W5VZO
19, WA4PBG 14, W4LXB 13, K4VWK 13, W4LGM 11, WB4YX
11, W2TPV/4 10, K3DSQ/4 10, WA4HHG 10, WB4LEK 1
W4KFC 8, W4MK 6, WB4RDV 4, K4EZL 3, WB4GMC 3. (Jul
K4JM 36, W2TPV/4 19, WB4YXN 17, WB4WUX 10, W4TZC
WA4WOG 1. (June) W4YZC 74.

WEST VIRGINIA – SCM, Kay Anderson, W8DUV - RM
W8HZA, PAM: WB8DQX. WVN Net reports 144 stations handle
127 messages. 8RN representation was 6 (93%) traffic up 6%. WV
meets nightly at 7 PM on 3567. Activity on phone Net slight
down – 645 stations handled 108 messages in 31 sessions. T
Mid-Day Net reports 433 stations and 91 messages. St. Albans clu
began 8-week course for beginners on Sept. 8. On 9th week class
will be aimed at Generals and Techs wanting to upgrade licens
WB8GDY in charge of code class; K8WMX will teach the theor
Highest scoring WV station in WV-QSO Party (held in June) w
W8BT; runner-up WB8DQX. WA8KCJ planning to put up ne
vertical for 6-meter fm. W8CKX received QCWA 50-year pi
congrats. Happy to hear from ex-W8GIU, now W5QPX/YN4I
working with International Amateur Radio Hosts (IARH). Welcon
new amateur WB8IUML, XYL of W8CZT. After very long wait, FC
came thru for WB8VXD, a valuable new member of Tri-State AR
in Huntington. Traffic: (Aug.) W8HZA 84, WB8DQX 59, W8EL
42, W8CKX 40, W8CZT 10, WB8LAI 10, K8QEW 8, WB8CPU
W8DUV 7, K8ZDY 7, W8FZP 6, WA8RCP 5, W8ETF 4, W8HIC
W8MZZ 3. WA8NDY 3, WA8LFW 3, WA8POC 2, WA8RUZ
WB8QYN 1. (July) W8CKX 32.

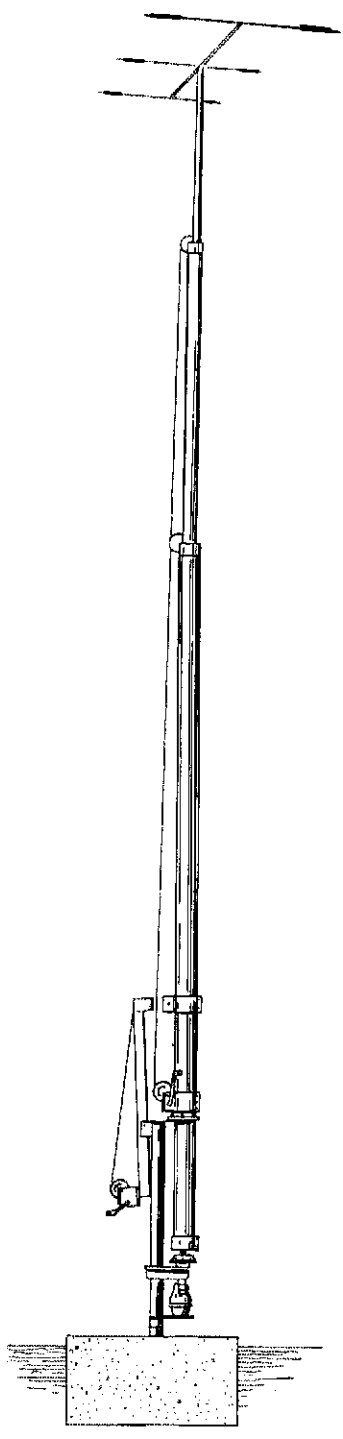
ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde O. Penney, WAØHLQ – SE
KØFLQ. RM: WBØHCK. PAMs: KØCNV, WAØYGQ. Newly elect
officers of the Colo. Ten-Ten Chapter are: Chapter Head WBØFQ
Vice-Chapter Head WAØYNQ, Certificate Mgr. & Treas. WBØLF
and Secy. WBØLFO. Charter membership as of July
numbered 24, while total chapter membership exceeds 40, plus
out-of-state members. It is with deep regret that we add to the l
of Silent Keys, the calls WØTIJ WØFU and WNØDLH. Congra
WAØYNQ who recently topped 500-10-X numbers and is now
member of the 500 club with VP No 230 (First in Colo. Sect
KØOST is now fully operational on 450 MHz, and is hard at wo
on 450 mobile, with 223.5 MHz fm and vhf RTTY next in lir
CCN is doing very well, and welcomes its newest membe
WNØMRU WNØMRB WNØNHA. Net traffic for Aug. Hi-Noon Q
505, QTC 19, informals 124, 29 sessions. Columbine QNI 118
QTC 107, informals 351, 1194 minutes. Late Net Tfc for June: SS
QNI 58, QTC 41, 16 sessions, 298 minutes. Late Net Tfc. for Jul
SSN QNI 32, QTC 17, 12 sessions, 140 minutes. CCN QNI 2
QTC 208, 30 sessions. Traffic: (Aug.) WØWYX 1343, KØZSO 86
KØYFK 698, WAIQME/Ø 321, WØETT 183, KØDCW 129, WBØI
129, KØSPR 128, WØSIN 100, WAØYNP 92, WØHXB 56, WBØJC
39, WØLAE 30, WØMYB 18, WAØYNQ 15, WBØIZO 9, WØPT
WAØYED 8. (July) KØYFK 692, WBØHCK 190, WØLQ 15
WBØIBS 138, WBØIZO 21, KH6BZE/Ø 1.

NEW MEXICO – SCM, Edward Hart, Jr., W5RE – Asst. SC
Joe T. Knight, W5PDY. SEC: W5ALR. RMs: W5UH K5KPS. PAM
W5PNY W5DMG. New Mexico Road Runner Net meets at 18
local time on 3940 kHz daily, this month reported QNI 692, QT
32. Southwest Net (SWN) meets daily on 3585 kHz at 1915 loc
time, had QNI 187, QTC 157. The SWN consists of stations fr
New Mex. and Ariz. as Ariz. has no ew net at the present time. T
weather station in Albuquerque is now in operation and can
dialed up thru the Mt. Taylor repeater. The station was financed a
is being serviced by the Radio Clubs of Albuquerque; The Carav
Club, the Albuquerque ARC, and the Upper Rio Grande VI
Society. W5PDY was the ramrod for this effort, and is t
coordinator for the three clubs. Traffic: K5KPS 182, WB5KSS 17
K5MAT 168, W5IIH 135, W5ENI 131, W5RE 111, W5HRS
W5PDY 53, W5YQ 21, WA5OHI 10, W5BWV 7, WA5MIY 4.

UTAH – SCM, Ervin Greene, W7FU – SEC: WA7ZBO. R
W7OCX. Aug. was filled with some very fine Hamfests with Ut
and W1MU the best ever. WA7TSB left in Sept. for a mission for t
LDS Church. WA7OXZ and ex-WN7STQ daughters of WA7M
have returned to school in Ariz. Dallas reports long skip showing
on UCN. WA7ZJD went for his 2nd phone in Sept. W7BE planni
another mobile trip to Mont. and plans on working much ra
while his XYL drives. Herb does a good job of checking into B
and keeping in contact with his home while away. WA7WKO a
group are demonstrating ham radio to the high schools in the val
and have all of the schools either visited or scheduled. Much is be
discussed about the proposed re-structuring of the VHF S
WA7SYV and officers are doing a super job with the propos
WR7ACY in a new location and coverage greatly increas
WA7GWU reports a duplexer and new antenna have been orde
for the Hidden Peak repeater. Traffic: WA7MEL 66, WA7TSB
WA7OAU 42, W7OCX 25, WA7JRC 23, W7DKB 11, W7EU
W7BE 3, WA7ZJD 3.

WYOMING – SCM, Joe Ernst, W7VB – The Wyoming Weatl
Net, 6:30 AM to 7:15 AM MDT on 3920 kHz M–S has a new cr
with K7TWK of Newcastle on M-T, W7TZK of Sundance on W-
K7VWA of Tensleep F-S and K7NQX and W7SQT of Cheyenne
backups. Wyo. RAs were on the firelines at the 2000 acre blaze
the Big Horn mountains over the Labor Day holiday. W7V
maintains contact with his wife, K7WUR, a flying nurse, as s
accompanies patients to Billings, Jackson, Rawlins, Casper a



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Great Falls by way of two meters and thru repeaters. The Great Plains Repeater Assn. should have their repeater on Laramie Peak elev. 10,178 by Oct. 1st on 25-85, control points Douglas and Wheatland. WA7WGF has just put together a new frequency counter. After completion of all his electronic gear in his pickup, everything from tape decks to two meters, WB7AHL of Lander had the truck totalled while parked by his house on Labor Day. Traffic: W7TZK 137, K7VWA 98.

SOUTHEASTERN DIVISION

ALABAMA – SCM, Jim Brashear, WB4EKJ – WB4IYW new rig and active on AENM and AENT. Congrats to the Tenn. Valley Chapter, QCWA. Charter members include W4HHU, pres.; W4RQS secy.; and K4YUP W4s ODT IJC RNX OBV GBR; K4s UR GUU IIR MG JK; W4s FJN LRE MBA IKK; K4s GKJ ER DP DV and W4MIO. There are currently 31 members plus a few applications being processed. K4CUU reports WA4JQZ contends you have a better ground while mobile if you get stuck in a mud hole. K4UMD new KLM10-140 for 2 meters and now will be running about 140 watts; also has auto patch in mobile unit. The Birmingham area will soon have new Motorola Solid State rig on .34/.94. The AENX (.34/.94, Birmingham 2100 local time Tue. nights) welcomes any check-ins. Enjoyed the dinner/meeting with the San Mountain Repeater Assn. in Guntersville. They have formed a new net – Sand Mtn. Emergency Net S, Tue. & Thur. nights, .16/.76, 2000 local, WB4BFQ Net Mgr. Welcome to the following: WA4s UBD UKB ULO UIR UMS. WB4AJN, WN4s ADJ AFN AGC AGM TZO UCO UCQ UCS UCT UCR UHB UHY UJK UMM UNA. WB4FZQ unable to accept FM appointment, so I have assumed duties until we get a replacement. Desperately need help on AENB net, 3,575, 1900 hours local. Traffic: (Aug.) WB4FZQ 95, WB4EKJ 72, K4AOZ 63, WN4IDH 50, WB4RCF 26, WB4IYW 18, WB4TVY 10, K4CUU 8, K4VF 7, K4UMD 7, K4LYY 4. (July) K4LYY 29, W4DGH 2.

GEORGIA – SCM, A. H. Stakely, K4WC –

Net	*Freq.*	*Time(Z)/Days*	*QNT*	*QTC*
GVEN 1	3.950	1730 Su	61	7
GVEN 2	146.94	0130 Dy	614	82
GSBN	3.975	2330 Dy	1199	110
GSN	3.595	2300/0200 Dy		
NEGEN	3.975	1830 Su		

SEC: K4KZP, RM: K4ELR, PAM: K4JNL. New officers Atlanta RC, W4BCD, pres.; W4GKF, vice pres.; K4EXB, secy.; WA4AKU, treas.; WA4RBM, act. mgr.; WB4VXP, editor; W4IXN, rptr. mgr. Great club bulletin by WB4VXP. New alignment of state CD has SEC busy organizing AREC assignments. Great job as EC being done by K4YRL and K4CRO. K4KZP first in Christmas Zip Code Contest in 4 call area. Moving QTH has K4JJQ activity restricted. W4JM erecting new 75-40 ant. K4LRO got Extra and 35 wpm certificate. W4DOC/4 worked safety break spot with Kennesaw Jaycees originating traveler traffic. That's a great idea for us all to do. K4ELR makes PSHR. Traffic: K4ELR 92, K4JNL 56, W4AAY 42, W4HON 28, K4YRL 17, K4WC 9, K4JJQ 6, K4KZP 6, W4JM 4.

NORTHERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: WA4WBM. RM WA4FBI. PAMs: WB4VDM/75; W4SDR/40 WB4BSZ/VHF. WB4FZR and WA4WBM sharing NCS slot on NFPN. K4CVO has digital freq. meter. WB0HHC/4 active on QEN, 80 hams under Orlando EC W4UIL provided comm. for Shrine parade over a 12-hour period. Hambone College sent group to Tampa for General & Advanced exams. W4MB had FB article in Aug. *QST*. WA4QIM starting crystal bank for 2m fm rigs. W7EM/4 engineer at WJAX. WN4NID earned Wacky Wing-Dinger cert; enjoying tfc, handling NOFARS combined with RANGE to hold big auction. K4MZK and WB4JHQ active OOs. The Gainesville 22/82 repeater extended its range, thx to new low-loss feedline. WA4WOC and W4DFP have new HTs. WA4BJI earned PhD in EE. WA4YPY gave club program on aids to blind. WA4FBI and WA4BAX building Accu-Keyer and memory. WR4AAB, 16/76, has dropped the .34 input. St. Andrews Bay ARC meets at 2:00 PM 2nd & 4th Sun. K4RZM new RACES RO. WN4MIG passed General/Advanced exams. K4YV a new ham. WA4NDX WA4SDM WB4AHG and K4VWE assembling transceiver kits for missionary use overseas. WA4ECY, with WH6FSF as Op. QNIs Fla. & Ala. cw nets. WB4BSZ Mgr. of new Gulf Coast Propagation Net (8:30 PM CDT on 50,110 MHz). The mini-swapfest at Corry Field drew big crowd. WA4LBM and WB4NCH from S. Fla. are students at UWF. Traffic: (Aug.) WA4FBI 571, W4RKH 280, WB4GHU 275, W4WNY 160, WA4BAX 119, WB4HKP 112, WB4DXN 110, WB4SKI 93, K4CVO 92, W4LDM 77, WB4JHQ 65, WB4FJY 54, W7EM/4 48, WA1QAH/4 46, K4KIX 42, WN4NID 42, WA4HOL 37, WB4VDM 31, WA4CRI 25, WA4IWW 24, WB4NJI 23, WA4ECY 18, WA4EYU 17, K4OER 16, W4VLK 16, WB4ADI 14, WB0HHC/4 14, W4LA 7, WB4VMP 6, K4DDY 5, WB4TVQ 4, WB4FZR 4. (July) W4WNY 109, K4VND 19.

SOUTHERN FLORIDA – SCM Woodrow Huddleston, K4SCL – SEC: W4IYT. Asst. SEC: W4SMK. RMs: K4EBE W4EE WA4GRC. PAMs: WA4NBE W4OGX. New appointment this month: WA4KKE EC Broward Co. Endorsements: WA4BPE EC Martin Co. K4DRH OPS; WB4FLW ORS. OOs reporting: K4DAS K4JPI W4MML K4NE K4WQG WA4UVG.OBSs reporting WA4CTM K4TH WA4GBC has gone away to college in Pittsburg, Pa. necessitating his resignation as RM-80. Hate to lose him; he did an outstanding job. There being no other valid nominating petition, K4SCL has been declared reelected as SCM Southern Fla. Section for a 2-year term beginning Feb. 4, 1976. My thanks to those who supported me. Let's all pull together and make Southern Fla. Section better than ever. K4TH has a new SIGNAL ONE transceiver and is doing a fine job on traffic nets both cw and phone. K4SCL sporting a new Collins S-Line setup and has constructed the cw break-in adapter pe W0INH and K0AZJ, *QST* Sept. 1970. K4NE has returned from a 45-day junket to PAC and other European countries. W4TAD has returned from Austria where he was studying a new surgical technique. Doc kept in touch via OESKE. Congrats to K4DAS who received his Extra ticket after 15 weeks waiting and is now sporting

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new Drake "C-Line" equipment. WA4ROX got his Advanced afte 12 weeks. WA4CTM has a new HW-10 in use for his 6-meter RTT bulletin transmissions. W4GOG enjoyed a 15-day vacation mobilin with a TS-520 on 80-40-20 cw. Traffic: (Aug.) WA4SCK 633 K4SIH 574, K4SCL 249, W4EH 203, K4TH 134, W4DVO 108 W4WYR 93, WB4ALH 91, WA4KKE 91, W4ILE 53, WB4AID 50 K4BLM 41, W4DQS 36, W4GDK 36, W4IYT 34, W4IRA 24 WA4EIC 23, K4CFV 20, WA4NBE 20, K4QG 17, K4NE 13 W4OGX 11, WA4CTM 10, W4NTE 8, W4LK 6, WA4UVG 5 W4KGJ 3, W4SMK 3, W4GOG 2. (July) WA4JWN 74, WA4HDH 54 W4GDK 20.

SOUTHWESTERN DIVISION

ARIZONA — SCM, Marshall Lincoln, W7DQS — RM: K7NHL PAMs: WA7KQE W7UQQ. New address for W7DRR is Page, Ariz. where he is in charge of audio-visual services for the school district With regret, WN7BOM and K7SPB are reported as Silent Keys WA7OYX and XYL kept in touch with their daughter, injured while doing missionary work at an Alaskan Indian reservation, through Alaskan stations KL7HGA KL7IBG and KL7HKA. W7YS' shack received minor damage from a lightning strike. The Phoenix repeater club reports a second input frequency, 146.25, has been approved for the Phoenix 22/82 repeater to enable Tucson operators to hi the Phoenix repeater without hitting the Tucson 22/82 repeater. Al Ariz. amateurs are reminded to submit reports of their traffic totals and other noteworthy activities to the SCM (address on page 6). ARRL station appointment holders are reminded this is requirement of their appointments. A monthly news letter is being sent to clubs by the SCM. Any club not receiving it should notify the SCM to be put on the mailing list. Any newsworthy items which are not sent to the SCM in your club's newsletter should be sen directly to him for inclusion in this monthly QST report. Aug. ne totals: Cactus Net QNI 1182, QTC 447; ATEN QNI 607, QTC 43 certificates to W7RQ K7NTG K7GLA WA7VTM W7CAF K7NMQ PSHR: WA7KQE 42, Traffic: K7NHL 256, WA7VTM 31, W7CAF 24, K7MTZ 22, K7NTG 22, K7CC 14, WA7EXL 14, WA7KQE 12 W7RQ 9, WA7YKM 8, W7DQS 4, K7NMQ 3, WA7ICK 2.

LOS ANGELES — SCM, Eugene H. Violino, W6INH — Asst SCM & RM: Kevin A. Berasley, WB6OYN. RM: K6UYK. Club program chmn. take note that a fine program on the legal aspect o amateur radio and the law regarding interference and towers wa presented at the LERC recently by WA6PTM, very informative W6MDQ is again in the hospital and QSL cards are in order. I hav had to make some changes in my SCM duties. Being SCM, RN mgr., act. chmn. for the Lockheed RC is a pretty good load for working man to handle. I have appointed WB6OYN as asst. SCM fo the Los Angeles Section and Chief RM. This will allow me mor time to devote to the Region Net. Kevin will be in charge o assigning ORS OPS and RM appointments. W6APW has returne from a trip across the US and Canada, via motorcycle with side ca Pres. WB6ZCT of the San Gabriel Valley RC reports much activit in the clubs AREC, RACES program. Also reports they are alread thinking of this winter's upcoming Rose Parade and starting to mak preparations. Over the years I have noticed how difficult it i becoming to elect officers for Radio Clubs. It seems that the sam people have to take over the offices again and again. Its our hobb why let, or make, a half dozen good hearted people take the office over year after year; let's get in there and do our part, the more w put into our clubs the more we get out of it. Pres. K6RXJ report good activities for the Ramona RC; they recently had their Annu Dinner and Installation meeting at El Gordo's. The Santa Clarita R recently had W6DDB present a program on the Pros and Cons Licensing Training courses for amateur radio operating. The PAR has an interesting series in their bulletin about the Care and Feedin of a Jammer by WA6ITF; this group is going all out to fin Jammers. Received a copy of a letter to ARRL by WB6JP regarding his ideas about the QSL Bureau. K6CYP has joined ARE and is active on all bands including 2 meters. WB6ZVC not onl active in contests but also carrying a heavy load on the NTS th summer. W6PZY has been very active on cw. He has a new HA keyer and sure sounds good. Look for him on 7 MHz in th afternoons. Note to all — those of you who need classes information and etc. on advancing your amateur tickets contact Bi Welsh at the Lockheed RC. Congratulations to WB6YID an W6MAB on receiving the Public Service Award, this is indeed a ver highly respected accomplishment. WB6FTB of the Metro N reports 205 check-ins and good traffic movement. Congrats WA6TLV on making 5BWAS. WB6VZI shopping for a new place order to build an antenna farm. WA6TLV finally made 5BWA congrats to him and all the hard work besides being one of th mainstays on SCN. Traffic: W6INH 322, WB6OYN 269, K6UY 212, W6OEO 193, W6QAE 167, WA6TLV 94, WB6FTB 5 WB6TKR 21, WB6VZI 16, W6BRO 10, WA6KZI 9, WA6TCH W6HUJ 5, WA6IDN 5, K6CL 4, W6NKE 4, WB6YID 4.

ORANGE — SCM, William L. Weise, W6CPB — Asst. SCM Richard Birheck, K6CID. SEC: WA6TVA. RM/PAM: WB6AKF W6WRM is doing an excellent job putting out the Morongo Basi ARC Newsletter. The club's programs are very attractive. Congrat to all. W6BUK says he will be more active after the summer trip Welcome to WA6NSZ who is active on SCN and WCARS. WA6YW spent July 1 through Aug. 15 mobiling in Canada and Alaska. Bi visited KL6HLC's QTH which is at the northern most part of th US, Barrow, Alaska. W6VOZ is using a chain link fence as counterpose on all bands, says it works fine. Worked YB0Indones with 5-9 signal using 400 watts PEP. K6YNB reports his 6M system now fully operational on 144 MHz, making contacts an hearing own echoes from portable sites in Utah. Congrats. WB6WO and WA6TVA and others provided communications for the Re Cross during the recent fire in one of the canyons. This proves tha practice pays off. Nice job well done to all. The Novice Emergenc Net meets each Sat. at 1600Z on 3730 kHz. This is a good place t improve your traffic handling ability. A number of members hav not graduated to SCN through this practice. Why not check-in K6GMI gradually recovering from recent illness. Hope to see yo

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back on the air soon Hal. Traffic: WB6VTK 335, WA6IVA 185, W6QBD 22, W6CPB 10, WA6NSZ 6.

SAN DIEGO – SCM, Arthur R. Smith, W6INI – SEC: W6GBF. Have you worked a Novice lately? Why not set aside an hour each week for this purpose? Club nets on 10 meters good idea to keep band active. Newest SWAN gear demonstrated at Sept. Palomar RC meeting. New meeting place for SOBARS is Rohr Manor. SANDRA's Mt. Laguna repeater on 147.75 in, 147.15 out gives San Diego and Imperial County coverage as well as northern Baja, Calif. Palomar RC flea mart on 1st Sat. each month now well established. WA6LHD and W6INI spoke to SD County Fire Chiefs Assn. on amateur radio capabilities. When W6PIU won Multi 2000 at Palomar picnic, she promptly gave it to OM, W6DEY for his birthday. New SD Chapter, QCWA officers: WA6OSD, pres.; K6UV, vice-pres. W6DEY, secy.; W6JWU, treas. WB6NMT reports contacts when Oscar 7 up to 1700 mile beyond horizon, due to tropo assist ducts. WB6PLZ keeping amateur radio in public eye with talks to civic clubs. WA6AJK new Poway ARS call. W6NGF recovering from motorcycle accident. W6SLF has open repeater on 222.94/224.54. Six meter bands openings in Aug. gave WA6MHZ East Coast DX contacts, WB6VIE soon going to Monterey for duty. Traffic: W6BGF 148, WA6DMB 148, W6GBF 56, W6PZU 54, W6DFY 30, WA6HXB 10, WA6UFY 1.

SANTA BARBARA – SCM, D. Paul Gagnon, WA6DEI – SEC: WB6HJW. PAM: K6YX. RM: K6QPH, WB6MXM working DX on 20 cw including YB0 and IW5. W6CDN working in Fresno. W6EHK earned a Section Net Cert. for his participation on the Southern Calif. Net, cw 3600 0130Z daily. The Poinsettia ARC showed Ham Wide World, Santa Barbara ARC held a joint picnic and T Hunt with the cb group with over 500 in attendance. W6POU and WB6QDS were the hidden rabbits and winners were WB6EAN and WA6BIV. WB6JKM spoke at the Ventura Co. Club on TVI and what the new interference group is doing about it. New appointees include W6ITW, WB6VGC as OPSs; W1UUQ OBS. WB6GRW assuming the EC duties in the North Santa Barbara Co. area from WB6WWY who did a swell job. W1UUQ new EC for South Santa Barbara Co. area. Bill replaces WA6YPK who moved to Nev. The Section AREC Net is on 3935 on Wed. at 5:30 PM. Mgr. K6YX says we are over the hump for the time change. There were 47 QNI in Aug. Don is authoring an interference column for a national CB magazine in his spare time. WB6AFI Santa Barbara has a new station master antenna. WA6IGH is a new General as is WB6EGW. WB6CNO a new member of the QCWA. SBARC has complete directory of SB area amateurs. See W6POU. The Fiesta City Net meets at 8 PM Mon. on 21150. Note the new address for the FCC is Box 1020, Gettysburg PA 17325 for amateur matters. PSHR: WB6MXM 37, K6YX 32, WA6DEI 39. Traffic: (Aug.) WA6VBS 177, WA6MBZ 144, WA6DEI 56, WB6MXM 40, K6QPH 36, W6POU 17, K6YX 16. (July) WB6MXM 67.

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L. E. Harrison, W5LR – Asst. SCM: Frank E. Sewell, W5IZU. SEC: W5SHN. RM: W5QU. PAM: W5GSN. Dallas ARC reports SSTV meeting, W5CEG RTTY expert spoke at Sept. meeting. Fall DARC license classes began Sept. 22. Braniff TraCtr. Dallas QCWA, Tyler and Texoma last weekend Oct. OT W5DZ, now out of intensive care. W5CCD broke leg. Arlington ARC July meeting report arrived late for July QST entry therefore am including same herein. Reference Dept. of Library accepted Extensive Amateur Radio collection of ARRL publications. Also now has 15 Kw Generator. PAM W5GSN submitted final report as TTN mgr. Relieved by WB5AUU Richardson Tx. Thanks to these men for saving a life on I-20 east of Abilene. Assistance given by WA5LVH and DPS. Zone 5 MARS met Aug. 17 LaQuinta Motor Inn. Repeater on 148.010/148.990 AAM5DHZ & AAM5HVF. W5IZU, Asst. SCM Tyler reports continued activity his area also QCWA meeting Sept. 20. WA5IKU VHF station NoDallas reported activity on 6 and 2 past few weeks. W2s heard also W9,Ø,7,6,3. New Mex. W5s all S-8 to 9. K5WIQ also sent in FB report. WB5DXP says he's been waiting months for his OPS certificate. Looks like we'd better check the mails. W5SHN's job as SEC may expire shortly. Does anyone have any suggestions as to who would make a good honest, dedicated volunteer for the job. Now's your chance folks. Please note that 18 stations plus several OOs sent reports this month. Thanks for your prompt reporting as this was a good month. My G-2 sez "Quote" Dallas QCWA plans to study this antenna business very seriously and submit proper recommendations to the proper people Unquote." I further understand they propose to take a hard look at various "government affairs" and prepare adquate statements to support themselves in the form of English Language. Traffic: (Aug.) WB5MEQ 275, W5TI 189, WB5DXB 91, W5SHN 38, W5TYS 38, WA5INJ 36, W5GY 15, W5LR 6, W5YK 4. (July) WB5DXB 144, W5GSN 29, WB5MTN 24, W5IAR 15, WN5LAT 11.

OKLAHOMA – SCM, Cecil C. Cash, W5PML – W5FW, his wife W5PWN, my wife and I attended the Panhandle ARC Swapfest in Amarillo, Tx. There was a good crowd and everyone seemed to enjoy it. The International Amateur Radio Hosts has recently been organized. Their purpose is to offer economic and social aid to foreign visitors. Interested amateurs may contact G. L. Baker W5QPX/YN4IM, 101 Rita Blanca Trail, Amarillo, Tx. 79108. WN5NKD, net mgr. of OAN, has an addition to the shack consisting of an SX-101-A and homebrewed TR switch. WN5OYU works one night as NCS on the net, also WB5KGP is NCS. Pat reports the net doing well but still needs QNIs or better still QNIs with tfc or can take tfc to RN5. The OAN (Novice Net on 3750 kHz) is handling more traffic than any other single net. W5JJ sporting a new TR-4-C also says he has his transmission lines under ground. Congrats to new Advanced Class W5RCK and WB5NTH. Congrats to new Novices WN5s OVP OVQ OVR OVS OHR OLR OOH OOI OSC OTD OZR and OZS also WH6IOY all products of WA6INF. Traffic: W5RB 242, WN5NKD 112, WN5KNC 68, WB5AZS 43, WB5KGI 42, WB5ELG 40, WN5OYU 30, W5FKL 23, W5SUG 20, W5PML 16, W5FW 14, WA5OUV 10, WA5FSN 7, WA5QOP 6, W5JJ 4.

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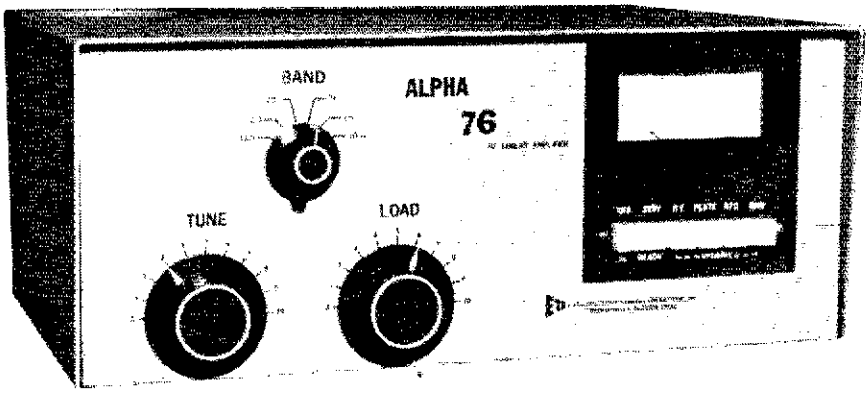

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WB5NMZ 2.

SOUTHERN TEXAS – SCM, Arthur R. Ross, W5KR – SEC: WB5CUR. RM: W5UGE. PAM: WB5AMN. OOs reporting this month: W5NGW WA5LTQ. OVSs reporting were: WB5CIT WA5QCP. EC WB5FMA has full QSK, also has new mobile 2-meter amplifier; he reports K5MYY has new IC21A, W5JND has his towers up, and W5LDA has new HR2B. RM W5UGE has new touch tone pad, now needs 2-meter rig. OPS K5HZR pleads for amateurs from Rio Grande Valley to check in on 7290 Net for Valley traffic: W8UX/5 and EC WB5GFU doing best they can but need help. OPS WA5VBM has new 2-meter quad; Sister Mary says she built it by herself. ORS WB5LII has new Kenwood TS-520. PAM WB5AMN says TTN and TEX sorely need phone/cw reps; anyone interested in traffic on both modes should get in touch with him, he's nearly always on TTN, 3961 kHz, 2330Z (0000Z when standard time is in). OPS WB5GQH reports W5NTM strictly cw for awhile account dental work. W5TFW reports WB5GIN upgraded to Advanced. OPS WB5HJV has been elected pres. of J. Frank Dobie High School ARC, call WB5OPO. OVS WB5CIT back to school. W5THF back on the air, all bands and modes; he reports W5YG hopes to have 420 MHz repeater going soon and is in need of a donated hf transmitter, TX4B or similar. Corpus Christi ARC, W5MS, all set with "hurricane proof" antennae on Police Station roof. ECs W5TQP K5WLT W5EVL K5DEX W5GVE W5VPI and W5RFV are promoting 160 meter operation; need information on their net times and days. WB5BZA now HL9VA in Seoul, Korea; he'll be on cw and ssb on low ends of bands and wants contacts, especially Corpus Christi. WB5OUV soon moving to Kansas City. W5MML has transferred to Germany; El Paso gang will miss him. Brownsville Repeater Organization hopes to have 22/82 repeater going soon. Traffic: (Aug.) W5UGE 366, K5HZR 317, W5UJJ 246, WA5YEA 234, WA5VBM 160, W5KLV 148, WB5IZN 113, W5TQP 85, WA5LII 74, WB5AMN 61, WB5FMA 35, WB5GQH 26, WA5RKU 13, WB5GFU 12, WB5NUM 11, W5TFW 8, WB5HJV 6, K5RVF 4, WB5CIT 2. (July) WB5FMA 29.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE4FK – Asst. SCM: John Wilkinson, VE6ALR. SEC: VE6XC. PAMs: APSN VE6AFO, VHF VE6FM. ECs: VE6WV VE6CAS VE6AW VE6AVV. The ARRL Canadian Division Convention, Century Calgary Amateur Radio Convention is over. All committee members deserve a great vote of thanks for their tireless efforts that made the convention so successful. ARRL Pres, W2TUK, Vice Pres and Pres IARU VE3CJ Can Divn Director VE2MS, Vice-Dir. VE1SH, Hq. speaker and rep W1ICP, all added terrifically to the convention. VE3QB was an outstanding guest speaker, and W5LFL presented a tremendous talk and showed slides on the Skylab Mission. VE6AW did a wonderful job on the ARRL booth. I noticed quite a few QCWA members in attendance. VE6FM indicates he is pleased with the VE6RPT 34/94 – VE6VHF 28/88 UHF linkup, and with the E&T VHF net meeting daily at 0230Z covering much of the Province with 25-35 check-ins and looking for more. Traffic: VE6FS 52, VE6FK 47, VE6AFO 19, VE6AMM 8, VE6AW 8, VE6WN 8, VE6VS 7, VE6WV 4, VE6AFW 2, VE6AKZ 2, VE6BC 2, VE6BL 2.

BRITISH COLUMBIA – SCM, H. E. Savage, VE7FB – Otto Schulz, VE7CDF reporting. With the vacation period passed, activity seems to be more normalized, although conditions are rather variable. VE2OJ/7, who has moved to British Columbia and is as active in traffic handling as he was in VE2-Land, will obtain his VE7 call shortly. We wish Jim and his XYL best success and happiness in their new QTH. BCEN is introducing a slow net for the purpose of accommodating newcomers and rusty fists in improving their efficiency in traffic handling. Seems that there are pirates on the 2-meter band, who operate only mobile on 147.33 and 146.64 en route through BC. VE7AJU is still in the hospital, but much improved. Both fone and cw nets are running smoothly, as in the northern net – thanks to the effort of all participating operators. Traffic: VE7ZK 142, VE7CDF 93, VE7DKY 22.

MANITOBA – SCM, Steve Fink, VE4FQ – RM: VE4PG. PAM: VE4JP. Members of the Winnipeg Repeater Soc. provided communications Sept. 12 for Shinerama, in aid of the Manitoba Cystic Fibrosis Society. VE7DEP, ex-VE4DQ, has returned to Brandon and now active on MEPN. VE4QI, chmn. of the CAN-AM Midwest Repeater Council, has left Shilo for VE1-Land. ARRL Dir. VE2MS, who recently moved to Winnipeg, now signs VE4IM, and addressed the Sept. WARC meeting. With the DX season here, please make sure you have a supply of SASE's with enough postage money in at our VE4 QSL Bureau, very capably run by VE4OX. Ed's QTH is 647 Academy Road, Winnipeg. VE4JA again active. Congrats to VE4GZ who won Manitoba top honors in a Grade XII Math contest. Let's all get on for the '75 SS, Nov. 8-9 and 22-23. MEPN: 31 sessions, 812 QNI, 20 QTC. Traffic: VE4PG 54, VE4IX 40, VE4LB 14, VE4XP 13, VE4OW 10, VE4IP 8, VE4AP 3, VE3BLV 3, VE4CR 2, VE4FK 2, VE4HA 2, VE4HR 2, VE4NM 2, VE4XN 2, VE4AU 1, VE4VZ 1.

MARITIME – SCM, W. D. Jones, VE1AMR – On Aug. 11-12 the PEI Amateur Radio League and The Charlottetown Radio Club operated a station at Old Home Week in Charlottetown. The operation went very well and tentative plans are for a full week of operation next year. Traffic handlers for the operation included VE1EO VE1AWV VE1ART and VE1ARB. VE1HG is now enjoying cw with a new TS520. The Atlantic Canada Amateur Radio Convention in Moncton on Labor Day weekend was enjoyed by over 250 people, VE1AAO won the ladies cw copying trophy and VE1AWP won the mens trophy. APN reports sessions 30, QNI 63, QTC 97. Traffic: VE1ARB 285, VE1AMR 126, VE1ZH 47, VE1ST 38, VE1AAO 23, VE1AMN 12, CY1AHM 4.

ONTARIO – SCM, Holland H. Shepherd, VE3DV – The officers and members of the OARC are to be congratulated for spending

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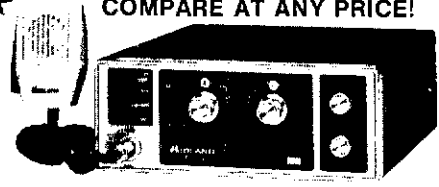

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many long hours of work in putting on the fine RSO conventi held in Ottawa Oct. 3-5. Various members of the Ottawa traf fraternity took advantage of the RSO Convention to hold a cou of open houses for eyeball QSOs with the visitors. Still no change the medical condition of VE3DV your SCM who continues to ke a very low profile. The membership might seriously consider successor if not as SCM then the appointment of SEC which t writer considers most important. I am sorry to report that VE3O ex-VE1KJ, is now a Silent Key. VE3GK, a teacher at Algonqu College, Ottawa, teaches such a successful course in amateur rad that the OARC has decided not to conduct their long standi classes. Congratulations to VE3HJS on obtaining his Advanced. pleasant welcome to a new amateur VE3HTM who can be found 40 metres and NOT the local repeater. Good for you John. I most disturbed that the NWOM is not fulfilling its potential for northern Ont. amateur and to the public. Perhaps the fall and win will bring back those backsliders so the old reliables can take so pride once again in the net. Thunder Bay Repeater VE3YQT is n in operation but antenna changes are already in progress to increa coverage. Congrats to VE3CYC and VE3FUF for pointing the w for the Burlington-Hamilton gang on two-way fast-scan TV. Otta and Hull, Que. amateurs supported the Univ. of Ottawa while Burlington-Hamilton gang helped the McMaster students in annual Shimeram for cystic fibrosis research. Traffic: VE3SB 3 VE3GOL, 249, VE3EQZ 185, VE3GFN 146, VE3AWE VE3DPO 62, VE3ERG 48, VE3HJA 46, VE3EHF 45, VE3GT VE3GCC 29, WA8ETX/VE3 24, VE3EGV 21, VE3GCE VE3DVE 13, VE3ATR 9, VE3GEQ 8, VE3ASZ 3.

QUEBEC – SCM, Larry Dobby, VE2YU – The Montr Hamfest was a well attended event in early Aug. with visitors fr W1, W2, VE3, The Burlington, Vt. Hamfest held later in the mon was well represented by VE2 amateurs. The RAQI callbooks finally out and it is expected that every amateur in Que. will so have his own copy. Welcome back to Edmond Dufresne n sporting the new call VE2EAG. The gang at VE2MO enjoyed summer picnic at VE2SW's chalet. VE2OJ/7 is on the air fr Nanaimo, B.C. around 14,100 MHz at 1400Z daily. VE2UY sporting a new 48-ft tower and a four-element yagi for 20 mete guess he will be giving VE2QO some competition. The West Isla RC is sponsoring an Olympic Award for working stations on island of Montreal. Contact them for further details. With possibility of a large volume of traffic coming from the Olymp station CZ2O during the Olympics, your SCM again requests th anyone interested in learning how to handle formal traffic get touch with VE2YU or listen in on the cw traffic nets 3535 at 7 and 3610 at 7:45 PM daily. Traffic: VE2DR 133, VE2EC VE2BP 40, VE2UY 10.

SASKATCHEWAN – SCM, P. A. Crosthwaite, VE5RP – We going to miss a very good cw operator from SATN, VE5RR moved to Winnipeg, Man. The Hamfest at Watrous was a success a one might look forward to another picnic style hamfest. Hamfest in Calgary was most interesting and encouraging. Winter around the corner so it would be appreciated if you would pass weather conditions while on the nets. This info can be very useful the USA. Traffic: VE5YK 18, VE5IK 17, VE5MP 4, VE5RP VE5LH 2, VE5RB 2, VE5TT 2.

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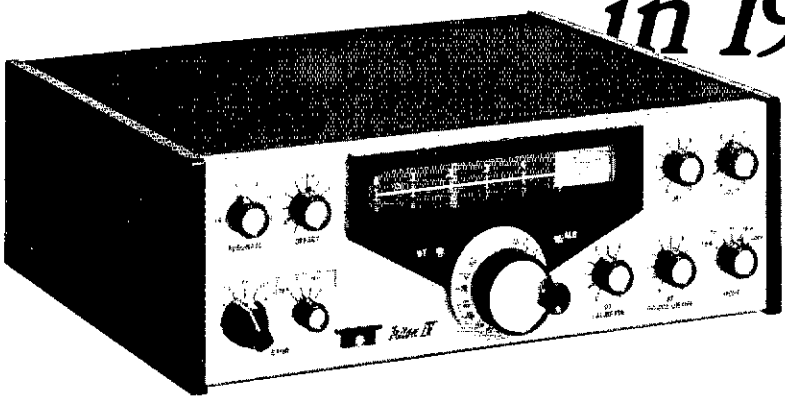

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Many small circuit improvements throughout, taken collectively, add more performance and quality pluses — such things as individual temperature compensated integrated circuit voltage regulators for final bias control and VFO supply. And toroid inductances in the ten and fifteen meter low pass filters, LED indicators for offset tuning and ALC threshold, accessory socket for added flexibility, and sequentially keyed mute, AGC and transmitter circuits for even better shaped and clickless CW.

And to top it all off, the highly desirable case geometry has been maintained, but it has a handsome new look. Bold lettering on an etched aluminum front panel and textured black sides and top make the TRITON IV look as sharp as it performs.

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JA Phenomenon

(Continued from page 50)

its rather different philosophical foundations. In the U.S., I think it is fair to say, one of the major – if not *the* major – reason for the existence of our hobby is to provide public service to the nation. This comes in many forms but is usually most important during times of emergency. In Japan, however, public service plays an almost insignificant role in amateur radio. The hobby in Japan is first and foremost just that – a hobby, something that one does in one's spare time much as one might sail a boat or fly a model airplane. Of course, society benefits in certain ways such as higher educational standards or the promotion of international good will, but these are far from being the major *raisons d'etre* for Japanese amateur radio.

Japan has nothing similar to the National Traffic System, nor any traffic nets at all, for that matter, because message handling is not permitted except under emergency situations. And there is little emphasis on emergency communications, even in a country plagued with severe earthquakes and violent typhoons. While the first paragraph under the United States Amateur Regulations defines as a fundamental purpose of Amateur Radio: "Recognition and enhancement of the value of the amateur service to the public . . . particularly with respect to providing emergency communications," there is no comparable clause in the Japanese Regulations.

While the JARL is trying to increase awareness of the more serious sides of amateur radio among Japanese hams, the task is not easy, for the majority of amateurs pay little attention to the League. League officials readily admit, for example, that the largest part of its 70,000 members probably pay their dues solely for the privilege of utilizing the JARL QSL bureau, which handles domestic as well as international QSLs.

Japanese specialists in various fields have frequently pointed out the Japanese genius for borrowing foreign ideas and institutions and adapting these for use in their own unique society. Almost as often, the Japanese have, in the process, improved and re-exported such ideas and institutions, giving the world the benefit of their unique point of view and their creative talents. This has already happened in the area of amateur equipment and many hams throughout the world have benefitted. It may very well be that these other countries will also begin to emulate the world's largest population of amateurs in other areas of amateur activity. QST

Sweepstakes

(Continued from page 52)

If, however, he has not been a member for a year's time, he must have attended at least 50% of the meetings since he became a member.

3) Members living outside of 175 miles and/or members operating stations outside of 175 miles may not compete in the club competition.

C) Scores of members meeting the requirements of section 11A may be submitted for club credit. Single and multi-operator station scores may be counted. At a guest-operated single-operator station, both the guest-operator and the station licensee must be members of the same club in

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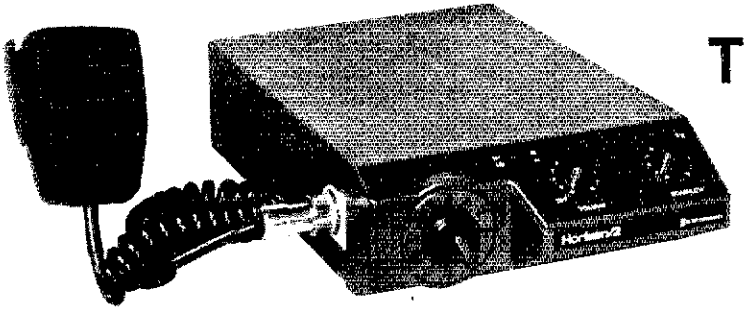

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order to count the score for that club. At multioperator stations at least 66% of the operators must be members of the same club in order for the score to count for that club.

1) In order for a member to attend at least 50% of the in-person club meetings it is necessary that the club hold *at least* 4 in-person meetings a year so the member can attend at least 50%.

2) It is not within the intent of these rules that a club should vote out a member or a member resign and then be voted back into the club later in order that he can meet the 50% attendance rule.

D) The highest affiliated club entry will be awarded a gavel.

The highest single-operator cw score and the highest single-operator phone score in any club entry will be rewarded with a club certificate where at least three single-operator cw and/or three single-operator phone scores are submitted.

12) *Disqualifications:* If the claimed score of a participant is reduced by 2 percent or more, the log may be disqualified. Score reduction does not include correction of arithmetic errors.

Score reductions may be made for taking credit for unconfirmed QSOs and/or multipliers, duplicate contacts, banned countries, and/or other scoring discrepancies.

If a participant is disqualified, he will be barred from submitting an entry in the next annual running of that specific contest, (e.g., disqualification from the 1973 phone SS prohibits submission of an entry for the 1974 phone SS, but 1974 cw SS participation is okay).

The calls of all disqualified participants will be listed in the *QST* report of the contest.

Any participant on the borderline of disqualification but not actually disqualified may receive a warning letter from the Communications Manager.

For each duplicate contact that is removed from the log by Hq., a penalty of 3 additional contacts will be exacted. The penalty will not, however, be considered as part of the 2% disqualification criteria.

In all cases of question, the decisions of the ARRL Awards Committee are final. QST

How's DX?

(Continued from page 79)

(W8ZCQ), *DX News-Sheet* (G.Watts, 62 Belmore Rd., Norwich, NR7 OPU, England), International Short Wave League *Monitor* (E. Chilvers, 1 Grove Rd., Lydney, Glos., GL15 5JE, England), Japan DX Radio Club *Bulletin* (JA3KWJ), Long Island DX Association *DX Bulletin* (WA2RJZ), Newark News Radio Club *Bulletin* (M. Witkowski, Rt. 5, Box 167, Stevens Point, Wisconsin, 54481), Northern California DX Club *DXer* (Box 608, Menlo Park, California, 94025), North Florida DX Association *News* (WA4UFW), Royal Signals Amateur Radio Society *Mercury* (G3DPS), Southern California DX Club *Bulletin* (WA6KZI), VERON's *DXpress* (PA0TO), West Coast *DX Bulletin* (WA6AUD) and Western Washington DX Club *Totem Tabloid* (WA7JCB). Encore!

Whence:

AFRICA -- If my first few sessions of operation at Lusaka are any indication I'll work plenty of DX from here. I like 20 meters at 1430-2000 UTC, 80 at 0400-0530. At present conditions are poor for North America but Asians roll in like locals. The gang may remember me as old 9Y4MH, (9J2MH-VE3MH) . . . I expect to return to Sierra Leone after two years in California as K4ZIN/6, (ex-9L1JT) . . . 5Z4PP looks for Stateside radiotelegraphers on 14,040 kHz almost daily at

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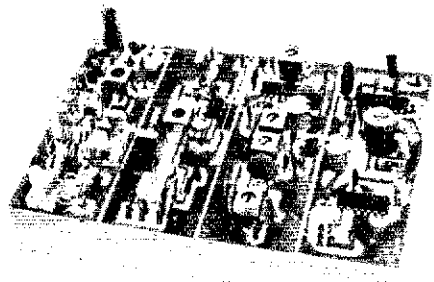

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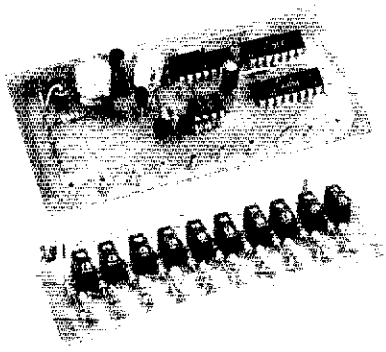

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Sunday at 1800. (W3HNK) . . . TU2DO will
settle down in Florida after about 6.8 multiba
kilo QSOs during a four-year Abidjan sta
(WA2DHF) . . . Africana courtesy t
aforementioned press of clubs and group
Ascension Island continues quite radioactive wi
ZD8s AB AR AW BD CI DX JR LN IS OE PH
RD RW and TM workable as of September. . .
The 21,355-kHz African Net awaits a few mo
sunspots to resume daily 1800-UTC sessions. . .
TU2EF is negotiating for operational stops in
TN TR TT TY 5T5 and 6W8 areas. . . . Northe
California DX Foundation sent a 500CX towa
3B8DA particularly for ssb emanations on futu
DXpeditionary maneuvers by Alex. . . . OH3
confirms from Tunisia that hamming authorizati
there is unavailable at present. 3V8AX adds th
resident licensees are also QSB. . . . 9X5SP w
G3IOR's 65th country via Oscar. . . . 5N2s A
and NAS, both on 14-MHz ssb at 1500-2000 UT
remain your only shots at Nigeria. . . . FB8s ha
a French Australasian group going on 14,150 k
almost daily around 0630 UTC. . . . ZD9BT's
will return from British holiday in January wi
14-MHz crystals. Meanwhile his Trist
replacement unfortunately is not DX-oriente
. . . After nineteen years in Ghana 9G1A
relocates to Sierra Leone. Norman logged enou
W/Ks for 5BDXCC but still awaits necessa
3.5-MHz QSLs. Neighbor 9G1AK head
Statesward.

ASIA — Took only half an hour to get
reciprocal Israeli operating privileges. Ev
U.S. Novices are eligible. I managed about 5
QSOs, mostly cw. Also attended the annual IA
meeting in Tel-Aviv. About a third of the countr
750 amateurs were present. I understand th
160-meter authorization is easier to obtain now
watch for more 4X-4Z activity on top band. By t
way, Israel has been on Russia's banned-QSOs
for some two years. U-stations will, however, wo
reciprocals there. (WB4FDT/4X). . . . Didn't
to visit AC3PT at the Chogyal's invitation becau
my travels were canceled by gallstone surge
Haven't heard from him since Sikkim's takeov
Anyway, thanks to FCC I'll be signing AC3LE ne
year right here in Baltimore. (W3LE). . .
Bangladesh communications officials are ve
helpful and would willingly issue ham licenses bu
believe higher authority there discourages th
(PA0IWH). . . . Ex-4W1GM is down sou
awaiting an 8R1 call. (W3HNK). . . . My HS2A
career came to an abrupt end in July and I'm n
back in California. WB6SCQ remains in Thailand
HS2AKZ. Ex-HS2AIG moved to Okinaw
(K7VAY/6). . . . In less than four hours I ma
176 contacts during Southeast Asia Net's Augu
contest. It was a pleasure to give many statio
their first Maldives QSOs. (VS9MB-VS9MDB
. . . Sure is rough to work DX from Dhahr
lately, according to HZ1AB. Their usual spots a
14,202, 14,242 or 14,250 kHz. (W3AG). . . . V
the literary grapevine: That big signal fro
UK9AAN on 20 takes off from a seven-eleme
Yagi. . . . UL7s NAA NR and NW of Chimke
ARC put UK7NAB on 14-MHz ssb in Octob
from Kyzl-Orda. . . . VU2JA was 77 years you
in April. Joe, a commercial brasspounder for fif
years, has been hamming since 1933 under su
calls as VS8AA, VUs 1AA 2BX and MP4BAF. . .
G5YN, from whom Reg Fox inherited the c
AC4YN many years ago in Tibet, still is very acti
on the bands. . . . HL9VR may wind things up
Huksan this month and try for a China brea
through. . . . In the same vein ex-5T5LO is said
be busy with a company assignment on t
Yangtse, a petrochemical project, and has thr
years to wangle a mainland China ham license. . .
OE5CA/YK, recently replaced in Syria
OE6DK/YK, still hunted a few WAS holdouts ne
QRT time. . . . 9V1SH (K5AQ) sees light at t
end of the 5BDXCC tunnel but still needs son
"easy" ones on 10, 40 and 80. QST

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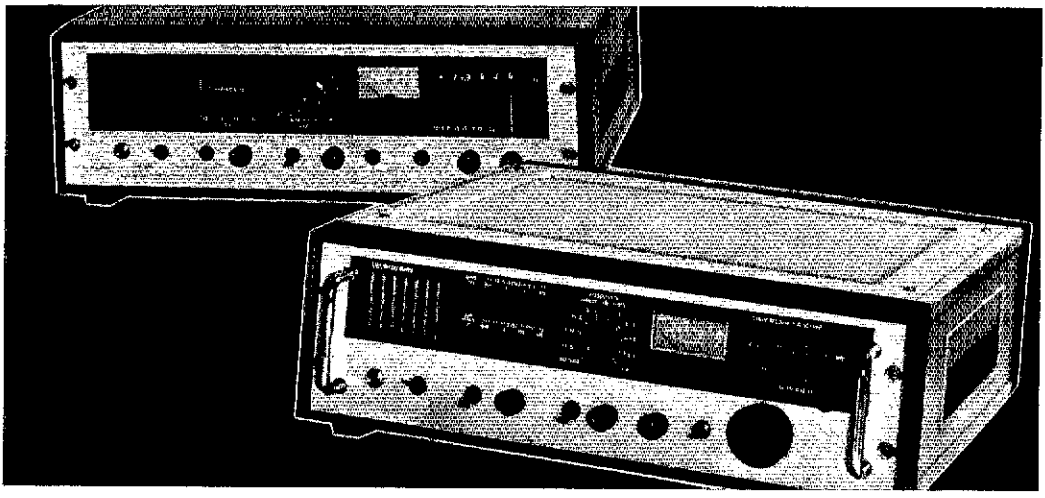

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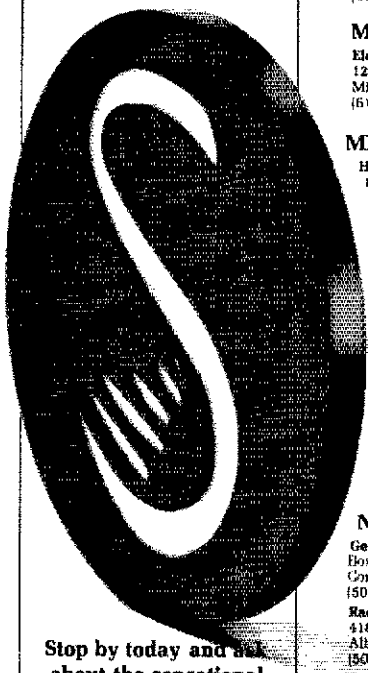

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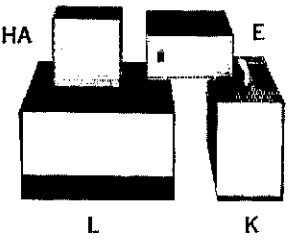

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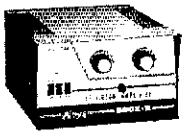

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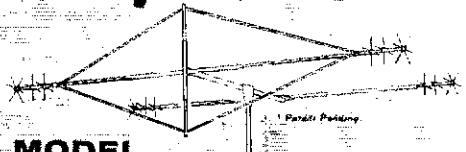

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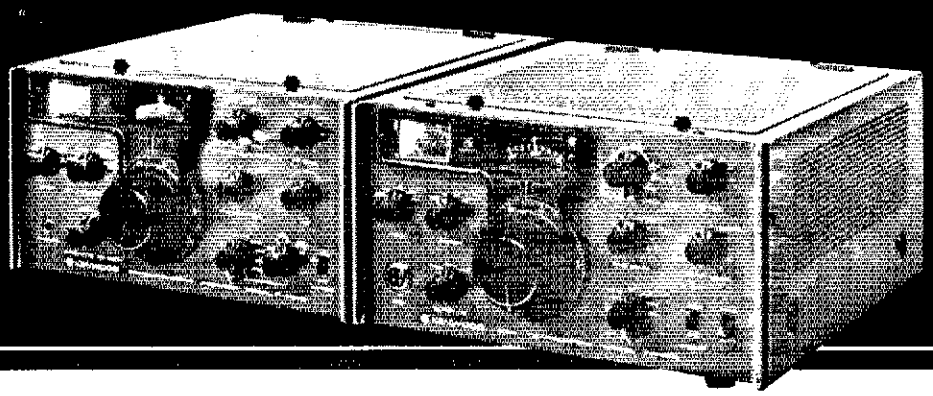

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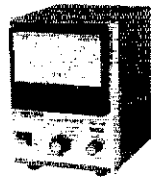

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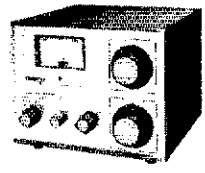

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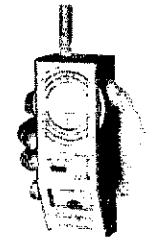

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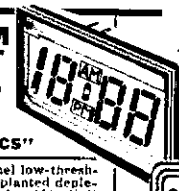

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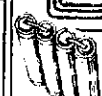

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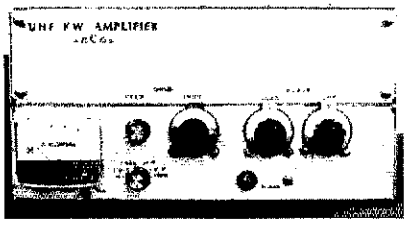

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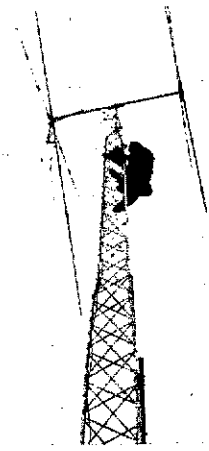

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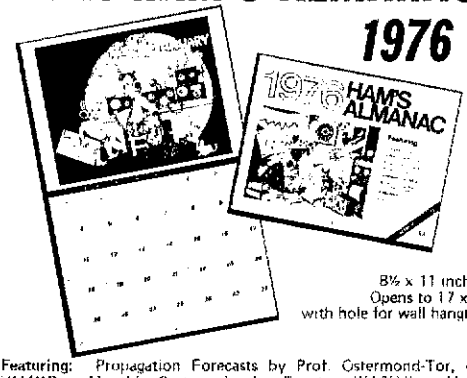

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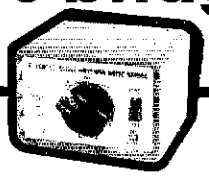

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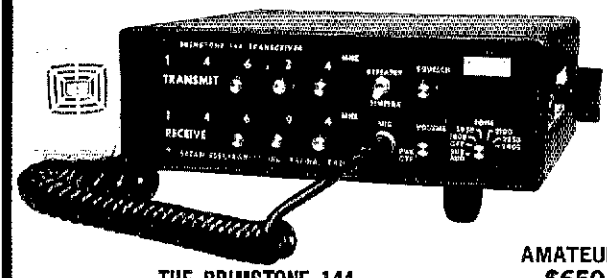

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SELL: TR-22-C used very little, $160. EICO 710 Dipper F/wired, $30. Galaxy F-3 300 Hz filter, $20. Cush-Craft 2 & 6 meter zipper portable beam. Never used, $10. You pay shipping. Steve Spevock, Rt. 2, Rivesville WV 26588.

MINT Drake 2-B and 2-BQ for sale or trade for 6-meter gear. Eico 753/ac and dc supply for sale or trade for 6-meter gear. Ross Hansen, Preston ID 83263.

FOR SALE: TH6DXX $150; HyGain 402BA $150; P&H VFO Matic transceive adaptor $50; Cushcraft Ringo $15; Wilson 3 element 20 meter $60; 2 HyGain 204BA $125 each; 2 inch outside diameter 1/4 inch wall masting 24 foot length $75; 2 inch outside diameter 1/4 inch wall 20 feet length $65; TriEx HZR471N motorized rotating tower, painted, good condition $1400, pick up only. Paul Neveu, W1CKA, 60 Northwestern Dr., Bristol CT 06010 (203) 582-4885.

FOR SALE: 75A4 SN4760, $395; HX-10 SSB Xmetr., $195; HW-17 2M Xcvr., $80; W DC PS, $95; HQ145XC, $195; HO-10, $65; 220 MH slot ant., $15; Hy-Gain 4BDQ coils, $12. Leonard D. Aulik, K2MRU, 556 Wittich Terrace, River Vale NJ 07670. Tel. (201) 391-2166.

WANTED: 20 meter tetrex beam, 10 meter tetrex beam and a Rohn tower section FK45G. Write stating model, condition, age and price. Sell or trade for above: SBE-34 and Hustler mobile antenna with 15 meter coil $225 complete. All responses answered. K2UNY, RD3, Box 113, Owego NY 13827.

SELLING AN/SRR-13A $300, AN/FRR-21 $200, K8GOV/3, 295 Edgemere, Annapolis MD 21403.

QST from 1923, 1921 and earlier, ARRL Handbooks editions 1, 5, 6, 8, 9 wanted. Ed Kalen, WA1JZC/1, 410 Memorial Drive, Room 441 G, Cambridge MA 02139. (617) 494-8812.

RADIO Books: Electro Importing, 1918, Mesco Wireless Manual, about 1918, Electrical Engineer's Handbook, first edition, 1909. Radio, 1937, Radio Amateur's Handbook, 1940. W1VIV.

SELL: 1972 Hy-Gain 18HT vertical antenna. 52 feet, 5 band. Dismantled at center. New $260. Selling $120. You pickup. J. B. Catlin, W9ZVY, 1640 Palisades Drive, Appleton WI 54911. (414) 731-1519.

HIGH power two meter linear, commercially made, final amplifier deck from Hughes HC-303 Ground-to-Air transmitter, 4CX3000A, 140-160 MHz, complete except power supply, $495/Trade; Collins 75S1, mint, $275; 4CX1500B, Pull, $65; 4CX1000A, $50; IC-230, $385; KH6IHP, (808) 455-2232.

COLLINS 75S3-B, 32S3, 516F2, wings type, immaculate, $1195 firm, FOB Phoenix, W7UV, 9504 Cedarhill Circle, Sun City AZ 85351.

HRO-60 COILS ABD and dial scales AsBsCsDs for sale or trade. Want HRO-50 coils EG and dials EFG, RME-84 receiver with RME-VHF-152A converter excellent with manuals $125. W6RSW, Rt. 1, Box 350-F, Oakley CA 94561.

SELL: Heath HR-10B Receiver, DX-60B Transmitter with HG-10B VFO, Excellent condition, $140 complete, R. S. Strothmann. WB9NTJ, 106 Marshall Drive. Seymour IN 47274.

NOVICES Sale: Elmac AF-67, M1070 supply, Heath HR10B and calibrator $100; WN0PCW, Don Peterson, Rt. 2, Mount Pleasant IA 52641. Tel. 257-6791.

$100; WN0PCW, Don Peterson, Rt. 2, Mount Pleasant IA 52641. Tel. 257-6791.

FOR SALE: HR-10B w/built in spkr, Knight T-60 w/key both mint condition, $90. Steve (314) 474-2531.

WANTED: Heath HA14, and HP24 if available. Mitchell, 24765 Calaroga, Hayward CA 94545.

HALLICRAFTERS HT-41 KW Linear Amplifier. Excellent. $200. No shipping. Will deliver reasonable distance. Joe Butler, W5ILJ, 3800 Linda, Amarillo TX 79109.

FOR SALE: Collins 75A4 receiver, S/N 4400+, 0.5, 2.1, 3.1 kHz filters, vernier knob, manual, speaker, Mint condition, $450 FOB. Paul Beavin, WB9PEL, 3540 Deerfield Pl., Columbus IN 47201. (812) 379-9628.

4-250A, mint condition, $10 plus postage. W2FSB, 2625 Fix Geand Island NY 14072.

TWO recycled antennas (AT/197GR), umbrella type. $25 each, $45 for both. Hodireff, P. O. Box 2244, Sacramento CA 95810.

COLLINS KWM-2A, Serial 16515, two A-C/PS, 30L-1 amplifier, SM-2 mike, Heath HD-10 keyer, Vileroflex key. WA1GQW, Millridge ME 04658.

SELL: Collins 75A4 Serial 424. Perfect, $375. F. G. Eidman, Rt. 1, Box 130A, Aillettsville TX 77964. (512) 798-3525.

WANTED: Mechanical filter for Collins 75A-4, 500 cycles, F-455 J-15. WA2QZD, 261 Glenwood Road, Englewood NJ 07631.

NEED sked with K1.7 on 75/80 for 5BWAS. W5LXG, 9323 McAfee, Houston, TX 77071.

SWAN 14-117 AC and DC supply $75. HW-7 $50. WA0BWF, 628-13th St., Spearfish SD 57783.

FREE: 8 extra crystals of your choice with the purchase of a new ICOM IC-22A at $249. With the 10 crystals that come factory-installed in the IC-22A, this gives you a total of 18 crystals! For equally good deals on Drake, Collins, Kenwood, Ten-Tec, Regency, Swan, Atlas, Midland, Alpha, Standard, Tempo, Genave, CDE, Hy-Gain, Antenna Specialists, CushCraft, Hustler, Mosley and others, write or call Hoosier Electronics your ham headquarters in the heart of the Midwest and become one of our many happy and satisfied customers. Hoosier Electronics, P. O. Box 2001, Terre Haute IN 47802. New phone number: (812) 238-1456.

SALE: 3600-0-3600 at 1 amp. transformer. 120-240 primary, $30. Want: Variable transformer, 240 volts input, 0-280 volts output. Henry Martin, 613 Pearl Street, Bluefield WV 24701.

WANTED: ERLA receiver, built around 1920, 3 201 tubes. State condition and price. Call collect (504) 837-9025, Bud, W5UTJ.

WANTED: Power transformer for Heath 0-10 oscilloscope, part 54-26. WA9BLA, Kenneth Courtney, 1502 Nowlin Ave., Lawrenceburg IN 47025.

SELL one crystal cw filter No. 8.9995-0.5 SX146 receiver $18. Will ship on M.O. K2TBZ, F. Rodia, 243 Senator St., Brooklyn, NY 11220.

WANTED: Harvey Wells Z-Match antenna tuner. K8JLK, 426 Central Parkway, Warren OH 44483.

WANTED: 1 KW class C amplifier for CW operation only. Barry Wright, 55 Howard Avenue, Weiser ID 83672.

DRAKE SPR-4 receiver with 5NB, SCC-4, TA-4, MS-4, most crystals, $790 invested, six months old, perfect condition. Will ship to best offer. Ron Mendel, 3419 Anderson SE, Albuquerque NM 87106.

WANTED: Motorola HT-220 and pocket mate. K4NBN, Del Popwell, 1946 Sweetbriar, Jacksonville FL 32217. (904) 733-9518.

SELL Drake SPR-4 receiver with RTTY adoptor, noise blanker and 23 crystals including all ham bands plus AC/DC cords in very good condition. In original carton with manual. $500 firm. Hamid A. Khan, 84-15 Britton Avenue, Elmhurst, Queens NY 11373. Phone: (212) 639-8159.

TRADE: Mobile radio telephone model TR245 (KAAR Engineering) and manual for best offer in cash, U.S. or foreign coins. Bernie Kane, Box 353, Madison NJ 07940.

BUMPER Stickers: Reading, Ham Radio Keeps You In Touch With The World. Legal SASE. 50 cents. WA0UTT, 2810 Euclid, Wichita KS 67217.

QST 1952 to present mostly bound $50 plus shipping. Marvin Fein, Box 207, Scarborough NY 10510. (914) 472-1100.

WESTERN Electric 12 button, 10 wire touch tone pads. Brand new with electronics and schematic. While supply lasts. $12 plus $1 each for shipping and handling. Calif. residents add 6% sales tax. CODs require 25% down. Send check or money orders to W. A. Maitrejean, P. O. Box 8205, Fountain Valley CA 92708.

HOUSE, ideal ham QTH, two bedrooms, screened tiled porch with planters, garage, work bench, fruit trees, central heating cooling, Hy-Gain vertical buried radials, few yards from excellent beach. View missile launches from sundeck. Unincorporated area low taxes. Fence and hedge assure privacy. K4RQE, 311 Meridian Drive, Cocoa Beach FL 32931.

WANT working Heath Q-multiplier with manual. Prefer internal power supply. Also Heath external VFO for SB102. WA2RUD, Bill Levy, 349 Old Roaring Brook, Mt. Kisco NY 10549.

HEATH IO-21 scope $40; IM-18 VTVM $20; IM-103 Line-volt monitor $10; F. S. Eggert, Box 2154, Livonia MI 48151.

QST 1966-1971 library binding. CQ 1966-1971 also bound, 1972 loose. $25 either set, $45 both. R. Mendelson, 27 Somerset, Murrayhill NJ 07974.

HEATH DX-60A transmitter, HR-10B receiver, HG-10B VFO. Also Vibroplex, Bug, Crystal calibrator, and brass key. Excellent condition. Only $235. Call (212) 241-1122, Brooklyn NY 11234. Lee Kokot, WN2ALS.

SALE: HQ-110 Rcvr, $125; DX-60A Xmtr, $60; shipping costs added. Stan Montz, WB2AYF, 67-25 Dartmouth St., Forest Hills, NY 11375.

NCX-500, HBAC, excellent, $200. DX-100, good, no shipping, $50. WA2IBE, Box 215, Ironia NJ 07845.

SELL Ten-Tec Triton II with cw filter No. 703. Hardly used. $550 (o.b.o.), WA2RUD (914) 241-0251.

SWAN 250-C, 117-XC, VX-2, NS-1. $375. John Boston, WB4RUA, Box 354, Calhoun GA 30701.

FOR SALE: Heath DX-60B, $80; HG-10B, $40; MFJ CW Filter, 2BX, $15. Prime condition. Write WB5MUA, Danny Robinson, Rt. 3, Searcy, ARK 72143.

HW-101 WITH 400 Hz filter and ac supply, $325. WB0OIE, Rt. 1, Satanta, KS 67870. (316) 657-2712.

SELL: Collins crystal packages for KWM-2(A) $50 each. Hustler vertical with 10 meter coil $20. RCA 4600A power amps with sockets $200, each. Lafayette Explor-Air SWL receiver good condition with manual $40. WB4JXZ/6, 2200 Olive Ave No. 21, Atwater CA 95301. (209) 358-8934.

WANTED: Drake TC2 transmitting converter, any condition. Will pay shipping. Also need Intel 8080 IC, non working Argonaut. WB0GAZ, 457 Farrand, CU, Boulder, CO 80302.

TRANSCEIVER: SB-102 with CW filter, HP-23A, SB-600, desk mike. Mint condition. Delivered, $450. WB5CWX, 1105 Kiowa, Ardmore OK 73401. Phone (405) 223-7472.

NCL-2000 clean $350; want KWM2-A, AC supply; 312B-5, 50 foot Sky-Needle. Ridings, 5301 Rockledge Dr., Buena Park, CA 90621.

SALE: Mobile or fixed DX station: SB101 w/cw filter, SB640 external VFO, SB600 speaker, HP23AC, HP13A DC, HD10 keyer, all manuals, cables, complete set spare tubes. Package sale only $600. P. Radding, W2DIQ, 11 W. Chatfield, Painted Post NY 14870.

WANTED: Schematic for 4CX1000 homebrew HF linear amplifier. Also will sell Galaxy G1000 mobile supply for $45 or trade for NCXA or equivalent. Tom Hancock, 411 13th St., NE, Cullman AL 35055.

WANTED: PVL-1 for ICOM 230 or equivalent VXO for Oscar communications. Morton Miller, 962 Paloma, Arcadia CA 91006.

WANTED: Small Hydro electric plant 4 to 10 KW 115/220 Volt AC. Send details and price. Fred Kost, Box 4453, Silver Spring MD 20904.

DRAKE TR-4, MS-4, and AC-4; excellent condition.$450 FOB, Ray Lynch, Rt. 2, El Reno OK 73036.

DRAKE 2B, 2BQ, 2AC. Good condition. $135 plus shipping. WA2OID, 140 Pleasant Ave., Pleasantville NY 10570.

HEALTH forces sale DX station including two towers, Q excellent site; View Oregon to Canada. Four bedroom brick, custom features, quality construction. Fifteen minutes Seattle. Ralph, Box 3061, Midway WA 98031.

HEATHKIT SB-104 transceiver, HP-1144 AC-supply, SB-604 speaker. All in kit form, boxes still sealed. Bought two months ago. $725 for all FOB. SBE-34 w/mike $180. I need schematic and Vidicon tube for Nivco TK-88W CCTV camera. W8NCN/4, 3450 Selwyn Avenue, Charlotte NC 28209.

SELL Gonset GSB-2 Sidewinder, A.C.P.S., manual, excellent condition, $250. W4BUZ, Rt. 11, Box 160, Greensboro NC 27410.

HW-7 PROFESSIONALLY wired, factory tested $65. Wanted Q Meter. J. Higgins, 116 Bay Avenue, Greenport NY 11944.

HW-101 PLUS CW filter, HP23A supply, perfect, with manuals, $295. Wayne Hall, 557 Lindley Drive, Lawrence KS 66044.

SELL: Heath DX-60, HR-10 receiver. Knight VFO with T/R antenna relay and calbes, plugs, $135. Arvis Thompson, 805 Winchester, Pine Bluff ARK 71601.

HT220 six frequency complete with charger, $550; Heath IT22 Capaci-tester, $15; Matrac extended housing 4 frequency, $320; TA30GT excellent complete P/L power voice speaker, $150; Beelman counter 7070 to 10 MHz, $65; RC221D freq. meter, $45; Navy version of RC221D, $30; D4COM amplifier 100 watts out, $115; Heath SB620 spectrum analizer, $395; R39A good condition, $155; NCX3 with power supply/speaker, $155; HP524C with converter to 250 MHz, $250. Vic, WB2PYE, 325 Wilson Ave., Westwood NJ 07675.

AMECO TX-62 and 621 VFO. Good for Oscar. Excellent cond. $90. Eico 717 keyer $40. Wanted; 2 Mtr transverter with 6 Mtr IF. Dick, WA1TRE (207) 774-8839 after 2100Z.

FOR SALE: Collins 30S-1 linear amplifier, $750; Collins 75S-3 receiver, $450; excellent condition. L. Grimm, 18307 Delano, Reseda CA 91335. Tel. (213) 343-8071.

HELP. Need 3035/455 kHz i-f transformer for Hammarlund HQ-170 type K38985-1. K7WJC, 7234 East Papago, Scottsdale AZ 85257.

HEATH SB220 linear, 3.95, used less than one hour. Tempo One with AC power supply and watt meter, 3.75. W8DSW, R. Hudson, 6646 Crane Ave., Detroit MI 48213.

2 METER mobile, Linear systems SB-144 10 watt, 12 channel fm transceiver, and Hustler CGT-144 colinear whip with trunk lip mount. Both mint used under 30 hrs. $220. W1SPI, Stamford CT (203) 322-6570.

CHEVROLET, 1940, Special Deluxe, excellent condition with spare body. Value $1300. Trade for ham gear. Mike Smith, P. O. Box 188, Dillsboro NC 28725 or call (704) 586-4966.

FOR SALE: New 2M standard 826MA with 4 channels supplied +16 crystal certificates, $349; Horizon "2" with 3 channels supplied, $275. Postage pre-paid with full remittance. Lake Havasu Electronics, 2011 McCulloch Blvd., Lake Havasu City AZ 86403 (602) 855-6822.

MICRO Mini Transmitter, $30; New Windspeed indicator, complete, $50. Nick Winter, 101Q7 Lev, Arleta CA 91331;

RF CONNECTORS, PL259 or S0239, five for $3.50 postpaid. Free catalog. COAKIT, Box 101-B, Dumont NJ 07628.

WANTED: Crown telephone valet induction box model CTI-4 or similar unit to fit standard phone cradle. Bob Houck, K3NXZ, Box 53-B, RD 2, Elverson PA 19520.

JOHNSON Kw Matchbox w/swr $175; Drake CC1, SC2, SC6, PS1, $150; Swan 508 Remote VFO $100; 410 $89; RG214 50 ohm coax, 20 cents foot; Heath HW7 QRP like new $65. Send for list of other items. W2FNT, 18 Hillcrest Ter., Linden NJ 07036. (201) 486-6917.

WANTED: Capacitor checker Heath IT28. K2LCS, 163 Ledgewood Circle, Rochester NY 14615.

WANTED: Drake 1A, 2A or 2B receiver. State condition and price. W4NI, 3600 Old Vineyard Rd., Winston-Salem NC 27104.

SELL: BC348K receiver with schematics: $40.00; PE125AX mobile power supply 12 VDC to 500 V, 160 mA: $15.00; 60 watt 6L6 modulator: $20.00. E. M. Irwin, 2118 Fisher Street, Indianapolis IN 46224.

DRAKE R4C triple conversion receiver. Perfect, $399. W4CH, 19 Sunset Avenue, Wilmington NC 28401. (919) 762-7958.

4CX1000A. Still in original sealed packages. Two for $100. Drake TR-4 and L-4 with new finals. Also two extra sets of L-4 finals. All for $750. WA8VFK, Springfield OH 45506.

COLLEGE Expenses. HW-101, HP-23, AC pwr $275. Good condition. WA3LWR, 634 N. Lincoln Ave., Scranton PA 18504.

REPEATER: Need two meter FM repeater. Leland Smith, W5KL, Jasper ARK 72641 (501) 428-5967.

DRAKE TR-4, AC-4, RV-4, MN-4, 34PNB blanker, mint, less than three years old. Never used mobile. All for $695; buyer pays shipping. WB5HTG, Bob Jorda, 87 Litchfield Lane, Houston TX 77024. (713) 461-7606.

HEATHKIT station: SB-303, SB-401, SB-200, SB-610. All excellent and documented. Like to sell together or trade for 20M single-bander plus cash. David Brumbaugh, 12 Hutchins St., Danielson CT 06239.

UNIVERSAL Self-supporting heavy duty alum. tower. 50 feet with hinged bases (2) rotor shelf. Never been up. 26 inch base section new cost $684. Sell $400 or swap for 2M or 220 gear and cash. TR-44 rotor $65. 100 foot belden 8214 $15, Hilltoper $15, Halo $10, SWR bridge $10. (617) 438-4165, Kevin Higgins, W1GAO, 25 Maple St., Stoneham MA 02180.

CLEGG-22er Mk II, absolutely mint. $169. W1KO (617) 878-1256.

SELL: Signal/one CX-07, excellent $1150. Like-new Alpha 374 $950. Greg, K4FJC, 520 Hemlock, Inman SC 29349. Tel. (803) 578-4534.

QST, 10 years for sale, 1965-1974. Best offer; include shipping. Harold Brown, W3GKB, RR 1, Box 145P, Palmerton PA 18071.

WANT HW-101. Hermann, Shimerville Rd., Emmaus PA 18049.

SELL: Collins 75A4, serial 226, exceptionally clean, $350. WA7IIM, Armand Pilotte, 15715 S.E. Division, Portland OR 97236.

VENUS Slow-Scan II, monitor for sale. Less than 12 hours use. $275 firm. Larry R. Salis, WB2FQH, 131 Station Road, Kings Point NY 11024. (212) 343-6620 after 6 PM.

COMPLETE: cw-ssb rig. Hallicrafters SR-160 xcvr, AC supply, mike, calibrator, manual, $225. WN6HHD, 920 San Pierre Way, Mountain View CA 94043.

HEATH 6 meter ssb SB110A w/power supply/speaker, Mint condition. WB5NIG, 12203 Spring Grove, Houston TX 77072. (713) 495-5035.

FOR SALE: 2EL mini-beam 20-15-10M, QSTs 1953-1970. 0-3MA, 0-300MA, 0-10MA meters. Knight 100KC calibrator. Make reasonable offer. WA4CLX, 674 Mt. Key Ave., NE, St. Petersburg FL 33702.

EXTRA nice DX-60A, HG-10, $75 plus UPS. Special deal if you buy SX-110 receiver also. K4JCX, 121 Maple, Oak Ridge TN 37830. (615) 483-1427.

FOR SALE: FR-4 frequency meter with service manual $40; Northeastern 14-20C frequency counter with 10-100 MHz plugin $75; Model 14 typing reperforator with keyboard $35; TT-100 teletypewriter with 60/100 WPM and service manual $75, 4CX300 tubes, sockets $35 each; PL172 with socket and chimney $50. WA6FIL, Box 177, Baker CA 92309. (714) 753-4542.

ATLAS 210 and AC console $565. SB200 with new finals $185. With manuals. Cashiers checks only. R. J. Hahn, K6GG, 740 East Sycamore, Willows CA 95988.

CRYSTALS airmailed: Novice, active FT-243, all frequencies, minimum five 40M, 15M, 10M 99 cents each, 80M $1.85. Less than five $1.50, 80M $1.95. Novice band: Edge Marker-QSO combination package, 80M, 40M, 15M, 10M, four bands, eight crystals, EBM-QSO-8, $9.95. Same less 10M pair, EBM-QSO-6 $7.95. Both novice packages for QSO just inside HI-LO band edges and calibration of your receiver or VFO. Satelliting? 8107 HC-6/u $2.46, 160M FT-243 pins $2.95, four for $9.80. Sockets 25 cents. Airmail 20 cents/crystal, 1st-cl 15 cents/crystal. Free listings, 160M-2M. "Crystals since 1933." Bob Woods, WØLPS, C-W Crystals, Marshfield MO 65706.

LATE Model KWM-2 with console power supply. Has rejection tuning. $800. W4LES. Telephone (704) 692-5512.

WANT 1923 to 1925 US Gov't Amateur Callbook. WØQL, Fred Lagerheim, Kimberling City MO 65686.

5BWAS your goal? Get a concise accurate "Insta-gress" Record Book showing which states are worked, confirmed and those still needed; all at a glance. Avoid repeated log searches and lost information. Order now! $4.98 postpaid US/VE $5.98 elsewhere. Richard Norley, WA1CFT, PO Box 543QM, Derry NH 03038.

HRO 60 RACKMOUNT Model with 10 coil sets, speaker, crystal calib., narrow-band fm, and instruction manual. Very good condition. $200. 168-19 Highland Ave., Jamaica NY 11432. (212) 739-8661.

SIDEBAND engineers SB-34 with mike. Excellent condx $250. John Bonica, WB2CZN, 552-78th Street, North Bergen, NJ 07047. (201) 869-2032.

SB303 & SB401, $480 pair; SB-220 $325; SB-610 $50; Johnson KW Matchbox $200. Also, HM-102, HD 10 & Vibroplex Auto Keyer, HDP-21A mike, KW low pass. Jack Hills, 3325 Paris Ave., Cleveland OH 44109.

MARRIAGE forces sale: Heath SB-102 w/P.S. and spkr $350. G. E. Pre-Prog base, 35 watts, w/6-freq T/R deck, all xtals and control head $125. Hy-Gain 18AVQ vert, and misc equipment and parts. WB9IEM, 18330 Torrence 1J, Lansing IL 60438. (312) 895-1014.

COLLINS/HEATH Station, complete. 75A-4, S/N 5698 (late), 3 filters, KWS-1, S/N 1112 (late). Coordinated with Monitorscope, Scanalyzer, Station Control. Relay, LP filter, microphone, extras. Excellent operating condition. Will demonstrate. Sell complete station only. $1350 firm. You pick-up. Feighner, W8BPB, Detroit MI (313) 885-6591. Evenings or weekends.

SALE: SB-620 Spectrum Analyzer, $100; SB-630 console, $68. W2WHK, 210 Utica St., Tonawanda NY 14150. (716) 692-5451.

HRO SIXTY mint condx. All coils best offer. E. T. Turney, Jr., 1112 South North Lake Dr., Hollywood FL 33020. (305) 925-5677.

INTERCEPTOR B receiver mint with allbander $245. Drake SC-6, CPS-1, SCC-1 $45. McCoy Golden Guardian SSB filters with USB/LSB crystals $25. WA3AXV (215) 355-5730.

SELL: Heath SB 610 monitor $70, you ship. C. Dyson, 5748 N. E. 62nd, Seattle WA 98115.

SELL: Drake 2-C receiver, Drake 2-NT transmitter, excellent condition, $225. Clifford C. Price, 41 Meadow Drive, Webster NY 14580, (716) 872-4755.

ROBOT SSTV 70-A monitor, 80-A camera with lens. Very clean and low hours. $550. Will split up. David Nicolaus, WB9AOU, Rt. 7, Box 275, Valparaiso IN 46383. (219) 762-1346.

WANTED: Collins equipment not working. WA5RGX, Box 254, Southaven MS 38671. (601) 393-0858.

"DON and Bob" discount prices plus full warranty on new guaranteed items. Midland 13505 2MFM 30W, 250.00; Vista 20A regulated supply 59.95; CDE HAM-2 117.00; Belden 8448 rotor cable 13 cents/ft; Hygain TH6DXX 192.00; TH3MK3 160.00; 18HT Hytower 208.00; Mosley Classic 33 179.00; Belden 8214 RG8FOAM 23cents/ft; 8237 RG8/U 19 cents/ft; Amphenol PL259 59 cents; CDE .001/10KV doorknob cap 1.95; 1R 2.5A/1000PIV epoxy diode 39 cents; 1R fullwave bridge 1.5A/400 PIV 95 cents; Quote Atlas 210X, Standard Horizon 2FM; Collins; Prices FOB Houston. Good until Dec. 1; Madison Electronics, 1508 McKinney, Houston TX 77002. (713) 224-2668; Nite (713) 497-5683.

SELL: HRO-500, TR-4 w/NB, AC-4, MS-4, SW-4A, AL-4, FF-1, crystals, GR-54 4BTV, instructograph, key, tymeter, ham, electronic magazines, SASE. Ross Moster, ex-WN6DEF, 10452 LeConte, L.A. CA 90024.

BUY-Sell-Trade. Write for monthly mailer. Give name, address and call letters. Complete stock of major brands. New and reconditioned. Equipment. Call us for best deals. We buy Collins, Drake, Swan, etc. ssb & fm. Associated Radio, 8012 Conser, Overland Park KS 66204. (913) 381-5901.

MISSIONARY church for Jesus Christ welcome help from local hams, or donations of any ham equipment. Transmitters, linears, components, etc. We have a particular need for a receiver. Anything welcome. Contact: Daniel Groves, c/o Gospel Outreach, 5815-5th Ave., Brooklyn NY 11220. Tel. (212) 492-6599.

CONSTANT impedance coaxial joint 5' long allows continuous rotation of your super beam using offset drive. $25.00 with connectors. W7JQO, Box 1310, Sedona AZ 86336.

KWM-2 516F2 Waters notch, noise blanker $825. K5OST, 4133 E. 43, Tulsa OK 74135.

FOR SALE: Transformer Dual Primary, 1150 or 900 volts at 1 Amp. Secondary $30. 2- 3-500Zs new. Never used. Sockets, filament transformer $50. H. C. Martin, Box 1275, Bluefield WV 24701.

SELL: Swan SS200 all solid state transceiver with power supply, 110/220 V, $750. Drake R-4, T4X and MS-4 power supply $750. All equipment in mint condition. Ulrich L. Rohde, 425 Fairfield Avenue, Ridgewood NJ 07450.

TEKTRONIX 545A with dual trace CA plug-in $650. Others available. Inquire Tudor (716) 538-6469.

GONSET, 2M, sidewinder model 900A with 20/A AC supply and manual. SSB-CW-AM. Like new, $195 FOB. Joe Harms, W4BLQ, B158, Edgewater FL 32032.

RME VHF-602, $75. Hallicrafters SR-46, $75. Portamon CRX-100 new, $25. PS-150 12 vdc supply now $75. National HPS and supply $75. XCU-300 Calibrator $13. Hustler DTLS new $6. RM-40s, 20s, 15s, 10s new $50. Clegg Thor 6 and AC supply-modulator mint $145. Ameco 2M CN converter FW new $40. Rare T17/ARC-5 160M new $30. Swan AF-800 CW filter new $22. Rare EV664 goldplated mike and stand new $50. F. R. Claus, W8VEQ, 104 Wetzel Road, Pittsburgh PA 15209. Tel. (412) 486-5201.

QST some from 1924, complete from 1932. CQ, Radio, Handbooks SASE. W8EYU, 1455 Rochingham, Rochester MI 48063.

WANTED: PMR-7, need parts, quote price. F. Ciulini, W9MLZ, 6359 So. Keeler Ave., Chicago IL 60629. (312) 767-3938.

YAESU ft-101B for sale. Less than 40 hours air time. Mint condition. $550. Alan Duncan, 4107 Ladoga, Lakewood CA 90713.

HIGHEST bid gets unaltered fully operable 1939 Howard 435 receiver 0.55-43 MHz. W3EON.

WHAT do you want? Buyers & sellers has the largest listings of used ham gear — anywhere. See our display ad to find out how to get the gear you want.

WANTED for cash: CX-7, SB-104, KWM-2, KWM-2A or S-Line; prefer working units but need not work if priced accordingly. Jerry Gunsolley, 1705 S.W. 15th, Lincoln NE 68522.

WANTED: General coverage AM/SSB/CW recvr, 0-30 MHz, built-in spkr preferred, must be rated 50/60 cycle for use overseas. State approx ship weight and age. Vandegrift, A/C Div, USAMMAE, APO NY 09052.

DK60G2C Dow relay, new, $21.00. Collins F455FA316550 filter, $35. Kilowatt 144 MHz amplifier, with 4CX250R's, linear, CW, RTTY, or FM. Beautiful 4 foot enclosed cabinet on rollers, fully metered. Photos and list for SASE. Jerry Swank, W8HXR, Willabar, Washington CH OH 43160.

FOR SALE: 51S1 5235, $1500. KWM2 38,692, PM-2, $1350. 30L-1 41,686, $495. 51J4 (3 filters), $595. R388, $395. R390-A 695. R390-A, cabinet, $745. CX7-A, $1250. 3281, 516F2, $425. 7583A, $495. Kenwood: TS520, $575, TS900, PS900, $795. VF0900, $165. R599A, SP599A, $410. T599A, $410. TV502, $229. Craig Radio, Box 615, Portsmouth NH 03801. (207) 439-0474. (603) 436-2884 (nites).

FOR SALE: Drake C-line all mint asking T4XC AC/4 $500; R4C MS/4, $470; MN2000 $150; SB220, $340. Bob Yourwith, Mott Hill Rd, East Hampton CT. (203) 267-0160, after 9:00 PM.

HALLICRAFTERS SX101A for sale, $110. D. Markl, WA4NIT, 603 S. Carney St., Atmore AL 36502. (205) 368-8727.

ICOM IC-230 two meter fm, $300. R390A receiver, $325. Drake CPS-1 converter supply, SCC-1 VHF calibrator and CC-1 converter console, $50. Drake SC-6 6 meter converter, $40. Heath HW-32A transceiver, $70. Heath HP-23A power supply, $40. P&H 6 meter transmit converter, 20 meter drive, 100 watts input, spare finals, $75. Telerex 6M624 6 meter 6 element yagi, $70. Hy-Gain GPG-6 5/8 wavelength 6 meter ground plane, $20. All equipment is in very good condition. You pay shipping. No trades accepted. Remit by certified check or money order. Bruce R. Palmer, WA0VPY, 120 East Signal Drive, Rapid City, SD 57701. (605) 343-6519.

WANTED: Mounting rack for GE pre-progline 4-ES-12-C1 VHF mobile transceiver (2 meter band). William T. Barron, W4WCF, 1011 Arlington Blvd (W507), Arlington VA 22209. Phone (703) 528-3672.

WANTED: CV89 teletype converter. WB5JEV, 5146 Village Path, San Antonio TX 78218. Phone (512) 655-9401.

TEMPO FMH 2 meter Handy Talkie, tiny tone pad, five sets crystals, AC charger, NICADS, case, rubber ant., mobile ant. Brand new $250. Kellersmith, 1433 Redding Road, Fairfield CT 06430.

MOBILE kilowatt: SBE-33, spare finals, new P&H spitfire linear, two inverters, microphone, $295. W7BIF, 107 Wyoming, Boulder City NV 89005. (702) 293-1182.

HEATHKIT SB301 with ssb and cw crystal filters and SB600 speaker. Perfect cond. $200. Fred Ligman, 711 W. Main St., Urbana IL 61801.

OPERATE from the world's best DX location — Curacao. Rent my waterfront, ham-equipped home. W1BIH, Box One, Torrington CT 06790.

MINT SB-300, best offer over $165. WB0HBM, 1024 Larimer, Pratt KS 67124.

GALAXY 5MK3, 5-band, 500w, ssb transceiver, AC, SC-1, $250. Want 2M-HT. Kohn, 7 Jeffrey, Hightstown NJ 08520.

YAESU FTdx560, cw filter, FV400S VFO, matching speaker. Excellent. Best offer over $500. FOB. Roger Smith, K4PFK, 4920 Liles, Raleigh NC 27606. (919) 851-4280.

WANTED: D-104 Mic, DX60 and MN4 Drake ant. matcher. State price and condition. WB9NMA, Al Sudeikis, 4316 N. Albany, Chicago IL 60618.

DRAKE L4B, Johnson 6N2, Atlas 210, HQ1 minibeam, Hustler 5 band 4BTV, Omega noise bridge, Millen solid state dipper, Ten-Tec RX10. Frank White, W8OY, 19601 North Park, Cleveland OH 44122.

PROG-LINE portables, 94 xtals included. Club equipment, $50 each, two for sale as is. Contact Walt Schick (518) 346-2997.

FOR SALE: Hammarlund PRO-310. Excellent condition. Make offer. Want SB-303. Dale Hammer, Colonial Crest, Apt. 222, Muncie IN 47304.

LIKE new, Regency HR2B with xtals for 6 popular repeater freqs plus 94 and 52 simplex and Hustler BBLT 144 5/8 trunk lip mount mobile ant. All for $200, plus UPS. D. Sowers, K4SUF, 522 McGeorge Dr., Vinton VA 24179.

SELL Swan 270B, all accessories, excellent condition, $300. W9KV, 706 N. Elmhurst, Mt. Prospect IL 60056.

WANTED: 1945 CQs; 5th edition ARRL Handbook. Sell: "Electronics" magazine 1936-1940s. Nagle, 12330 Lawyers, Herndon VA 22070.

SELL Collins 75S3C receiver round $850 O-B-O. Bill Levy, 349 Old Roaring Brook, Mt. Kisco NY 10549.

FOR SALE & wanted: Sell TS-900, PS-900, VFO-900 like new condition; sale price $725, new price $1110. Wanted: motor tuned transmitting condenser 300 mmf. W7UR, Rt. 8, Box 700, Tucson AZ 85730. Tel: (602) 886-1702.

FOR SALE: Rutherford pulse generator, model B7B. $125. Mike Persson, WB9FLN, 1001 Knapp, Chetek WI 54728.

NOVICE package. Drake 2 NT, like new, W/manual, 11 crystals, plus Hammarlund HQ180 receiver, good condition W/manual. Trade for 2 CBs (23 ch) mobile and base, prefer ssb, or sell $250. Pickup only. John Stevens, 2 Arnold Way, Verona NJ 07044, (201) 239-2616.

EICO 435 scope, $80; Heathkit IM-1202 DVM, $50; EICO 147 signal tracer, $35; SX-28, $50. WB2AXH, 36 Flower Lane, Centereach NY 11720.

NEW TV cameras, $129. New color VTR, $195. Send 2 stamps for catalog. Haas Enterprises, 6017 Majorca Court, San Jose CA 95120. (408) 997-0132.

ACCU-KEYER complete with full memory in new Ten-Tec M enclosure. Also, Gonset G-63 available used. Ed Blake, 3 Country Lane, Simsbury CT 06070.

FOR SALE: Drake R4-C, latest version, mint condition, used less than 20 hrs., with MS-4 spkr, $390; 4NB noise blanker, $45; filters 4kHz, 1.5kHz, 250Hz $35 each; 15 assorted international broadcast, CB, other band crystals; everything for $530, you pay shipping. Also, Hy-Gain 18HT Hytower, still in original carton, $190, plus shipping. Gary Sanders, RR 5, Box 327, Franklin IN 46131.

COLLINS 75S-1, 32S-1, 30L-1, 516F-2, 312B-4 with manuals mikes and T O keyer, $1100. WA4EZL, Rt. 1, Box 96, Columbus NC 28722. (704) 894-8827.

SELL: Heath HW-101, cw filter, HP-23B, SB-600, all excellent with manuals, $350 firm. WB4WME, 106 Colby Road, Oak Ridge TN 37830.

SWAN MB-40A, 165 watt 40 meter solid state, excellent, $275. Wanted, quad, rotator. K9KIC, 219 Halle, Sumter SC 29150.

WANTED Used Quads: Mosley or Hy-Gain. Condition not important. Whetstone, 411 Dantzler, St. Matthews SC 29135.

HENRY 2K2, mint condx., low hours, w/2 new spare 3-400Z, $575. K8IKB, (419) 352-8734.

DISCOUNTS on all Astatic, Electro-Voice, and Shure microphones, Astatic D-104, w/UG8 PTT stand: 32.68. EV 619: 35.53, and Shure 444; 25.87. All units new and guaranteed. Include 90 cents shipping w/check or request COD. Advance Sound Company, 781 Deer Park Road, Dix Hills NY 11746.

"HOSS-Trader, Ed" Says "We Refuse to be undersold: If you didn't buy it from the HOSS you paid too much. Shop around for the best price then telephone the Hoss last." New Atlas 210 transceiver, $509.00; Demo TR4-C, $489.00. New display SWAN 700-CX, $509.00; Demo T4XC, $469.00; Demo HR-2B, $179.00; new ICOM demonstrator, $379.00; New Rohn 50 ft. foldover tower prepaid $345.00; Demo HAM-2 rotator, $116.95; new display Atlas 210-X, $519.00; HOSS-Trader, Specials: TR-4, $395.00; R4-C, $429.00; New Heath-Kit SB-303 receiver, $299.00; new Collins at old prices, fractory sealed. Make offer. Moory Electronics Company, P. O. Box 506, DeWitt, Arkansas 72042. Tel: (501) 946-2820.

WANTED Buyers for antique radio gear. Free lists for SASE. Postals ignored. W6LM, Box 308, Wrightwood, CA 92397.

CRYPTOGRAPHY devices, machines, books, related material wanted. German Enigma machine especially sought. Leads appreciated. WN2TSD, 17 Alfred Road, Merrick NY 11566. Call Collect (516) 378-0263.

CE200V 80-10 meters. New finals with manual $300. Pick up only. Rotunno, WA2CKM, 1816 Park View, Bronx, NY 10461.

ETCHED Circuit Boards prepared from your layout. Sase for information. Karl A. Raup, Box 498, Springfield, VA 22150.

HAM Radio Repair. Expert repair and alignment in our new lab. Prompt, reasonable. "Grid" Gridley, W4GJO, 3824 Malec Circle, Sarasota, Florida 33581.

CALL letters white, red, yellow, reflectorized 3" high stick-on $1.00/set. Ben Lindberg, 3707 Van Dyke, White Bear Lake MN 55110.

COLLINS KWM-2 winged emblem with Waters Q Mult., 800 Hz Collins Mech. Filter, Wisper Fan, PM-2 Supply and 399C-1 Remote VFO. All for $875. W. E. Hill (WA3UFW/7) 1015 East 9th Street, No. 109, Tucson AZ 85719. (602) 792-2065.

SELL: Heath HD-10 Electronic Keyer. $27 COD. WA5PSW, 6209 Nasco Dr., Austin TX 78757.

HEATH GR-54 Receiver; best offer. WN2AVM, (512) 864-2169.

DRAKE R-4C; 4NB noise blanker; .5 and .25 filters; WWV crystals; 6 mo. new: $580. WA2OVG (212) 889-4303. Eves, 796-8617.

DRAKE TR-3, good condx., with AC (AC-3) and DC (DC-3) power supplies $325. Donna Lifland, Donmoor Road, Lawrence NY 11559.

TUBES — Motorola Dispatcher — hard to find types — tested — CK6397 $2 and 1AD4 $1. M. J. Moss, W4UXJ, Box 28601, Atlanta GA 30328.

WANTED: Hammarlund HQ-225 or HQ-215 and Collins filters type FA. K9UKX, 51625 Chestnut Road, Granger IN 46530.

WANTED: Recent models, Drake R4C, T4XC, TR4C, AC-4; YAESU FT-101B, FT-201, FR-101, FL-101, FT-101E; Kenwood TS-520, VFO-529, SP-520, TS-900, PS-900, VFO-900, R-599A, T-599A. Laver, 28 Gallatin Drive, Dix Hills NY 11746.

COLLINS 75S-3B, 32S-3, 516-F2 plus speaker, Ham-M Rotor and control, Mosley Classic 33, Johnson Phone Patch, manuals and interconnecting cables. All in excellent condition. Complete station only, no partials. $1,300. WA5OFT, 10 Lefever Lane, Little Rock Arkansas 72207. Tel (501) 225-5655.

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In the CW mode, you can send at speeds anywhere between 8 WPM and 60 WPM. You can also adjust dot-to-space weight ratios to your liking. For CW, you have all alphanumeric keys, plus 11 punctuation marks, 5 standard double-character keys, 2 shift keys, a break-for-tuning key, error key, "DE-call letters" key, plus 2 three-character function keys. Output interfacing is compatible with cathode keying or grid-block keying. A side tone oscillator and built-in speaker allow you to monitor your signal — with adjustable volume and pitch controls.

The DKB-2010 also has a three-character memory buffer which operates in either the RTTY or CW mode, allowing you to burst type ahead without losing characters. A 64-character memory buffer is also available as an option. Key function logic in either mode is governed by LSI/MOS circuitry. All key switches are computer grade.

The DKB-2010 is available assembled or in kit form. Should you choose the kit, you'll find construction easy — the unit consists of three assemblies: power supply board, logic PC board, keyswitch PC board, and pre-assembled wiring harness.

Any way you look at it — as an easy-to-build kit, a complete assembly, as a CW keyboard, or an RTTY keyboard, the HAL DKB-2010 is a real breakthrough for every amateur. It adds a whole new dimension to the exciting world of amateur radio. Once you've used the DKB-2010, you'll wonder how you ever got along without it!

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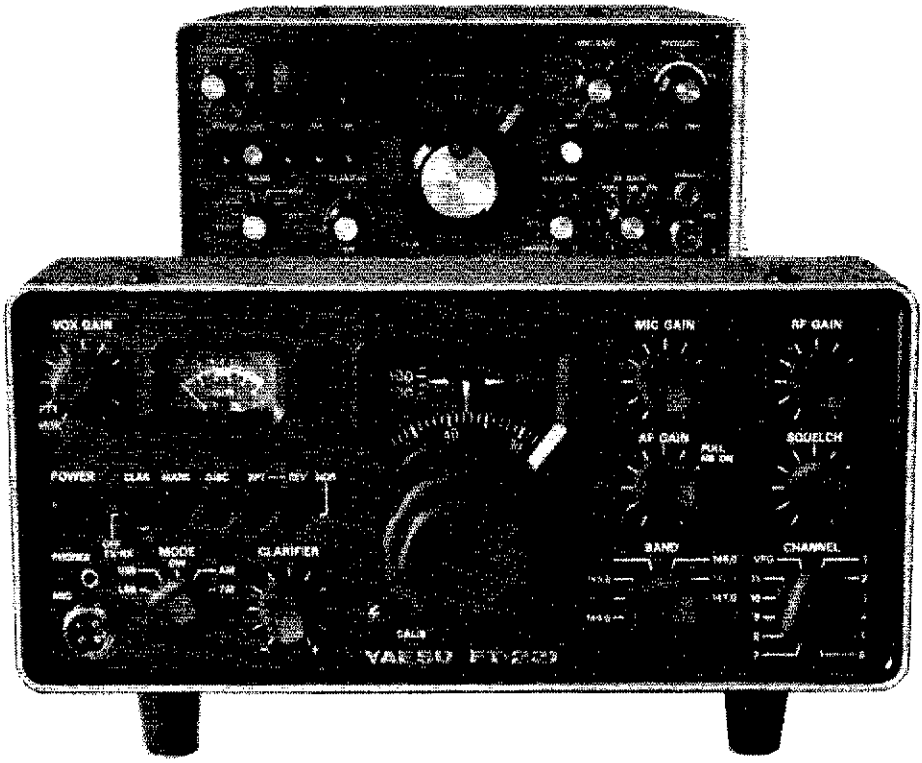

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