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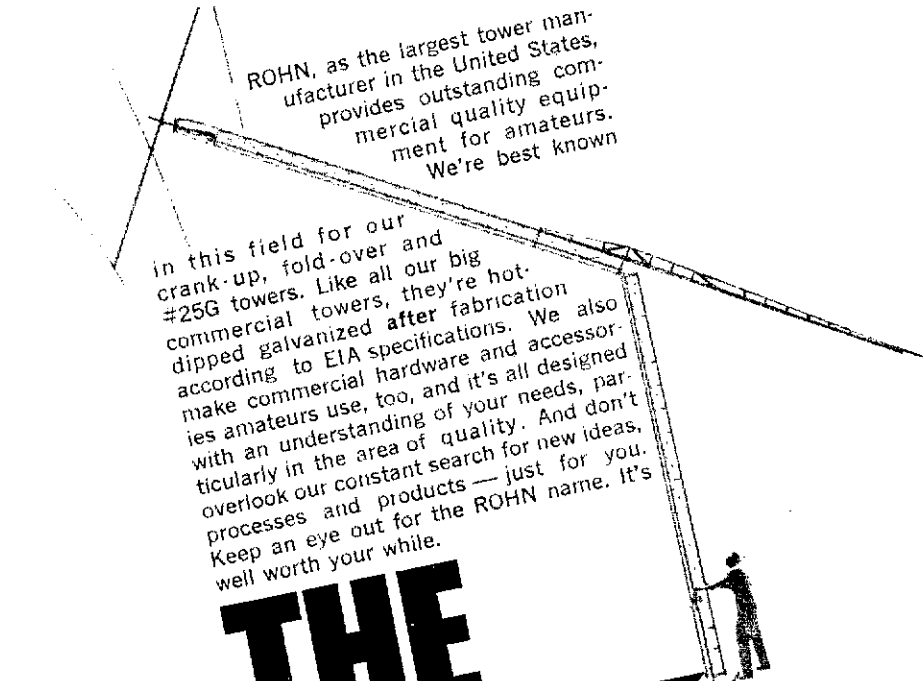
But if your choice is between putting a 3 or 4 element beam on a 30 or 40 foot tower, or the 2 element model at 60 to 70 foot, from a standpoint of dollar value, we recommend the TB-2... it's a giant killer.

It may sound odd for us to be talking you out of buying our more expensive models, but Swan has always been known for giving the radio ham more value for his dollar. In this case, the TB-2 on an inexpensive telescopic TV mast and rotator is a remarkable value.



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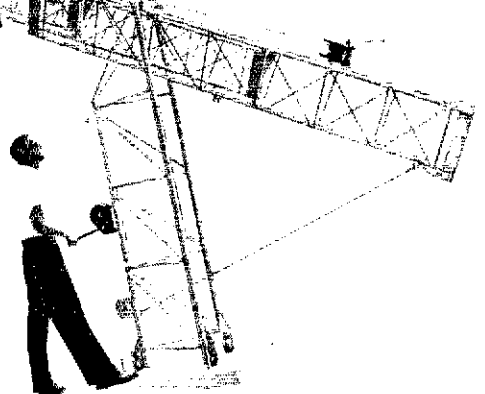
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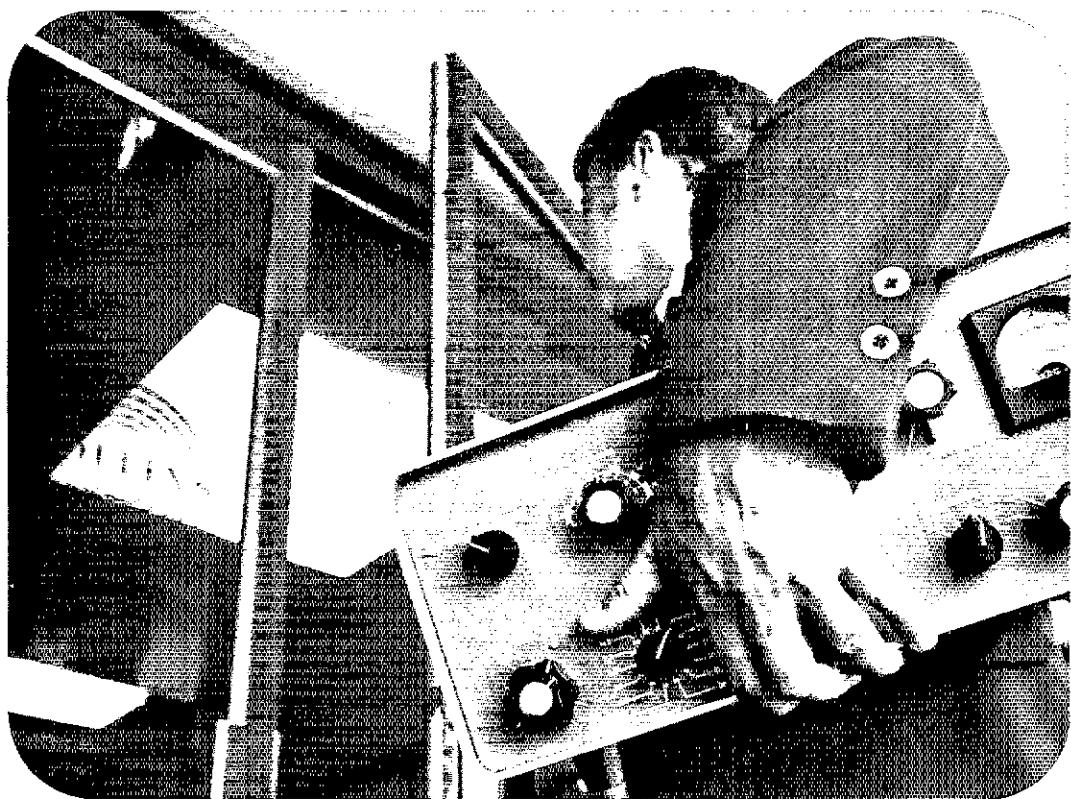
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—CONTENTS—

TECHNICAL —

The 2-Meter FM "Pip-Squawk"	Doug DeMaw, W1CER	11
The Ground-Image Vertical Antenna	Jerry Sevick, W2FMI	16
A Solid-State Noise Blanker	Frank N. Van Zant, W2EGH	20
Two-Toter	E. Laird Campbell, W1CUT	23
A Tunable 440-MHz FM Receiver	John Bertini, K1ZJH	26
A Second Look at Linear Integrated Circuits	Douglas A. Blakeslee, W1KLK	29
A Simple IC Keyer with Weight Control	Dean Straw, WA1RG, and Ralph S. Hawkins, W1OEX	40
Recent Equipment:		
Heath Model SB-303 Receiver		48
The Braun TTV 1270 Transverter		52
Technical Correspondence		55

BEGINNER AND NOVICE —

A Power Bridge and SWR Indicator for 2 Meters	Lewis McCoy, W1ICP	37
---	--------------------	----

OPERATING —

1970 VE/W Contest Results	Al Noone, WA1KQM	56
1971 ARRL International DX Competition — High Claimed Scores		59
Distress Calling		60
SET 71	Bill Reichert, WA9HHH	64

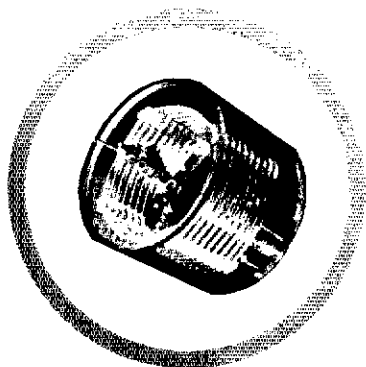
GENERAL —

Amateur Laser Contact Established		93	
ARPS	60	"It Seems to Us. . ."	9
ARRL QSL Bureau	87	League Lines	10
Coming Conventions	71	New Apparatus	54
Correspondence	88	Operating Events	104
Feedback	55	Operating News	105
Hamfest Calendar	70	Silent Keys	96
Happenings of the Month	72	Station Activities	109
Hints & Kinks	46	World Above 50 Mc.	94
How's DX?	97	YL News & Views	102
IARU News	90	W1AW Schedule	106
Index of Advertisers	158	25 and 50 Years Ago in QST	39

OUR COVER

We had a "Pip-Squeak" (March), a "Pip-Squawk" (this issue); could this antenna be the "Pip-Squirt"? W1FXJ operates the two-meter portable beam described on page 23 in this issue.





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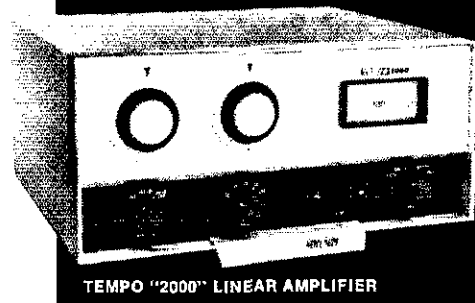


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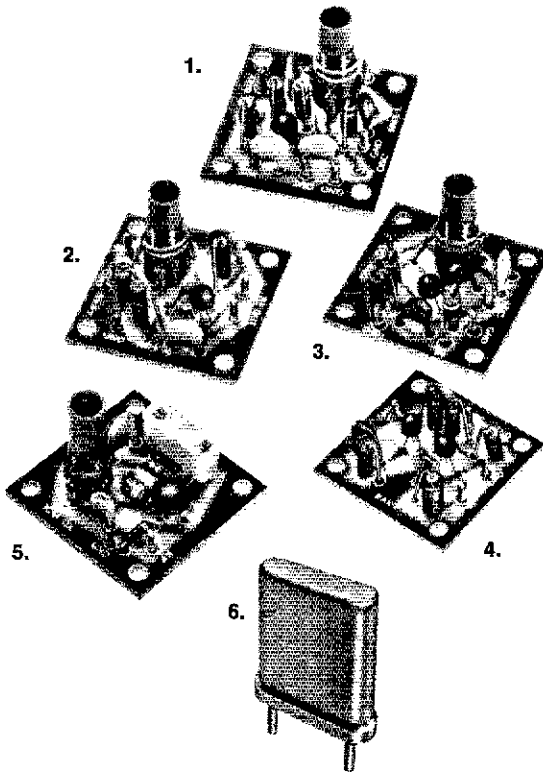
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* Member Executive Committee

"It Seems to Us..."



THE BOARD MEETING

AMATEUR RADIO'S elected representatives had their annual sessions in Hartford May 7 and 8, 1971, facing issues as complex and many-sided as any in recent years. Not the least of these were proposals for expansion of the hf phone bands used by U.S. amateurs.

At the start of discussions, views — based on input from members — ranged from complete acceptance to complete rejection of Docket 19162 as proposed by FCC. The most-involved DX chasers, dedicated cw men, and amateurs who had done much operating from outside the States (joined by many amateurs of other nations) were generally against expansion — the avid DXers fearing loss of "windows" where they can hear the weak ones on phone, as well as being conscious of what U.S. high power and large numbers do to the smaller overseas amateurs. Traffic men who preferred phone saw the nets being throttled by too-narrow space and the need to stay in General-Conditional Class segments so that all could participate. Traffic men who preferred cw, however, were apprehensive about a squeeze in which U.S. phone expansion would be followed by Canadian expansion, in turn to be followed by a general breakdown of the various "gentlemen's agreements." And, finally, the general phone operators — the most numerous group — who are moderately interested in DX, moderately interested in traffic and emergency work, and quite interested in just conversation for the most part were strong supporters of the FCC proposal just as issued. Then there were variants based on license class, such as the people who had gotten Extra specifically to enjoy a lower QRM ratio in the 25-kHz cw bands at the low edge and were unhappy at the prospect of losing it. But many comments cut across the license class of the member — Generals thought the 10 kHz plan was unfair to Extras, even though they personally didn't benefit; conversely, Extras and Advanced felt General Class amateurs should have more phone space, particularly in the 75-meter band.

Needless to say, then, the first motion by the first director — after disposition of statutory and customary "business" — was on Docket 19162. Minute 9 (See "Happenings" this issue) reflects all the complexities, all the concern, of the members, and their representatives the directors, toward

this issue; and it shows how hard the Board sought compromises acceptable to the majority. It also gets a little complicated to follow the course of the parliamentary action to its final result — so in "Haps" we also show: the present bands, the FCC proposals, and the ARRL counterproposals as adopted.

Nor was that the only touchy issue to be faced. At Minute 16, the Board took up the matter of a dues increase, in light of the fact that the League had operated at a deficit each of the past several years. There would definitely have to be a dues increase — but how much? When? There were many imponderables, the largest being raises in postal rates of unknown size, under the new United States Postal Service and a separate rate-setting body. So when a motion was offered delaying the question until the first Board meeting of 1972, it was unanimously adopted.

That's a strange-sounding phrase, "the first Board meeting of 1972." It results from Minutes 14 and 15, which provide for two meetings a year of the Board, on the third Friday of January and July each year. Here again there was quite a bit of discussion — costs, the possibility of severe weather in January hampering travel, of unpleasant humidity in July, shortness of time for preparation of fiscal information, etc., all being balanced against greater responsiveness to changing currents of amateur opinion, greater exchange of viewpoints provided by the more-frequent meetings. (Incidentally, this was the fifth official introduction of a motion for two board meetings a year, going back to 1957; other years there was informal discussion which didn't get brought to the floor of the formal sessions.)

Other motions aimed at making the League more accessible to the rank-and-file include Minute 25, expanding the Advisory Committees to eleven members, so there can be one from each call area and from Canada on each of the groups (currently, on repeaters, on DX, and on contests); amending affiliation rules so that school and college clubs can "join up" if only one key person is an amateur and League member (Minute 26); and extending the privilege (Minute 28) of prepaid Life Membership to members overseas (20 times annual rate, so \$140 for amateurs abroad) and to non-amateur members at home (\$130, same

(Continued on page 86)

League Lines . . .

May QST (page 84) reported an informal ruling by FCC that Technicians on two meters could not be repeated outside their assigned (145-147 MHz) band. At the Board meeting a 1960 written interpretation by FCC on the same point came to light and was the subject of some discussion since it okayed such activity! In response to a more-recent inquiry on the subject, FCC answers: "The rules are not absolutely clear . . . We are considering these matters (in Docket 18803) and will answer the questions when a decision has been made."

Hq. has an up-to-date list of the U.S. amateur bands by mode and class of license (good at least until Docket 19162, phone band expansion, is settled). A self-addressed stamped envelope will be appreciated and will expedite your request for "Members Guide to U.S. Ham Bands," S-15.

Speaking of SASEs, thousands of 'em are still on file in ARRL QSL bureaus with 6, 12, etc., cents postage. Now that first-class rates have gone up, how about sending along (to your district manager, not to Hq.) enough 2-cent stamps to cover your envelopes?

Interested in world travel and being exotic DX? ITU has a number of overseas job openings in its technical cooperation program. Examples: relay and multiplex expert for the Central African Republic; traffic engineering, Bangkok; instructor, Nepal; frequency management, Trinidad. Interested and qualified candidates should send a resume of background to Office of International Organization Recruitment, Bureau of International Organization Affairs, Washington, D.C. 20520.

And if you're going to operate outside the U.S. under your W/K call, you must first notify the FCC Engineer in Charge of the district in which your station is located (Sec. 97.95, amateur rules). This is true whether you'll be on the high seas (e.g., W1XYZ/RI) or within the jurisdiction of a foreign government (e.g., W1XYZ/VF). Citations have been issued for failure to report. For any operation away from home, Hq. has a handy-dandy form, S-43a; SASE, please!

ARRL has purchased a 15-minute 16-mm. color film, "This is Ham Radio," oriented specifically toward youth. Prints are available at \$100 each. Members in or associated with audio-visual departments of educational institutions are urged to promote school purchase. Affiliated clubs, or particularly club councils, should also consider acquisition of a print for local promotional activities.

Speaking of good public relations, Prexy Dick Schmidt (KØFLQ) and WAØUME of the Denver Radio Club have a slick idea -- on the occasion of a special program they charge "admission" to the club meeting: bringing a non-ham pays the fee.

1976 isn't too terribly far away as planning goes, and that will be the two-hundredth anniversary of the United States. Amateurs will want to have some part in celebrations, both on the national level and on a local or regional basis. (Colorado hams, for instance, will help celebrate the 200th anniversary of their country and 100th of their state by sponsoring the ARRL National Convention that year.) Pass along your thoughts on this subject to Box 1776, ARRL, Newington, CT 06111.

No more hide-and-seek to locate "feedback" items correcting any technical or diagram errors in earlier articles; henceforth they'll all (tho hopefully few) be at the end of the Technical Correspondence department each month.

University Microfilms now has a complete collection of QST on film, right from No. 1. Write them at Ann Arbor, Michigan 48106 for info on prices.

The 2-Meter

F M

“Pip-Squawk”

A Mate for the “Pip-Squeak”

BY DOUG DEMAW,* WICER

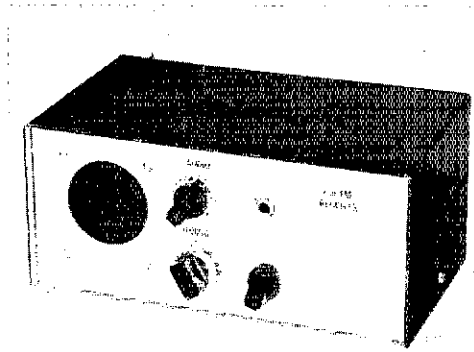
DESIGN TRADEOFF is sometimes necessary in the interest of simplicity and low cost. This has been proved in designing and building a suitable receiver to be used with the “Pip-Squeak” fm transmitter described in March 1971 *QST*. Simplicity, however, does not rule out good performance if one is willing to do without some of the frills found in commercial two-way radio equipment. The receiver described here has no squelch. It uses no crystals or i-f bandpass filter. Furthermore, detection is accomplished by means of slope tuning.¹ This nonplethoric approach was followed in the interest of saving money. The Pip-Squawk is easy to build, and the parts are not difficult to obtain.

Three models of full-blown crystal-controlled fm receivers have been built in the ARRL lab by this writer and K1ZND. The best of the three will be described in *QST* later in 1971. It is worth mentioning, however, that top-rate performance does not come to those who keep a frugal eye on the family slush fund. A 4-channel solid-state fm receiver of the double-conversion variety, and with good limiting and selectivity, will cost somewhere between \$75 and \$100 if new parts are used. Those who have a reasonably well-stocked junk box will fare somewhat better.

The little receiver in this article will provide performance compatible with that of the 2-watt fm transmitter described earlier. In more precise language, its sensitivity is ample for the kind of communicating that one is likely to carry on with a 2-watt fm transmitter. A 0.3- μ V signal with 10-percent amplitude modulation is readily dis-

*Technical Editor, *QST*.

¹ Slope detection is accomplished by tuning to either side of center frequency (carrier without modulation). During frequency modulation the signal is tuned in for best clarity. This method does not provide the best signal-to-noise ratio, but is quite satisfactory for copying all but the weakest of signals.



View of the assembled fm receiver. The top left knob is the on-off and volume control. The lower left knob tunes the oscillator of the bc set. The two panel-mounted components at the right are not related to this circuit, but are for use with an accessory which will be added later.

cernible, the stability is good, and the selectivity is on the order of 10 kHz. Judicious shopping for parts should enable the constructor to build this receiver for \$10 to \$20.

Circuit Description

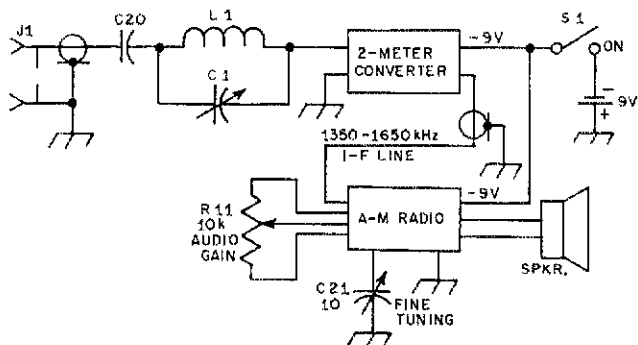
The core of our project is a transistorized a-m broadcast-band receiver. A \$4.50 Radio Shack receiver is used in this unit. The writer tried three models that were available, selecting one that used a 9-volt battery, and which had good sensitivity. It is wise to try these radios before buying them. This will assure the consumer that the set functions properly. Check for stability, good audio quality, sensitivity, and selectivity. The a-m radio will serve as the i-f and audio sections of the Pip-Squawk.

A three-stage homemade solid-state 2-meter converter is used ahead of the a-m receiver (Fig. 1). The front-end module uses npn transistors (Motorola MPS-3563) which are connected for positive grounding. This makes the converter compatible with the a-m radio. The B-minus from the battery feeds the emitter circuit of each stage, and the collectors are returned to chassis ground through their tuned circuits.

Transistor Q1 operates as a common-base if amplifier. Bandpass tuned circuits are used between the antenna and the emitter of Q1, and between the collector of Q1 and the input to the mixer. Bipolar transistors were selected for this circuit because they exhibit high gain and are inexpensive. FETs offer superior cross-modulation immunity, but in so simple a circuit they would fail to deliver the overall gain needed.

The mixer, Q2, is also connected in common-gate. Injection from oscillator Q3 is supplied to the emitter terminal of Q2. A fixed-tuned collector tank is used at Q2, and it is resonant at 1500 kHz. A capacitive divider across L6 provides a

Fig. 2 - Diagram of the complete hookup. The trap circuit, L1-C1, is mounted near J1 on the rear wall of the receiver cabinet. C21 is the fine tuning control (see text). Any miniature 10-pF variable with 1/4-in. dia shaft will be suitable for C21. R11 is a panel-mounted 10,000-ohm audio-taper carbon control. S1 is part of R11. The positive foil of each circuit board is connected to chassis ground. For information on BT1 see text.



low-impedance take-off point for coupling to the loop antenna in the a-m set. The tuned circuits of the rf and mixer stages are of the high-C variety. There are no tuning adjustments because the networks are broadly resonant. This approach was chosen in the interest of simplicity and reduced cost. The L-C ratios used provide a modicum of impedance matching between the antenna and Q1, and between Q1 and Q2.

Oscillator Q3 uses a fixed-tuned collector tank. The a-m receiver is tuned from 1350 to 1650 kHz to provide 2-meter reception from 146.7 to 147.0 MHz. The specific tuning range used will depend upon the output frequency or frequencies of the repeaters in your area. Generally speaking, the 146.7- to 147.0-MHz section of the 2-meter band will be suitable for most regions. If more than 300 kHz of the broadcast band are to be tuned it will be necessary to employ a two-gang fine-tuning variable at C21, Fig. 2. The additional coverage will require that both the mixer and the oscillator of the a-m set be tuned to maintain the sensitivity of the radio.

Operating voltage for the oscillator, Q3, is regulated at 6.8 volts by Zener diode CR1. This helps to assure stability during peak audio periods, thus compensating for variations in battery voltage. For even greater stability one might consider using regulation of the supply line to the oscillator in the a-m set, though this did not prove necessary in the author's model.

The oscillator operates at 145.350 MHz. That frequency provides the 1350- to 1650-kHz i-f over which the a-m radio is tuned.

Looking into the receiver one can see the a-m radio mounted parallel to the bottom surface of the case. The 2-meter converter is mounted vertically by means of an L bracket which fastens to the bottom surface of the cabinet. A solder lug connects between the ground foil and one mounting screw of the coax connector. The wave trap, L1-C1, is visible on the rear wall of the box near J1. The vacant space at one end of the case will be used for circuit additions later on. The phone jack on the rear side of the cabinet is used for charging the Nicad battery from an external dc supply.

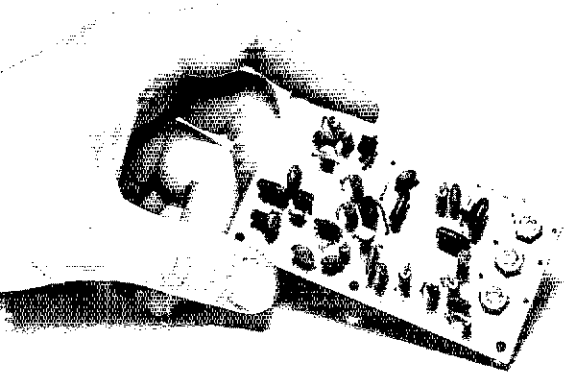
Construction Notes

The size and style of the cabinet can best be decided by the constructor. It should be made of metal to prevent the a-m set from picking up broadcast-band signals. The model shown in the photos is housed in a homemade aluminum box which measures 7 x 4 x 4 inches. There is room to spare so that a small fm transmitter can be added later on.

The first step in assembling the receiver is to remove the a-m radio from its plastic case. The audio gain control should be removed and discarded. A new 10k-ohm control (with spst switch) should be installed on the front panel and connected to the terminals where the original gain control was wired. The new switch will be connected to the circuit-board foils common to the original on-off switch. The writer chose to remove the original two-section tuning capacitor and replace it with two ceramic trimmers - a 5- to 25-pF unit for the oscillator, and an 8- to 50-pF capacitor for the mixer tuning. This was done because of a mounting problem caused by the tuning shaft of the two-gang variable. However, the original tuning capacitor can be retained and glued in place when set at 1650 kHz.

The miniature speaker should be removed from the radio cabinet and mounted on the front panel. Extend the voice-coil leads as required. The remaining modification requires that the battery leads be extended to the new on-off switch and to chassis ground . . . positive lead to chassis. The a-m-set board should be mounted above the new chassis on 1/4-inch standoff posts, making certain that the mounting points are selected carefully. *Do not short to ground any circuit-board foil that should be above ground.*





Coupling to the a-m radio from the converter is done by means of a 6-turn link of insulated hookup wire which is wound over the cold end of the ferrite-rod antenna.

Pip-Squawk Tune-up

Once the converter board is completed it can be connected to the remainder of the circuit by means of short lengths of hookup wire. Keep it outboard from the rest of the set until it has been proved operational.

A tunable broadcast band trap, L1-C1, is shown in Fig. 1. It may not be necessary to use the trap if there are no strong a-m stations operating nearby. If there is a-m station leakthrough after the metal cabinet is fully assembled and closed, install the trap near J1. Adjust it for minimum feedthrough at the interference frequency. A toroidal inductor was selected for use at L1 because of its high-Q characteristics, and because toroidal inductors are self-shielding — an aid in reducing bc-band pickup.

A signal generator is recommended for use during testing and tune-up. Select a test frequency that falls in the middle of the i-f tuning range. Adjust C21 until the output from the generator is heard, i.e., 1.530 MHz for reception of 146.880 MHz.

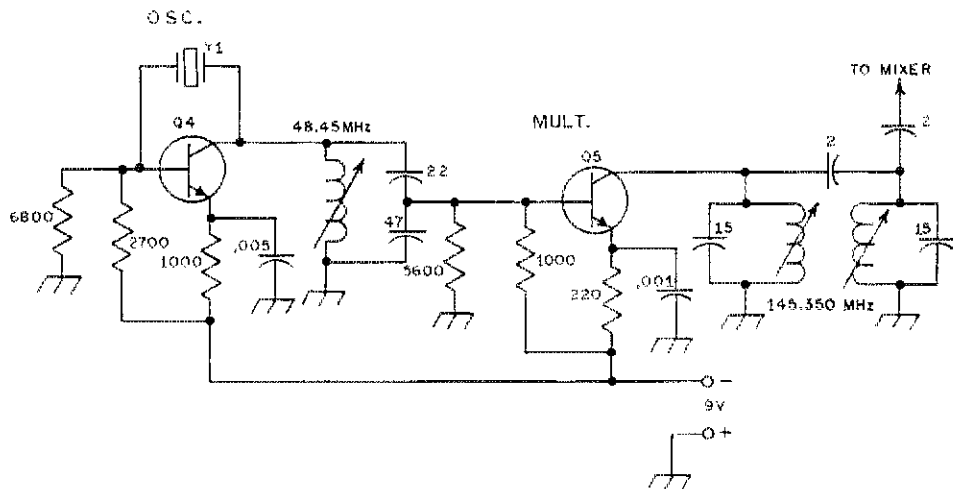
This photo shows the detail of the converter board. Two additional slug-tuned coils are shown on this model, but were later removed. Piston trimmer C16 had not been added when this photo was taken. C14 is also missing from this view.

Do not be alarmed if the vhf oscillator shifts frequency from body-capacitance effects. Once the front-end assembly is securely mounted inside the cabinet the condition will diminish markedly.

It may be necessary to experiment with the number of turns used on L7, or with the value of fixed capacitance across the coil. The end result will depend on the type of coil form you use. An air-wound coil made from No. 16 copper wire can be used in place of L7 if the builder wishes. This will eliminate the cost of a slug-tuned coil and will provide better Q in the vhf oscillator tank. The air-wound inductor will be less subject to changes in value brought about by temperature changes. If such a modification is made, the silver-mica capacitor across the slug-tuned coil can also be eliminated. The piston-trimmer mentioned later will be suitable for tuning the tank to resonance at 145.350 MHz. Do not be hesitant about experimenting with this receiver circuit. A grid-dip meter will be helpful in getting the tuned circuit close to the desired frequency.

The slug-tuned inductor used in this model consists of a ceramic 1/4-inch-diameter form whose powdered-iron core is designed for vhf applications. The three turns of No. 22 enameled wire are close-wound at the end of the form farthest from its metal collar. A J. W. Miller 4500-4 blank should be fine for this part of the circuit. The coil form should have a slug screw that fits tightly in the threaded bushing. This feature will lessen that chance of mechanical instability of the vhf oscillator.

Fig. 3 — Suggested circuit for using crystal control in the oscillator portion of the 2-meter converter. Q4 and Q5 would be MPS3563 or 40637. The coils would be wound on 1/4-in. dia ceramic slug-tuned forms, Miller 4500-4 or equiv. Y1 should be a third-overtone crystal.



Some Refinements

A 0.5- to 8-pF piston trimmer was added from collector to ground at Q3. Alternatively, a small ceramic trimmer can be used, but the piston type will provide better oscillator stability. One of the small E. F. Johnson pe-mount miniature air variables offers a low-cost compromise for C16. Again, don't be afraid to experiment a bit in the interest of improvisation. The piston trimmer was added to allow an additional "fudge factor" in getting the oscillator on frequency.

A small vernier drive can be used to turn the panel-mounted variable capacitor, C21. This will assure smoother tuning and improved bandspread. One of the small imported dial mechanisms should be satisfactory. Capacitor C21 should be mounted as close to the tuning capacitor in the bc set as possible. Use a short lead to parallel the two components.

If crystal-control operation of the vhf oscillator is desired the circuit of Fig. 3 can be substituted for the oscillator portion of the front-end assembly of Fig. 1. This will increase the cost of the project by approximately \$5.

It should not be difficult to add another bipolar transistor and two diodes to the i-f section of the receiver to provide true fm detection. These parts, a limiter and a discriminator, can be mounted on a separate pc board along with a J. W. Miller 455-kHz discriminator transformer. The existing diode detector can be removed and the new circuit added between the secondary winding of the last i-f transformer and the input to the first audio amplifier. This modification was not tried, but there is no reason to believe that the approach would not be a worthwhile one.

Those desiring to incorporate a squelch circuit could add a noise-operated system whose take-off point would be at the output of the discriminator. However, the receiver in its present form exhibits very little hiss noise when a signal is not being received. Therefore, the squelch facility was not included.

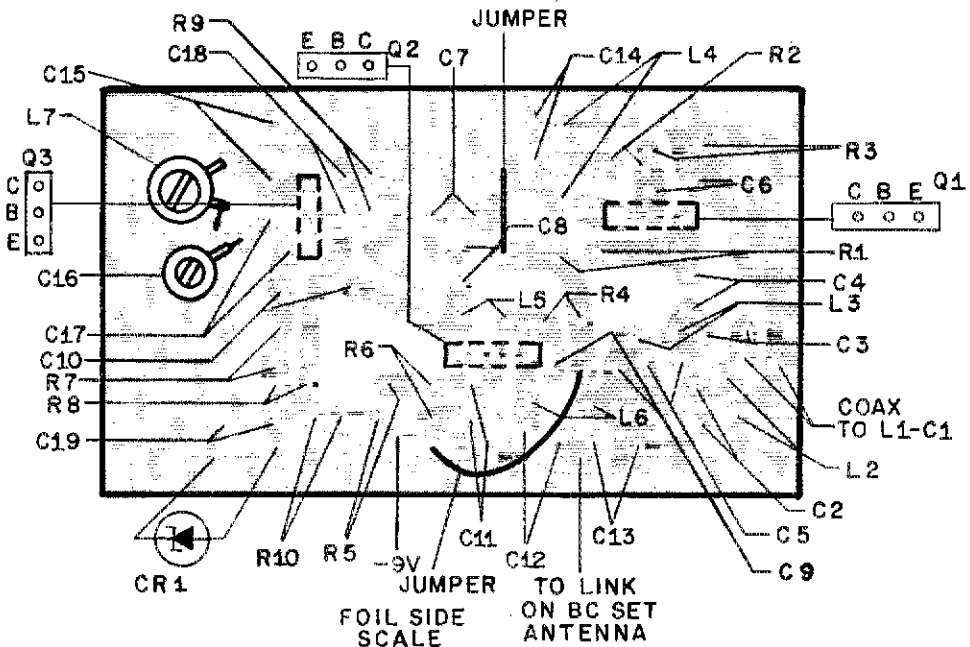
In Conclusion

The battery shown in the photo is a 500-mA-hour Nicad. This type of battery is very expensive and need not be used. A heavy duty 9-volt dry battery will do the job nicely, but do not attempt to use one of the small 9-volt transistor-radio batteries if long service is desired. This receiver draws approximately 100 mA during audio peaks. Alternatively, 7 penlite cells can be series-connected to provide a power source for the receiver.

The converter section of this receiver can be used for mobile operation by installing it ahead of the auto radio. (An article describing this technique is scheduled to be in August QST.) If the converter is to be used in the foregoing manner it would be wise to use a 9.1-volt Zener diode and dropping resistor between the 12-volt source and the converter to provide 9 volts, regulated. The converter, because of its positive ground, would have to be isolated from the automobile body since most cars employ a negative ground system.

There are probably a number of refinements that the reader can add to this receiver. The important thing is that this project, as shown, is a cost saver! It all depends on how sophisticated you want your Pip-Squawk to be. Whatever the case, this receiver does a creditable job as described here. The final touches are up to you!

QST



Scale drawing of the converter pc board. Parts placement is shown in red.

The Ground-Image Vertical Antenna

BY JERRY SEVICK,* W2FMI

A RECENT JOB transfer and the subsequent move into a new neighborhood permitted me to review my antenna needs in a different light. I wanted to avoid, or at least minimize, the problems and difficulties involved in reinstalling my 40-foot tower and Yagi beam antenna at the new location. Even though a beam antenna supported at the modest height of 40 feet is a compromise (a 20-meter beam should be higher to be really effective), it still can be an obstacle to good neighborly relations, at least if your neighbors don't appreciate the ecological beauty of such an installation. Moreover, even that modest sort of an installation presents quite a number of engineering problems.

This report presents the results of the first phase of my investigation to find a less conspicuous but equally effective antenna for use at the new location. I hope it will provide suggestions for those faced with a similar problem. At the least, it may be of some value to those with a general interest in the subject of antennas.

* Technical Relations Manager, Bell Telephone Laboratories, 600 Mountain Ave., Murray Hill, N.J. 07974.

The first part of this article deals briefly with theoretical considerations, the second with experimental results on quarter-wavelength and five-eighths-wavelength verticals, and the third on the test equipment. It should be pointed out at the outset that the information presented here is the work of a hobby and as such cannot be exhaustive. It is hoped that others will repeat some of the experiments, extend the work, and report the effect in practice of a ground-plane system above 3 MHz. To my knowledge such practical data has not been reported.

Theoretical Considerations

A beam antenna possesses the advantage of gain and directivity. Nevertheless, its DX capability is determined primarily by its vertical radiation pattern. A large portion of the radiated energy should be directed between 5 and 25 degrees from the horizon.^{1,2} Horizontally polarized antennas yield lower angles of radiation with increase in height above the ground. This is a result of the interference pattern created by reradiation from the earth's surface. Since the earth is a somewhat conducting medium, the electric field tangential to the surface must be approximately zero. This "boundary" condition is brought about by the induced surface currents which create an electric field of opposite phase. This field then combines constructively and destructively with the initial radiation from the antenna. A model for this condition is an image antenna of opposite phase below the earth's surface at a depth equivalent to the height above the surface.³ In order to get a lobe below 15 degrees, the antenna height must exceed a wavelength. This is greater than 60 feet or 20 meters.

On the other hand, a vertical antenna, in the ideal case, possesses an image which is in phase to produce a lobe tangential to the earth's surface. Only when the antenna length is increased to a wavelength, or multiple thereof, does the tangential lobe disappear. This is true whether the antenna is on the ground or suspended in space. Therefore, a vertical beam, i.e., an array of vertical antennas coupled together with an appropriate feed system, on the surface of the earth, seemed to me to be the logical choice for my new installation

¹ Terman, *Radio Engineering*, McGraw-Hill, New York, 1947, p. 651.

² Fris, Feldman, and Sharpless, "The Determination of the Direction of Arrival of Short Radio Waves," *Proceedings of the IRE*, Vol. 22, No. 1, January, 1934.

³ Williams, "Antenna Theory and Design," *The Electrical Design of Antennae*, Vol. 2, Second Edition, Sir Isaac Pitman and Sons Ltd., London, p. 126.



The 20-meter vertical antenna in the foreground, and the 26-foot test tower.

The base of the vertical element of the antenna and the impedance bridge. Forty radials, in bundles of 5, are fastened to the aluminum base plate, and are tied down with a ring made from copper tubing.

since it would appear to meet the following objectives: The system should

- 1) Exhibit a minimum profile.
- 2) Be easy to install and tune.
- 3) Offer a low angle of radiation.
- 4) Not require a large outlay of money.

I proceeded, therefore, to construct an array with four vertical elements. When my tests were begun, it immediately became apparent that the simple procedures I was using were inadequate to cope with such a complex system, I had to start anew to develop a test procedure and to build some suitable test equipment. The logical step was to backtrack to a single vertical antenna and use it as a standard on which to develop some basic test standards. As discussed subsequently, I found that relatively simple equipment, e.g., a simple impedance bridge, a field-strength meter, and a test oscillator, gave me all of the data about the system that I needed.

It is important to note that a true ground-image antenna differs substantially from a ground-plane antenna system which relies merely on a few $\lambda/4$ radials above the ground. A true ground-image system results when a sufficient number of radials are used and an image of only the vertical section is sufficient to describe it. Considerable information^{4,5} is available on ground-image systems for verticals operating below 3 MHz. The results have shown that some 100 radials of $\lambda/2$ in length, buried just below the surface, provide an adequate ground system. At higher frequencies, the dielectric effect of the earth becomes important, resulting in severe discrimination of radiation or reception at very low angles.^{6,7} At low angles, the waves not only suffer by absorption, but also by a change in phase which results in destructive interference. Since little specific information was available at higher frequencies, the objective of the

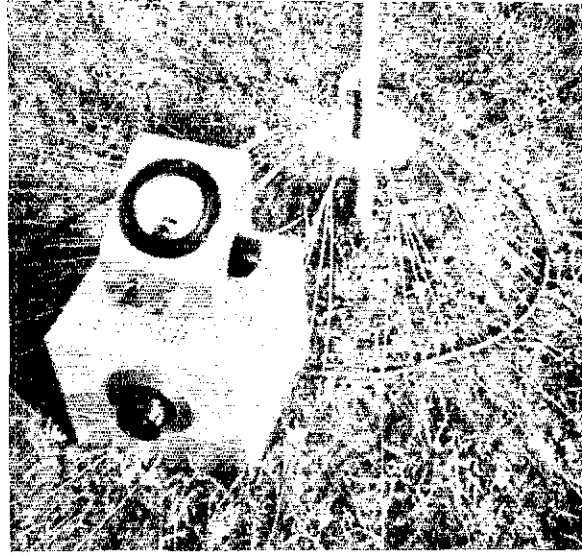
⁴ Brown, Lewis, and Epstein, "Ground Systems as a Factor in Antenna Efficiency," *Proceedings of the IRE*, Vol. 25, No. 6, June, 1937.

⁵ Wait, "Input Resistance of L. F. Unipole Aerials," *Wireless Engineer*, May, 1955.

⁶ Feldman, "The Optical Behavior of the Ground for Short Radio Waves," *Proceedings of the IRE*, Vol. 21, No. 6, June, 1933.

⁷ Jager, "Effect of the Earth's Surface on Antenna Patterns in the Short Wave Range," *Internat. Elektr. Rundschau* 1970, Nr. 4.

Fig. 1 - The input impedance of a 20-meter quarter-wave vertical antenna as a function of the number of radials 0.4-wavelength long. The 4 and 8 radials consisted of bundles of 5 wires of No. 18 gauge. The 40-radial point was obtained by fanning out the 8 bundles.

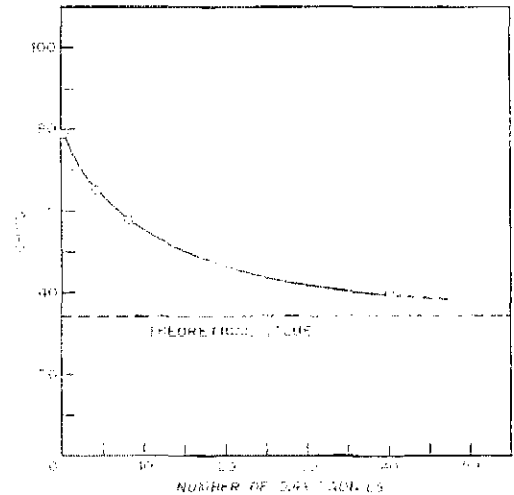


present work was to measure the input impedance and vertical radiation pattern at low angles of a vertical antenna as a function of the number of radials, in order to determine the feasibility of a vertical-array system as a competitor to beams at high elevation. The results of my tests were most gratifying. I found that many of the "rules of thumb" which have developed and have been perpetuated to the point where they are practically taken for granted were more myth than truth.

Experimental Results

The classical paper on radial systems, which reports experimental results at 1 and 3 MHz, indicates that a large number of radials 0.4λ long should be used.⁸ This appeared to be a good starting point for a 20-meter vertical. Accordingly, to check the number of radials needed, I used eight bundles of wires, each 25 feet long, and each made up of five No. 18 copper wires. Each bundle was

⁸ See footnote 4.



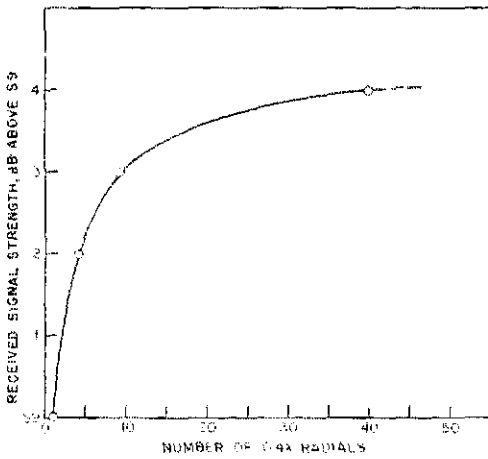


Fig. 2 — The improvement of low-angle radiation of a quarter-wavelength vertical antenna on 20 meters as a function of the number of added radials. A test oscillator was mounted on a wooden tower four wavelengths away at an elevation angle of 6 degrees from the base of the vertical.

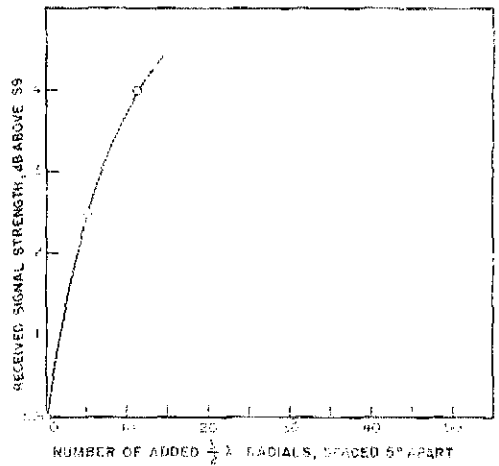


Fig. 3 — The result of interlacing 3/2-wavelength radials in a particular direction. Data were obtained by using a test oscillator on a wooden tower eight wavelengths away, at an elevation angle of 3 degrees from the base of the vertical. The results indicate the advantage of longer wires and the possibility of directional properties of a nonsymmetrical radial system.

bolted to a 5 x 1/4-inch aluminum plate as shown in the photograph. I was then able to use each bundle as a radial, measure the input impedance of the system, and then separate the bundles, wire by wire, to increase the number of radials in the system.

Fig. 1 shows the input impedance as a function of the number of radials used. Measurements were made with a simple impedance bridge. (Its construction is discussed later.) The antenna was resonated before each measurement was made, and the difference between the 40-radial system and the 8-radial system resulted only by fanning out the bundles of wires. This technique points out another important feature of ground systems and refutes one of the old myths: since the current carried by the radial system is equally divided among n radial elements, each radial is required to

carry only $1/n$ of the total current. This means that relatively small diameter wire is perfectly adequate.

Moreover, it was found that at the higher frequencies it is best to keep the radials near the surface of the ground. Radials buried more than a few feet become less effective! Thus, you should not rely on the old admonition that radials should be six feet down to be effective. I found that burying the wires slightly below the surface is the best way of installing the system. Mechanically the radials can be nailed down, electrically they are most effective, and esthetically they provide little interference to a healthy stand of grass.

It will be seen from Fig. 1 that the input impedance for a vertical antenna is drastically affected by the number of radials. Many radial wires are necessary to prevent an excessive loss of power and to provide a convenient input impedance. Fig. 1 also shows the theoretical impedance limit for an antenna having an effective height-to-radius ratio of 300.⁹

Fig. 2 shows the effect on low-angle radiation as a function of the number of radials. These data were obtained by placing a test oscillator on a wooden tower, four wavelengths away. A photograph shows the 20-meter vertical and the 26-foot wooden test tower.

⁹ King and Harrison, "The Impedance of Short, Long, and Capacitively Loaded Antennas with a Critical Discussion of the Antenna Problem," *Journal of Applied Physics*, Vol. 15, February, 1944.

Base hardware for the antennas being tested. The insulator was made from 1-inch maple dowel, turned down to accept the 7/8-inch inside diameter of the ground and antenna tubing.

The effect of using longer radials in a particular direction is shown in Fig. 3. Radials of No. 18 wire $3/2$ wavelengths long, were put down between the existing 40 radials. The spacing between the longer wires was 5 degrees. The considerable improvement indicates the need for longer wires and the directional properties a ground plane could give.

A $5/8$ -wavelength vertical was also constructed and tested. It consisted of a 40-ft telescoping aluminum pole and a loading coil of 8 turns of No. 12 wire with a diameter of 2.5 inches. The comparison in low-angle radiation at a distance of 7.5 wavelengths is presented in Table I. A field-strength meter was mounted at different heights on the 26-foot tower. The ground plane for these data consisted of the forty 0.4λ radials plus the eleven $3/2\lambda$ ones. Measurements were taken in the direction of the added longer radials. The results show the improvement in low angle radiation offered by the $5/8\lambda$ vertical. The input impedance of this longer antenna was found to be 76 ohms.

On-The-Air Checks

From these experiments and measurements I decided to settle on a $1/4\lambda$ antenna with approximately 40 radials. My installation is shown in the photograph. I then proceeded to make on-the-air tests to compare its effectiveness with an inverted-V antenna having its apex at 0.4 wavelength, and with a $5/8\lambda$ vertical using the same ground system. Surprisingly, the $1/4\lambda$ vertical seemed to perform just as well as the much taller $5/8\lambda$ vertical. This could result from the fact that most signals arrive after several hops and the optimum lobe angle is probably as high as 15 to 20 degrees.¹⁰ At that angle, the $\lambda/4$ antenna actually enjoys an advantage. With practically all DX contacts, the verticals had a 6- to 8-dB improvement over the inverted V! The only exceptions were at intermediate distances and for local contacts. At about 500 or 600 miles, the inverted V with its higher angle of radiation gave better results. Locally, the verticals gave far superior performance. Improvements of 10 to 15 dB were recorded. A triband trap vertical antenna was also tested on 20 meters and found to be practically the same in impedance and performance. This antenna had an overall height of only 12.5 feet!

Test Equipment

A most interesting aspect of antenna measurements is that the equipment can be rather simple and in many cases constructed from items most

¹⁰ See footnote 2.

Shown here is the triband trap vertical antenna which has an overall height of only 12.5 feet. With the system of 40 radials, performance of this antenna on 20 meters was about the same as that of the quarter- and $5/8$ -wavelength vertical elements.

TABLE I

Comparison of responses of quarter-wavelength and $5/8$ -wavelength vertical antennas at low radiation angles. Data were taken by field-strength meter mounted on a wooden tower at a distance of 7.5 wavelengths at 14.25 MHz. Field strength (E) is normalized to maximum value obtained with $5/8$ -wavelength case.

θ	$E(\lambda/4)$	$E(5/8\lambda)$	GAIN OF $5/8\lambda$ ANTENNA
0.1°	0	.58	∞
0.4°	0	.62	∞
0.75°	.69	.80	3.4 dB
1.1°	.69	1.0	3.2 dB
1.5°	.62	.92	3.4 dB
2.25°	.48	.80	4.3 dB
3°	.41	.69	4.5 dB

amateurs have in their junk boxes. All that is really needed is some standard to compare with, such as a wattmeter or an S meter that is known to have reasonable accuracy. I have used both - the wattmeter in my Drake L-4B linear amplifier and the S meter in my R-4B receiver.

The impedance bridge shown in the photograph was patterned after the one shown in the ARRL *Handbook*. Care was taken in shielding the input and output circuits. The meter was mounted externally in order to minimize stray pickup. A calibration curve was obtained at 14.25 MHz by using many carbon resistors of known values as the load.

The field-strength meter is a simple diode detector and dc amplifier. The instrument was constructed to cover the 10-, 15-, and 20-meter bands. Its meter was also mounted externally. The antenna length for the field-strength meter was determined by the strength of the available field. In addition to these pieces of test equipment, a 20-meter transistorized crystal oscillator was used for many of the tests.

(Continued on page 22)



A Solid-State Noise Blanker

BY FRANK N. VAN ZANT,* W2EGH

THE LAMB-TYPE noise silencer first appeared in *QST* in the late 1930s.¹ Various modifications of this excellent circuit have appeared over the years, the latest being the circuit used in equipment manufactured by the R. L. Drake Co.² A noise blanker consists of an i-f amplifier followed by a diode detector with time constants chosen to enhance detection of short-duration noise pulses. The noise pulses are further amplified and applied to a stage which is biased and threshold-controlled in such a manner that it performs as a switch. The on-off switching action

follows the rise and fall time of the noise pulses. By connecting the switch to a later i-f stage in the receiver, the noise pulses traveling in the i-f chain can be blanked out.

Design Considerations

The Drake noise blanker uses tubes. Inspection of the Drake circuit suggested the possibility of a solid-state conversion. Field-effect transistors are similar to vacuum tubes, since they are high-impedance, voltage-controlled devices. For those of us who grew up with vacuum tubes, the design process therefore becomes somewhat more comfortable when using FETs.

Fig. 1 shows the circuit of the solid-state noise blanker. Circuit values are similar to those of the tube version. The pentode i-f amplifier in the Drake blanker has its solid-state equivalent in the dual-gate MOSFET. Each triode section of the 12AX7A is similar to a 1FF7. Several suitable dual-gate MOSFETs are currently available: RCA

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¹ Lamb, "A Noise-Silencing I.F. Circuit for Superhet Receivers," *QST*, February, 1936. - Editor

² See *Hints and Kinks for the Radio Amateur*, Vol. VIII, pg. 21 and 22 for a circuit description and schematic diagram of the Drake blanker. - Editor

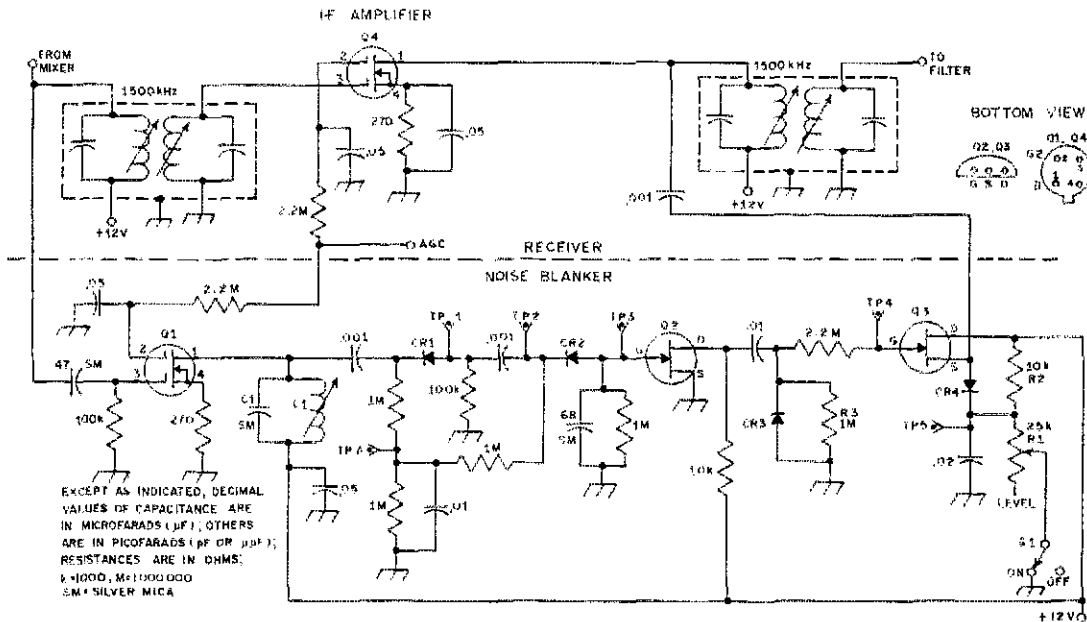


Fig. 1 - Schematic diagram of the solid-state noise blanker. Capacitors are 50-volt disk ceramic, except as otherwise indicated; resistors are 1/2-watt composition. Waveforms obtained at the test points are shown in Fig. 2.

- CR1-CR3, incl. - 1N914 high-speed type.
- CR4 - 1N34A or similar.
- L1 - See text.
- R1 - Linear-taper composition control.

- R2 - Text reference.
- S1 - Spsst toggle.
- Q1, Q4 - RCA 40673, Motorola MFE3006.
- Q2, Q3 - Motorola HEP802 or MPF102.

The noise blanker is constructed on electronic pegboard. Q1 is located at the upper left, with Q2 at the center right and Q3 to the far right. L1 is mounted on the bottom side of the circuit board.



40673, RCA 3N140, and Motorola MFE3006. The RCA 40673 would be the preferred type, since each gate is internally protected by Zener diodes. The best choice for the JFET seems to be the Motorola MPF102 or HCP802, which are widely available.

It is important for the i-f input amplifier stage of the noise blanker to be age controlled. Age is applied to gate 2 of the dual-gate MOSFET. Ideally, the age voltage should vary from approximately 3 volts dc, for maximum gain with no signal input, to approximately -2 volts dc, for minimum gain with maximum signal input. However, most receiver age schemes use a negative potential which starts at zero volts, increasing negatively with increasing signal. A negative age range of zero to -2 or -3 volts dc is satisfactory for the MOSFET, since adequate stage gain is available with zero voltage on gate 2. The maximum age voltage of -3 V can be obtained from a high-megohm voltage-dividing network across the age line.

Pulse Detector

The pulse detection circuitry is an exact duplicate of the Drake version. Inexpensive, fast-switching 1N914 computer diodes are used. The negative output pulse of the detector is applied to the gate of the first JFET, amplified, and inverted in the drain circuit. This positive pulse is then applied to the gate of the final JFET stage through a gate-leak resistor network which establishes a residual positive bias on the gate during pulse input. This bias, associated with the proper setting of the threshold control, helps to rapidly "kick" the JFET into conduction each time a new pulse arrives. This circuitry is similar to that of the old triode clipper tubes, except that, in this case, the only thing arriving at the input of the stage is a pulse rather than a signal plus a pulse.

The threshold control in the source of Q3 sets the operating point of the device. The threshold control applies a positive back-bias voltage to the general-purpose silicon diode, CR4. With the bias voltage at its high value, the stage is virtually cut off. As the bias voltage is varied toward zero,

positive pulses arriving at the gate will cause the JFET to conduct for the duration of the pulse. At some point very near zero bias, the JFET will begin to conduct continuously without pulse input. This point will be discussed later.

The JFET conducts through the series-source diode. By connecting a capacitor between the JFET source and a signal amplifier in the receiver i-f chain, every time the JFET conducts through the diode, the i-f amplifier will be short-circuited for if. The shorting action will occur virtually at the same moment in time that the pulse which caused the JFET to conduct arrives in the i-f. Thus, the noise pulse will be canceled or at least attenuated.

The degree of effectiveness of the blanking action depends on the amplitude and shape of the conduction pulse appearing at the source of the last JFET. The amplitude is a function of the threshold control setting and is also related to appropriate age action, as mentioned earlier. The pulse shape is a function of the time constants in the pulse detection and amplification chain. Some minor change from the Drake circuit is required. A germanium diode is placed at the junction of R1 and R2 to eliminate some negative overshoot on the trailing edge of the positive pulse. Fig. 2 shows scope traces of the pulse waveform at various points in the noise blanker circuit.

Construction and Adjustment

The entire noise blanker was built on a 2x4-inch piece of Vectorbord. The physical layout of parts can be almost identical with the circuit diagram. The author's model was built for a 1500-kHz i-f. The tuned circuit in the drain of Q1 is a cup-core assembly from a Miller 13W-1 1500-kHz i-f transformer, sawed in half to provide one tuned circuit and glued back together on the Vectorbord.

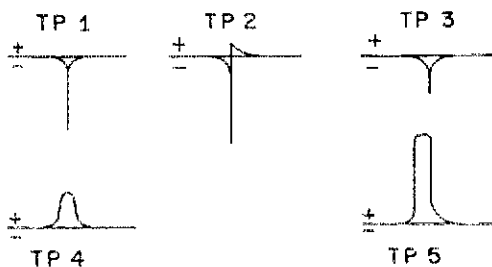


Fig. 2 - Typical wave forms to be found at the test points shown in Fig. 1.

Low-voltage miniature capacitors and 1/2-watt resistors are used to keep the size of the blanker at a minimum. Connection in the author's homemade solid-state receiver was made inside the 1500-kHz shielded i-f compartment. The 1500-kHz second i-f is ahead of the highly selective 455-kHz third i-f; therefore, blanking action takes place prior to any crystal or mechanical filters, eliminating the pulse stretching that occurs in high-selectivity stages.

The only adjustment required to ready the blanker for operation after it is installed is to realign the i-f stages to which it is coupled and adjust L1 for maximum positive dc-voltage reading taken with a VTVM at point A in Fig. 1, with a signal centered in the i-f passband.

Operation

As a matter of curiosity, the noise blanker was connected to a number of points in the receiver i-f chain following the initial pick-up point. These connections produced varying degrees of successful blanking. As the blanker output connection was moved to the latter stages of the strip, it became less effective because considerable amplification of signal and noise pulses had taken place.

One of the severest noise tests that can be made is to attempt copying a signal through Loran interference around 1900 kHz. An image of a BBC station was purposely introduced at 1900 kHz and the blanker threshold carefully adjusted for heavy blanking action. As long as the desired signal was approximately the same strength as the Loran interference, the blanker made the difference between intelligible and unintelligible copy. When the desired signal was greater than the Loran interference, there was still a great amount of interference riding on it, but this was practically eliminated when the blanker was engaged.

Another realistic test was to tune the receiver to the 10-meter band while the author's Volkswagen pulse generator was set at a fast idle in the driveway under the antenna. What an eye-opener this test proved to be! With the receiver tuned to an unoccupied spot in the band where only atmospheric noise and the chain of noise pulses could be heard, the blanker was turned on. The ignition noise dropped right out of the picture. Weak signals, of the S1 to S3 variety, were tried next. Although they could be copied with considerable discomfort through the ignition noise, with the noise blanker on they were literally cleaned up so completely that it was hard to realize that there could have been a problem a moment before.

As the threshold control is advanced toward minimum reverse bias on the switching diode (maximum blanking), a point is reached where the last JFET conducts all of the time. From this point on, to the maximum position of the threshold control, the gain of the i-f stage to which the switching diode is connected is gradually reduced to almost zero — an effect similar to that produced by the action of an i-f gain control. By taking advantage of this feature, the gain of the i-f stage can be adjusted to provide a variable "window" through which only the strongest portion of the

desired signal is allowed to pass. Thus, in a broad selectivity position, if the static level is S7 and the desired signal is S9, the gain can be reduced to lessen the QRN and signal. At the same time the heaviest pulses of QRN which ride through on top of the signal momentarily switch the i-f stage off. With the slow age time constant selected, some fairly weak ssb stations on 75 meters have been copied comfortably in this manner. The optimum setting for the threshold control, with most types of pulse interference, seems to be at the position immediately before the i-f gain is affected, as observed on the S meter.

Conclusion

The solid-state noise blanker has performed remarkably well in the author's homemade solid-state receiver. The total retail cost of all parts, including semiconductors, is less than \$20. The unit has not been tested in receivers using vacuum tubes or low-impedance bipolar transistor circuits. It is the author's opinion that it would work as well in a low-level i-f stage of a tube receiver as it works in the MOSFET receiver. Some modification of the output switching or gate circuit might be required for a receiver using bipolar transistors.

QST

Vertical Antenna

(Continued from page 19)

Conclusion

The performance of a vertical antenna on the ground is highly dependent upon a good ground system, and, properly installed, the antenna can be a very good performer indeed for DX and local contacts. This is particularly true at the higher frequencies where the dielectric property of the earth plays a major role. Forty radials of No. 18 wire, 0.4λ long, will increase the total radiated power by about 3 dB. Radials can be thin if a sufficient number is used. The thought of using thick wires buried deeply, probably a carry-over from lightning grounds, is not valid at higher frequencies. The idea of using only four buried radials, as commonly recommended, is a serious error, and if this article does nothing more than eliminate that misconception, I will be satisfied. Since the electric field only penetrates the ground for a foot or two at the higher frequencies, the radial wires need be buried only as deep as necessary to escape children's feet and the lawn mower. Finally, these results from the single vertical antenna indicate that a vertical array could be a competitor to the more elaborate horizontal beams and warrants further investigation.

QST

**SWITCH
TO SAFETY!**



Two-Toter

A Lightweight Portable Beam
for Two Meters

BY E. LAIRD CAMPBELL,* WICUT

ALMOST ANY part of the USA or Canada is now within the range of a repeater, so the chance for reliable communications in any territory under almost any condition is now a reality. With the advent of hand-held and battery-portable 2-meter transceivers, there is still an opportunity for participation and fun by the vhf man interested in portable work or mountain-topping . . . whether it's camping, or an afternoon hike to the hills.

Within the "normal" range of a repeater, a simple whip antenna will probably do the job. But for tripping fringe and over-the-hill repeaters, long-haul direct operation, or for some added directivity in a repeater-saturated area, a beam antenna can be very useful. Of course, if the antenna is to be transported by hand, it should be as light in weight as possible. The antenna described here fits all of the above criteria.

The Package

The portable antenna consists of a 4-element parasitic array with 0.2-wavelength element spacing. The elements are cut for the center of the 2-meter band. The driven element is gamma-matched and fed with 52-ohm coax feedline. Included in the package is a short wooden mast which can be attached to any available structure at the site; the antenna could also be hand-held. Whether the support be an old tree branch, ice axe, or alpenstock, the mast need not be more than a wavelength or so above the ground if the shot to the distant repeater or station is clear of local obstructions. Theoretical gain of this beam is slightly over 8 dB, referenced to a half-wave dipole.

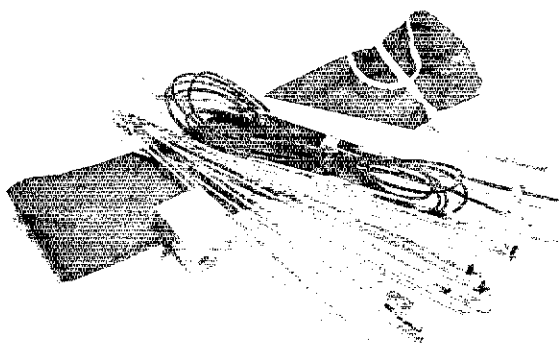
* Managing Editor, *QST*.



Although the longest piece in the erected antenna is about 50 inches, the broken-down antenna package is about 13 inches long, 2 inches wide, and weighs about 14 oz (see Table 1). The boom, elements, and mast are actually sections of aluminum and wood that screw or push together. The antenna and mast can be assembled in approximately 2 1/2 minutes (if the Beaufort number is less than 2!).

Except for the driven element, each element consists of three sections of 1/8-inch aluminum rod held together with threaded unions. Aluminum welding rod works fine here, but use the hardest grade. Threaded 6-32 to 6-32 unions (A in Fig. 1) can be made by drilling and tapping short sections of 1/4-inch rod, if you can't come up with something at a hardware store. Cut the elements to length as indicated in Fig. 1. Thread (6-32) the proper ends (for example, the reflector would have one 13.3-inch rod threaded at both ends, and two 13.3-inch rods threaded at one end only).

In Fig. 1, note that except for the driven element the center rod of each element has a collet swaged to it. This is a cheap and easy way to prevent the rods from slipping through the oversize holes in the boom after the antenna is assembled. Since, in my case, the antenna is always used for



Anyone for a game of Pick Up Sticks? The longest piece in the package is about 13 inches and they all weigh in at 14 oz. If everything goes okay, the antenna can be assembled in a few minutes.

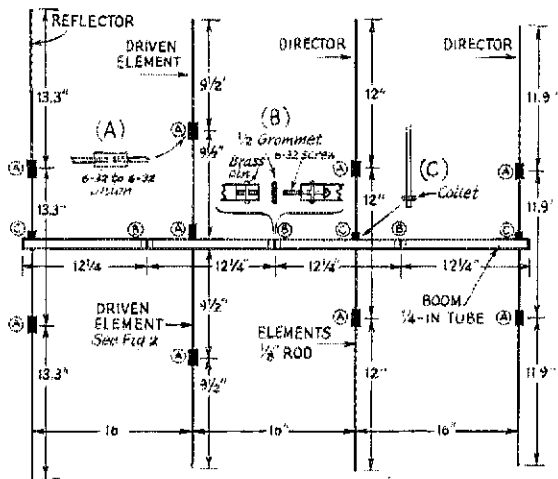


Fig. 1 - Dimensions and details of the 2-meter beam.

vertical polarization, gravity holds the elements in position; the collets prevent them from sliding all the way through. I made my collets from sections sawed from an old volume-control shaft. The original shaft was hollow and the rings slid easily over the elements. A whack with a hammer swages the collet fast to the element.

The driven element is a four-piece affair and is similar to the other elements except for the gamma section, shown in Fig. 2. A 1/8-inch and 1/16-inch brass rod is used here because it is easier to solder to brass than it is to aluminum. Again, a welding supply shop is a good source of material (or a model airplane supply store).

The gamma capacitor, C1, is soldered to both the large and small rods. For added gamma-rod support, bend a 90-degree radius at the end of the small rod and plug it into the hole in the ceramic frame of the capacitor. Now solder the capacitor tabs to the rods. You might notice that the gamma capacitor is mounted in a rather unorthodox fashion; that is, it is usually connected at the point where the feedline is attached, rather than at the point where the gamma rod connects to the driven element. However, it works fine as shown and gives spacing and support to the outer limits of the gamma rod.

The feed line is connected to a ceramic crystal socket which also acts as a support spacer for the gamma rod. An old crystal holder or a plug made

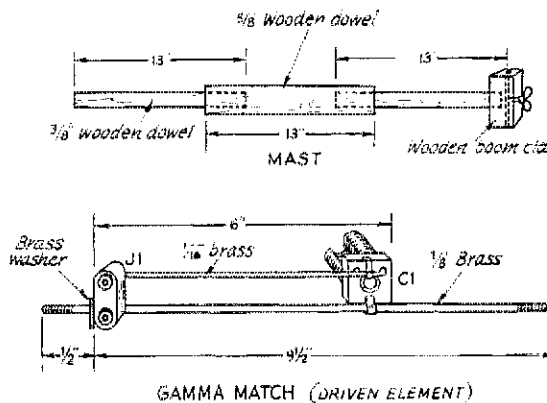


Fig. 2 - The wooden mast and driven element.

for the socket is used to connect the feedline to the antenna.

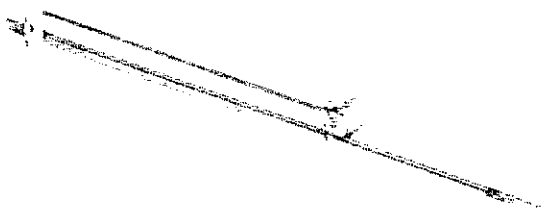
Note the brass washer (Fig. 2) is soldered to the 1/8-inch brass rod. This forms a seat to hold the rod against the boom. The rod element is held there by a union from the other side of the boom (no collet required here).

The Boom

Four 12 1/2-inch sections of 1/4-inch aluminum tubing make up the boom. The sections are fastened together by 6-32 threaded "plugs" (B in Fig. 1) at the section ends. The plugs are forced inside the tubing ends. Even though the forced fit may be tight, the joints will get sloppy with use, so it is necessary to pin the plugs with brass brads or nails. Peen both ends of the nail for a snug fit.

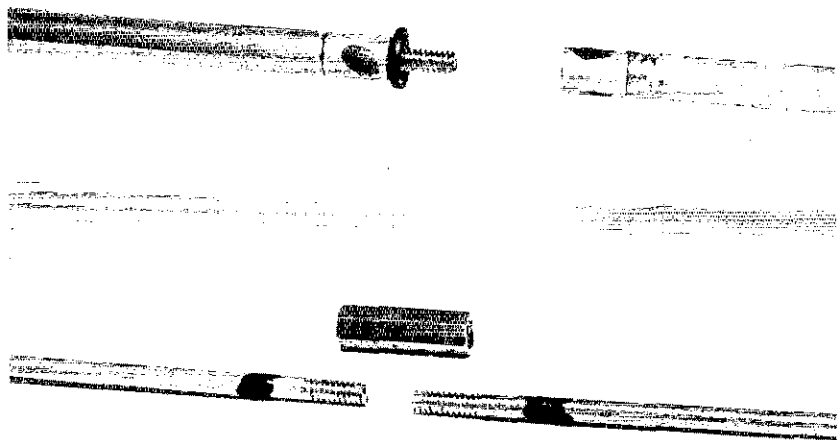
Notice that with each pair of mating plugs, one plug contains a 1-inch 6-32 brass machine screw. Thread the screw through the plug before the plug is inserted in the boom tube. The brass nail will hold the screw fast so that when the boom pieces are mated the screw won't slip loose.

One half of a small rubber grommet is placed between the mating boom sections. Use an old razor blade to cut a grommet in half. Trim off the center piece of rubber so that both sides of the finished piece are flat and parallel. Push the half-grommet over the thread of the machine screw where it will stay put. The purpose of the grommet is to allow element alignment. The grommet allows 30 or 40 degrees of twist while maintaining a relatively tight connection between boom sections. By the way, don't drill holes in the boom sections for the elements until you have assembled the complete boom and all the sections are nearly tight. Drill the 1/8-inch element holes parallel to each other.



The gamma section of the driven element. The feed line attaches to the socket at the left.

Close-up of two boom sections (top). The rubber grommet gives a tight fit between sections and makes it possible to twist the sections for element alignment. Element pieces are joined with a threaded union (bottom). Note the dabs of paint to identify the proper matching sections.



The Mast and the Boom Clamp

Ordinary wooden dowels make up the mast. Any number of sections can be used to get the desired height, although mast material can probably be found at the operating site. My 40-inch mast is a 5/8-inch diameter dowel drilled at each end to accept 3/8-inch diameter dowels in a slip fit. The boom clamp is also wood, drilled to take the 3/8 dowel and 1/4-inch boom. Some kind of a boom clamp is necessary; the one shown in Fig. 2 works fine. A threaded chunk of brass (or a large nut) is cemented and then hammered into the wood. A threaded wing screw is finger-tightened against the boom.

Now Take to the Hills

This little antenna project can be put together in an evening or two. There are probably many refinements that could be made to improve the mechanical stability of the beam. The presentation here is simply an idea article for "Mod" II!

To allow easy assembly, color-code each adjacent joint of the boom and elements. Model airplane dope works nicely. Have the XYL make you a canvas tote bag (or get a telephoto lens bag at your photographic supply house) to fit the knocked-down antenna. Keep a handful of rubber bands or some twine in the bag for use in attaching the mast to whatever stanchion is available at the site. Try to keep the mast "nonferrous" within a half wavelength or so of the antenna in order to reduce losses and pattern distortion.

The feedline used is the miniature type, RG-174/U. Don't worry about attenuation in the cable for short lengths. A ten-foot length will only introduce about 0.4-dB loss. RG-58/U is less lossy, but it is larger, heavier, and difficult to wind into a small bundle.

Now take to the hills and have some fun! Remember, using this antenna effectively makes your peanut-whistle rig 6 times stronger than it would be with a whip, plus some added selectivity to boot. Who knows, with a lucky opening, you might even work a G, a KH6, a . . .

QST-

Table I

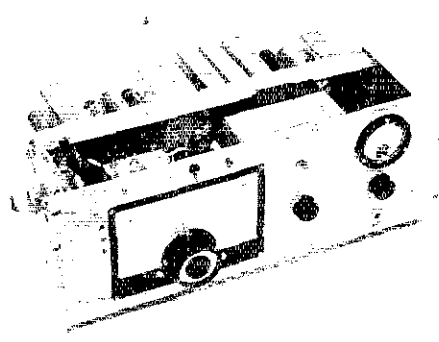
Antenna Weight

Item	Weight (oz)
4-element beam	7.0
40-inch wooden mast	3.5
Feedline and connectors	1.5
Tote bag	1.5
Rubber bands	.5
Total	14.0

Parts List

- 4 - 1/4-inch aluminum tubes, 12.25 inches long.
- 3 - 1/8-inch aluminum rods, 13.3 inches long.
- 3 - 1/8-inch aluminum rods, 12.0 inches long.
- 3 - 1/8-inch aluminum rods, 11.9 inches long.
- 3 - 1/8-inch aluminum rods, 9.5 inches long.
- 1 - 1/8-inch brass rod, 10 inches long.
- 1 - 1/16-inch brass rod, 6.25 inches long.
- 9 - 6-32 to 6-32 unions (A in Fig. 1).
- 6 - 6-32 1/4-inch "plugs" (B in Fig. 1).
- 3 - 1/8-inch ID collets (C in Fig. 1).
- 3 - 6-32 machine screws 1 inch long.
- 2 - Rubber grommets, 1/8-inch hole.
- 1 - Brass washer, 1/8-inch hole.
- 2 - 3/8-inch wooden dowels, 13 inches long.
- 1 - 5/8-inch wooden dowel, 13 inches long.
- 1 - Wooden boom clamp.
- 1 - Ceramic crystal socket.
- 1 - Plug to fit above socket.
- 1 - Connector to fit equipment.
- 1 - Hank of RG-174/U miniature coaxial cable.
- 1 - Handful of rubber bands.
- 1 - Canvas tote bag with draw string.

A TUNABLE 440-MHz FM Receiver



Panel view of the K1ZJH 440-MHz fm receiver. The vernier dial drives the tuning shaft of a converted uhf TV front end. At the rear is a 450-MHz Motorola fm receiver, the i-f system of which takes the output of the converted TV tuner. The meter can be connected in the limiter or discriminator circuit.

Effective UHF Monitoring at Low Cost

BY JOHN BERTINI,* K1ZJH

THOUGH ORIGINALLY intended for checking signal paths between proposed uhf fm sites, this receiver also provides convenient eavesdropping on local 440-MHz fm activity, and monitoring of commercial frequencies adjacent to the high end of our 420-MHz band. If or something quite similar to it is readily put together, and can be assembled quite inexpensively. Though a duplicate can be built from the information supplied here, the reader should treat this discourse mainly as a collection of ideas. The exact units used for the receiver may not always be available, so other components may have to be adapted to the job.

The first successful attempt at assembling such a receiver used an fm broadcast receiver and a uhf TV converter. The latter was intended to work into TV Channel 5 or 6. The fm broadcast band starts at 88 MHz, which is the high end of TV Channel 6, so the uhf converter was simply connected to the antenna terminals of the fm receiver. The tuning range of the converter was lowered to include the top 10 MHz of the 420-MHz band. Fairly good results were obtained by using the converter for

* 257 Elm Street, Windsor Locks, CT 06096

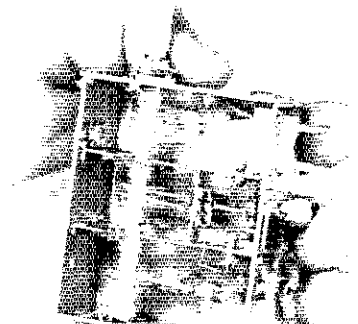
rough frequency spotting, and the fm receiver for fine tuning. Low sensitivity, lack of a good squelch, and severe drift in the converter oscillator were the main weaknesses of this system.

In most modern TV receivers the uhf tuner is solid-state, designed to feed the 43-MHz TV i-f strip directly. The mixer output is untuned, so it is apparent that any intermediate frequency can be accommodated, depending solely on the frequency range of the tuner oscillator. One advantage of the 43-MHz i-f is the great number of low-band fm monitor receivers for this frequency range available at low cost.

It is best to avoid the narrow-band monitors that won't accept more than 5-kHz deviation. Tuning will be too sharp for the stability and tuning rate of uhf converters, and most amateur fm in the 420-MHz band is still wide-band. The wide-band receiver will not be bothered seriously by any slight drift in the TV tuner.

The uhf TV tuner I chose to use is a Sickles Model 228. Many tuners use the same basic electrical and mechanical layout, the only differences being in the dial drive arrangement made for a particular TV receiver. These tuners do not have trimmer capacitors for alignment, such as were used in earlier uhf converters. Alignment is done with specialized test equipment, by precisely bending the rotor plates in the tuner. Most tuners are linear within plus or minus one TV channel, over the entire UHF TV spectrum, when they leave the factory.

Typical uhf TV tuner similar to the one used in the fm receiver described by K1ZJH. This is the original condition, before modification.



UHF Tuner Modifications

Getting this type of tuner to cover the upper 10 MHz of the amateur band is best done by adding trimmer capacitors across the tuner circuits. The photograph of the original tuner, and a sketch of the tuner as modified, Fig. 1, should help to make clear how this is done. Start by removing one of the two rotor plates in the oscillator compartment (bottom section of the photo and Fig. 1). The mixer and antenna circuits will not require tuning across our small intended frequency range, so the rotor plates in the two upper sections of the tuner can all be removed.

Mount three 16-pF glass trimmers on the tuner walls, parallel to the three lines and as close as possible to them. See Fig. 1. Connect the trimmers to their respective lines with short pieces of heavy wire or copper strip. By bending the one oscillator rotor plate away from its stator carefully, the tuning range can be reduced to as little as 15 MHz.

Remove the 300-ohm connector and coupling loop from the antenna section, by drilling out the mounting rivets in its insulating support. Enlarge the hole, and mount a phono jack or a BNC fitting for antenna connection. Run a 1/8-inch copper strip from a point on the antenna line, 1/2 inch from the wall, down to as close to the coupling port to the mixer compartment as possible, then up to the connector, as shown in Fig. 1. If the port is not merely an open hole in the wall separating the sections, but is a Faraday shield, as in the 228 tuner, remove the Faraday shield to improve

interstage coupling. This shield is not visible in the tuner photo. If used, it is a comb-like insert in the port, as shown in enlarged form in Fig. 1.

One lead of the mixer diode in the 228 tuner runs through a small port between the oscillator and mixer sections. The other diode lead, barely visible in the tuner photo, is parallel to the mixer line and is connected to the right-hand wall of the tuner. Cut it at this point and solder the lead to the mixer line, about 1/2 inch from the wall, as shown in Fig. 1. In some of the better tuners the mixer diode is reverse-biased, and does not go directly to ground in the mixer section. This was done for improved noise figure, and should be left the way it is.

Most tuners are designed to terminate in an i-f input circuit which is at dc ground potential. If the receiver to be used does not provide a dc path, a 50-MHz rf choke should be connected from the tuner i-f output to ground to provide a dc path for the mixer crystal current. The ground end of the choke can be lifted to measure crystal current, which should be at least 100 μ A.

Fixed or Tunable I-f?

The converter can be tuned by means of a suitable dial mechanism connected to the tuning capacitor shaft, or the tuner can be left set and the tuning done with the receiver, if the latter covers a suitable frequency range. The receiver can also be used for fine tuning, resetting the converter oscillator if the receiver tuning range is insufficient to cover the desired frequency spread. Of course, if the receiver is crystal controlled, as in the application pictured here, the tuning is done entirely with the converter. In this case a good vernier dial is desirable.

Preferably the intermediate frequency should be between 20 and 100 MHz. Lower than about 20 MHz the oscillator frequency will be close enough to the signal frequency so that the mixer circuit

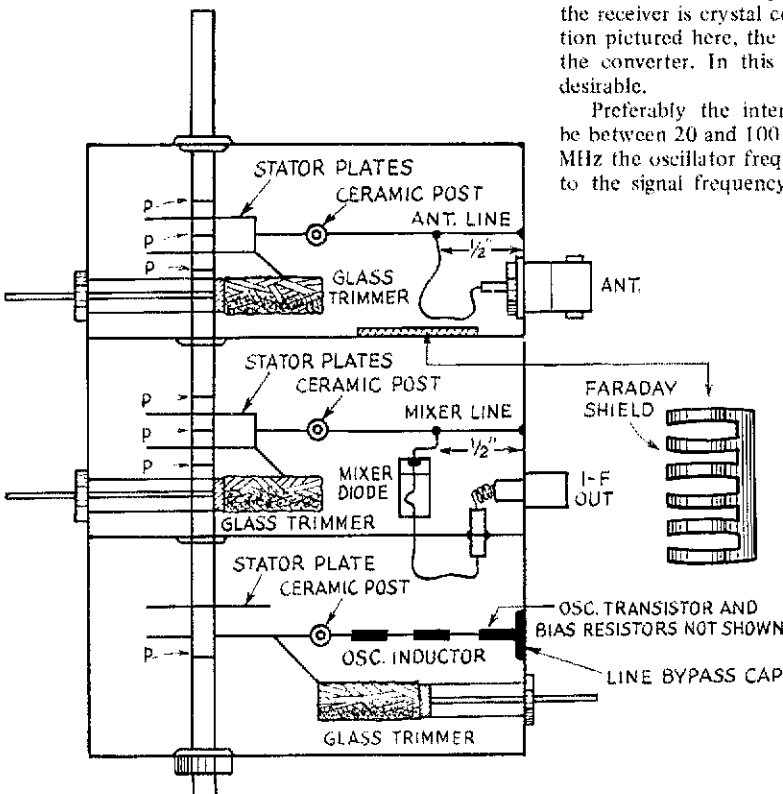
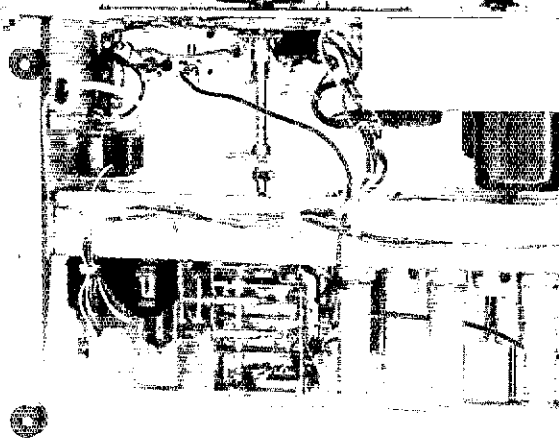


Fig. 1 — Bottom view of the uhf TV converter, as modified for use in the 420-MHz band. Only the oscillator circuit is tuned by the vernier dial, all rotor plates in the mixer and preselector circuits having been removed. One rotor plate is left in the oscillator section. Positions of plates to be removed are indicated by the letter P.



Looking into the bottom of the tunable 440-MHz fm receiver shows the converted TV tuner below the vernier dial. A transistorized rf preamplifier, also built into a TV tuner case, is visible just to the left of the tuning shaft.

reception obtained with the antenna working directly into the TV tuner.

The tuning range of this receiver is roughly 440 to 454 MHz. No images or other spurious responses are heard. Tuning is smooth, and stations are easily "zeroed" on the discriminator meter. With a simple whip antenna several local stations between 440 and 450 MHz are heard at K1ZJH, as well as the Hartford Police on 453 MHz.

The sensitivity is adequate for monitoring on line-of-sight paths, but not for weak-signal DX work such as is commonly done around 432 MHz. The TV tuner alone is very poor; on the order of 10 microvolts for 10-dB quieting. If one wishes to be able to hear the weak ones, a much better mixer is needed, and it should be preceded by a good low-noise rf amplifier. With the mixer operating in more or less its original condition, rf amplifier gain in excess of 20 dB, using the best uhf transistors available is necessary to make the receiver "come alive" on weak signals. This kind of sensitivity is not required for the purposes for which this receiver was intended, but the improvement needed for adequate weak-signal sensitivity is stated so that the reader will not think that the receiver described is any "quick-and-easy" route to DX on 432.

As a final note, this general approach should be good for use with a television receiver in amateur TV work. However, don't try using a TV receiver if system with the tuner as an aural monitor, unless you provide injection into the TV if to produce the 4.5-MHz aural intermediate frequency. This is normally produced in the receiver when the aural and visual carriers heat together. QST

will tend to pull the oscillator. A low i-f will also result in trouble from stations in the image frequency range, if there are any operating locally. With an i-f above 100 MHz the oscillator injects on the low side of the signal frequency. For this reason it is desirable to have the oscillator on the high side, when setting up the tuner.

If the receiver with which the tuner is used has a good dial system, leaving the oscillator set and tuning with the receiver makes for good handling. Problems may arise with strong signals on the image frequencies, or in the i-f range, however. It is hard to keep a local fm or TV signal completely out of the receiver. If the TV tuner is fitted with a good dial mechanism, and there is no backlash or chassis flexing, the tunable oscillator is probably the better approach.

A Practical Example

In the receiver shown here the tuner feeds the 75-MHz i-f of a Motorola 450-MHz crystal-controlled fm receiver. The two 6AK5 frequency multipliers which provide injection to the first mixer, the front-end rf tubes and afc tube were removed to conserve power, since they are not used in this application. A National vernier dial drives the 2-plate tuning capacitor in the tuner, through a shaft extension and a flexible coupling. If there is backlash in the drive system it is not evident in the operation of the receiver. Signals tune in smoothly and easily.

A meter indicates limiter current, for signal strength observation, and as an aid in adjusting antenna systems and beam headings in fm work. The nature of fm reception makes small changes in signal level undetectable by ear. The discriminator is also metered, for ease of station tuning. Supply voltage for the tuner is dropped from the receiver B-plus line, and is regulated with a Zener diode.

Visible in the upper left portions of the photographs of the complete receiver is a grounded-base uhf preamplifier using a 1TXM101 transistor. The preamp was built in another tuner case, using some of the tuned lines and shielding as a matter of convenience. Its 8-dB gain and low noise output make a marked improvement over the

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A Second Look at Linear Integrated Circuits

With Practical Circuit Examples

BY DOUGLAS A. BLAKESLEE,* WIKUK

ALTHOUGH INTEGRATED circuits are being introduced at an ever-increasing rate, manufacturers have only begun to learn the techniques of making complex-function building blocks the size of aspirin tablets. Whatever the technical phase of radio which may interest you, there is a bevy of ICs that you could be experimenting with. This article reviews a number of new devices, but we will only be looking at the top of the iceberg — a small sample of the linear integrated circuits which have been introduced during the last two years.

Mixer/Modulator/Demodulator

The MC1596 IC, which can be operated as a balanced modulator, a doubly balanced mixer or a product detector, is an excellent example of the circuit simplification that an integrated circuit can provide. This device solves a number of the problems associated with modulator/mixer design. The oscillator energy required, rather than being ten times the signal level, is approximately one half of the input signal level, reducing the need for shielding and filtering around the oscillator circuit. The balance of the IC is sufficient to provide 55 dB of oscillator suppression. Either push-pull or parallel output tuned circuits may be employed; at low frequencies a resistive load will suffice. Motorola makes two versions of the '1596, the MC1596G for operation over wide temperature ranges and the low-cost MC1496G for room-temperature operation. Signetics and Fairchild make similar devices.

Macleish, Pattison, and Hejhall¹ have described the advantages of the '1596 as a balanced mixer. A product detector, suitable for use in a direct-conversion receiver is shown in Fig. 1A.² The inherent balance of the IC circuit suppresses both the oscillator and the signal inputs, reducing the amount of rf filtering required at the detector output. The sensitivity of the '1596 is about 3 μ V, sufficient for some applications, but in the circuit shown a dual-gate MOSFET rf amplifier, Q1, is included to improve the overall sensitivity and to

make up the losses of the input circuit. Audio-derived agc may be applied to gate 2 of Q1, if desired. A double-tuned rf input circuit is used with the value of the coupling inductor, L3, chosen to provide a bandpass characteristic, so that a preselector control is not required. A high-gain audio IC, previously described in QST,³ provides about 2 watts of output when operated from a 12-volt dc supply.

Another use for the '1596 is as a balanced modulator in an ssb or dsb transmitter. A typical circuit, operating at 9 MHz, is shown in Fig. 1 at B. R1 sets the dc level applied to pins 1 and 4, which allows adjustment for maximum carrier suppression. The gain of the modulator is set by the resistor connected between pins 2 and 3. Diode switching of the carrier-generator crystals permits selection of upper- or lower-sideband operation with a dc voltage. A National Semiconductor LM370 provides amplification and compression of the audio signal from the microphone input. The compression feature insures that the balanced modulator will not be overdriven. The audio level is controlled by R2, and R3 sets the point at which compression starts. A KVG⁴ crystal filter was chosen because it is the smallest of the filters now available. A dual-gate MOSFET amplifies the signal passed by the filter and provides a convenient alc control point.

An I-f Amplifier

One of the problems encountered with the early IC i-f amplifiers was difficulty in designing a

³ "New Apparatus," QST, February, 1971.

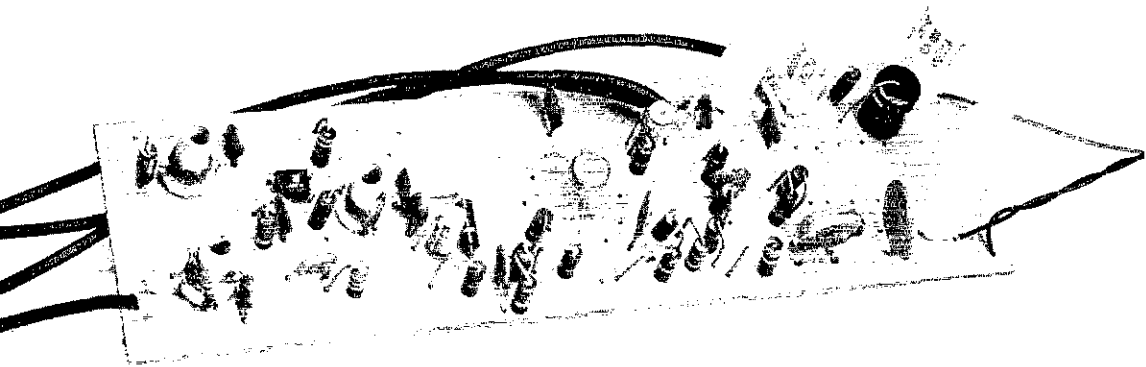
⁴ Available from Spectrum International, Box 87, Topsfield, MA 01983.

WICER reviewed the basics of linear integrated circuits in QST for March 1968. Since then, many ICs have been introduced, most of which are suitable for use in amateur equipment. Here are some designs using new ICs that should tempt even those who haven't tried solid-state devices.

* Assistant Technical Editor, QST.

¹ Macleish, Pattison, and Hejhall, "The Rec/Counter," QST, May, 1971.

² The designs using the MC1596G borrow circuits contained in private correspondence from Hejhall, W7QWR. Many of these designs were contained in Hejhall's article in *Ham Radio*, September, 1970.



A direct-conversion strip for the 75-meter band, minus the tunable oscillator. The IC-10 audio amplifier has been mounted on the bottom side of the pc board to allow the heat sink tabs to be bolted directly to the chassis.

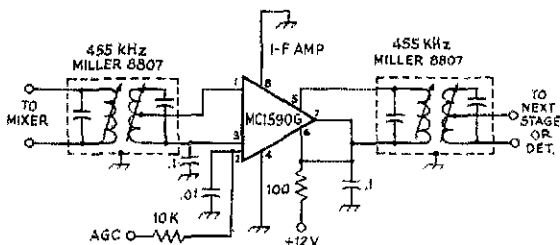
suitable agc circuit, as appreciable current was required from the agc source. The Motorola MC1590G has eliminated this problem, drawing a maximum of 140 μ A from the agc line. The '1590 is a wide-band device, delivering 70 dB of gain at 455 kHz or 50 dB at 30 MHz. A typical circuit is shown in Fig. 2 at A. The input impedance of the device is typically about 800 ohms, and the optimum load is between 1 and 2 kilohms. A positive agc control voltage is required; the agc threshold is plus 4 volts. A change from 4 to 8 volts produces a 60-dB change in the gain of the stage. Application of the '1590 in an fm receiver has been described recently in *QST*.⁵

Audio Circuits

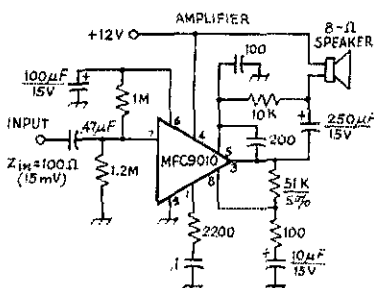
Motorola has introduced a number of low-priced, plastic-packaged ICs which its sales department calls "functional circuits."⁶ All of the devices in this line are housed in miniature rectangular cases with leads brought out in a wide, uneven pattern that simplifies pc-board layout. Five models, intended to deliver audio outputs from 0.25 to 5 watts, are available. The MFC9010 of Fig. 2B is representative, delivering 2 watts to an 8-ohm load. The input sensitivity of the stage may be set between 560 and 15 mV by using specific values of feedback resistors.

⁵ Blakeslee, "FM Reception, Part 4," *QST*, April, 1971.

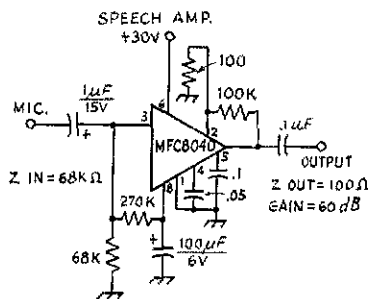
⁶ Described in "Functional Circuits," available at no charge from Technical Information Service, Motorola Semiconductor Products, Inc., 8005 East McDowell Road, Phoenix, AZ 85036.



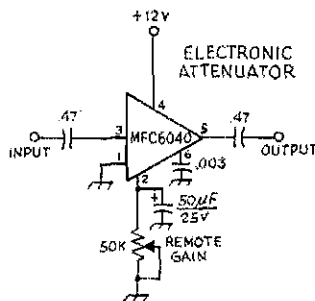
2-A



2-B



2-C



2-D

Fig. 2 - Schematic diagrams of the (A) i-f amplifier, (B) audio power amplifier, (C) speech amplifier, and (D) electronic attenuator. Resistors are 1/2-watt composition and capacitors are ceramic or mylar, except for those with polarity marked, which are electrolytic.

MULTIMODE DETECTOR

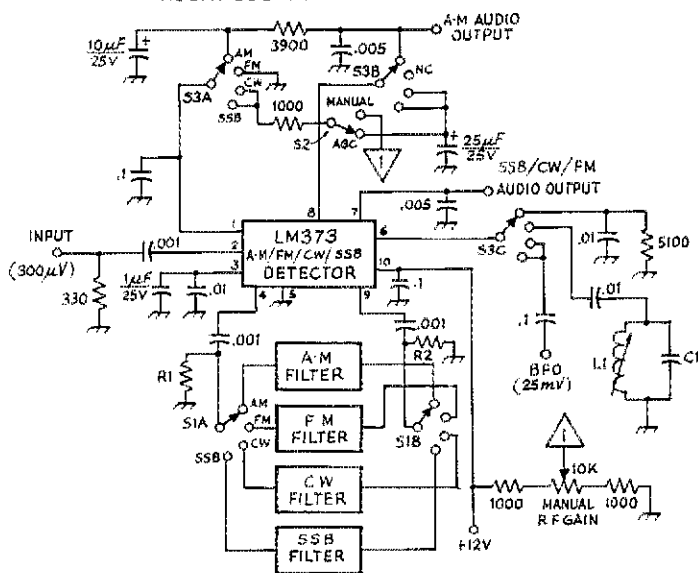


Fig. 3 — Diagram of the IC multimode detector. Resistors are 1/2-watt composition and capacitors are ceramic, except those with polarity marked, which are electrolytic. C1/L1 resonate at the i-f frequency to tune the quadrature detector. R1 and R2 are chosen to provide proper loading for the filters used.

If a high-gain microphone amplifier is needed with low internally-generated noise (less than 1 μV), the MFC8040 may be used. This IC features 60-dB gain, high input impedance, and low-Z output. The circuit shown at C would be an excellent choice as an audio amplifier for use with the balanced modulator of Fig. 1B, if the compression feature of the LM370 is not needed.

The MFC6040, Fig. 3D, might be called a hum-free volume control. It is an electronic attenuator that uses a 0- to 3-V dc potential to change the gain of the device from plus 6 dB to minus 85 dB. As the gain-control line carries only dc, hum pickup is minimized. In addition to applications for audio gain control in transmitters and receivers, the MFC6040 could be used as the control element in an audio compressor. The capacitor connected to pin 6 determines the upper frequency limit of the stage. A .0033- μF capacitor provides a roll-off starting at 5 kHz. Uncompensated, the MFC6040 will work at 455 kHz, so the device could also be employed as i-f gain control.

An I-f/Detector Package

How much can be put in one IC? National Semiconductor packs an i-f amplifier, an agc circuit, an fm limiter, a product detector, an envelope detector, and an fm quadrature detector

in a case no larger than that used to house many small-signal transistors. Designated the LM373, the device can be used for ssb/cw, a-m or fm detection. With appropriate switching, as shown in Fig. 3, the IC performs all of these functions for use in a multimode receiver. For ssb, cw, or a-m reception, about 300 μV of input signal is needed. Good limiting for fm operation requires a 1600- μV input signal.

A Miniature Ssb Receiver

Plessey Microelectronics, an English manufacturer, has developed a line of ICs which can be used to construct a complete ssb receiver small enough to fit in the palm of one's hand. A circuit example is shown in Fig. 4. Four Penlite cells are all that is required for power. The SL-610 and SL612 are agc-controlled rf and i-f amplifiers, respectively. The SL641 is a balanced mixer/product detector similar to the '1596 described earlier.

The SL621 audio-derived agc module is unique. It produces a control voltage which, when applied to the '610 and '612, will maintain the audio output of the receiver within 4 dB when the input signal changes 110 dB in level. Dual detectors within the IC operate with separate time constants. A long time constant holds the agc output voltage nearly constant during short pauses in speech. Noise pulses are sampled by the second detector which activates a trigger circuit, preventing the agc voltage from trying to follow the pulse so that the



A 2-watt-output audio module using a Motorola "Functional Circuit."

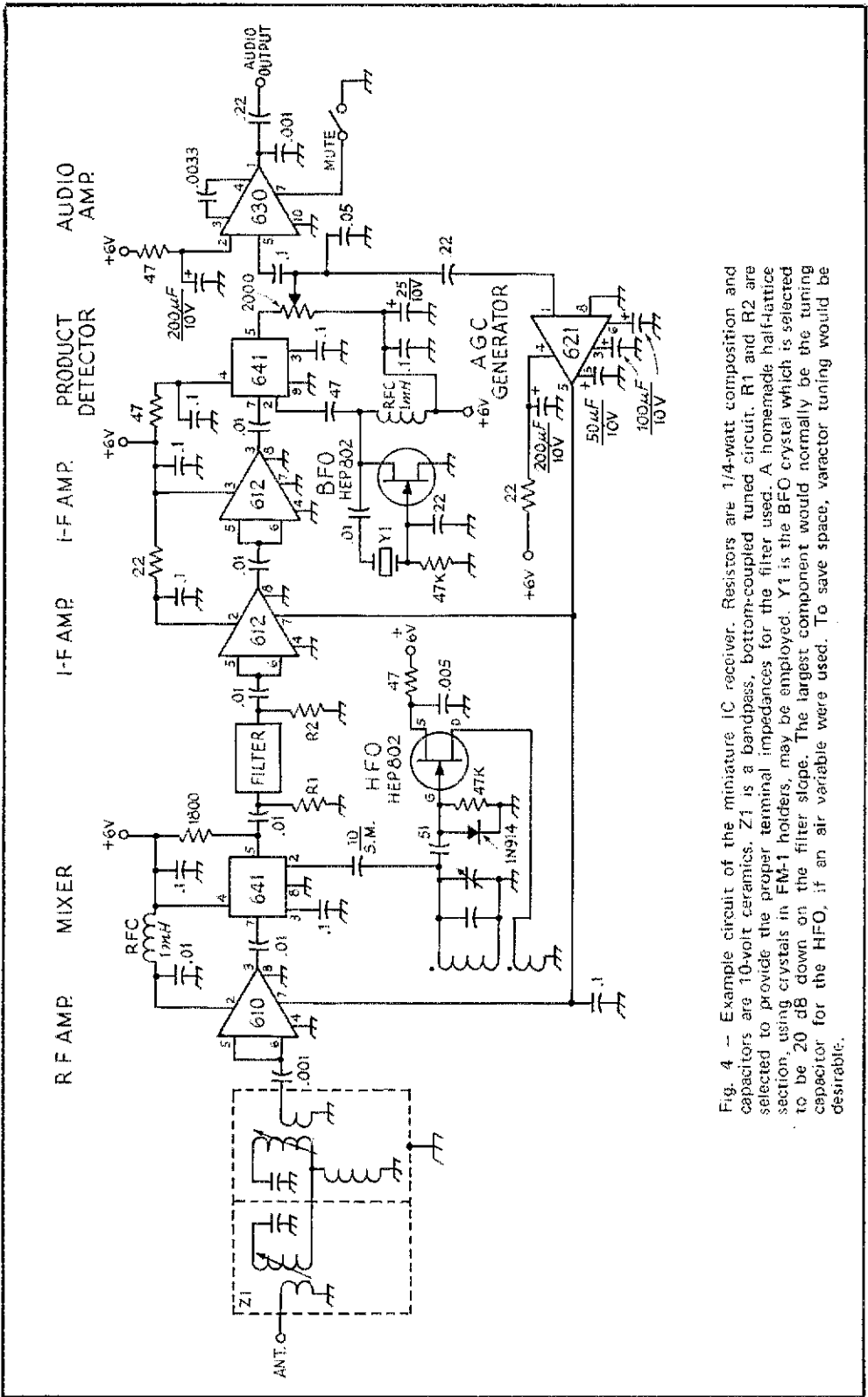
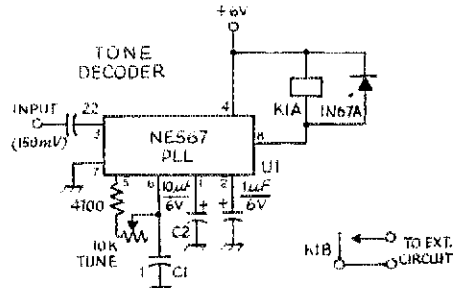
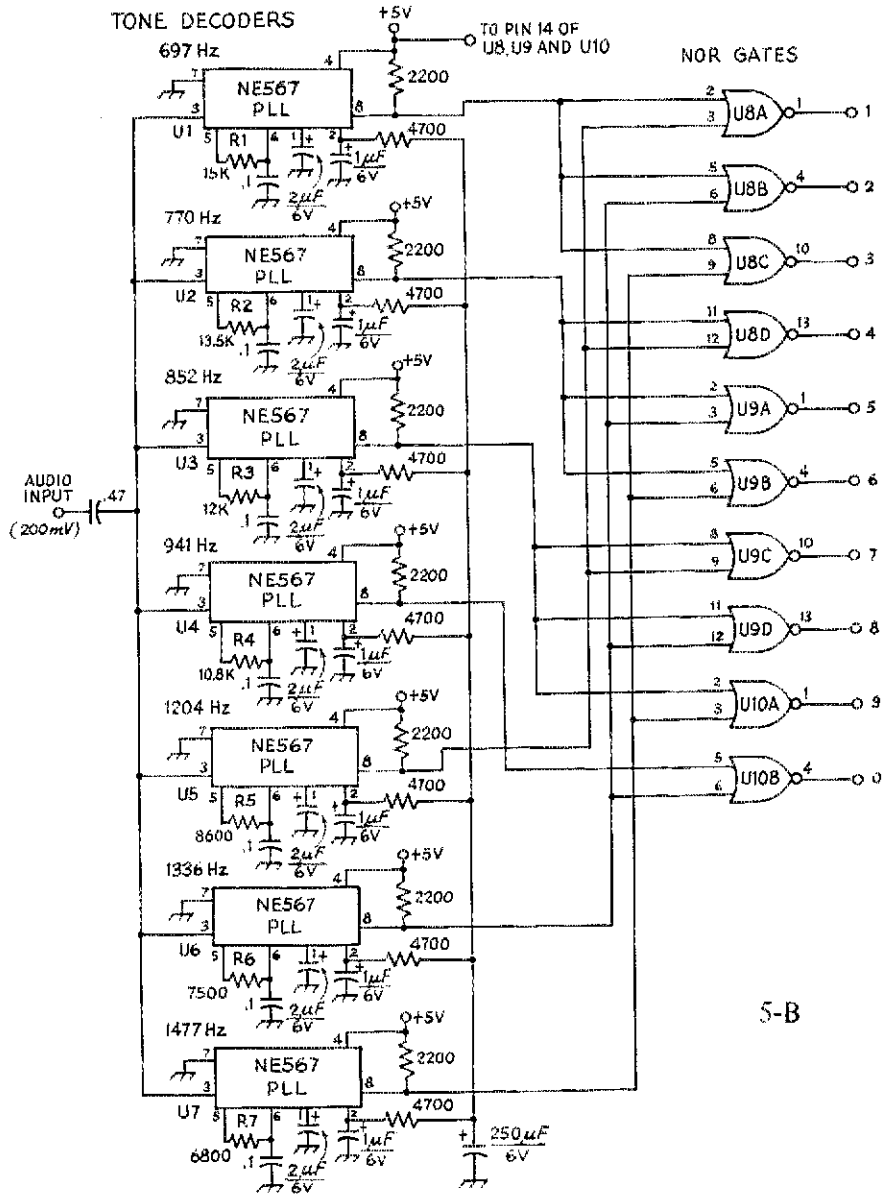


Fig. 4 - Example circuit of the miniature IC receiver. Resistors are 1/4-watt composition and capacitors are 10-volt ceramics. Z1 is a bandpass, bottom-coupled tuned circuit. R1 and R2 are selected to provide the proper terminal impedances for the filter used. A homemade half-lattice section, using crystals in FM-1 holders, may be employed. Y1 is the BFO crystal which is selected to be 20 dB down on the filter slope. The largest component would normally be the tuning capacitor for the HFO, if an air variable were used. To save space, varactor tuning would be desirable.

Fig. 5 -- (A) Tone-burst decoder and (B) Touch-Tone decoder. Resistors are 1/2-watt composition and capacitors are mylar. K1 is an spst reed relay with a 6-volt coil (C. P. Clare PRA-2010). The values indicated for R1-R7, incl. are approximate. Final adjustment of the frequency of each PLL should be made by trimming the resistor values as needed to center the phase-locked loop on the telephone-company frequency. A frequency counter facilitates the adjustment procedure. U1-U7, incl., are Signetics NE567Vs and U8-U10, incl., are Motorola MC7402Ls (2 NOR gates are not used).



S-A



S-B

age system does not "hang up" on noise. Essentially, the SL621 is an up-to-date version of Goodman's hang age system,⁷ built on a single silicon chip.

An IC Tone Decoder

Most narrow-bandwidth tone decoders currently used in amateur repeater and remote-station applications employ several bulky LC circuits to achieve the required audio selectivity. The phase-locked loop (PLL) IC's, pioneered by Signetics, have simplified the design and reduced the size of tone decoders so that a complete Touch-Tone demodulator can be built on a 3 x 5 1/2-inch etched circuit board (about the size for a single-tone decoder using LC components).

A typical PLL single-tone decoder, such as might be employed for tone-burst entry control at a repeater, is shown in Fig. 5A. One RC network establishes the frequency to which the PLL is tuned, according to the relationship:

$$frequency = \frac{1}{R1C1}$$

The PLL, a Signetics, NE567, may be operated from 0.1 Hz to 500 kHz. C2 establishes the bandwidth of the decoder, which can be set between one and fourteen percent of the operating frequency. C3 smooths the output signal, and, when this capacitor is made a high value, provides a delay in the turn-on function when a tone is received. Up to 100 mA may be drawn by the '567 output circuit, enough to key a relay directly or to drive TTL logic. The PLL contains 62 transistors and 50 resistors yet requires only 5 external components -- an example of what modern IC technology can do.

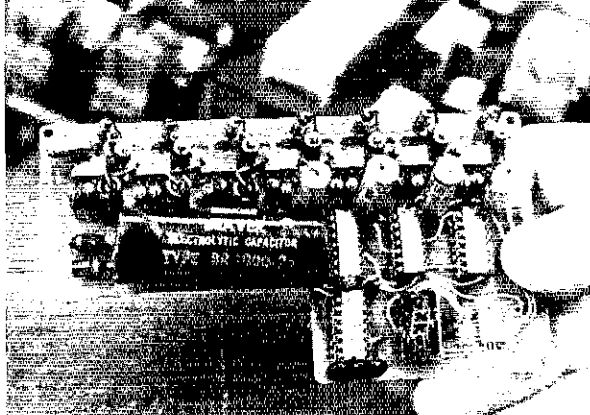
Seven PLLs are employed in the Touch-Tone decoder circuit shown at Fig. 5B.⁸ The resistor values indicated in the diagram for R1 through R7 are approximate; the exact value required for the standard Touch-Tone frequencies (Table 1) will depend on the exact value of the 0.1-μF capacitor. When a pair of tones arrives at the input of the decoder, 697 and 1207 Hz for example, after several cycles of audio have been received, PLLs U1 and U5 will activate, changing from 5 volts to about 0.4 volt at the output pins. These two "lows" will cause NOR gate U8A to change to a "high" (about 5 volts) at its output, the digit output line of the number represented by the two audio tones.

⁷ *The Radio Amateur's Handbook*, Chapter 5.

⁸ This basic design was received from Arthur Fury, WA6JLD, who is Manager of Linear Marketing at Signetics Corporation.

Low Tone (Hz)	High Tone		
	1209 Hz	1336 Hz	1447 Hz
697	1	2	3
770	4	5	6
852	7	8	9
941	#	0	*

Table 1 — Standard Touch-Tone frequencies for the 12-digit pad.



The Touch-Tone decoder, including a 5-volt power supply and a solid-state numerical display which is driven by the digit output lines through a diode matrix. As numbers are received and decoded, they are displayed, providing a visual check on the operation of the decoder.

Other possible uses for the '567 include a simple RTTY demodulator, PL (private line) decoding in an fm receiver, or 455-kHz demodulator for an fm receiver (demodulated audio may be obtained from pin 2). Signetics also makes the general-purpose NE562 PLL which is suited to frequency synthesizer applications, and the NE566 function generator. Two '566s can be used to build a homemade Touch-Tone encoder.⁹

Some Practical Considerations

Despite their advantages, integrated circuits can be hard to handle. With gains as high as 80 dB, and input and output terminals separated by only a fraction of an inch, self-oscillation often occurs if proper layout techniques are not used. The use of a shield between input and output is a good practice. IC's such as the MC1590G have ground-terminals arranged so that a shield can be connected across the bottom of the device, picking up two ground-return leads in the process. See Fig. 6. Proper ground returns are important in high-gain circuits. Some IC's such as the Plessey SL610 have the input and output returns brought out separately to avoid the problem of common-ground-return impedance. IC's are designed to be operated without neutralization, so if oscillation does occur the trouble will likely be traced to improper circuit design or layout.

Vhf parasitics can cause a problem in high-frequency circuits, as many IC's have upper-frequency limits above 100 MHz. A 10-ohm composition resistor in series with the input or output lead, placed physically close to the case of the IC, will usually eliminate vhf parasitics.

With high-gain stages, decoupling of the voltage feeder becomes particularly important. At low voltages, the values of series resistors must be kept low to prevent excessive IR voltage drop; thus,

⁹ Wyland, "Application Note — Touch-Tone Telephone Encoder with the SE/NE 566," copy available at no charge from Signetics Corporation, 811 East Arques Avenue, Sunnyvale, CA 94086.

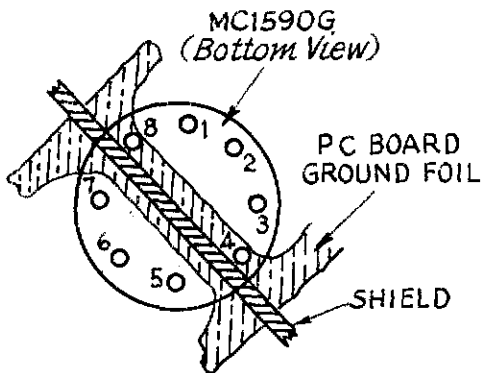


Fig. 6 - Diagram showing the proper foil layout and shield arrangement for the MC1590G.

low-impedance bypass capacitors are a must. If rf chokes are used in decoupling networks, they should present a high impedance at the operating frequency. High- Q chokes can be troublesome, so it is often wise to slip a ferrite bead over one lead of the choke before it is installed. The bead will greatly reduce the Q of the inductor. Obviously, the higher the gain of the stage, the more decoupling will be required if stable operation is to be achieved.

As with transistors, most ICs have relatively low input and output impedances. Impedance matching between stages is of utmost importance if the full gain potential of the integrated circuit is to be realized. Wherever possible the experimenter should try varying the turns ratio of a transformer, or the values in capacitance-divider circuit to ascertain that optimum transfer of energy is indeed taking place. If a tuned circuit occupies excessive space, an FFT source follower may be a suitable alternative impedance-matching method in low-level circuits.

Availability

Solid-state devices, because of the myriad of types available, are not always marketed in the same manner as other electronic components. Some distributors have specialized in the sale of transistor and IC devices. Because dealers often do not maintain a store front, most amateurs don't realize that seemingly hard-to-get ICs may actually be close at hand.

The addresses of the major semiconductor manufacturers are listed in Appendix A. If you are interested in an IC made by one of these firms, a letter to the Sales Department will bring a specification sheet on the device, application notes (when available), and a list of the manufacturer's sales offices and distributors. Most of the IC distributors stock in depth, so you can usually obtain a desired part in a matter of days. Fortunately, many of the IC distributors get small orders from research and development laboratories, so no unreasonable minimum-order requirements have been established. If a local dealer proves uncooperative, try another name on the manufacturer's list. And, save the distributor list for the next time that you want to obtain the manufacturer's solid-state "goodies."

In the next few years, ICs will become more complicated, accomplishing more functions in less space and with less power consumption. Amateur equipment designs will make increasing use of all types of ICs. To learn the design and assembly techniques that will be the way of the future, now is the time to try an IC circuit! And if your XYL laughs when she finds you on the floor with a magnifying glass looking for an IC that was to be the major part of your new ssb transceiver, until it slipped off the workbench - well, they laughed at Fulton, too.

Appendix A

- 1) Fairchild Semiconductor Corporation, 313 Fairchild Drive, Mountain View, CA 94041.
- 2) General Electric, Integrated Circuits Project, Electronics Park, Syracuse, NY 13201.
- 3) Motorola Semiconductor Products, Inc., Technical Information Service, 8005 McDowell Road, Phoenix, AZ 85036.
- 4) National Semiconductor Corporation, 2900 Semiconductor Drive, Santa Clara, CA 95051.
- 5) Plessey Microelectronics, 170 Finn Court, Farmingdale, NY 11735. (Plessey components are available directly from Bernard R. Erde, Components Marketing Manager, with a \$.50 handling charge.)
- 6) RCA Electronic Components, Commercial Engineering, Harrison, NJ 07029.
- 7) Signetics Corporation, 811 E. Arques Ave., Sunnyvale, CA 94086.
- 8) Texas Instruments, Inc., Marketing and Information Services, P.O. Box 5012, Dallas, TX 75222.

QST

Strays

Awards hunters will be interested in the new Certificates Handbook announced by the *Union Belge des Amateurs-Emetteurs*. The Handbook is in two parts; Part I for the licensed amateur and Part II for the SWL. The price for both parts is 285 Belgian francs (\$6), and they may be ordered through Omer Timmerman, ON5TO, 8 Oostende, Steenweg WV, Brugge, Belgium.

QST congratulates the following hams for participating in the XIII World Scout Jamboree in Japan, July, 1971: H. James Hire, W8ZET; Frank A. Rogers, W2NIC; Glen T. Logan, WA5UHF; Bill Knight, WA8ZIN; Hugh N. Chapman, WN4TNN; Bradley H. Burrell, WN3PAK/KG6; Steve Shoup, WN8IKH; Steve Oki, WN6SSK; Jim Kazakoff, WN6GWE; Steve Antosh, WB5BNN; Duane L. Peterson II, WN6CEM; Mark Brantley, WN5CJQ; Scott Kasler, WN8HWH; Jeffrey Gomberg, WN6FWW; Harry Harchar, W2GND.

Stolen Equipment

On May 17 a Tempo One transceiver (serial 111750) was stolen from the home of W2VPY. Anyone with information contact W2VPY.

• Beginner and Novice

This is the completed power bridge. S1 is at the right and the sensitivity control, R3, is at the center. Note the setting mark on the R3 control. This unit was designed and built by Doug DeMaw, W1CER.

A Power Bridge and SWR Indicator for 2 Meters

BY LEWIS McCOY,* WHCP

A MUCH-NEEDED device for the vhf amateur is a simple power bridge and SWR indicator. The unit shown in the photographs and Fig. 1 is designed for the 2-meter ham, and should prove to be extremely useful in checking the feed-line-to-antenna match, plus monitoring power output. As any ham who builds and uses a solid-state transmitter knows (or should know), transistors are very unforgiving of mistakes. Most transistor final amplifier stages cannot be operated without a load, because, if they are, it is very easy to ruin the devices. An SWR indicator is almost a "must" piece of equipment so that the operator can monitor the transmitter to make sure it is working into a proper load.

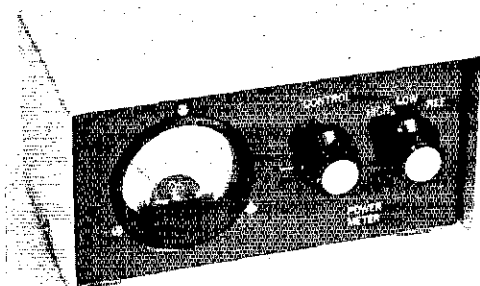
Circuit Details

The bridge described here is designed to work with 50-ohm lines, in order to reduce any chances of the bridge upsetting the line impedance when the unit is inserted in the line, microstrip line techniques¹ are used. The heart of the unit is the 50-ohm microstrip line which is made from a piece of circuit board, glass epoxy type, with copper foil on both sides. One side of the board is etched (see Fig. 1) to provide the conductor section, L3, and the two pickup lines L1 and L2. Using etched-circuit board provides a simple method of making an accurate section of strip line.

* Novice Editor.

¹ Reference Data for Radio Engineers, Chapter 22, Howard W. Sams & Co., Inc.

The etched-circuit stripline is mounted on the rear wall. The board is supported by the solder connections to the inner pins of J1 and J2, and by the solder lugs mounted under the coax fitting nuts. The ground connection for the ends of R1 and R2 is visible at the top center of the board.

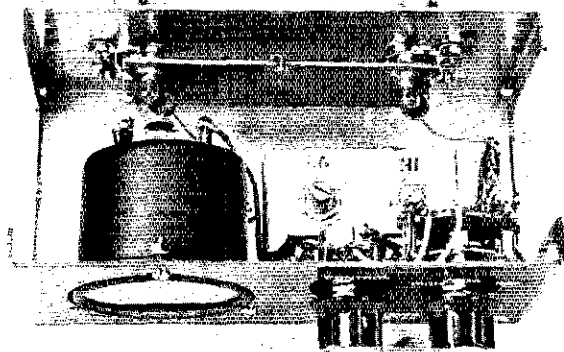


The center of the two pickup lines, L1 and L2, is terminated with two paralleled resistors, R1 and R2, which have a combined value of slightly more than 33 ohms. Using two resistors in parallel reduces the inductive reactance which could be a problem in obtaining accurate measurements at 2 meters.

Rf energy is sampled from the transmission line, being coupled out via L1 and L2 and then rectified by CR1 and CR2. M1, a 0-200 microammeter is used as the indicator. In the unit shown, two forward-power scales are available, one for 20 watts and the other for 200 watts. While we didn't try the unit at a higher power level, it should be possible to modify the circuit to handle more than 200 watts. This would no doubt entail changing R1 and R2 to one-watt resistors and adding diodes in series with CR1 and CR2 to increase the PRV rating of the rectifiers.

Construction Information

The etched-circuit strip-line section is made from a piece of board that measures 4 inches long by 1 1/2 inches wide. L3 is 5/32 inch wide and is separated from L1 and L2 by 1/8 inch. L1 and L2 are 1/16 inch wide. Try to hold to these dimensions as closely as possible. R1 and R2 are connected to the center point of L1 and L2, keeping the resistor leads as short as possible. The grounded leads on the resistor are brought around



the edge of the board and then soldered to the foil side, keeping the leads as short as feasible.

Before mounting the strip line in the enclosure study the photograph carefully. The box used here is a homebuilt job that measures $6\frac{1}{2} \times 3\frac{1}{2} \times 3$ inches. However, any shielded box of adequate size can be used. J1 and J2 should be installed and spaced so that their center pins can be soldered directly to the far ends of L3. Also note that soldering lugs are installed under the end nuts that hold the SO239 coax chassis fittings. The lugs are bent up and around so that their ends can be soldered to the foil side of the circuit board. The rf chokes RFC1 and RFC2 are mounted close to the feedthrough capacitors.

Calibrating the Unit

Calibration of the bridge is not difficult but there is one slight problem. You need the use of a calibrated power bridge, such as a Bird vhf wattmeter to plot an accurate chart. This is where your ham ingenuity should come into use. Many electronics labs have such units. Also, most 2-way radio repairers have power bridges. Fortunately, either of these places usually has hams working for them. In any case, it only takes a few minutes to calibrate the bridge, so let's hope you can obtain access to a known unit.

Calibrations consist of inserting the bridge in a 50-ohm coaxial line, along with a known bridge, using a 50-ohm vhf dummy load. Feed enough power into the system to have 20 watts indicated on the known bridge. Set S1 for the 20-watt position and adjust R5 so that your bridge meter deflects to full scale. If you cannot get 20 watts output from your equipment you can make the adjustments with less power. For example, if you have 10 watts showing on the known bridge then set R5 for half scale, or 10, on your meter. Next, reverse your bridge in the line and don't change anything else, such as the transmitter settings. Turn on the power and then adjust R3 for an indication of 20 watts, or 10 watts, or whatever power you used on the first adjustment. Then mark the knob setting of R3 so you will have a reference point. See the front view photograph.

The same techniques are used in setting the higher power range. We didn't mark the R3 knob for this power range but you can do so if desired. Once these adjustments are made, R4 and R5 should not be readjusted. The reason R3 can be adjusted from the front panel is that you may want to increase the sensitivity of the circuit on reflected readings when you are trying to match an antenna.

Figuring SWR

When using a power type SWR bridge, regardless of the make, a lot of arithmetic is necessary to determine the SWR. However, Roy Johnston, W0MAN, converted the formulas to a simple graph. This graph is shown in Fig. 2. Shown

Fig. 1 - Circuit diagram of 50-ohm Micro Stripline bridge.

- C1, C2 - .001- μ F feedthrough capacitors.
- CR1, CR2 - High-PRV germanium diodes, 1N55A or equiv.
- J1, J2 - Coax chassis connectors, type SO230.
- M1 - 0-200 microammeter.
- R1 - 56 ohms, 1/2-watt composition or carbon, not wire-wound.
- R2 - 82 ohms, 1/2-watt composition or carbon, not wire-wound.
- R3 - 25,000 ohms, linear taper (Ohmite CU2531 or equiv.).
- R4, R5 - 15,000 ohms, linear taper (Ohmite CU1531 or equiv.).
- RFC1, RFC2 - Rf choke, 25- μ H (Millen 34000-25 or equiv.).
- S1 - Two-pole, three-position rotary switch (Mallory 3123J or equiv.).

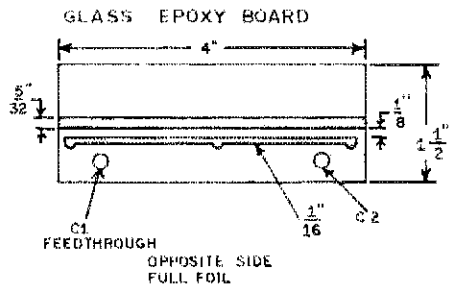
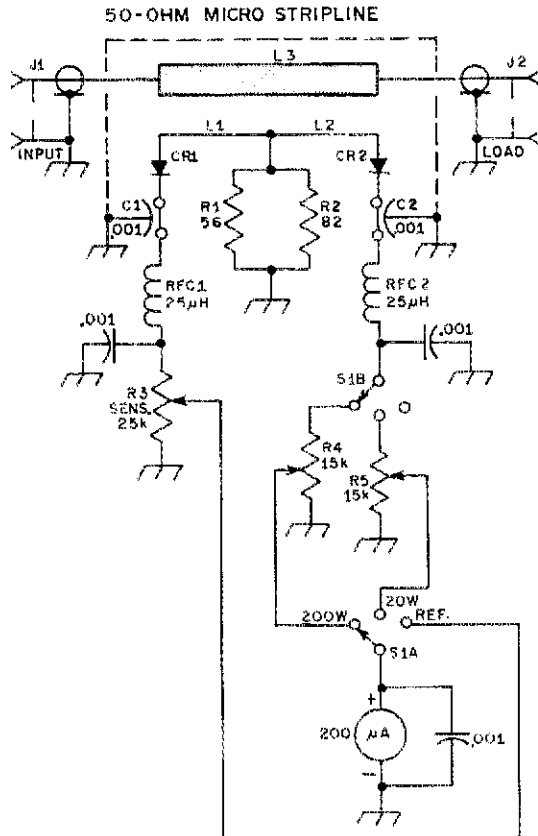


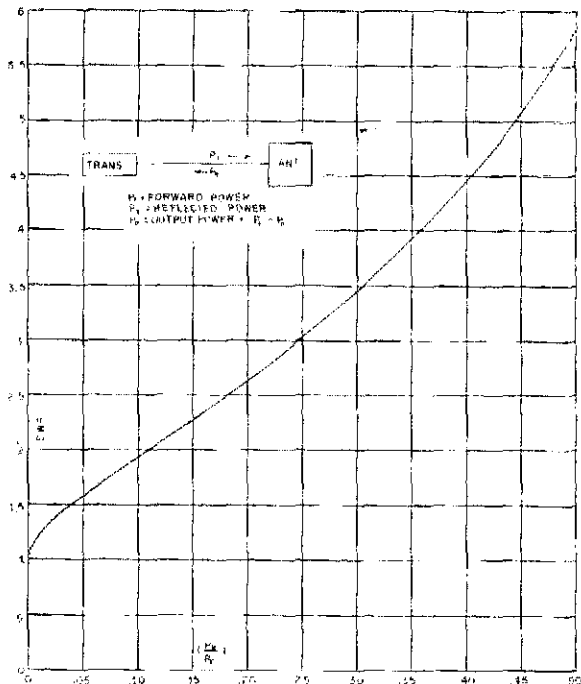
Fig. 2 — This graph provides a simple method for figuring SWR when the forward and reflected power are known. Simply divide the forward power into the reflected to obtain the percentage. Take the percentage figure and follow that number up from the bottom of the graph to where the SWR curve intersects.

along the vertical axis is the SWR, and along the bottom a percentage figure. Let's assume our forward power is 20 watts, and we have 4 watts reflected. Simply divide the forward power into the reflected, or 20 into 4, which gives an answer of 0.20 percent. Go along the bottom of the graph to 0.20 and then follow that line up to the curve. In this case, 0.20 shows an SWR of 2.6 to 1. The beauty of this graph is that it is easy to use whether you are running a few watts output or hundreds of watts.

If the bridge described in this article is to be used for power measurements on bands other than 2 meters, the power calibrations will need to be changed as the bridge sensitivity will vary from band to band. However, the accuracy for most of the 2-meter band is more than adequate for amateur use. If the reader desires to construct a power bridge for the lower frequency bands it is suggested he use the design of WICER that appeared in a recent issue of *QST*.²

QST

² DeMaw, "In-Line RF Power Metering," *QST*, December 1969.



July 1921

... Our Cover shows a couple of hams rowing out to a yacht anchored in the stream. The yacht has a slanting four wire flat-top and the rowboat is full of ham gear. Stuff like that still going on.

... R. A. Heising of modulation fame has Part I of a comprehensive article on "Modulation in Radio Telephony." This article mentions the formation of upper and lower side frequencies. Perhaps this is the first mention of these things. It is all audio, of course.

... A large and handsome loving cup has been presented to the League by Seymour Wemyss Smith of Hartford for the best performance during the summer months. S. Kruse, 3ABI, is Chairman of the award committee which comprises some well-known hams such as Vermilya, 1ZE; Matty, 9ZN; and Clayton, SZL. We have this trophy in our Museum.

... Irving Vermilya relates the story of his first meeting with New England's first YL, Miss Eunice Randall, then assistant operator at IXE, Medford Hillside. Turns out she was a neighbor, about five miles away and used a spark coil with a scratchy note. She is now W3GCW.

... A couple of new bills introduced into Congress would take amateur wave allocations out of the law and have the Department of Commerce have the say. K. B. Warner strongly protests such things and wants amateurs to have specific allocations, as at present.



July 1946

... Editorial comments on the present status of the 160-meter band. Loran is in there but arguments have been filed with the Commission to make it non-exclusive, letting the amateurs share it.

... Dana Griffin, W2AOE, and L. C. Waller, W2BRO, describe a method for cw reception involving audio modulation of the incoming signal. Seems to me I fooled around with something like this once, using a buzzer instead of an audio oscillator. Worked too.

... A very simple two-stage transmitter, built with only a screw driver, pliers and a soldering iron, is described by A. David Middleton, W2OEN. It is crystal controlled and uses a 6V6 and a 6L6.

... George W. Bailey, W1KH, is reelected President of ARRL. Good picture of George (and he's still going strong in 1971).

... We have a 2400 Mc transceiver using the recently-developed "lighthouse" tube. A. R. Kock, W9WHM/2, and G. H. Floyd, W6JJK/2, are the authors. Their first QSO was about a mile from inside the buildings. Improvements in the cavity design are coming up.

... The new "Thyrite" lightning arrester, long used by the power companies, finds a new use preventing undue peaks from forming in modulation transformers. The material is good ole carborundum.

— W1ANA

July 1971

39

A Simple IC Keyer with Weight Control

BY R. DEAN STRAW,* WA1IRG, AND RALPH S. HAWKINS,** W1OEX

IN THE APRIL, 1968, issue of *QST*, W0ZHN and K0UXQ described a very simple and compact electronic keyer,¹ which, judging from the interest generated locally, must have spawned many copies in the ranks of cw-minded hams. However, it was felt that a very desirable feature rarely found in keyers using ICs, a weight control, could be added to the W0ZHN keyer relatively easily. The parts count would not be increased by much - a potentiometer and one resistor. This article explains the development and operation of a simple keyer that, in addition to having a weight control, has a built-in monitor and power supply.

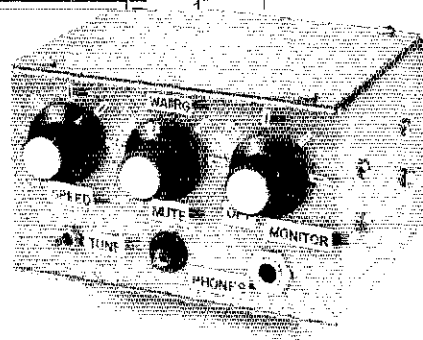
Electronic keyers have certainly come a long way in terms of size and weight since W9TO's vacuum-tube keyer brought digital circuitry into the hamshack.² But just about every keyer that has come along since then has followed the basic design principles first used in the TO. Although the description of the circuit didn't really indicate it, the basic design of the W0ZHN and K0UXQ keyer is very similar to that of the W9TO. However, some very clever manipulations were done in the change from tubes to digital ICs. One of these keyers was built and operated for a while at WA1IRG. The device did work as described, but after extensive listening to it compared to a TO type of keyer, it was decided that a weight control was really needed.

* 18 Bryant St., Wakefield, MA 01880.

** 207 Mountain Ave., Arlington, MA 02174.

¹ Halverson and Stordahl, "An Integrated-Circuit Electronic Keyer," *QST*, April, 1968.

² Ricks never published his design, although copies of the original schematic have been circulating since the early 1950s, and a commercial version has been marketed. The first reference in *QST* to the TO keyer appears in Old, "Transistorized Electronic Key and Keyer," *QST*, May, 1959. An improved version of the vacuum-tube design is presented by Lutz, "The 9TO Mark II Keyer," *QST*, June, 1967. - Editor.



The WA1IRG-W1OEX keyer is self-contained, except for monitor speaker, in its 4 x 5 x 3-inch Minibox (Bud AU-1028). The SPEED and MONITOR volume controls flank a MUTE control (not described in the text) which provides a variable degree of muting for Collins S/Line receivers. The weight control is located on the rear panel and is not visible in this view.

Why Use a Weight Control?

A weight control allows limited adjustment of the dot-to-space (and hence dot-to-dash) length ratio to be made. It is true that a perfect 3:1 dash-to-dot (or dash-to-space) length ratio is the way cw is really supposed to be sent, but it is also true that the wave-shaping circuits employed in transmitters to eliminate key clicks can alter that ratio somewhat, especially at high speeds. This can be confirmed by listening to a keyer set for a 3:1 dash-to-dot ratio by means of its own monitor, and by then listening to the weight of the signal actually transmitted.

Even beyond the technical desirability of having a variable weight adjustment lies the tendency for the individual amateur to want his fist to be somewhat distinctive, or at least just slightly different from a tape machine. And by adjustment of the weight control, some very individual fists indeed can result!

Let us examine the basic designs for both the W9TO and the W0ZHN keyers. The W9TO version uses a multivibrator to generate dots directly. To generate dashes, that same multivibrator is used to drive a flip-flop and an output summing gate. See Fig. 1A. (For a full description of the "blow-by-blow" action of a multivibrator and a flip-flop, a good book to study is *Theory and Application of Active Devices*.³)

The W0ZHN keyer uses an asymmetrical multivibrator to produce pulses, which are fed into a flip-flop. This flip-flop divides the input frequency by two, and by this action produces square-wave dots. For dashes, this same combination of asym-

³ Reich, Skalaik, and Kraus, *Theory and Application of Active Devices*, Chapter 16 (Multistable Circuits), Van Nostrand Series in Electronics and Communications.

metrical multivibrator and flip-flop is used to drive another flip-flop and summing gate. See Fig. 1B. It turns out that a modified multivibrator with weight control can be used in the WØZHN keyer instead of the multivibrator and flip-flop combination that is used to make dots.

A Multivibrator with Weight Control

The heart of this keyer design is the variable-weight multivibrator. Its development is shown in Fig. 2. A basic transistor multivibrator is shown in Fig. 2A. The two transistors are inverting amplifiers in a common-emitter configuration. As such, they can be represented in terms of logic symbols, as shown in Fig. 2B.

If two inverting amplifiers are added between the output terminal of one of the amplifiers and the input of the other, the multivibrator will still be able to operate normally since the overall phase shift from input to output of the two amplifiers is 360 degrees, with no net change in phase. If one of these two added inverting amplifiers has another input terminal to which a dc control voltage can be applied to shut down the gain of that amplifier, we have a dc-controllable multivibrator. See Fig. 2C. The two-input amplifier is more commonly known as a NOR gate.

Besides having obtained a method of controlling whether the multivibrator is turned on or off, we have increased the loop gain of the circuit and have provided a definite starting pulse so that positive starting is always assured. Occasionally a regular multivibrator will lock up, when both sides of the symmetrical circuit try to come on together.

By the action of increasing the gain available in one branch of the circuit, we assure that this branch is the one which predominates upon turn-on.

So far we have not departed from the basic design of the W9TO keyer, but we have not yet discussed what sort of wave form is coming out of our fancy multivibrator or how we can change that wave form by judicious component selection. The output wave form from a symmetrically constructed multivibrator is a square wave, at least for the relatively low frequencies that we are considering here. However, if the multivibrator is made asymmetrical by making the timing capacitors or timing resistors (C_T or R_B in Fig. 2) unequal for each side, the output wave form likewise assumes an asymmetrical shape. The length of on time for one side of the circuit becomes different from the time when the other side is on. The weight resistor can be looked upon as a way to disturb the symmetry of the circuit. See Fig. 2D.

Formation of a Dash

In order to understand how this ability to control the degree of asymmetry in the output wave form of the dot multivibrator allows us to vary the weight of the keyer's output, let us see how a dash is formed. Without a weight control, a dash is equal to three dots in time, and for this symmetrical case a space length is equal to a dot length. See Fig. 3A. In Fig. 3B, the flip-flop is arranged to be triggered on the leading edge of the first dot in the sequence coming from the dot multivibrator, and to be retriggered back to its original state on the leading edge of the second dot

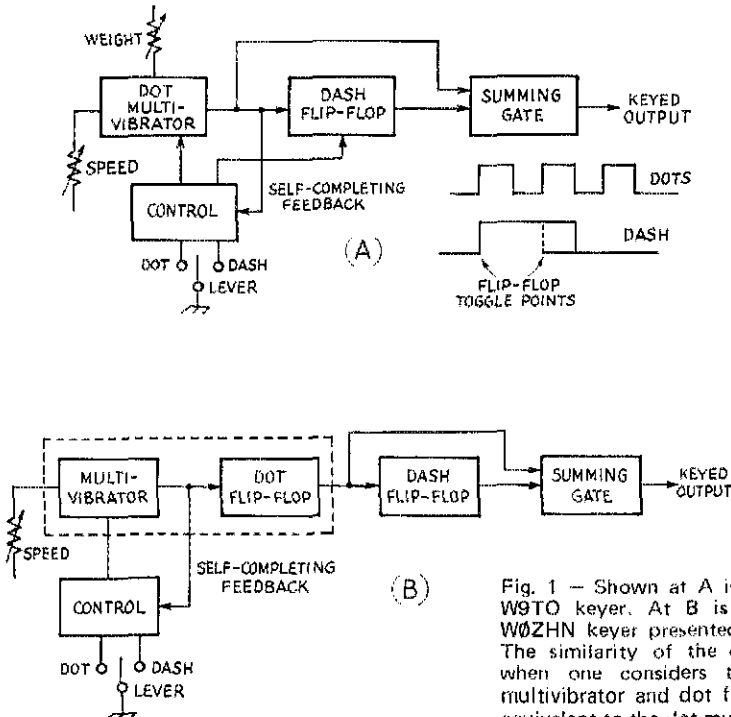


Fig. 1 — Shown at A is the basic design of the W9TO keyer. At B is the basic design of the WØZHN keyer presented in *QST* for April, 1968. The similarity of the designs becomes apparent when one considers that the combination of multivibrator and dot flip-flop at B is electrically equivalent to the dot multivibrator at A.

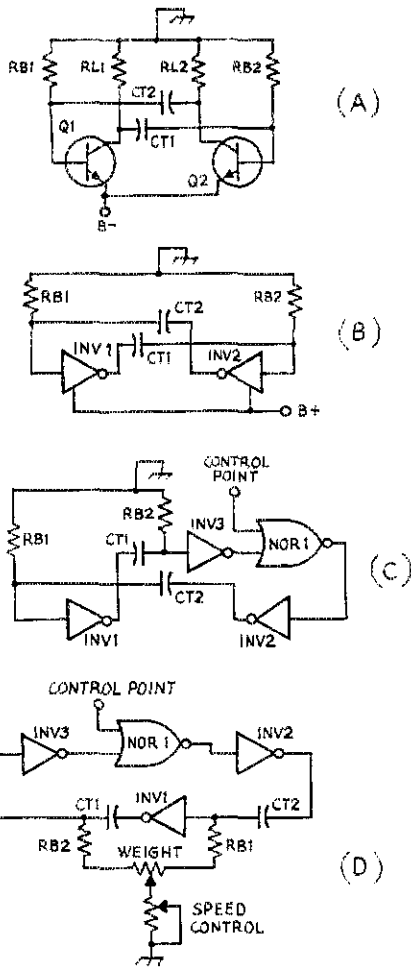


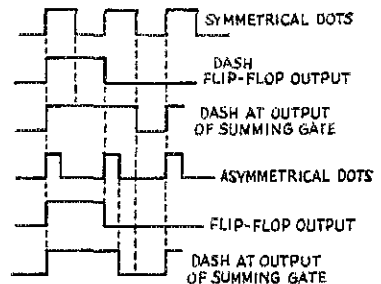
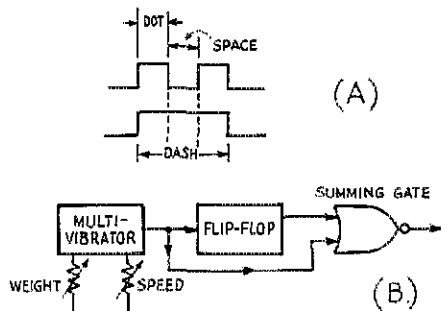
Fig. 2 - Evolution of a multivibrator circuit with weight control. Shown at A is a basic multivibrator circuit, and at B is its equivalent using logic-circuit symbols. (At B, RL1 and RL2 are considered to be part of INV1 and INV2.) Inverting amplifiers INV2 and NOR1 have been added in one leg of the multivibrator at C, and the B- connection has been deleted for simplicity. The circuit at D shows a complete multivibrator with weight and speed controls.

Fig. 3 - Formation of dashes. At A is a timing diagram for dashes generated with a 1:1 dot-to-space ratio, the output of the circuit at B. At C, three wave forms for the symmetrical case are compared with three wave forms for the asymmetrical dot case of weight-control settings. The dash-to-dot ratios shown here are 3:1 for the symmetrical case, and approximately 5:1 for the asymmetrical case.

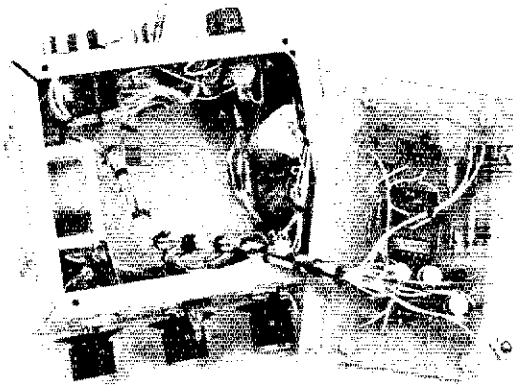
in the sequence. Thus, the flip-flop has been set up to count out two dot intervals in time, or rather, one dot and a space equal to that dot. This flip-flop output is the second wave form shown in Fig. 3C. But we still need one more dot time to give the dash its full length for a 3:1 dash-to-dot ratio. This time is obtained by adding in the rest of the second dot, the leading edge of which retriggered the flip-flop back to its original state. This combining is done through an OR gate, which passes either the output of the flip-flop alone, the multivibrator alone, or both together. The summed output is shown as the third wave form of Fig. 3C.

Now, if we deliberately make the output wave form of the dot multivibrator asymmetrical, the ratio of dash length to dot length is different from three-to-one. A dot length is no longer equal to a space length. As may be seen from Fig. 3C, the output from the flip-flop is the same for the asymmetric and symmetric cases, but the ratio of a dash to dot is quite different. With this circuit the weighting, whatever it is set for, remains relatively constant for different speed settings, since normally a large degree of asymmetry is not needed to obtain the desired weighting. The weight control can be set at the higher speeds and then will be satisfactory at lower speeds.

Before we observe in more detail the operation of this keyer circuit, let us quickly review in brief the operation of the logic circuits used. A logic high in this keyer is defined as ground potential, and a logic low is defined as -4 volts. The negative supply potential is used to simplify the interface between the keyer and a negative grid-block keying line. A NOR gate output will be high only if its two inputs are low. Any other combination of inputs will produce a low output. It can be said that a NOR gate ANDs lows to produce a high. An



The power-supply components are mounted around the periphery of the enclosure. The etched circuit board, containing all the smaller components, is affixed to the bottom plate of the keyer with No. 4-40 screws and metal spacers. This photograph is of an earlier version of the keyer, taken before the transistors in the dot-multivibrator section were replaced with an integrated circuit.



inverter will simply invert at its output whatever logic level is at its input. Thus, a low at the input will produce a high output, and a high input will produce a low output.

The particular flip-flop used here is called a J-K flip-flop. It will toggle, or change its output state, on a low-going change in logic state at its toggle input (sometimes called trigger input). The C_d input is a "clear direct" input which allows direct control of the Q output of the device. When C_d is held high the Q output will remain cleared to a low state, and the action of the trigger input will have no effect on the output state of the flip-flop.

Dot Operation

The schematic diagram for the complete keyer is shown in Fig. 5, and timing diagrams for its operation are given in Fig. 4. To initiate the dot sequence, a logic high from the paddle is applied to pin 13 of U2D. The paddle can be pressed momentarily and then released, and the dot will be self-completed. Pin 12 of U2D starts at a low; otherwise the transmitter would be keyed through U1F and Q1. Thus, following the rules for operation of a NOR gate, we find that pin 14 of U2D goes low. This action results in pin 8 of U2C being forced high, and thus the multivibrator chain starts oscillating. The multivibrator action may be seen by referring to Figs. 4A and 5.

The high received at pin 8 of U2C causes pin 3 of U2A to go low, since a low has been held at its pin 2 input. Pin 9 of U4A is held low by a high at pin 10, its C_d input, through the action of U3A and U3B. Pin 3 of U1C goes high, and pin 7 of U1F goes low. The output transistor, Q1, turns on now and keys the transmitter.

The high condition at pin 1 of U2A holds until the multivibrator chain goes through one dot length, that is until pin 8 of U2C goes low again. Self-completion of the dot is assured by the action of U2D, where pin 14 is held low until the entire dot is completed.

Note that the multivibrator produces a dot and a following space for each dot-paddle closure. The space is formed for as long as pin 5 of U1D remains high, since at this time the opposite side of the multivibrator (at pin 1 of U1A) must be low. If the dot paddle is held closed, a sequence of alternating dots and spaces will be produced, with the next dot in the sequence not being able to start until the succeeding space is fully concluded. The necessity for U3A and U3B will be covered later.

Dash Operation

As explained before, dash operation involves the combining of two dot lengths and the space between them. When the paddle is pressed to the dash side, the dot multivibrator is activated through U2B. Pin 5 of U3B is initially low and remains low, enabling the leading edge of the first dot from the multivibrator (at pin 8 of U2C) to trigger the flip-flop (through U1B). The flip-flop holds with a high logic state at its Q output until the leading edge of the second dot from the multivibrator occurs to retrigger it back to the low state. This sequence is shown in Fig. 4B.

Note that the high input on pin 2 of U2A, makes pin 3 low, and hence pin 3 of U1C is kept high. This holds pin 14 of U2D low, and thus the multivibrator is kept going. After the leading edge of the second dot has triggered the flip-flop back

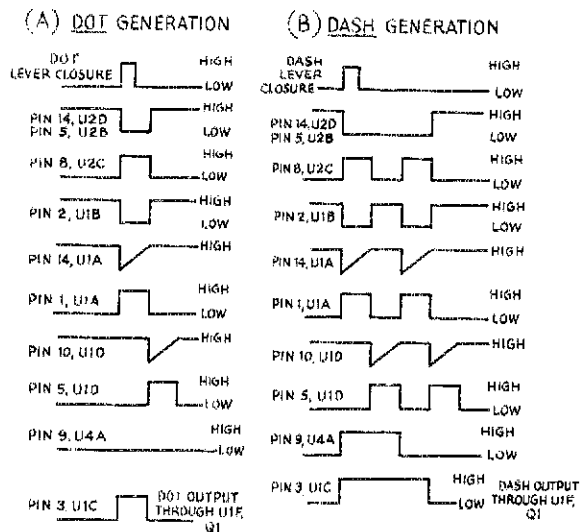
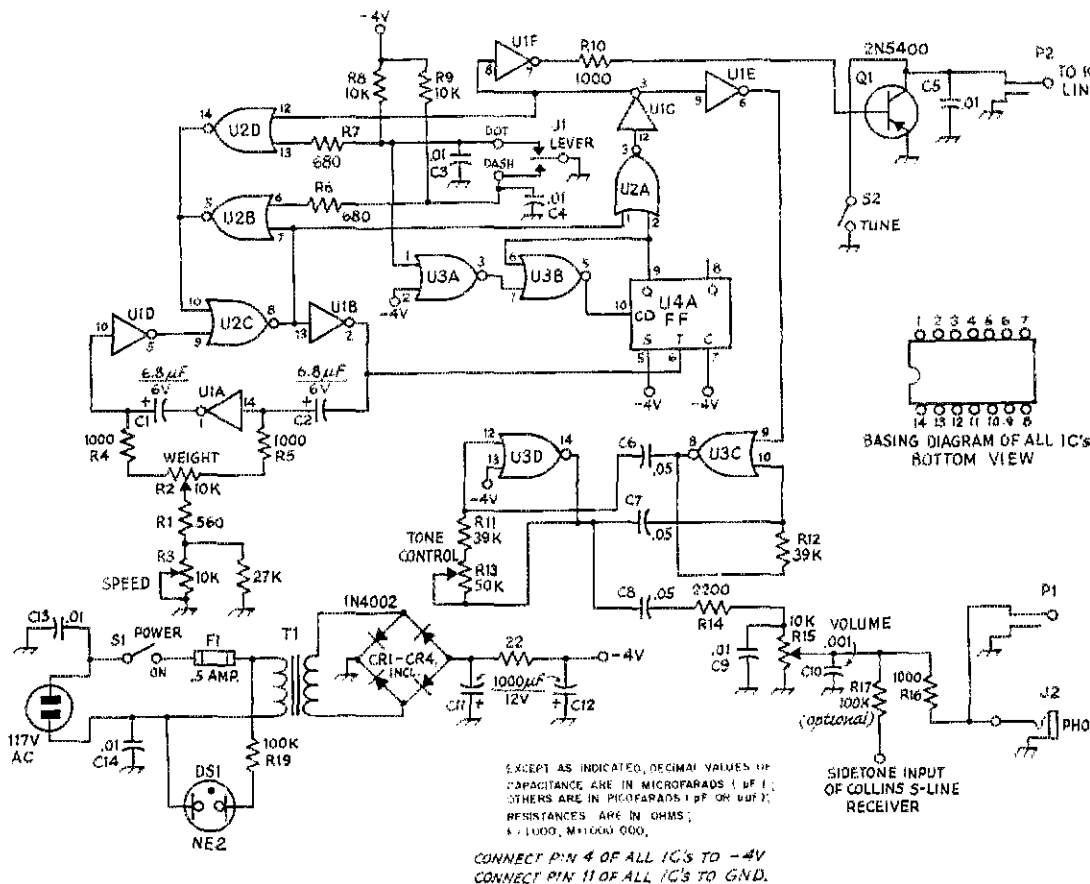


Fig. 4 — Idealized timing diagram for dot generation (at A) and for dash generation (at B). For each paddle closure, the appropriate element and a following space are produced.



to a low Q output, the remainder of the second dot continues through the action of U2A, U1C, and U2D to produce the rest of the dash. This last portion of the dash is self-completing, again through U2D as with the dot. Thus for each dash-paddle closure, a dash and following space are produced, the space being made exactly the way it is in dot operation.

U3A and U3B are used to assure that once a dash is initiated by pressing the paddle to the dash side it cannot be clipped short if the operator quickly presses the paddle to the dot side while anticipating a dot following a dash. Once a dash is initiated, pin 9 of U4A goes high, which causes pin 5 of U3A to stay low until the flip-flop has been retrIGGERED back to zero, after which time the keyer is operating as though it were merely going through a dot cycle. A dot closure, coming when pin 9 of U4A is high, thus cannot cause the C_d input to the flip-flop, pin 10, to go high and clear the flip-flop to clip the dash short.

There is a possible "race" condition here in dot operation.⁴ If pin 10 of U4A is not made high

⁴ A "race" condition results when an undefinable or unpredictable situation in terms of logic-circuit operation occurs. Such a condition is developed when two separate input-circuit wave forms representing conflicting instructions to that circuit arrive simultaneously. — Editor.

Fig. 5 - Schematic diagram of the keyer with weight control. Unless otherwise indicated, all resistors are 1/4-watt, 10-percent tolerance. Capacitors C1 and C2 are electrolytic or tantalum, C11 and C12 are electrolytic; all others are disk ceramic. Components not listed in the parts list below are identified for text reference and for circuit-board location.

- CR1 - CR4, incl. - Silicon diode, 1-A, 100 PIV or greater.
- J1, J2 - Phone jack.
- P1, P2 - Phone plug.
- Q1 - High-voltage pnp transistor, 2N398B or 2N5400 or equiv.
- R2, R3 - 10,000-ohm linear-taper control (Mallory Midgetrol U-20 or equiv.).
- R13 - 50,000-ohm linear-taper control (Mallory Midgetrol U-35 or equiv.).
- R15 - 10,000-ohm audio-taper control (Mallory Midgetrol with spst ac switch type U-18 or equiv.).
- S1 - Spst, mounted on volume control.
- S2 - Spst.
- T1 - Filament transformer, 6.3-V 0.6-A secondary (Chicago-Stancor P6465 or equiv.).
- U1 - Hex inverter IC (Motorola MC789P or HEP 573 or equiv.).
- U2, U3 - Quad 2-input gate IC (Motorola MC724P or HEP 570 or equiv.).
- U4 - Dual J-K flip-flop, 1 section used (Motorola MC790P or HEP 572 or equiv.).

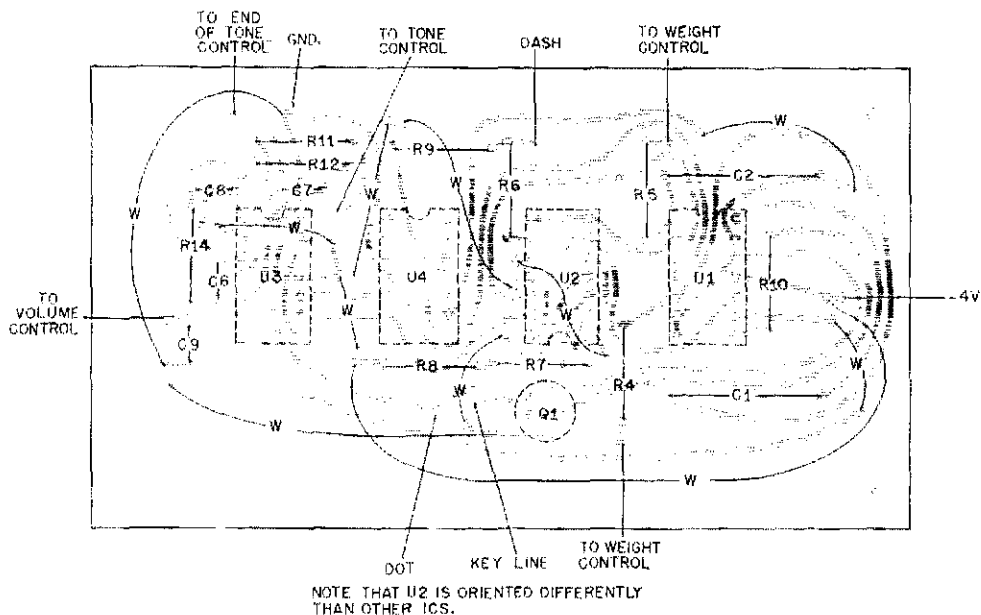


Fig. 6 — Etching-pattern template and component layout for the keyer with weight control, shown from the foil side of the board. W indicates wire jumpers added on foil side of board. Pattern is full scale. Keyer components not mounted on the circuit board are located on the chassis enclosure.

before pin 6 receives a toggle pulse, the flip-flop could toggle and produce a false dash. However, the propagation delay of the chain of U2D, U2C, U1B, and U4A is longer than that of the chain of U3A, U3B, and the C_d input of the flip-flop, so this possible condition does not arise.

The timing diagrams are quite useful in following the moment-by-moment actions of the various parts of the circuit, and can be drawn quite simply by following the rules for use of the NOR, inverter, and flip-flop building blocks. If a scope is triggered from the output of the keyer, the state of any of the gates can be observed as depicted in the idealized timing diagrams. This information is an invaluable aid in troubleshooting, provided of course that one has access to a scope with external triggering capabilities and sufficient stability to allow the wave forms to stand still for observation.

Construction

A suggested etched-circuit board layout is shown in Fig. 6. Because of the low frequencies involved in the keyer, the layout is not critical. However, to prevent rf from falsely actuating the RTL ICs, the keyer should be built into a metal box and the leads bypassed extensively. The bypassing components are shown on the schematic and are placed physically as close as possible to the point where the bypassed wire leaves the enclosure. To be even more sure that stray rf is kept out of the keyer, use miniature coaxial cable for all leads

going into the box. With these precautions, a "full gallon" on any hf band can be keyed at WA11RG without any rf-pickup problems.

A simple audio-multivibrator monitor is shown on the schematic, utilizing two gates, U3C and U3D. This multivibrator drives a pair of high-impedance headphones or an outboard audio amplifier such as the sidetone-generator input of a Collins S/Line receiver. A tone control is included which is an unbalancing device for the multivibrator, set to provide an 800-Hz tone (a pitch deemed least tiring over long contest periods). When the monitor is to be used with an S/Line receiver, a 100,000-ohm isolating resistor must be inserted in the line between the output of the monitor and the sidetone input jack, to prevent the high-impedance audio circuits in the receiver from being disturbed too much by the monitor.

The output from the audio monitor is fed through a filter network consisting of C8, R14, C9, and the volume control, R15. These parts all serve as a rudimentary band-pass filter to prevent clicks from appearing in the monitor output. These values can be varied to produce sidetone keying that ranges from very clicky to quite mushy.

The power supply is quite simple. An inexpensive 6.3-V filament transformer is used to supply the -4 volts for the keyer and monitor.

The ICs are available from many distributors. Note that the MC790P dual flip-flop was chosen even though one section is not used. The 790 is more generally available than a single flip-flop and costs little or no more.

Adjustments

To set the range of the speed control, C1 and C2 can be changed in value. With the circuit shown, the speed range available is approximately

(Continued on page 53)



Hints and Kinks

For the Experimenters

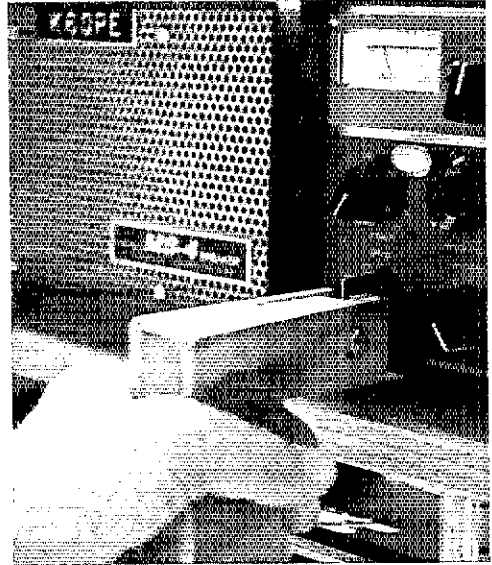


WOODEN HANDLE FOR EASIER BAND-SWITCH OPERATIONS

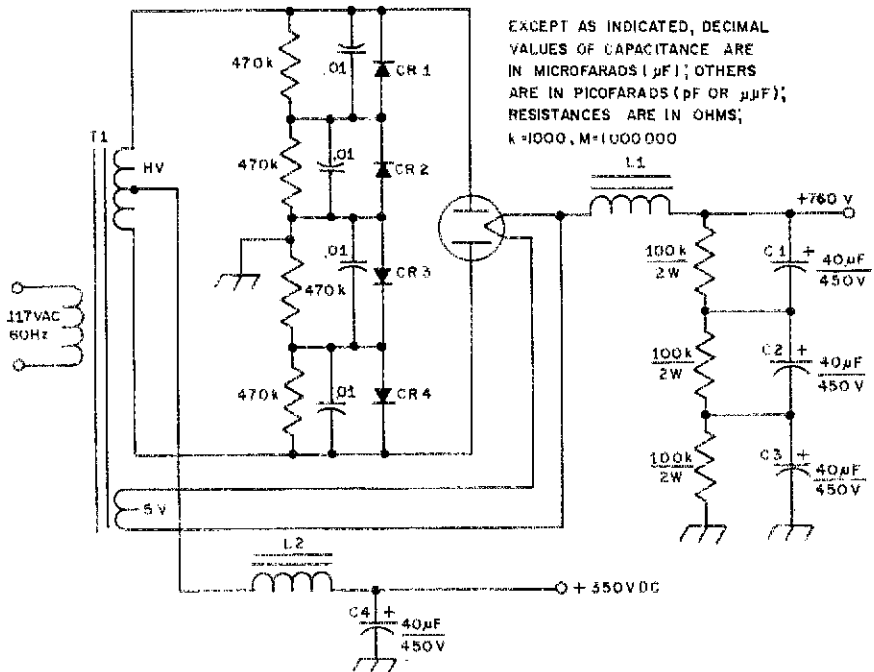
Recently I purchased some new gear, but because of my arthritis I was unable to operate the band switch. Al Roach, W6JUK, made up a little handle with a wooden grip which allows me to turn the switches in my station very easily. Outdoor-indoor carpeting is used on the front of the handle to protect the panels. — *Nick Hauck, K0QPE*

INCREASED VOLTAGE FOR TV-TYPE POWER SUPPLIES

Novice operator WN4SCF was running 40 watts with a junk-box rig consisting of a 6AG7 and an 807. The power supply used a TV transformer and a 5U4 rectifier. Since we wanted a Novice gallon, keeping within the tradition of building from the junk box, we decided to install a series of diodes in a bridge circuit across the 5U4 plate terminals on the tube socket. The addition of the diodes increased the plate voltage to 900 without a load, so a choke was installed to keep the capacitors from charging to the peak voltage supplied by the transformer. Using a 2-H choke, we reduced the voltage to 760. The modified power supply allowed us to load the amplifier stage to 75 watts input. — *Gerald L. Collins, W8BQE, and Frank Kendall, WN4SCF*



Circuit diagram for increasing the voltage of a tube-type full-wave rectifier power supply. C1-C4, incl. — 40- μ F, 450-V, electrolytic. CR1-CR4, incl. — 600-PRV, 1-A silicon rectifier. L1, L2 — 2-H filter choke, TV replacement type. T1 — TV transformer.



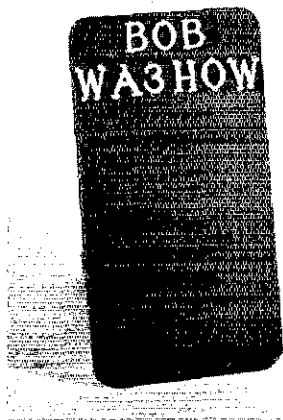
ELIMINATING TUBE NOISE IN THE HALLICRAFTERS HT-37

When operating break-in cw while using a TR switch, a noise is generated within the HT-37, under key-up conditions, which can create a "hash" in the receiver. A relatively simple modification, passed along to me by Jim Ricks, W9TO, takes care of the problem nicely. Although I have not personally tried this modification with the HT-32, it should work equally well.

Disconnect the grounded end of R26 (15,000-ohm, 1/2-watt resistor) and reconnect it to the keying line which is connected to one end of R72 (4700-ohm, 1/2-watt resistor). The keying line at R72 is on the side *opposite* R71 (10,000-ohm, 1/2-watt resistor). These resistors are mounted on a terminal strip on the underside of the chassis. After the modification is completed, set the bias voltage as prescribed in the instruction manual. - *Bill Bryant, WA4UX*

A HANDY NAME PLATE

Shown in the photograph is a name plate I made from a piece of scrap aluminum and bulletin board letters. The letters are available from many stationery stores for about 10 cents each. - *Robert M. Patton, WA3HOW*



The handy name plate

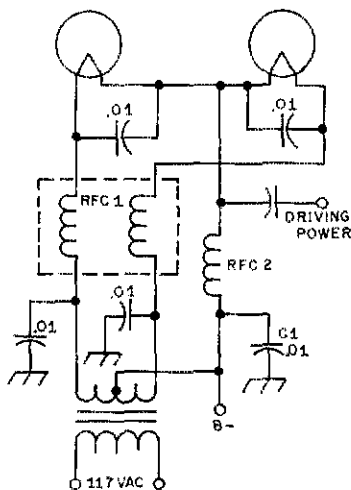
HEAT REDUCTION IN AMATEUR TRANS- MITTERS

Excessive heat is sometimes a problem in amateur gear. It becomes acute if the unit is placed in a position which restricts the air circulation. An easy solution is to place a small fan, such as a Rotron Whisper Fan, on top of the cabinet over the final amplifier compartment. The fan will pull out hot air and bring in cool air from underneath the cabinet. This system is especially helpful when used with TV sweep-tube amplifiers.

A Venturi type of fan has a supporting structure around the fan blades. This serves as a place to mount small rubber feet to protect the top of the cabinet. - *Paul Kent, WA0UPD*

SERIES CONNECTION OF FILAMENTS IN GROUNDED-GRID AMPLIFIERS

When two identical high-power tube filaments are connected in series, the filament voltage may not split equally since there are some differences in the warm-up time. One of the tubes may heat faster than the other, resulting in a greater voltage drop across that tube's filaments. The increased voltage will heat it further and the added heat will increase the resistance. The hotter tube will receive the higher voltage. In my amplifier, a pair of 4-250s, one tube received 9 volts while the other received 1 volt.



Circuit diagram for series connecting the filaments. Component designations are for text reference.

Connecting the filament transformer center tap to the point where the tubes are joined together will eliminate the problem because each tube is fed independently. In the grounded-grid configuration, the circuit shown can be used. The only additional part required is RFC2, which is similar to RFC1. The new choke could be wound on a separate piece of ferrite rod, or the original choke could be rewound with three conductors instead of two. Of course the cold end of this new choke must be properly bypassed with a capacitor (C1 in the circuit shown). - *Leonard Lehmann, WB2GTU*

INSULATION FOR HOMEMADE TRANS- FORMERS

For insulation between layers of turns in a homemade transformer, the plastic bags used for roasting meats, manufactured by Reynolds Metals Company, work well. The trade name is "Brown-In-Bag" and the material is slightly over .001 inch thick. Of course, the material will withstand high temperatures. No tests have been made to determine the voltage breakdown point, but I have used this material successfully with transformers up to 750 volts rms. - *W. Volkammer, W2HO*

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Recent Equipment



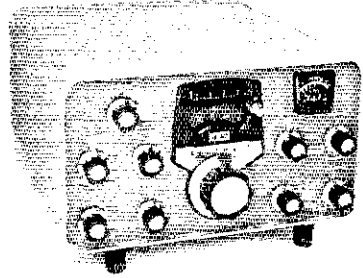
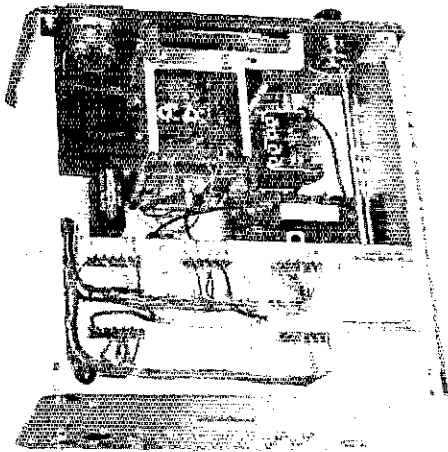
To acquaint you with the technical features of current amateur gear.

Heath Model SB-303 Receiver

WHEN A NEW device is introduced to the market, speculation as to how useful it may become is always generated. This was certainly true of the transistor when it was announced in the late forties. "It doesn't appear that there will be much use made of transistors in amateur work, unless it is in portable and/or compact audio amplifiers. The noise figure is said to be poor, compared to that obtainable with vacuum tubes, and this fact may limit the usefulness in some amateur applications," was a prediction published in *QST* in 1948.¹ Although it has taken better than two decades, manufacturers of solid-state devices have, indeed, overcome these early-recognized deficiencies. This is evident from the increasing number of high-quality solid-state communications receivers showing up on the market. One of these receivers, available in kit form, is Heath Company's SB-303.

Although the SB-303 is a direct descendant of the vacuum-tube models SB-300 and SB-301, it is totally solid-state, using 27 silicon transistors, an integrated circuit, and a number of diodes. The external appearance of the '303 is quite similar to that of the '301 — a couple of control knobs have been added and the S meter has been moved to the opposite side of the front panel. The physical dimensions are not greatly different either, the '303 being only about 2 1/2 inches narrower. But when the cabinets are removed, it becomes immediately apparent that the '303 is more than just a transistorized version of its forerunners. From the striking difference in internal appear-

¹ "The 'Transistor' — an Amplifying Crystal," Technical Topics, *QST*, October, 1948.



ance, it might well be considered as a brand-new receiver — which it actually is in many aspects. All but the very largest of components are mounted on eight circuit boards, six of which are plugged into mating connectors. Instead of one large chassis, the receiver assembly consists of several subpanels arranged to form compartments for each of the circuit boards. The change to modularized construction is distinct.

Assembly and Testing

SB-303 assembly time for the average builder will be about 35 hours. Circuit-board components are soldered in place during the early stages of construction and completed boards are then temporarily laid aside. Next comes the mounting on chassis subpanels of the various controls and switches, along with some of the preliminary point-to-point wiring. The various subpanels are then assembled into what becomes the complete chassis, and the larger components are added. The sealed LMO is factory-assembled and aligned, so it requires nothing more than unpacking and mounting.² A wiring harness supplied with the kit removes the tedious aspect of completing the remaining point-to-point wiring. However, the preparation of the many coaxial cables and attachment of phono plugs thereto for interconnecting the various circuit boards and running to the rear panel is somewhat time-consuming.

² The LMO is identical to the one used in the SB-102 Transceiver. See the Recent Equipment presentation in *QST* for February, 1971.

Looking into the top of the receiver, one sees, from l. to r. across the top, the power transformer, the LMO and the RTTY-shifter circuit board nestled thereon, and the rf preselector capacitor. Partially hidden just below the capacitor is the mixer circuit board. Pins from connectors for plug-in boards occupy the lower portion of the chassis in this view.

Fig. 1 — Frequency relationship of signal frequencies and dial settings where false responses occur. For the 40-meter band

$$D = (21.605 - S) \div 2$$

and for the 20-meter band

$$D = (42.395 - S) \div 2$$

where D is the dial setting in MHz and S is the true signal frequency in MHz.

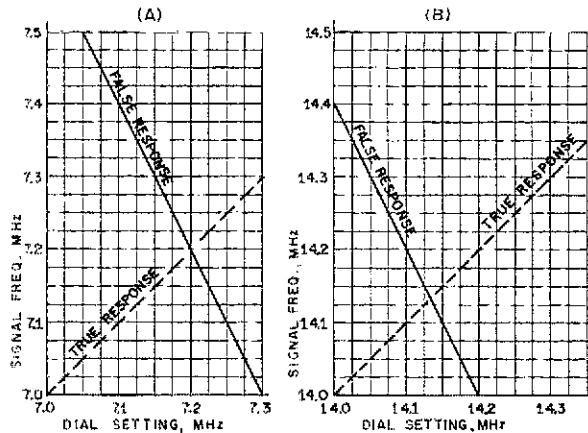
This writer did experience some difficulty during the dial-assembly procedure. Repeated performance of the instructional steps just would not lead to a situation where the dial could be driven by the main tuning shaft without slipping at some points unless the tuning-knob torque was uncomfortably high. It was finally concluded that the circular-dial assembly itself was defective, its hub not being squarely press-fit into the plastic dial. Dial wobble and consequent friction between the dial and other parts of the mechanism created the problem. A replacement for the circular dial was dispatched by Heath immediately after the problem was reported, and its installation resulted in a smooth and free-wheeling feel which one would expect. If any dial backlash is present, it isn't detectable in normal operation.

Following completion of the mechanical assembly, the circuit boards are emplaced and interconnected. Switch shafts and knobs are installed, and then electrical testing is begun. Two alignment procedures are given in the instruction book — one for use with instruments and one for use without. The instruments required, if that procedure is to be used, are an ac VTVM and an rf signal generator. Otherwise, only a dc VTVM is required. Heath's ingenuity eliminates the requirement for an rf voltmeter during the alignment of the heterodyne-frequency oscillator for the various bands — an rf probe is built into the circuit and a test point for monitoring dc voltage is provided.

Whether a kit builder is completing his very first kit or is a veteran of many projects, there is always a moment of anxiety when power is first applied to a just-completed instrument. The SB-303 we tested performed "by the book" when energized, with but one exception: the S-meter circuit was not functioning. (This trouble was subsequently traced to a diode which had become damaged after a completed board was laid aside.) The adjustment procedure was performed without an rf signal generator, and went very smoothly. Later checks made with a signal generator indicated that essentially no difference in the end results existed, no matter which method was used.

Operation and Performance

The SB-303 receiver covers the 80-, 40-, 20-, 15-, and 10-meter amateur bands in 500-kHz segments (four segments cover 10 meters); all crystals are included. Also, a 15- to 15.5-MHz segment is included for coverage of WWV. (Heath specifications apply only to the lower 300 kHz of this last segment.) A crystal calibrator with 100-



and 25-kHz markers is included in the receiver. The completed kit offers reception of upper and lower sideband, fsk (RTTY, SSTV, facsimile), and cw, all through the use of the 2100-Hz-bandwidth i-f filter supplied. An optional 400-Hz filter for sharper selectivity during cw reception is available as an accessory. A-m signals may be copied with a linear detector if the optional 3.75-kHz a-m filter is obtained, or they may be tuned for exalted-carrier reception with the ssb filter supplied with the kit. We obtained the optional cw filter. The results of measurements of audio output frequencies indicate the following —6-dB response:

Mode Switch	Frequency Range, Hz
cw	809 - 1175
usb	398 - 2399
lsb	480 - 2552
RTTY	1918 - 3958

Repeated checks produced minor variations in readings of a few hertz, but these figures will suffice to give one an idea of the audio-output frequency range of the receiver.

Some variation in the performance of the receiver may be expected with different transistors. This statement applies particularly to the four dual-gate MOSFETS, two of which are used as rf mixers, and one each as an rf amplifier and an i-f amplifier. "Red-hot" transistors will provide sensitivities far better than Heath's specification of 0.25 μ V for 10-dB S+N/N ratio, but at the expense of increased intensity of spurious responses and perhaps a tendency toward oscillation in the rf or i-f stages.

Our measurements indicated that all of Heath's specifications regarding sensitivity, image rejection, i-f rejection, spurious responses, and stability, were met or exceeded. These checks were confined to amateur bands or band edges only. In the receiver we tested, the 10 dB S+N/N sensitivity varied somewhat from band to band, being better than 0.1 μ V on all bands except 20 meters, where it was 0.12 μ V. The two strongest internally generated spurious responses occurred at 3.737 and at 21.199 MHz, being equivalent to 0.16- and 0.30- μ V signals, respectively, at the antenna terminals. Stability checks indicated 48-Hz drift in the first

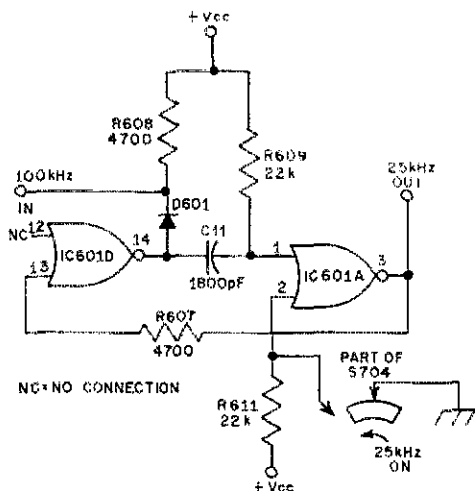
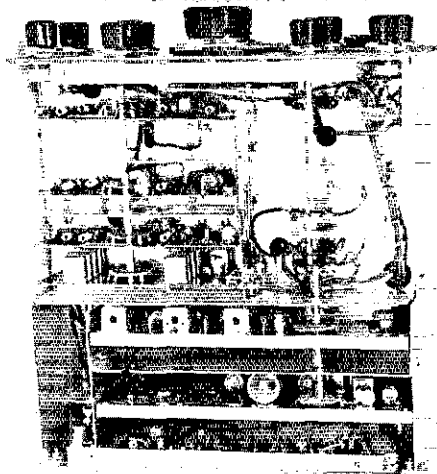


Fig. 2 — 25-kHz divider circuit of the SB-303.

five minutes after turn-on, and less than 10 Hz thereafter for an extended period. These checks were made with a constant line voltage applied and in a constant-temperature environment, by comparing the 7-MHz input frequency against the output audio frequency obtained with the product detector in use.

Susceptibility of the receiver to crossover responses was noted on 40 and 20 meters. Second-harmonic energy from the LMO mixes with a strong incoming signal to produce a false response somewhere on the dial. Stated another way, a strong signal in these hands will appear at two places on the dial — one where it should be, and the other depending on the exact signal frequency. Fig. 1 shows where these false responses occur. Correctly setting the rf preselector will attenuate the false responses to some degree, but at or very near the crossover frequencies of 7202 kHz for 40 meters and 14,132 kHz for 20 meters, no rejection is available without attenuating desired



signals. The results of amplitude measurements of these responses are summarized below.

Signal frequency, MHz	Dial setting, MHz	Signal level, dB above equiv. level of false response
7.0	7.3	78.4
7.2 (-)	7.2 (+)	64.9
7.3	7.152	68.0
14.0	14.197	49.6
14.132 (-)	14.132 (+)	40.9
14.350	14.023	51.5

For casual operation, these false responses would normally create no problems. But for critical weak-signal listening by an ARRL Official Observer or an Intruder Watcher on these hands, it might be well to spin the dial up or down the band according to Fig. 1 to verify that a false response is not being generated in the receiver, before sending out a report.

A useful feature for the RTTY enthusiast, not available in the SB-301, has been added. The '303 may be used as a companion unit for the SB-401 sideband transmitter. Transceive operation is available with the pair, using the receiver LMO. The '303 has provisions incorporated for frequency-shift keying its LMO. When used with the transmitter, this feature offers instant capability for shifting the carrier frequency, and also offers the capability of transceive operation on RTTY. Through connections on the rear panel and appropriate external switching, either 850- or 170-Hz shift may be used. In addition, an input jack is provided on the receiver for narrow-shut keying of Morse identification. This feature is of little value if the receiver is used alone, however.

As with the SB-301, provisions are included in the '303 for easy attachment of vhf converters. A front-panel switch permits selection of an hf antenna or the outputs of either of two vhf converters for routing to the input rf amplifier stage. Power is available for operation of converters through an accessory socket on the rear panel.

Circuit Operation

The conversion scheme used in the '303 is identical to that of the SB-301, and we won't take up space here giving great detail. If the reader desires this information, it is suggested that reference be made to the Recent Equipment presentation of the SB-301 in the March, 1967,

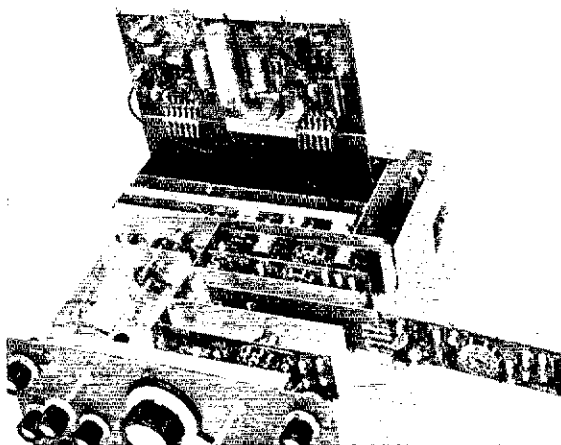
Most of the working parts of the SB-303 are shown in this view, looking into the bottom. The upper-left quarter of the chassis contains four plug-in boards associated with the band switch. Individual switch sections are soldered onto each board, and the switch shaft is installed from the front panel when all boards are in place. The longer switch shaft visible to the right is that of the mode switch, extending through switch sections nearer the bottom of the photo on the i-f/audio circuit board and power-supply/BFO board. Initial tests and alignment of the receiver are performed with all boards in place.

Plug-in extenders afford easy troubleshooting of the SB-303. Loosening a single setscrew in a collar permits either switch shaft to be removed. The large boards, such as the power-supply/BFO board at the rear, are fully operational in the extended position. Dc operation only of the remaining boards is feasible in the extended position, because extending lengths of rf leads would upset the circuits.

issue of *QST*, and the earlier review of the SB-300 in *QST* for July, 1964. As a matter of fact, the complete block diagram of the SB-301 might well be a diagram for the SB-303, if the tube type numbers were changed to transistor type numbers.

The SB-303 line-up includes a 40673 rf amplifier, a 40673 first mixer, an SE5023 HFO, a pair of cascaded 2N3694s as HFO amplifiers, a 40673 second mixer, a trio of 2N3393s in the LMO fsk-control circuit, a 40673 and a pair of 2N3694s in the i-f strip, and an F844 BFO. A cascaded pair of 2N5232As function as BFO buffer and amplifier, a pair of 2N3393s as audio preamplifier and emitter follower, a 2N3053 as the audio driver, and an MJE371 and MJE512 as complementary audio output amplifiers. In addition, a 2N5232A and a 2N5294 provide an electronically regulated 15-V power supply output, a 2N3393 controls the muting, and a pair of 2N3393s controls the S meter.

An MC724P quad 2-input gate integrated circuit is used for the 100-kHz calibrator oscillator and 25-kHz divider, with a separate F844 transistor to amplify each signal. Heath uses an interesting method for obtaining the 25-kHz calibrator output, and this portion of the circuit is shown in Fig. 2. The 100-kHz oscillator is a straight-forward arrangement of two gates connected as a crystal-controlled astable multivibrator. The 100-kHz signal is fed directly to the input of the 25-kHz divider; when the divider is switched on, no additional loading of the oscillator is created. IC601A and D are interconnected as a monostable or one-shot multivibrator. The 100-kHz input signal is a symmetrical square wave. The positive-going portion of the wave has no effect on the divider circuit. The negative-going edge is coupled through D601 and C611 to pin 1 of IC601, causing its output at pin 3 to switch from low to high. This change in level is coupled through R607 to pin 13, and causes the output at pin 14 to switch from high to low, reinforcing the negative-going portion of the 100-kHz signal which triggered this action. Even after the negative half-cycle of the 100-kHz signal has ended, the levels of the divider circuit are held in their existing



states for a time depending upon the values of C611 and R609. After C611 becomes charged, the two IC sections will revert to their original state. The values of C611 and R609 have been chosen so that only on every fourth cycle of the 100-kHz signal will any action be triggered. The output of this multivibrator is a nonsymmetrical 25-kHz signal. The interesting feature of this arrangement, in addition to its simplicity when compared to cascaded binary dividers, is that the division factor may be changed merely by changing the value of either, or both, one capacitor and one resistor.

A rather simple but very effective agc system is used in the '303. With a 3.6-MHz input frequency, we measured a 3-dB change at the speaker terminals for a change in signal strength from 1.2 to 100,000 μV , and a 6-dB change from 0.35 to 100,000 μV . The agc threshold level was found to be approximately 0.1 μV .

A 3-position switch is provided to select either fast or slow release times, or to turn agc action off. Agc voltage is applied to only two stages in the receiver, the input rf amplifier and the first i-f amplifier. Both of these stages use 40673 dual-gate MOSFETS. The agc detector and time-constant

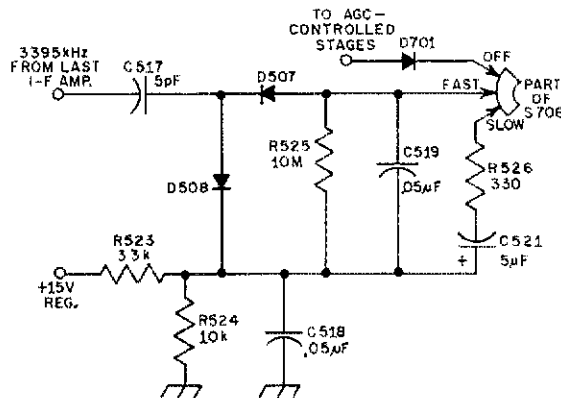


Fig. 3 — Agc detector circuit of the SB-303. R523 and R524 form a voltage divider to set a fixed agc-threshold level.

Heathkit SB-303 Receiver

Height: 7 15/16 inches.

Width: 12 1/4 inches.

Depth: 14 inches.

Weight: 15 3/4 pounds.

Power Requirements: 105 to 130 or 210 to 260 volts ac, 40 watts maximum.

Price Class: \$320.

Manufacturer: The Heath Company, Benton Harbor, MI 49022.

circuit is shown in Fig. 3. The 3395-kHz signal from the last i-f amplifier is fed to detectors D507 and D508. In the FAST position of the AGC switch, only C519 filters the dc age voltage, to provide both fast attack and release times. In the SLOW position, R526 and C521 are switched into the circuit to provide a fast attack but slow release time. The charge path for C521 is through D507 and R330, but during the absence of signal, D507 is essentially out of the circuit so that the discharge path for C521 is only through R526 and the 10-megohm resistor, R525. In the SLOW position, pleasurable copy of ssb signals is obtained. Time for recovery to full receiver gain after a strong

signal disappears is approximately two seconds. The FAST agc position was found to be quite useful in combating rapid selective fading encountered with RTTY signals, a condition which is difficult to overcome with conventional RTTY demodulator circuits.

The S meter functions indirectly from the age voltage. Its calibration can vary widely from one receiver to another, depending on the transconductance of the various devices which have been installed. And in a given receiver, the S-meter response can vary by a fair amount from band to band. In the receiver we tested, an rf input of 4.2 μV produced an S-9 reading on 40 meters and, for the other bands, required inputs ranged from 7.0 to 9.9 μV .

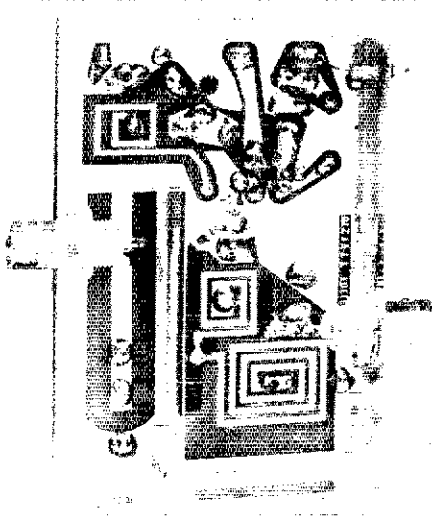
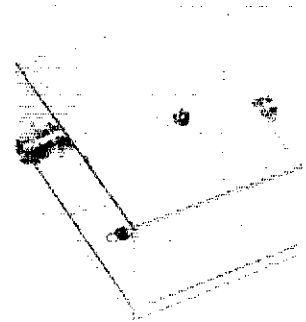
A continuously-variable rf attenuator is built into the receiver. Its range is 40 dB nominal, approximately linear with rotation. Adding attenuation can often be an effective means of reducing the effects of receiver desensitization and cross modulation caused by very strong adjacent-channel signals.

All-in-all, the SB-303 is an impressive performer, and with this performance plus the new features it contains over its predecessors, it might well be the best amateur receiver Heath has ever produced. — K1PLP.

QST ————— QST ————— QST

The Braun TTV 1270 Transverter

BRAUN'S LITTLE transverter provides a quick and easy way to get on the 420-MHz band. Imported from West Germany, the TTV 1270 consists of a varactor tripler for transmitting and a diode mixer functioning as a converter for receiving. The unit is designed to go with a 144-MHz transceiver. Input to the varactor is limited to 1.6 watts of 2-meter energy, so the



only commercially made a-m rig that would be a good companion is the Heath Twoer. Our lab tests were made using a "Benton Harbor Lunch Box."

The manufacturer's specifications rate the efficiency of the varactor tripler at 60 percent exactly the result obtained in the ARRL lab. On receive, 12 volts dc must be applied to the Braun transverter to power the crystal-controlled conversion oscillator. With the crystal supplied, a receiver tuning from 144 to 148 MHz will be able to receive 432 to 436 MHz. The varactor is employed as a diode mixer, resulting in a conversion loss of 6 dB when receiving. With the Twoer

The interior view of the TTV 1270 shows the etched-circuit inductances used in the input circuit (lower right), idler tank (upper left), and output stripline, inside the shielded compartment.

Braun TTV 1270 Transverter

Height: 1 3/8 inches.

Width: 3 1/2 inches.

Depth: 2 5/8 inches.

Weight: 5 1/2 ounces.

Power Requirements: 12 V at 12 mA on receive, no dc power needed when transmitting.

Price Class: \$50.

Importer: Spectrum International, Box 87, Topsfield, MA 01983.

receiver as a tunable i-f, it takes 2 μ V of input signal to produce an audible signal. Obviously, a better 2-meter receiver will provide improved results.

One interesting feature of the Braun transverter is the use of etched-circuit inductances, as can be seen in Fig. 2, for the 2-meter tank circuit. A strip-line inductor is employed in the 432-MHz circuit, and the transverter is housed in a silver-plated box.

With one watt of output and a receiver whose sensitivity is 2 μ V, you aren't going to be able to go DXing on 420, or to work Oscar 6. However, the TTV 1270 is a simple way to get a start on uhf. Some of the local Twoer nets that are QRMed by nearby 2-meter stations might well be switched to the 420-MHz band. Fin-ers will also find the Braun unit of value, as with a change in the frequency of the conversion crystal it can allow a 2-meter hand-held transceiver to be used with a 420-MHz repeater or down-link channel. — WIKLK

IC Keyer

(Continued from page 45)

13 to 55 wpm. (Using different power-supply voltages will change the keyer speed.) For a slower speed range, it is suggested that C1 and C2 each be changed to 10 μ F.

To set up the weight control, the transmitter can be operated into a dummy load and monitored with the station receiver. Make sure the receiver isn't being overloaded, and adjust the weight control until the dash-to-dot ratio sounds good to you. (One good way to insure against receiver overload is to pull the receiver rf-amplifier tube.) For the really fastidious individual, a scope can be used to observe the transmitter output to set up the 3:1 dash-to-dot ratio, or perhaps a more easily seen 1:1 dot-to-space ratio.

It will be observed that there is a slight difference in the weight of a character heard on the monitor as opposed to that same character heard with the station receiver. That difference comes from the transmitter's wave-shaping circuits. It is generally desirable to monitor the transmitted signal to make sure there are no undesirable keying characteristics — clicks, chirp, and hum, to name a few. The station receiver should be partially unmuted during transmit and the sidetone-monitor volume reduced when the station being worked is on the same frequency as yours. If the station being worked isn't on the same frequency, of course the monitor can always be turned up and used. The schematic includes a simple circuit that can be plugged into the receiver output so that the receiver audio may be mixed with the sidetone monitor output from the keyer. The 1000-ohm resistor, R16, is used to isolate the receiver output when the monitor volume control is turned down to minimum.

As WIOEX puts it, his whole ham career was changed the day he got his hands on an electronic keyer. It is a lot more fun to send with a good keyer than it is to pound on a J-38 or even on a bug. In fact, the ancient Vibroplex at WA1JRG continues to serve admirably since it has been modified to function as a keyer paddle.

Thanks go to John McCormick, W1KCO, and Jim Pierce for their aid and advice in the layout and development of the circuit board etching pattern.

QST

Strays

The VE/W Contest Committee would like to know the whereabouts of VESKT. As winner of the 1967 VE/W Contest, he is entitled to the trophy which is awarded Canadian high scorer. Anyone who can advise us on his QTH please write: VE/W Contest Chairman, David Weiner, VE2DCW, 676 Wiseman Ave., Outremont 154, PQ.

Tony DiCola, WN2RAV, was one of the graduates of a Novice course in Camden, NJ, which was sponsored jointly by South Jersey Radio Association, RCA, Camden Board of Education, Rutgers University, and the Brotherhood for Unity and Progress. RCA and SJRA have offered the Camden Police Community Center equipment for a permanent ham station for inner-city youths if a licensed sponsor can be found as trustee and advisor.



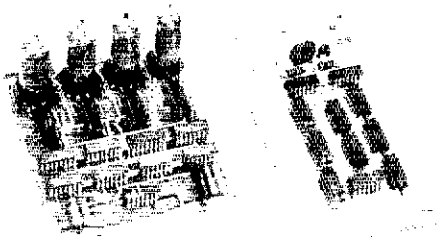
• *New Apparatus*

Stafford Digital Readout and Frequency Standard Kits

Since the publication of "A Frequency Counter for the Amateur Station,"¹ many hams have begun to build specialized counters. Two firms have recently introduced subassemblies which can simplify the construction task and reduce the cost of building a counter. Stafford Electronics is marketing six 4-digit numerical display kits, offering the pc board alone or a complete kit which includes the board, ICs, mounting pins, and display tubes. Two models, the 10-70D and 10-70I, use the NL-840 and B5750 Nixie tubes, respectively, while the 10-70H employs DR-2000 RCA Numitron 7-segment tubes. Also, all three models are available with a modification to use the Signetics N8290 high-speed decade counter, extending the range of the Macleish design to above 50 MHz.

Stafford is also offering a simplified frequency standard. Instead of using individual transistors in the oscillator circuit, two TTL logic gates are employed along with a 4-MHz high-temperature-stability crystal. A series of 7490 decade counters

¹ Macleish, "A Frequency Counter for the Amateur Station," *QST*, October, 1970.



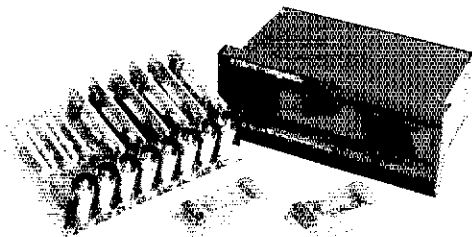
provide 16 outputs from 2 MHz to 0.1 Hz. Of course, the frequency standard can be used alone as a programmable secondary standard, as well as in counter applications. Price class of the 4-digit display kits is \$65 (\$88 assembled). The frequency standard etched-circuit board is priced at \$5.00; interested parties may write for a kit price. A four-page brochure is available from Stafford Electronics, 427 S. Benbow Road, Greensboro, NC 27401. — *WIKLK*

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IDI Counter Display Kits

Instrument Displays (IDI) offers a number of counter-display kits, all of which are also available as assembled units. The unusual feature of these kits is that they include the hard-to-obtain Polaroid light filter and a bezel housing that lend a professional appearance to a homemade counter. The housing is constructed from three black-anodized extruded-aluminum pieces that, when assembled, mount in a manner similar to a panel meter. The front bezel may be removed to replace a defective display tube without removing the entire assembly.

The display tubes and the associated decoder/driver ICs mount on a main pc board. All connections are brought out through a pc connector. The decade counters and memory ICs are assembled on a small plug-in board — one for each display tube. This construction technique simpli-



fies troubleshooting, should a problem ever develop. Six models are available, providing 3 to 8 display tubes. All carry a one-year warrantee. Prices are \$28 per digit for kits and \$35 per decade for assembled units. Catalog information on IDI's complete line of digital displays may be obtained from Ted Chadurjian, Product Manager, Instrument Displays, Inc., 18-36 Granite Street, Haverhill, MA 01830. — *WIKLK*

Strays

During a recent visit to a nearby ham friend, K6ARQ brought up the possibility of using very low power for local contacts. Having bet his friend he could design, build, and be on the air with a QRP rig within two hours, he rushed home and was on the air 25 minutes later with a haywired Pierce oscillator capacitively coupled to the antenna. With an estimated power of one milliwatt he received a 569 report from his friend one mile away. The friend then contacted a W5 and asked him to stand by for K6ARQ's milliwatt, but he did not hear him. Not to be discouraged, K6ARQ is now working on an improved rig to see what can be done with QRPP.

The Bellevue Amateur Radio Club, Inc. will be operating a special station June 26 - July 7, 1971 in conjunction with the celebration of the 115th anniversary of the founding of the city, the 25th anniversary of the Strategic Air Command (SAC), and the 10th anniversary of "Looking Glass," the SAC flying command post.

The call sign will be WSØATA, in line with the theme of "Arrows to Aerospace." Operating times will be primarily in the evening hours, with some daytime operation. Frequencies will be approximately 30 kHz inside the lower end of the bands for cw and 3905, 7265, 14290, and 21355 kHz for phone. Foreign stations QSL to KØBLT via Bureau. Domestic stations enclose s.a.s.e. number 10 envelope to: Chamber of Commerce, Bellevue, NE.

Technical Correspondence

SSB PROCESSOR AND SPECTRUM CONSERVATION

Technical Editor, *QST*:

The single-sideband processing method I described in October, 1970, *QST* prompted some letters suggesting that the method could also be applied to provide spectrum conservation.^{1,2,3} To examine this possibility, consider a normal fm multiplication chain. A frequency multiplier will increase the deviation, or shift, and thus the bandwidth of the signal, but will not alter the modulating frequencies. The same holds true for a frequency divider.

Because with fm, first-order sidebands, at least, have to be transmitted, the minimum fm bandwidth is twice the highest audio frequency. Limiting an ssb signal, as described in my article, results in a form of fm. To see whether frequency division will reduce the bandwidth, some knowledge of the highest "audio" frequencies of the fm component is necessary. Because the envelope, with relatively high bandwidth (approximately 20 kHz), is used to cancel the fm sidebands in order to recover the original relatively narrow ssb signal, the audio of the fm component has a structure similar to the envelope, and thus contains frequencies up to 20 kHz and higher. Listening to the ssb frequency-divided components reveals a bandwidth of approximately 15 kHz at 40 dB down. It is interesting to note that the tripler in fact greatly reduces the bandwidth by destructive addition of its self-created distortion with the distortion fed to it. Unfortunately, this simple processing cannot be used for spectrum conservation. — *Karl Meinzer, DJ4ZC, 38 Hoehenweg, 355 Marbach, Hessen, West Germany.*

REPEATER-FREQUENCY STANDARDIZATION

Technical Editor, *QST*:

ARRL should promote the principle of using four standard pairs of repeater input and output frequencies: 146.16 — 146.76 MHz, .22 — .82, .28 — .88, and either .31 — .91 or .37 — .97 or both. It takes only four colors to make a map, and it takes only four frequency pairs for 100-percent coverage of a given area, with no two similar pairs adjacent. This works on a commercial basis; four fm assignments are adequate for every town and city to have a local fm station, without interference, provided that power and antenna height above average terrain are held to levels necessary for local coverage — in no case exceeding 5 μ V/m at 50 miles.

I am in favor of restricting repeaters to the four (or five) pairs of frequencies, with perhaps the addition of one more pair above 147 MHz. Repeater are handy, but they can also be a

¹ Meinzer, "A Frequency Multiplication Technique for VHF and UHF SSB," *QST*, October, 1970.

² Price, "Narrow-Band SSB Emissions," Technical Correspondence, *QST*, February, 1971.

³ Roos, "Or Microband SSB?" Technical Correspondence, *QST*, May, 1971.

nuisance if there are too many, or if they use all the highest sites in an unlimited way. There should be a rigid power limitation. An effective radiated power of 200 watts is adequate to cover a service area, with a minimum of interference to adjacent areas. I am in favor of restricting mountain-top repeaters to even lower power, and imposing a requirement for directional antennas for the intended service area. Power limitations could be set by the same methods as in fm broadcasting; very high antenna sites would be compelled to drop power.

The first item on the agenda should be a move toward eliminating the now-overloaded .34 — .94 combination. Please — let's get off of .94 with repeaters! All vhf groups should get behind this, insisting upon it. Next we should opt for standard 600-kHz input-output separation. Access to 146.76 MHz, particularly, should be put back on .16, where it belongs. I feel that all would be best served by reserving both .34 and .94 for simplex operation.

By all means, let's get together on 15-kHz total swing. Not 5, not 10; take advantage of the improvement in signal-to-noise ratio thereby gained. Sure, some gear now available will not take 15 kHz without modification. It should be modified; don't narrow up good ham fm to suit narrow-band gear. There is no valid reason for adoption of narrow deviation limits or modulation indices less than 2. Commercial standards were pulled in to allow doubling the channels available. We don't have this problem; why degrade performance to accommodate available equipment, when the latter can be widened out easily enough?

Finally, I think it is time to agree on keeping the upper half of the 2-meter band for fm only. There is plenty of room for the other modes (a-m, cw, ssb, SSTV, RTTY) below 146, and for wide-band modes on 220, 420, and higher amateur frequencies. — *F. C. Hervey, K4ETZ, Rt. 1, Box 336, Indian Trail, NC 28079.*

A NOVEL ADDITION TO THE STORM FINDER

Technical Editor, *QST*:

I enjoyed W2ZWA's note regarding thunderstorm direction finding.¹ I went back to W0VTP's 1964 article,² and also cribbed from W2ZWA during a "sport" thunderstorm of brief duration. My contribution is minimal, but I laid the two receivers in a horizontal position, at right angles to each other. Now the nulls will be off the ends of the antennas, I suppose. But, the important thing is, I put them on the XYL's "Lazy Susan" on the dining room table. Talk about flexibility, it was like scan radar. Lazy Susans have a new field of application! — *Al Smith, W1GAA/K3ZMS, Penury Priory, Temple, NH 03084.*

¹ Johnson, "Simple Thunderstorm Direction Finder," Technical Correspondence, *QST*, April, 1971.

² Leary, "An Electronic Storm Finder," *QST*, June, 1964.

Feedback

On page 51 of *QST* for May, the input resistor of Fig. 2 should be 100K ohms, not 100 ohms.

To modify the AC-Power Monitor (page 40 of *QST* for March) to operate from 220-224 volts, change M1 to a 0 — 250 V ac meter and substitute a 33-k Ω 2-W resistor for that shown at R1.



1970 VE/W



Contest Results

THE MONTREAL Amateur Radio Club, Inc., takes pleasure in announcing the results of the 1970 VE/W Contest. (Sept. 19-21, 1970) The information to follow comes to you as compiled by D. Livesey, VE2IZ and submitted by D. Weiner, VE2DCW.*

The new scoring system which was instituted last year has met with great success, and will be retained in the 1971 contest. Record-breaking scores were obtained this year with the use of band-multipliers.

The trophy-winner for Canada is again Lee, VF7BDJ, with a record 450,288 points representing 954 contacts. The University of Saskatchewan VE5US operated as usual by Doug, VE5UF, followed behind at 378,840. On the American side, W5JAW took top honours with 33,770 points, followed by K4PUZ with 30,906. Phone high-scorers were VE6ANR operated by VE6AMR with 173,467 and K1PKQ/5 at 9,310.

Soapbox

Worked 200 in the first four hours, and 380 in the next 16 hours. How come? — VE1AI. If I only had a beam! — VE2DKJ. Very good contest but I blew it again. — VE3ABN. New scoring system is good. Certainly emphasis is on all round station/antenna flexibility. — VE3DUS. Didn't find many W7s. — VE3BKP. Only had a few hours practice before the contest on an electronic keyer. My apologies to those who had to put up with me. — VE6AVR. Excellent conditions. KH6IJ and KL7MF are the ones who make Hawaii and Alaska available. — VE7AZL. Band multipliers great. Plan to make all Canada next time. — VE5NW. Certainly glad to see more activity on phone this year. The new rules are very nice. — K9GEL. Tried all bands, but couldn't find any VEs. — WB0ABE.

*Address all correspondence to 676 Wiseman Ave., Outremont 154, P.Q.

Only one regret, the new antenna farm wasn't up yet. — K1VTM. Really enjoyed the new multiplier system. Still my favorite contest. — WA3ATX. The once per band system working very good, keeps activity at maximum. Had fun with the fine operating of the VE gang. — W9LNQ. Thanks for a very fine contest. I worked my first VE8. — WA0VJF. Best VE/W ever. Band multipliers make the contest much more challenging. See you next year. — K0GJD. Much better contest with the new multiplier rule. First time I ever QSO'd any VE on 28 MHz, during the contest. — W5JAW. Finally worked all 13 sections. Was surprised to find VE8CE in Yukon coming through but largely unnoticed. Log sheets a big help. — W9HE. Very good contest, but where did all the stations go around 23:00 GMT Sunday. I sure like the logs, check sheets and Summary sheets. — VE7BLO. I'm delighted that this contest comes along. Would you believe I have more JA contacts than VE? I'm still looking for VO1 and VO2, maybe next year. — WA6CPP.

HIGH SCORES

	VE	
	CW	Phone
VE7BDJ	450,288	VE6ANR 173,467
VE5US	378,840	WB2RLK/VE1 132,888
VE3BMV	291,914	VE6UV 116,688
VE2NI	285,018	VE5NW 95,108
VE7UBC	264,410	VE4SI 78,400
	W/K	
	CW	Phone
W5JAW	33,770	K1PKQ/5 9310
K4PUZ	30,906	W4UPI 8296
K0GJD	29,744	K5SVC 8062
W4YWX	27,456	K4RTA 4872
K1VTM	26,900	WA5TSJ 4600

Scores

Scores are grouped alphabetically by section. The station first-listed in each section is the certificate winner for that section. Multi-operator entries are listed after the single-op category. Example of listings: VO1HH 61,776-312-99-11; or, final score of 61,776 points, 312 contacts, multiplier of 99, 11 hours operating time.

VE3BMV, a newcomer to the VE/W affair, is an old hand at contests. His total of 291,914 netted him third place among Canadian high scorers.



CW RESULTS

Canada		<i>Multiops</i>		W4AZU 6496-112 29-16	W8AGRR 2304- 64 18- 8
<i>Newfoundland</i>		VE2BS (+VE2s DLG DIN) 32,856- 722- 74-17		K4BAM 5280-110 24-11	<i>Oklahoma</i>
VO1HH 61,776- 312- 99-11		VE2AWQ (5 opps.) K2,536- 362-114-20		W5OB 11,764- 173- 34-17	K5OCX 4000-100- 20- 5
<i>Labrador</i>		VE2BGF (+VE2s AQQ BVO) 94,40- 118- 41-20		<i>Louisiana</i>	W5SWCK 1740- 58- 15-12
WA2HVN/VU2 1216- 32 19- 6		VE8RG (+VE8YF) 84,900- 360-118-20		<i>Los Angeles</i>	W5MGE 1122- 33- 17- 7
<i>Nova Scotia</i>		USA		W6CFL 16,948- 223- 38-19	<i>Oregon</i>
VE1AI 193,052- 578-167-20		<i>Alabama</i>		K6UVJ 14,208- 192- 37-15	W7LT 2640- 66- 20-12
VE1EK 20,020- 143- 70- 8		WB4ADT 3036- 66- 23- 4		W6DQX 13,776- 168- 41- 9	<i>Orange</i>
<i>Prince Edward Is.</i>		<i>Alaska</i>		W6DGH 9520- 40- 34-10	W6BZT 2052- 57- 18-11
W8KMF/VE1 9362- 151- 31-17		KL7AKE 1620- 54- 15-14		W6TSC 8771- 128- 34-15	<i>Rhode Island</i>
<i>New Brunswick</i>		KL7MF 448- 32- 7- 2		WB6TLQ 7626- 123- 31-14	W1VVPY 5980- 130- 23-13
VE1ASJ 72,094- 319-113-20		<i>Arizona</i>		W6BKHK 2356- 61- 19-13	<i>South Carolina</i>
VE1ACU 29,512- 217- 68-10		W7AYY 6384- 114- 28- 7		1830- 61- 15-14	K4II 1815- 48- 19- 4
VE1AIT 16,988- 137- 62- 8		W7CFJ 5800- 116- 25- 6		<i>Maryland-D.C.</i>	W4FNS 1260- 63- 10- 6
VE1IN 12,654- 111- 87-10		W7A7GH 2- 1- 1- 1		W3HQU 15,600- 218- 36-19	S.C.V.
VE1JZ 12,300- 123- 50- 7		<i>Colorado</i>		W3CRF 15,230- 189- 35-12	WA6DKE 25,586- 272- 47-20
<i>Quebec</i>		K5QNO/Ø 9858- 159- 31-17		WA0FHG 9114- 147- 31-18	W6SWK 11,016- 162- 34-12
VE2NI 285,018- 709-201-20		WØL 8122- 131- 31-13		W3EZY 1380- 66- 15- 7	W6GJV 5650- 113- 25-15
VE2DKJ 145,040- 518-140-19		WØLN 2844- 79- 18-17		W3JNZ 160- 20- 5- 5	W6COF 1872- 52- 18- 5
VE2VZ/2 119,232- 414-144-16		WAØZWA 1880- 79- 10- 9		WAGN 40- 10- 2- 1	W6GBY 1140- 38- 15- 7
VE2WA 97,022- 349-139-10		WØYSK 1380- 46- 15-20		<i>Michigan</i>	WA6NH 464- 29- 8-10
VE2WP 35,604- 207- 86- 7		<i>Connecticut</i>		W8SH (K7NH, ovr.) 23,184- 252- 46-18	WA6ZG 112- 8- 7- 3
VE2VY 21,172- 158- 67- 8		K1VTM 26,900- 269- 50-20		WROQH 15,048- 198- 38-19	<i>Santa Barbara</i>
VE2NV 21,168- 147- 72- 3		K1DPP 8184- 124- 33- 7		W8VRY 13,580- 194- 25-14	W6OHL 5760- 120- 24-12
VE2DR 18,706- 199- 47- 6		WA1EXF 3608- 82- 22- 8		W8PGW (WBSA1G, ovr.) 3306- 67- 19-13	WA6DEI 2310- 65- 17- 4
VE2PJ 7714- 133- 29- 6		WA1GFG 1586- 61- 13-10		WARBBB8 (WASH8R, ovr.) 3168- 66- 24- 9	<i>South Texas</i>
VE2M 4780- 70- 27- 2		WA1JSD 72- 12- 3- 1		W8VNZ 2916- 81- 18-14	W5SWK 20,240- 220- 46-16
VE2BQK 3658- 59- 31-12		<i>East New York</i>		WARBPY 2318- 61- 19- 9	W5NQOM 5724- 106- 27-11
VE2ALE 234- 26- 9- 3		W2EY 1258- 37- 17- 5		K8YL 1274- 49- 13- 5	W5UCUG (200- 40- 15- 3
<i>Ontario</i>		K2EKM 220- 22- 5- 2		W8QJR 1152- 48- 12- 6	<i>South New Jersey</i>
VE3BMV 291,914- 719-203-20		<i>E. Pennsylvania</i>		W8YVR 552- 46- 6- 6	W2LYL 2952- 82- 18-12
VE3ABN 213,010- 598-179-19		W3AZT 19,890- 221- 45-18		<i>Mississippi</i>	WA2IUF 1200- 40- 15- 7
VE3HCC (VE3DUS, ovr.) 172,454- 529-163-16		W3ADE 4224- 96- 22-12		K5AYA 2464- 88- 14-11	<i>Tennessee</i>
VE3EEW 135,250- 541-125-19		W3HMR 1176- 42- 14- 6		<i>Minnesota</i>	K4PUZ 30,906- 303- 51-19
VE3BKP 74,814- 337-111- 1		W3CHF 2- 1- 1- 1		KØØK 17,024- 224- 38-18	<i>Utah</i>
VE3QQA 68,460- 326-105-19		<i>East Mass.</i>		KØZX 13,464- 187- 36-20	W7HVH 224- 14- 8- 4
VE3DDU 64,272- 312-103-12		K1JUC 3450- 69- 25-10		WØKDI 10,106- 163- 31-16	<i>Virginia</i>
VE3AU 49,500- 250- 99- 8		<i>East Florida</i>		WØJYP 8700- 145- 30- 9	W4CRW 17,802- 207- 43-20
VE3GJY 39,960- 222- 90-14		WØGMC/4 1452- 33- 22- 8		WØJAW 406- 29- 7- 1	W4VC 3270- 70- 23- 7
VE3GFN 34,860- 249- 70-18		W4JMX 1200- 50- 12-13		WØWDX 324- 18- 9- 2	W5KMS 2904- 68- 22-10
VE3AIA 21,216- 156- 68- 4		<i>East Bay</i>		WØAMZ 300- 28- 1- 5	E4OD 1040- 40- 14- 5
VE3BIY 12,676- 139- 42- 9		W6AFJ 13,104- 182- 36-19		<i>Missouri</i>	W4RAL 962- 37- 13- 5
VE3DH 8712- 99- 44- 4		W6BHM 10,368- 144- 36-20		KØGJD 29,744- 286- 57-20	W4LEPL 96- 16- 3- 3
VE3DLS 8342- 97- 43- 9		W6RQZ 2370- 79- 15-13		9438- 143- 33-15	<i>West Virginia</i>
VE3GEJ 4352- 68- 32- 2		<i>Georgia</i>		WØKCG 4158- 77- 27- 8	W8BJ 1152- 32- 18- 7
VE3AQJ 588- 21- 14- 1		W4YWX 77,456- 286- 48-20		WØAEW 3642- 77- 23-14	<i>Wisconsin</i>
<i>Manitoba</i>		WA4CZX/4 224- 14- 8- 1		KØJEO 2960- 74- 30- 8	W9HE 4060- 151- 30-13
VE4SW 43,360- 255- 86-12		<i>Hawaii</i>		WØYFF 2400- 75- 16- 9	WA1TZD 6600- 137- 25-12
VE4EW 35,316- 327- 54-18		KH6J 3420- 90- 19-19		WØV 1148- 41- 14- 5	<i>West New York</i>
VE4ZS 12,980- 110- 59- 7		KH6HAM 1066- 41- 13- 5		W1DXB 3648- 76- 24-15	K3AH1/2 9800- 140- 35-10
VE4D1 4752- 72- 33- 7		<i>Illinois</i>		WA1JTM 2928- 61- 24- 7	K2KQS 4032- 96- 21-11
<i>Saskatchewan</i>		W9LNQ 10,368- 162- 32-11		<i>North Texas</i>	W8KJT 1806- 74- 11-12
VE5US (VESUF, ovr.) 378,840- 918-210-20		K5LQJ/9 7236- 134- 27-16		W5QGZ 8320- 130- 32-10	W8PXL 1848- 43- 18-13
VE5DP 115,656- 474-122-12		WB9AZZ 5814- 171- 7- 9		<i>North New Jersey</i>	WA238R 302- 11- 5- 5
VE5PC 85,500- 342-125-17		W9A 3174- 69- 23-10		W2ASM 11,840- 160- 37-17	<i>Pennsylvania</i>
VE5DZ 49,296- 316- 78-20		K9QWM 2100- 70- 15- 6		W2KHT 3308- 126- 29-13	K4JHL 17,384- 212- 41-15
VE5SC 33,696- 216- 78- 6		W9EBK 2472- 74- 14- 8		W2VPR 4444- 101- 22-15	W4JONZ 2024- 44- 23-16
VE5RC 1024- 32- 16-15		W9WR 1500- 50- 15-10		W2FUE 3120- 78- 20-13	W4JON 1980- 55- 18-14
<i>Alberta</i>		W9HVP 1500- 50- 15-16		W2IVP 2268- 63- 18- 8	W4JNT 140- 10- 7- 2
VE6MR (VE6AVR, ovr.) 238,650- 681-175-16		<i>Indiana</i>		W21CL/2 (WA2JNO, ovr.) 1800- 60- 15-15	<i>West Indies</i>
VE6AY1 54,436- 327- 84-12		WA9VBG 9688- 173- 28-16		W22FWA 1680- 60- 14- 7	KG4CS 1152- 36- 16- 3
VE6AGY 17,152- 134- 64- 6		K9KLR 5106- 111- 33-13		W2EMS 214- 16- 7- 2	<i>Washington</i>
<i>Br. Columbia</i>		W9JOO 5060- 118- 22- 8		<i>N. Y.C.-L.I.</i>	W7IEU 5656- 101- 28-15
VE7BD1 450,288- 954-226-20		WA9YIC 752- 47- 8-10		4x4LOW2 10,152- 141- 36-19	<i>Multiop.</i>
VE7URC (VE7AWO, ovr.) 264,410- 685-193-20		<i>Iowa</i>		WA2DHF 5000- 100- 25- 7	<i>Maryland-D.C.</i>
VE7QH 245,088- 668-184-20		WØMYW 13,984- 184- 38-12		<i>New Mexico</i>	W33PP (4 opps.) 11,842- 174- 34-20
VE7GG 240,130- 649-185-20		WØBRE 5200- 100- 26- 9		W5QNY 15,132- 194- 39-13	<i>West New York</i>
VE7IQ 186,840- 519-180-18		WA9YJW 4800- 96- 25- 9		W5RF 1880- 47- 20- 3	VE2MW2 (2 opps.) 16,068- 206- 39-16
VE7AGN 120,688- 397-152-6		WØI 3000- 78- 25- 6		W5DZA 304- 19- 8- 2	<i>Illinois</i>
VE7OO 108,980- 413-130-18		<i>Kansas</i>		<i>North Carolina</i>	W9ZNF (2 opps.) 1012- 46- 11-13
VE7TO 27,360- 180- 76- 15		WAØVJF 6912- 128- 27-10		E4CAK 2660- 70- 19- 4	<i>PHONE RESULTS</i>
VE7BP 15,972- 121- 66- 6		WØCHI 500- 25- 10- 3		W44JQZ 832- 32- 13-15	CANADA
VE7HQ 15,070- 137- 55- 4		<i>Kentucky</i>		<i>Ohio</i>	<i>Nova Scotia</i>
VE7AZL 4980- 75- 33- 4		K4WCL (K3SIG, ovr.) 7308- 126- 29-12		WRLT (W8AJ7, ovr.) 12,210- 165- 37- 5	W2RLK/VE1 132,888- 452-147-18
VE7AFJ 4392- 61- 36- 5		<i>Michigan</i>		W8GOC 3792- 157- 28-16	
VE7BLW 546- 21- 13- 2		<i>Missouri</i>		W8FCL 4228- 122- 44-20	
<i>N.W.T.</i>		<i>Minnesota</i>		W8CCL 8064- 144- 28-17	
VE8BB 40,548- 218- 93- 9		KØØK 17,024- 224- 38-18		W8EAS 3570- 85- 21-16	
<i>Yukon</i>		KØZX 13,464- 187- 36-20		W8EDU 4388- 73- 23- 4	
VE8CF 8845- 91- 47-11		WØKDI 10,106- 163- 31-16		2660- 70- 19- 6	

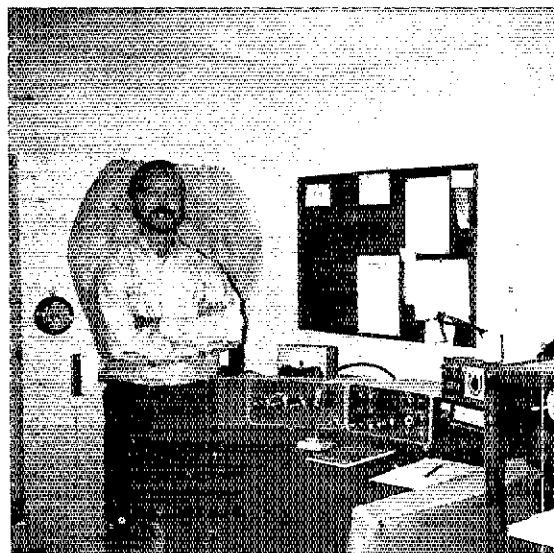
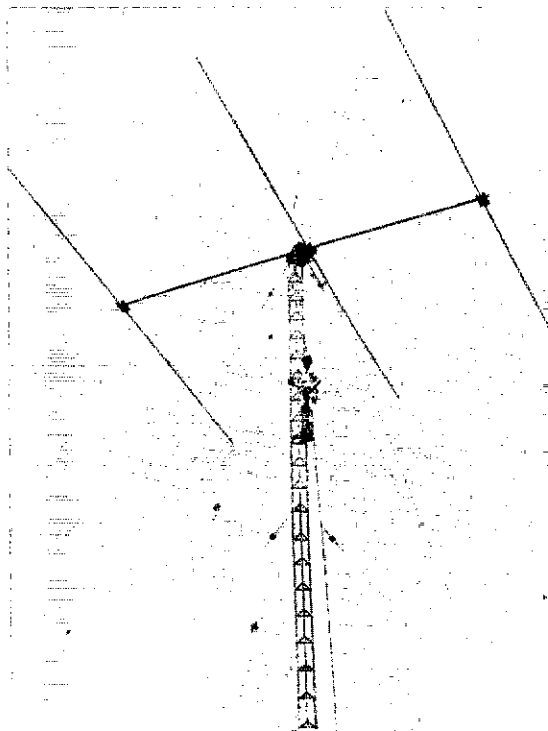
W6YK/VE1	364- 14- 13- 4	VE7DG 14,642- 124- 59- 7	<i>Los Angeles</i>	
<i>Prince Edward Is.</i>		VE7BLW 540- 18- 15- 1	W6JSC 3888- 72- 27- 12	WB6OK 1186- 47- 19- 14
W6YK/VE1	300- 15- 10- 9		W6YRA1K6SE, opr.1	<i>South Dakota</i>
		USA	3050- 64- 25- 6	WA6B7D 364- 26- 7- 2
<i>Quebec</i>			WA6NCQ 192- 12- 8- 3	<i>S.I.V.</i>
VE2AQY 18,172- 154- 59- 14		<i>Arizona</i>	WB8HUU 930- 31- 15- 3	WA6COP 1932- 46- 21- 11
VE2AKI 10,104- 122- 41- 13	WA7OGA 210- 15- 7- 4		<i>Mississippi</i>	<i>Santa Barbara</i>
VE2HS 532- 18- 14- 3	W6MAI 4466- 77- 29- 13	<i>Colorado</i>	KSSVC 8062- 139- 29- 15	VE7HNE/W6
VE2ALE 528- 44- 6- 4			K5MDX 1980- 45- 22- 4	48- 6- 4- 2
VE2BGJ 144- 12- 6- 4		<i>Connecticut</i>		<i>South Texas</i>
<i>Ontario</i>		KI7WQ 440- 29- 10- 10	WA6JEF 1080- 36- 18- 14	K1PKJ/S
K9JLR/VE3		<i>Delaware</i>	WA6PRS 192- 12- 8- 1	9310- 133- 35- 18
46,332- 234- 99- 14				WA5IHR 3584- 64- 28- 8
VE3HGL 40,180- 245- 82- 11	WA3HGV 870- 29- 15- 4		<i>Missouri</i>	<i>Tennessee</i>
VE3RYO 5600- 70- 40- 8	WA3KZX 462- 21- 11- 15		K0IKZ 2068- 47- 22- 11	K4RTA 4872- 87- 28- 9
VE3DLS 3604- 53- 34- 5		<i>Pennsylvania</i>	<i>Nevada</i>	<i>Utah</i>
VE3GEJ 2653- 47- 28- 2	WA3LLJ 1862- 49- 19- 10		W7CWA 648- 27- 12- 9	W7HVH/J
VE4CAA 1892- 43- 23- 8		<i>Fast Florida</i>	<i>North Texas</i>	5- 2- 2
VE3BIF 1760- 40- 23- 5	W4ZTW 756- 27- 14- 9		K5YRK 2288- 52- 22- 8	<i>Virginia</i>
VE3AYR 616- 22- 14- 3	W4JMX 120- 12- 5- 5			W4QPI 8196- 122- 34- 19
<i>Manitoba</i>		<i>Georgia</i>	<i>North New Jersey</i>	W4WSF 3780- 70- 27- 6
VE4SI 78,400- 400- 98- 17	W4NAL 810- 27- 15- 8		W4ZVPR 2- 1- 1- 1	W4KMS 80- 10- 4- 1
VE4IK 24,192- 168- 72- 6		<i>Idaho</i>	<i>Ohio</i>	<i>Wisconsin</i>
VE4AR 4510- 55- 41- 4	E7RLS 2100- 50- 22- 13		WBRESB 1216- 38- 16- 9	W9IID 2332- 53- 22- 17
<i>Saskatchewan</i>		<i>Illinois</i>	WBEOG 26- 7- 4- 1	WA9NBU 1440- 45- 16- 10
VE8NW 95,108- 403- 118- 9				WA9TZD 24- 6- 2- 1
VE8TO 18,348- 139- 66- 9	WA9CLO 2904- 68- 27- 14		<i>Oklahoma</i>	
<i>Alberta</i>	W9LNF 2730- 65- 21- 14		WA5SI 4600- 100- 23- 19	<i>Washington</i>
VE6ANR (VE6AMR, opr.1)	K9VBW 1568- 49- 16- 7			W7YOZ 1224- 54- 18- 6
173,467- 590- 147- 20		<i>Indiana</i>	<i>Oregon</i>	K7AWB 972- 27- 18- 14
VE6UV 118,688- 429- 136- 19	K9GEL 1802- 53- 17- 5		WA7JBF 1056- 33- 16- 11	W7HAR 144- 12- 6- 4
VE6AYU 26,640- 185- 77- 16	WB9AWK 1800- 45- 20- 8			
VE6HN 12,984- 166- 39- 10	WB9COD 704- 32- 11- 16			
VE6MD 6966- 87- 40- 6		<i>Kansas</i>		
VE6JW 1044- 29- 18- 4				
<i>British Columbia</i>				
VE7BLO 39,421- 219- 91- 11	W80ABE 2464- 56- 22- 16			

Check Logs

VE2HI, VE1DB, VE2HN, VE4SD, K4IUV, W0BE, W6ZS, W0LQ, W9CFS, W4UWZ/7, W4JUK, K8MMZ/9. QST

The three-element beam is the wide-spaced 20 meter job used at VE2NI. Thain's other antennas include wide-spaced 3-element beams for 10 and 15 as well, and dipoles for 40 and 80.

Long time VE/W participant WA6DKF (formerly K2EIU/5) again ran up an impressive score in the event, 25K this time. Some of the trophies on the right are for the VE/W!



QST for

1971 ARRL INTERNATIONAL DX COMPETITION - High Claimed Scores

Following are high *claimed* scores of entries received by May 21. Read (left to right): total score, multiplier, contacts. Final results will appear in (or near) October *QST*: please don't ask for DXCC credit based on log confirmations until the adjusted scores make the scene! - *W1AKQM*

WVE - CW	K6SIN	1,855,844-309-2002
<i>Single Op.</i>	WB2SQN	1,841,100-361-1700
W1BGD/2	K1VTM	1,250,980-379-1842
	W2SZ (WB2OEU, opr.)	1,242,547-361-1609
W5RLR	K5ZJK	1,683,540-398-1471
W1BPW	K4SHB	1,650,416-356-1546
KJNOL	WA6JN	1,600,179-286-1865
K1ZND	WA1JD	1,510,392-376-1339
K1LPL/3	K4BVD/6	1,509,108-268-1827
K1DIR	K5MDX	1,463,894-368-1326
K0DQI/1	W9ZRZ	1,433,076-389-1228
K1VTM	WA1JHQ	1,401,048-319-1464
W3GRI/1	WA1RG	1,318,240-352-1253
K3HTZ	K6COF	1,316,868-257-1721
WA1JLD	W2YU	1,281,942-311-1374
W4KIC	W1OKG	1,219,431-311-1307
K6LOM	K1ZND	1,210,192-331-1212
W2DXL	W6HVN	1,135,260-255-1484
W6MAR	W3VT	1,114,997-256-1044
K6AHV	W0HP	1,105,830-330-1117
W6RR	W4LBP	1,101,210-310-1184
K4HIG	W5NMA	1,049,670-327-1070
W8QXQ	W51QI	1,041,003-321-1128
W5JMK	W9MH/4	1,020,627-309-1130
W2GGF	W2JSX	1,001,072-298-1101
WA1RG	W3V1Q	993,462-313-1058
K3JH	K7YWZ	936,117-273-1143
W3VT	WA41F/W	928,896-328-951
W5WML/5	K7RAJ	875,529-344-1201
W6ZKS	W6DGB	869,970-250-1159
K6SDR	W3LTP	834,400-298-935
W51QT	W42BYJ	828,240-277-1015
W8BOY	VE7BDJ	824,760-322-1185
W11BY	W4ZC B	817,089-287-949
W11FQ	W2MB	815,265-305-891
W2YT	W6BLD	800,058-255-1062
K1UDD	W1BHB	805,464-324-829
W8RUF (W8AZDT, opr.)		
		Multi-Single
	W5REB	2,851,425-437-2175
WIPI	K4HF	2,678,868-419-2124
W1BH	K8MM	2,462,229-363-2261
K1JHX	W1BGD/2	2,256,315-419-1795
	W5QUO/7	2,020,518-396-2201
	WA6JQM	1,894,221-321-1967
	VF1DB/1	1,813,320-365-1656
	W6HX	1,632,620-260-2109
	K8UD	1,514,540-379-1420
	W4EJA	1,656,044-337-1570
	W6WTF/6	1,530,192-284-1796
	G6AN	1,365,134-781-1738
	WA4QD	1,451,340-330-1466
	W31V	1,384,761-329-1403
	W8SH	1,102,230-331-1110
	WTMX	1,070,460-313-1140
	WA1JUY	1,041,600-320-1085
	K1J1Z	1,033,746-326-1057
	W0MYN	1,023,750-273-1250
	W6DOD	1,023,570-255-1354
	WA2CEA	996,300-324-1025
	K4RTA	957,420-324-985
	K41JA	931,224-322-964
	K0WXX	884,070-285-1034
	VF7ZZ/W7	814,681-181-1501
		Multi-Multi
	W3AO	8,687,977-617-4703
	W3GM	3,999,892-466-2854
	K4CG	3,356,535-455-2459

K3H1Z	2,383,128-408-1947
WA3ATX	1,980,180-380-1737
W5JMK	1,897,200-400-1581
W3MWC	1,790,106-402-1485
K2UQ1/2	1,550,607-349-1481
WB6GFI	1,479,924-284-1737
W8NGO	1,273,635-341-1245
WA3ATP	1,217,727-357-1137
WA7GWU	1,160,664-274-1412
WSQHM	1,155,735-315-1223
	DX - CW
	<i>Single Op.</i>
KH6RS (K25LU, opr.)	4,319,532-281-5124
YV5KT	3,385,692-261-4324
KH6JJ	3,334,230-265-4194
KH6HKM	2,673,216-252-3536
FL2CB	2,518,485-245-3427
P12PS	2,496,156-258-3225
1J1AW	2,278,404-228-3341
HR2CK (W8ABRB, opr.)	1,712,787-241-2369
C1P6EG	1,615,464-216-2493
G3FAB	1,609,212-217-2472
C1VX	1,386,930-211-2191
G2RO	1,371,510-210-2177
HU1KP	1,320,600-213-2100
OX3DL	1,279,292-211-2021
OZ5DX	1,180,704-196-2008
9Y4VU	1,170,960-210-1860
DL7HN	1,066,200-170-1777
DK1CU	1,044,270-205-1698
HAS1	1,023,885-183-1865
1I91	1,017,530-194-1755
H1BO1	929,443-187-1499
VK3OL	867,867-187-1547
LA1QA	852,638-161-1786
OA4DX	835,674-197-1414
OX3WO	801,293-171-1565
G2OT	683,758-185-1250
KL7RCH	663,348-149-1484
G2DC	645,836-173-1244
JA1HC	618,266-157-1314
PY2DRP	606,624-142-1424
H8VJ	600,636-168-1193
ZB2AV	560,696-172-1106
OK2QX	564,438-151-1285
K4BZH/VP7	557,928-189-985
GW3J1	529,704-168-1051
K1WKK/112	510,842-163-1046
Z5SWN	508,380-148-1151
PA0LOU	506,385-155-1121
DL7BQ	502,803-161-1041
	Multi-Single
LU2E	2,221,422-227-3262
YD3FY	2,146,221-231-3263
JA3YBP	1,759,176-212-2766
YU1HR D	1,482,618-218-2235
KR6AY	1,191,003-187-2123
OK1KTL	1,117,585-185-2050
HA5KDO	931,500-180-1725
UI1RS	881,025-175-1621
G3SJK	734,616-111-1432
VP2FS	702,884-182-1284
CW3PTZ	632,632-154-1364
G3VNR	582,417-159-1221
P40GN	502,200-155-1080
	Multi-Multi
SK6AB	1,948,140-205-3170
	DX - Phone
	<i>Single Op.</i>
NI1KS	6,140,817-283-7233
KH6RS (K25LU, opr.)	4,545,456-281-6719
KH611	4,143,079-263-5251
KH6BZF	3,618,680-260-4651
KP4DLW	3,392,536-251-4512
FL2CB	2,872,302-239-4006
	Multi-Multi
GH2R	1,108,809-169-2190

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity

CONDUCTED BY GEORGE HART,* WINJMJ

DISTRESS CALLING

IN JANUARY *QST*, this column, we discussed this topic in some detail. As usual, it brought on quite a bit of comment, some of which was published in the April issue in the "Correspondence" section (p. 91). It is now time to draw some conclusions resulting from all the discussion.

Considering that the reaction to the need for an amateur distress call was almost unanimously negative, it is amazing that such a call has existed for some 45 years in the face of various and sundry distress calling procedures provided by international regulation, as detailed by Bruce Peters, WB2LRS, in April *QST*. Such procedures existed in commercial circles internationally before we hams came up with QRR. Why, then, were QRR and its successor QRRR, "CQ Emergency" and other emergency procedures, ever devised? There must have been a reason. It can't be (can it?) that amateurs in those days were so much more insular than we are today, and that in our blindness we simply carried on an old tradition thoughtlessly. Can it be that we are less proud of our own heritage as a service now than we were thirty years or so ago, which makes us more willing than previously to adopt the procedures used by other services? Or are we just more mature and intelligent now than we were then?

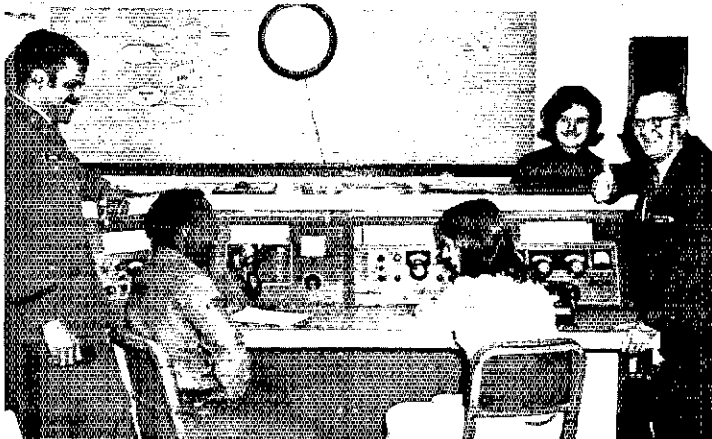
The answers to these questions are very much a matter of opinion. Research will probably show that the development and use of QRR (later QRRR) and the more recent "CQ Emergency" were related to a supposed need of an amateur asking assistance of another amateur without

running the risk of suffering penalties invoked by regulations against misuse of distress calls. After all, an SOS or MAYDAY call is generally associated with a wild cry for help from someone about to go down for the last time. QRR(R) had a slightly less urgent connotation in that it was considered the call of an amateur station asking assistance of other amateur stations in an emergency situation — within the family, so to speak.

A letter from John von Sneidern, K2GTJ, received too late to make the April *QST* "Correspondence" symposium on the subject, bears some quoting: "The very nature of a distress signal," he says, "requires that it be understandable to as broad a group of potential receiving operators as possible. A distress signal cuts across jurisdictional lines between services, and a signal unique to a single service would be meaningless to operators in other services — and therefore would not summon the aid needed. The logic behind standardization of distress signals among various nations and services seems solid."

After outlining the history of international development of distress calling, John goes on as follows: "American amateurs already labor under a series of self-imposed handicaps bred of a somewhat provincial and insular approach to international communications. We assign (for example) peculiar meanings, unique to ourselves, to many internationally recognized Q signals. Let us not erect still one additional language barrier between ourselves and other radio operators around the world — this one above all others, where the safety of life and property is at stake."

Makes sense? Still, we have to point out that amateurs have adopted and used many procedures



Handling traffic at Ft. Gordon (Ga.) Radio Club are WN4SSB (left), K0VRG (2nd from left), and W4DDY (far right). The two YLs are awaiting their Novice licenses.

Here are a few of the volunteers who currently handle phone patches from servicemen to their stateside families via Army MARS. Left to right: WB6MTL/AL6MTL, K6DBV/AADB, W6NAZ/A6NAZ, WB6KPR/AL6KPR, K6IHD/AA6IHD, W7ZT/A7ZT and W6DQE/A6DQE. So far this crew has completed 84,000 patches, 35,000 of them by W7ZT. (Photo by W6VGO.)



that are standard internationally; it isn't as though we have completely isolated ourselves from the international inter-service communications picture. Every service has its own particular requirements and idiosyncrasies, and very frequently we must make the decision whether to use the procedure or customs of one or more of the other services, or adopt our own. As often as not, no overt decision is made, the custom just materializes from somewhere and becomes the amateur standard by usage.

But are we all agreed, then, on distress calling? We throw overboard QRRR and "CQ Emergency" and adopt SOS and MAYDAY when, as and if needed, along with the less-urgency calls of XXXX and PAN. Unless subsequent correspondence indicates there is more sentiment on the other side than has appeared so far, we'll gradually be eliminating the amateur distress calls from our literature.

PSHR Format to Change

In order to conserve QST space, the Public Service Honor Roll format will be changed to eliminate the point-by-point breakdown of all recipients of this honor listing who make fewer than 45 points. Effective with the October issue, those making fewer than 45 points will be listed with point totals only, similar to the BPL listing of those making the list on "originations-plus-deliveries."

This does not also eliminate the requirement for those claiming PSHR listing to break down their points. It is only a simplified format to save QST space, and the cut-off point is strictly arbitrary. All those qualifying with 30 points or more will continue to be listed. — WINJM.

Traffic Talk

VE3DV announces that a course in CW Traffic Net procedures for Ontario amateurs will commence on Monday, Oct. 4 at 6:30 P.M. local time (2230 GMT) on approximately 3700 kHz. It will run Monday thru Friday for two months or longer, depending on the number of participants and their ability to progress. Shep gives a twofold objective to the course: (1) to increase the number of cw traffic handlers and thus give a better message service to the Ontario radio amateur and his/her friends, and (2) to provide instruction in a rather specialized facet of amateur radio to the newly licensed amateur and to the confirmed ssb operator. The course is being directed by VE3CYR and instructors will include VE3GI, VE3ERU and VE3DV.

While the course is specifically for Ontario amateurs, there is nothing to prevent others from listening. Mark the date on your calendar. Perhaps you will want to start something along the same line for your own group, or get someone to start it for the benefit of yourself and others like you. If you plan to listen to the Ontario course, you'll need a copy of *The Radio Amateur's Operating Manual* and a syllabus from VE3CYR. The latter can be requested by mail or radio, although we're not entirely sure it is available to amateurs outside Ontario. — WINJM.

National Traffic System. On May 8 and 9, the Eastern Area Staff of NTS met in Philadelphia to discuss problems concerning NTS and to make recommendations to the Communications Manager on how to improve the system. Attending the conference were W4UQ, Staff Chairman; K2KIR, EAN Manager; W3EML, TCC Director; W1EFW, W2ER, W3NHM, W4SHJ, and W8CHT, Region Net Managers; and W1BIG and W8RYP, Members-at-Large. Observing the proceeding were WB2TUL and WA2BAN, at the invitation of W2ER, and WA9HHH of headquarters.

Included on the agenda of items for discussion were the use of out-of-section stations as section representatives, traffic volume, moving EAN to forty meters during the summer months, MARS/APO/EPO liaison, "commercial" traffic, the EAS Terms of Reference, late sessions of section nets, and the SET, among others.

On the first of these items, in accord with published NTS policy, the staff decided that if a lack of personnel makes it difficult for a section to supply the necessary liaison, it is permissible for this section to "borrow" representatives. It was also noted that a station is not obligated to participate from his home section. In either case, when out-of-section reps are used, the staff recommended, the procedure outlined in the *Public Service Communications Manual* should be followed explicitly.

Because of the distances involved, difficulty was being experienced in supplying the proper representatives to EAN on the part of some regions. A move to forty meters was discussed in an effort to alleviate the distance problem; however, some felt such a move might create other problems because of a lack of short skip. Finally, it was decided to give the change a trial period and see how it worked out.

Traditionally, APO New York traffic has been handled through 2RN and the NLI section nets, but because of problems in getting the traffic into MARS circuits, possible revision of this routing was discussed. Some of those present wondered whether traffic ever got anywhere after it was placed in MARS and suggested it might be better to stop accepting APO traffic if it was QTA after leaving NTS. Setting up MARS/APO/EPO as a separate traffic region was

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for April Traffic

Call	Orig	Revd ¹	Ret	Del.	Total
W3CUI	221	1542	1497	53	3413
W5TLY	25	641	592	0	1263
W6BHR	20	378	370	10	769
W4AVS	129	588	64	205	766
W4ICX	29	384	308	9	730
W7BA	29	382	325	23	709
W4VYR	241	709	178	13	640
W44NNO	29	288	226	4	557
W44Sc K	14	273	254	4	545
W4JMI	21	298	197	0	516
W4OIM	5	252	253	0	509
W7BA (Mar)	39	381	336	42	808
KØZU (Mar)	0	340	0	338	678

More Than One Operator Station

W4BNE	239	W8LE	129	W4111	109
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BPL for 100 or more originations-plus deliveries

KØZU	288	W46YZ	146	W9YH	110
W0BB	185	K1BCS	113	W40GM	109
W4JYO	182	W19AR	133	V131V	109
W4ANAZ	175	W6VYQ	128	W21GA	104
W4TN	173	K5MA1	124	W21G	104
W9FS1	169	W2OC	123	W4MP	102
W4OU	160	W44MK	123	W30RZ	101
K8ONA	155	W41R	121	W46YZ (Mar)	104

BPL Medallions (see July, 1968 QST, p. 99) have been awarded to the following amateurs since last month's listing: W4QVY, W44NNO, W40MG, W8111, W46RA.

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.

April reports.

Net	Sessions	Traffic	Rate	Avg. Rep.	(%)
EAN	30	1613	1,239	53.4	98.3
CAN	30	1193	1,075	39.7	100.0
PAN	30	1153	1,036	38.4	100.0
2RN	61	601	322	9.8	100.0
3RN	61	473	428	7.9	98.4
4RN	56	568	376	10.1	90.0
RN5	60	810	437	10.2	94.6
RN6	60	699	523	11.6	100.0
RN7	54	211	250	3.9	53.8
8RN	61	594	388	9.7	94.5
9RN	60	431	439	7.2	95.4
1EN	60	547	539	9.1	84.5
ECN	56	104	155	1.9	84.4
TWN	51	279	245	5.5	58.0
TCC Eastern	125 ¹	749			
TCC Central	90 ¹	645			
TCC Pacific	125 ¹	901			
Sections ²	2074	11,423		5.5	
Summary	2804	23,471	EAN	13.2	
Record	2699	28,426	1,421	19.1	

¹TCC functions, not counted as net sessions.

²Section and local nets reporting (60): QLEN, OSSB, STEEN, BN (Ohio); EPA, WPA, PTTN (Pa.); M1N (Man.), 11 N (Ill.); SGN (Me.); WMN (Mass.); GBN, OPN (Ont.); OQN (Ont.-Que.); TTN, TPN (Tex.); BSN (Ore.); CN, CPN (Conn.); AENB, AEND, AENM, AENO, AENT (Aa.); MDCIN (Md.-Dc.); BEN, WBSN, SW2RN, SW6RN, WSSN, BWN, WIN (W.V.); NYS (N.Y.); O7K (Ark.); KYN, KTN (Ky.); SATN (Sask.); VN, VSN, VBSN (Va.); GN, FMTN, QFN, FPUN, 1PTN, QFTN, VEN (Fla.); MSN, MJN, MSPN (Minn.); CN (N. & S. Car.); GSN (Ga.); PVTEN (N.J.); WSN (Wash.); LAN (La.); W. Que. VHI; QMN (Mich.); NCN, SCN (Cal.); BUN (Utah).

Transcontinental Corps, W3JML says it was a fair month on TCC Eastern even though traffic was down. The change to daylight time was made smoothly with no particular problems. W6VNO also reports a good month even with seven failures; but no problem with time change.

April Reports

Area	Functions ¹	% Successful	Traffic	Out-of-Net Traffic
Eastern	125	93.6	2004	749
Central	90	96.6	1312	645
Pacific	125	94.4	1802	901
Summary	340	94.9	5118	2295

The TCC Roster: Eastern Area (W3JML, Dir.) - W1s B1G E11 NJM QYV, K1SSH, W4111M, W2s FR GKZ OC, K2KTK, WA2UWA, W2LZN, W3FEM, K3MVO, W4s NLC SQO EQ, K4KNP, W4s GTS NNO SMA, W8s PMJ RYP, K9KMO, W1s POS YVR ZGC, Central Area (W0LXC, Dir.)

W40GG, W4s HQW KPE, W5MI, W9s CXY DND, WA9VZM, W9s HI INH LCX ZHN, K0AEM, W4s DOU IAW WLZ, Pacific Area (W6VNO, Dir.) - W5RE, K3MAT, W4s BGE BNX EOI IPW MLE MNY VZT, K0s DYX KCB, W4s DET LFA, W7s DZX EM KZ PL, K0JSP.

Public Service Diary

During the period of April 15 to 19, eighteen Winona, Minn., amateurs provided communications between the civil defense headquarters and persons patrolling dikes surrounding the town inspecting for flood damage. Communications, on a 24-hour-a-day basis, were also provided to many locations where pumps were being operated, at the request of city officials. - WAØOVV, EC Winona, Minn.

Members of the Firelands Amateur Radio Club of Sandusky, Ohio, were requested to set up portable equipment on Kelly's Island, a five square mile bit of land in Lake Erie about ten miles off shore, for a Boy Scout Jamboree on April 16-18.

also mentioned as a possible solution. Eventually it was decided to leave the routing as it is now while the problem was investigated more fully.

Some difficulty has arisen occasionally because some representatives have refused traffic on the grounds that it was commercial in nature. The point was raised that there is no restriction on the content of domestic amateur traffic so long as it contains no profanity and no pecuniary interest is involved. Thus, in most cases a relaying station couldn't refuse traffic on the grounds that it was commercial since he had no pecuniary interest in the traffic. The staff felt that an assigned representative was obligated to receive all traffic directed to him by NC's, conditions and time permitting, and if for some reason the representative felt he couldn't relay it or deliver it, it was up to him to service the originator.

Since the other Area Staffs had revised their Terms of Reference, PAS took a look at theirs, but decided no major revisions were needed. It was stated that candidates for member-at-large positions of the staff be excluded from attending the meeting at which they are to be voted upon. During this portion of the discussion W4UQ was re-elected to a two-year term as chairman, the new term to begin at the conclusion of the conference.

Probably the largest single subject of discussion at the meeting was the Simulated Emergency Test, as a whole afternoon and most of an evening were spent in kicking the topic about. Intertwined with SET was discussion of actual emergency operation, namely the L.A. earthquake. Although this observer feels no specific recommendations came about as a result of the discussion, many good points were brought up creating food for thought and future discussion. For the most part the staff felt SET was not very useful to the higher echelons of NTS in its present form and most members objected strenuously to the overflow of SET traffic into the week following the test. Overload situations occur spontaneously often enough that it was unnecessary to create them artificially. It was mentioned that attention should be shifted toward the other aspects of emergency operations, such as emergency power, emergency alerting, spontaneous generation of the needed portions of the system, etc., rather than continuing to concentrate on traffic overload. WA9HHH.

Public Service Honor Roll April, 1971

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category.

Category	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Totals
Max. Pts.	10	10	12	12	12	20	3	5	5	
K3ZNP	10	10	12	12	12	8			5	59
W2OF	10	10	12	12	12		3		5	64
W4BF IX	10	10	12	12	12	3			5	64
WA2BAN	10	10	12	12	12				5	61
W0LRW	10	10	12	12	12				5	61
WB4OK1	10	10	12	9	12				5	58
WB2DJJ	10	10	12	12	12	1				57
WH2AEH	10	10	12	12	12					56
WA2ICF	10	10	12	12	12					56
W4QGG	10	10	12	12	12					56
WA8UPI	10	10	12	12	12	6			5	55
WA0VAS	10		12	9	20	3				54
WA1LJP	10	10	8	12	12					52
W1MPX	10	10	12	12	12		3		5	52
W7OCX	10	10	3	12	12				5	52
WA2KHO	10	10	9	9	12					50
WB4JMH	10	10	12	6	12					50
WA1GLE	10	5	12	12	12		5		5	49
K7CTP	10	5	12	12	12					49
WA8NOQ*	10	10	12	12	12		5			49
K9MRI	10	10	12	12	12				5	49
VE3NO	10	5	12	12	20					47
W3FZT	10	5	12	12	3				5	47
WA3OGM	10	10	12	12	12		3			47
W4NOG	10		12	12	20				5	47
WB8CWD	10	10	12	3	12					47
WA0VYV	10	10	12	3	12					47
W2MTA	10	10	12	9			5		5	46
W6BGF	10	7	12	12					5	46
W9HWR	10	7	12	12					5	46
WA0YMU	10	10	12	12	2					46
E7NHI	10	5	12	12	1					45
WB1MI	10	6	12	12			5		5	45
VE3GI	10	5	12	12					5	44
WA2VYS	10	10	12	12						44
K41AC	10	10	12	12						44
WB4OMG	10	10	12	12						44
K5ROZ	10	10	12	12						44
W5SBM	10	10	12	12						44
W6JNH	10	10	12	12						44
W6LRU	10	5	12	12					5	44
W7AXT	10	10	12	12						44
W7PI	10	10	12	12						44
WRLT*	10	10	5	4	12		3			44
W0BV	10	10	12	12						44
WA0JFC	10	10	12	12						44
W4LCX	10	2	12	12		3			5	44
W7CAF	10	5	9	12	2				5	43
W7MCW	10	5	12		16					43
W7JWI	5	5	12	20						42
WA01ZK	10	3	12	12					5	42

W1YNF	10	10	12	9						41
WA2JHM	10	10	9	12						41
WB2NOM	10	10	12	9						41
WB4DAJ	9	10	12	9						40
WA8VK1	10		12	12	1				5	40
VI3FRU	10		12	12						39
W2LR	10		12	12						39
W2RU1	10		12	12						39
WA3BPI	10		12	12						39
W3LOS	10		12	12						39
W3NEM	10		12	12						39
WB4KSL	10	5	12	12						39
W5RBB	10	5	12	12						39
WA5VQF	10		12	12					5	39
W7L BK	10	5	12	12						39
W0HI	10		12	12					5	39
WB4FKJ	10	3	12	12						38
W4UO	10	4	12	12						38
WA5VW	10	3	12	12				1		38
WA1FSI	10	2	12	12						36
WA7MAD	10	2	12	12						36
WA0VYB	4	10	12	6	4					36
WB6ZVC	10		12	6	7					35
WB8AIU	10	1	12	12						35
WB8BLH*	10	10	3	12						35
VE3ARS	10		12	12						34
VE3GFN	10		12	12						34
VE3FKI	10		12	12						34
VE3LK	10		12	12						34
K1SXF	5		12	12					5	34
W1UBG	10		12	12						34
K2KTK	10		12	12						34
WA3LYC	10		12	12						34
K3OHO	10		14	12						34
W3YA*	10		12	12						34
K4KNP	10		12	12						34
WB4RNT	10		12	12						34
K8LGA	10		12	12						34
WA0HTN	10		12	12						34
K0JSP	10		12	12						34
K7UYW	10	5	3	12	3					33
WA8WZF	4	5	12	12						33
WB0RTJ	10	10	12							32
WB2LFW	10	10	3	3					5	31
W3IN	10		12	6	6		3			31
W6JIT	10		6	9	15					31
VE4EQ	10		6	9					5	30
K0UR	5	2	12	6					5	30
WA9WMT	10	3	9	3					5	30

*Denotes multipoint station.

Category Key: (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (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.

Portable equipment was obtained and antennas erected. About 500 scouts were attending the jamboree and K8WLP and W8OTJ were manning the portable station, WB8DHS/8. On Saturday evening the portable station paid off when an adult scout advisor fell and broke his arm. The call for assistance was made about 9:00 p.m. local time, with W8QZY replying, but weather conditions were such that it was impossible to evacuate the injured man immediately. The hams stuck with it until the fog lifted and a plane was able to land and pick up the injured party two hours later. - W8BU.

Ten Hillsboro (Fla.) Co. amateurs assisted the Red Cross just prior to Easter in sending greeting messages for the public. W4DUG was set up in the Red Cross Headquarters to handle the traffic, which numbered well above 200 before the five days of operation ended. - W4BNE, EC Hillsboro Co., Fla.

The Bayonne, N.J., AREC/RACES participated in a simulated disaster exercise with other city

emergency groups on April 14. An explosion and fire was supposed to have taken place in the oil refinery section of the city. Amateurs were used to handle simulated emergency traffic from the disaster scene to local hospitals, c.d. headquarters and auxiliary police. K2UXW, K2QMS, WB2GFR and WB2GFS participated in the amateur portion of the drill under EC WA2FUI. - WA2FUI, EC Bayonne, N.J.

Fourteen members of the Johnson Co. (Kans.) Emergency Communication Service furnished communications at check points along the twenty mile route of Project Concern - Walk for Mankind. Nearly 2000 persons began the walk at 1200 GMT and about 1400 finished it before 2300. During this time the amateurs stood by at the check points, along with officials and Red Cross personnel, to supply any emergency needs. Six-meter f.m. units were used for the communications. - W0RXD, EC Zone 6, Kans.

(Continued on page 87)

SET '71

Records Tumble as ARPSC

Raises Emergency Preparedness to a New Pinnacle

REPORTED BY BILL REICHERT,* WA9HHH

AS MOST ARPSCers who've been around a while will know, 1969 was the big year for the Simulated Emergency Test. Statistics derived from the multitude of reports far outdistanced anything SET had previously produced. The 1970 edition wasn't too bad. In fact, except for 1969, 1970 was the best ever. But '69 just over-shadowed '70 and we wondered if the 1969 super-SET would ever be topped.

The 1971 drill went off with a bang. Activity seemed very good, even with the problems that arose from FCC's unfavorable interpretation of our traditional public service functions. We weren't making any predictions, though, as the previous two years had caught us out on a limb as we prematurely guessed wrong both times.

Well, the returns are in, and we can now say 1969 is no longer the best ever, as the 1971 version topped old marks in nearly every statistical category. The main reason for this, aside from a lot of hard work by a lot of dedicated people, was increased reporting. Activity was up and resulted in a tremendous job well done.

Now there's only one thing to worry about: Can we ever top the 1971 SET?

National Traffic System

There's no doubt about it; NTS was at its finest in the 1971 Simulated Emergency Test. Sure, there was the horrendous overload of traffic that continued to flow for a week after SET concluded, and many of the usual problems cropped up, but we

* ARRL Communication Dept.

seem to be making the point of overload more remote, and hopefully we're learning how better to cope with overload situations.

SET '71 served as a dress rehearsal for a real disaster that came only a few days after the test — the Los Angeles earthquake. Comparing the two, there seems to be a growing sentiment, especially at region and higher echelons of NTS, that SET as it is now organized is not very representative of an actual emergency.

Certainly, this is true. No one can imagine a disaster of such magnitude that the entire system would of necessity go into such extended operation as is done in SET. Disasters are usually localized in nature and often occur with no prior notice. Although everybody knows SET is coming, we've gotten a little closer to the real thing by using the "unplanned" approach of NCS and liaison assignments. Getting much closer to the real disaster situation creates great problems administratively, and with everything going at once, SET should be infinitely worse, from the overload standpoint, than any real emergency. Thus, after the SET, the real emergency should be that much easier. Unfortunately, the actual emergency operations don't seem to bear this out.

Some feel that we've proved the system can be overloaded and that we know what the result of such overloading will be — chaos. These people believe SET should now be changed so that other problems encountered in emergencies can be studied, such things as emergency power, activating the system under emergency conditions, etc.

Listed below are the 120 nets that reported SET activity to headquarters. This ties the number of reports garnered in the banner 1969 test, and is considerably ahead of last year's 95 reports. All of the categories are up from 1970, and several all-time marks were set.

The number of participants appears to have doubled since last year, with more than 13,000 stations reportedly having taken part. This is a bit hard to believe and the figure is almost certainly inflated by a number of nets that reported total check-ins, rather than the number of individual participants as requested. Another inflationary

Here are WB4OAG and W4JD, EC of Sullivan Co., Tenn., operating in the Kingsport SET.

QST for



WA9VVI (left) demonstrates amateur radio to the Gibson Co., Ind., civil defense director during SET. Frank is secretary of the Gibson Co. ARC. (Photo by Princeton Daily Clarion)



statistic is the number of minutes in session: most nets insist upon reporting the total time on the air instead of time during which traffic was actually being handled. Remember, SET is not a competition and individual nets shouldn't be trying to trounce all the rest by artificially raising scores. We're striving for the best efficiency possible and a previous net is competing only with its own previous record.

Area, region and TCC echelons lead off the list, followed by section and local nets in decreasing order of points earned. Column A refers to the number of messages handled; B is time in session; C is number of different stations participating; D is the number of net control points, and E is the number of liaison points. To determine the actual number of NCS and liaison stations, divide the figures in Columns D and E by five.

Net Name	A	B	C	D	E	Total
EAN	1608	857	224	40	85	2814
CAN	979	761	148	40	145	2073
PAN	863	759	290	30	-	1942
IRN	519	900	108	40	60	1627
2RN	297	582	74	35	80	1068
3RN	320	660	54	40	30	1104
4RN	284	633	84	25	30	1056
RN5	796	960	128	35	110	2029
RN6	546	757	72	35	65	1275
RN7	414	840	64	30	60	1408
8RN	539	990	100	55	110	1794
9RN	373	662	86	50	60	1231
TEN	215	790	76	25	75	1181
FCN						
IWN	210	539	46	30	45	870
TCC Eastern	1843					
TCC Central	870					
TCC Pacific	1486					
OSSB (Ohio)	635	1378	1236	85	105	3439
Stark Co. Emerg. Ohio	704	2110	330	80	130	3354
GRN (Ga.)	464	970	1232	50	40	2756
TLN (Tex.)	222	1380	996	70	30	2698
QFN (Fla.)	589	1665	124	90	135	2603
ISSB (Conn.)	293	960	1038	65	30	2386
OPN (Ont.)	252	1165	852	13	10	2294
PVTEN (N.J.)	579	1454	50	45	35	2163
KPN (Kans.)	379	1082	494	20	55	2034
NJLEPTN (N.J.)	373	952	466	40	45	1876
Area 4 10 mtr. (Va.)	250	1300	86	50	80	1766
NJN (N.J.)	571	704	144	80	85	1584
MSN (Mont.)	398	960	130	20	10	1518
BN (Ohio)	287	990	114	65	60	1516
TFN (Va.)	252	1140	46	30	25	1493
MEPTN (Md.)	311	960	126	45	35	1477
WIPN (Fla.)	242	1028	122	25	15	1432
NYS (N.Y.)	248	984	88	40	60	1420

KYN (Ky.)	217	1012	76	40	55	1400
OMN (Mich.)	318	867	82	60	45	1372
CN (Conn.)	228	940	62	50	80	1360
GSN (Ga.)	311	800	76	60	70	1317
MDD (Md.-D.C.)	257	922	54	25	45	1303
FMTN (Fla.)	348	518	352	35	30	1293
NCN (Cal.)	218	887	84	50	40	1279
VSNB (Va.)	86	960	38	40	35	1219
Teletype (Fla.)	973	120	12	15	5	1125
AENB (Ala.)	239	739	50	35	50	1113
SSN (Colo.)	122	900	36	25	30	1113
VN (Va.)	266	702	60	30	35	1093
Lscambia Co. AREC (Fla.)	39	960	20	5	20	1044
EPA (Pa.)	195	679	58	70	35	1037
Wayne Co. Emer. (Ohio)	149	840	12	15	10	1030
Wash. AREC	264	675	80	5	5	1029
GBN (Ont.)	124	800	44	35	25	1028
ILN (Ill.)	158	733	42	50	48	1028
FCATN (Ky.)	77	820	40	35	45	1017
AENM (Ala.)	223	448	280	35	25	1013
WSN (Wash.)	120	670	58	30	60	938
WPA (Pa.)	127	670	52	30	40	919
NJLPN (N.Y.)	116	635	76	30	25	882
QJN (Ont.-Que.)	147	580	52	55	45	879
LAN (La.)	76	638	44	45	35	838
QCEN (Ohio)	168	510	86	25	30	819
Queens Co. AREC (N.Y.)	326	274	132	25	15	772
OKS (Kans.)	112	551	44	25	35	767
SCN (Cal.)	117	515	66	20	45	763
OSN (Oreg.)	63	585	22	25	40	735
Newfoundland-Labrador						
WIN (Wisc.)	63	478	104	35	25	705
APN	123	466	46	35	25	695
Morgan Co. (Ala.)	95	498	28	35	30	686
NLI (N.Y.)	315	270	45	20	25	678
Altanta AREC (Ga.)	117	430	30	35	50	662
CPN (Conn.)	115	380	58	25	10	588
Cleveland ARC	128	375	60	20	-	583
Central Ky. 6 Mtr.	17	480	34	5	20	556
SATN (Sask.)	12	490	28	15	5	550
Frederick Co. AREC (Md.)	72	310	18	20	25	445
Crittenden Emerg. (Ark.)	7	360	36	10	5	418
Buena Vista Co. (Howar.)	10	375	6	5	5	401
OZK (Ark.)	13	360	6	10	10	460
THEN (N.C.)	40	301	22	20	15	398
ICEN (N.J.)	225		132	35	-	392
MoSSB (Mo.)	16	340	8	5	20	389
MON (Mo.)	46	233	86	15	380	
MTN (Miss.)	122	187	14	35	20	278
AFND (Ala.)	59	270	6	15	15	365
ATFN (Ariz.)	39	225	32	30	20	346
Kans. Zone 11 ARLC	29	214	62	25	15	345
Tuscarawas Co.	12	262	32	10	5	321

R.C. (Ohio)	63	192	26	10	25	316
Bristol AREC (Va.)	25	230	22	15	10	302
BCFBN (Mo.)	98	176	12	5	10	301
Fort Smith RAC (Ark.)	100	135	30	15	15	295
GFN (Ga.)	26	200	28	15	25	294
Memphis 10 & 6 Emer.	38	135	80	25	5	283
AENR (Ala.)	57	120	58	30	15	280
Queen Co. 10 Mtr. (N.Y.)	54	180	50	30	5	279
Clark Co. Emer. (Ohio)	42	160	42	10	10	264
MTN (Man.)	26	190	10	20	15	261
DEPN (Del.)	54	156	30	25	15	260
Area 10 AREC (Wash.)	150	30	26	15	35	256
UPFN (Mich.)	88	128	18	15	15	254
Green Co. AREC (Pa.)	9	200	8	15	10	242
SCVN (Cal.)	60	120	16	20	10	236
Del. 2 Mtr. Charlottesville Emer. (Va.)	16	168	14	15	10	223
Orange Co. 75 Mtr. AREC (Cal.)	30	120	40	20	10	220
Bernard Fwp. Emer. (N.J.)	2	180	10	5	15	212
Luzern Co. C.D. (Pa.)	5	180	14	5	5	209
BUN (Utah)	26	117	40	10	15	208
Aquidneck Is. Coinn. (R.I.)	15	150	18	10	10	203
St. Johns Co. Emer. (Fla.)	10	180	2	5	5	202
SGN (Me.)	26	120	30	5	10	191
LEN (Fla.)	12	120	28	10	10	180
Clallam Co. AREC (Wash.)	30	90	24	20	15	179
Lancaster Co. Emer. (Pa.)	5	144	18	10	-	177
Lenawee Co. 2 Mtr. (Mich.)	32	120	16	5	-	173
Mich. Thunb	37	90	24	10	10	171
Bayonne AREC/RACES (N.J.)	45	90	10	15	10	170
Richmond RACES/AREC (N.Y.)	30	60	24	20	5	139
CHRC (Ohio)	25	60	12	5	15	117
Meriden ARC (Conn.)	4	70	18	10	5	107
Linn Co. C.D. (Iowa)	3	40	40	10	5	98
Osceola Co. RACES (Fla.)	3	60	4	5	5	77
Seymour ARC (Ind.)	5	30	8	15	5	63
Totals (1971)	28,108	64,805	13,244	3,530	3,770	113,447
(1970)	25,292	51,732	6,446	2,945	3,105	86,555
Record	25,292	64,476	6,446	3,645	3,850	102,158

AREC/RACES

Although some are skeptical about the value of the NTS portion of the SET, most feel that the value of local participation is great, the one crying

need being better liaison between local groups and their NTS counterparts.

During 1971, all but one of the categories used to judge the SET saw new all-time highs established as 338 reports were received from 61 sections, three up from '70, but one down from 1969's record. The table below gives the blow-by-blow detail, with 1970 figures in parentheses:

Total reports: 338 (290)

Mail Reports: 289 (259)

Radio reports: 142 (128)

Total reported AREC/RACES membership: 9615 (8633)

Total reported participation: 4769 (4398)

AREC/RACES messages to SEC/State RO: 3163 (2470)

EC/RO messages to HQ: 231 (195)

Self-powered portables/mobiles: 1567 (1158)

Fixed stations on emergency power: 451 (371)

Total SET points: 44,854 (34,168)

Ohio again got the pole position, followed closely by Eastern Florida. Moving into a tie for third place were Kansas (eleventh last year) and Tennessee (seventh). Kentucky (seventh) captured the number five spot, followed by Northern New Jersey (17th), Michigan (tenth) and Alabama (third). Rounding out the leaders were West Virginia (25th) and New York City-Long Island (13th) in a tie for ninth place.

Other important changes were Washington (sixth last year to twelfth in 1971); Virginia (7 to 13); Orange (25 to 14); San Diego (no report to 16); South Texas (28 to 18); Western Florida (42 to 19); Santa Clara Valley (31 to 20); and Minnesota (4 to 21).

SET is not meant to be a competition with one section trying to beat out the rest. Rather, each participating group in a section should be in there pitching to better previous performances. Scoring is a necessary evil used to establish an order of listing. Each group must decide the success or failure of its individual drill looking much further into it than just the total score.

The listing below is obtained by ranking each section by each of four criteria: total reports, mail reports, radio reports and total score. The sum of the placings is taken giving "ranking points" and the section having the fewest points finishes highest. Figures preceding the section name indicate placing, last year's finish being shown parenthetically; parentheses following individual entries indicate method by which the report was received (m-mail, r-radio, mr-mail and radio).

HI). OHIO (6 ranking pts.), 21 reports)	4992
Allen, Putnam, Anglaise Cos. (m)	W8MIH 133
Belmont, Monroe, Noble Cos. (m)	W8BQ 71
Central Ohio (m)	W8ERD 596
Clark Co. (mr)	W8VZ 106
Darke Co. (m)	W8ARW 235
Gallia, Jackson, Meigs Cos. (m)	W8EPA 80
Highland, Fayette, Clinton Cos. (mr)	K8CKY 26

W4EH (left) operates W4BCZ/4 at the court house in Sebring, Fla., as Highlands Co. Civil Defense Director James Lawson and Red Cross Exec. Sec. Florence Peach look on.



Manitoba Route Manager VE4FQ is one of the stalwarts who keeps Manitoba represented on the Tenth Region Net, no easy job during SET.



Huron, Erie, Sandusky Cos. (nr)	KNQV	121
Jefferson, Harrison Cos. (nr)	W8ERR	110
Knos, Coshocton, Holmes Cos. (r)	WARTKL	-
Loraine Co. (r)	W8GET	-
Montgomery, Green, Preble (nr)	W8LLC	687
Northeast Ohio (nr)	W8GRG	423
Northwest Ohio (nr)	K8LFI	671
Richland Co. (nr)	WA8MXQ	76
Ross, Pike Cos. (nr)	K8SUB	152
Southwest Ohio (nr)	K8THT	332
Stark Co. (nr)	W8RETX	770
Trumbull, Columbiana, Mahoning		
Trueman Cos. (nr)	W8OE	222
Tuscarawas Co. (nr)	W8SHP	101
Wayne Co. (nr)	WB8BPB & WB8DOU	80

2(2). EASTERN FLORIDA (11 ranking pts., 24 reports) 3495

Alachua Co. (nr)	WA4UF-O	22
Bradford Co. (nr)	WB4OMG	6
Brevard Co. (nr)	WA4BWE	174
Broward Co. (nr)	WB4CKY	726
Clay Co. (nr)	W4WHK	9
Columbia Co. (nr) (no test held)	W4YNM	-
Dade Co. (nr)	WB4CBP	454
Duval Co. (nr)	WA4VZF	163
Hendry Co. (nr)	WB4BMR	46
Highlands Co. (nr)	W4RCZ	127
Hillsboro Co. (nr)	W4BNL	309
Indian River Co. (nr)	WA4SK-K	112
Lake Co. (nr)	K4UYN	197
Lee Co. (nr)	W4SMK	66
Martin Co. (nr)	K4NKA	19
Monroe Co. (nr)	WB4OUD	31
Orange Co. (nr)	W4BKC	323
Osceola (nr)	WB4JY	46
Pasco Co. (nr)	WA4WBB	30
Pinellas Co. (nr)	WA4HAA	-
Polk Co. (nr)	W4WZZ	471
St. Lucie Co. (nr)	W4NTF	83
Sarasota Co. (r)	W3UL	-
Volusia Co. (nr)	WB4NCL	151

3(11). KANSAS (23 ranking pts., 10 reports) 1529

Zone 1 (nr)	WA0OZP	146
Zone 3 (nr)	WA6PMS	81
Zone 4 (nr)	WB0NI	-
Zone 5 (nr)	WB0GX	138
Zone 7 (nr)	WB0UR	252
Zone 9 (nr)	WA8UTT	531
Zone 12 (nr)	K01NN	90
Zone 13 (nr)	K0LPI	74
Zone 14 (nr)	W0LXA	91
Zone 15 (nr)	K0UVH	126

3(5). KENTUCKY (23 ranking pts., 16 reports) 1710

Anderson Co. (nr)	WB4DYJ	222
Bradley Co. (nr)	WA4GOL	13
Bristol (nr)	WA4JUF	161
Cocke Co. (nr)	K4HHA	18
Coffee, Franklin Cos. (nr)	WA4RAS	273
Crossifle (nr)	WB4MT1	22
Hamblin Co. (nr)	WB4OOR	31
Hamilton Co. (r)	K4CMY	-
Knos Co. (nr)	WB4OBY	237
Madison Co. (nr)	WB4LHV	6
Marshall Co. (r)	W4DWT	-
Shelby Co. (nr)	W4OOQ	246
Sullivan Co. (nr)	W4JD	288
Sumner Co. (nr)	WB4MDA	27
Washington Co. (nr)	WB4LHK	98
Weakley Co. (nr)	W41LW	88

5(7). KENTUCKY (27 ranking pts., 11 reports) 1365

District 4 (nr)	WA4FMY	889
District 6 (nr)	WA4AGH	16
District 7 (nr)	WB4HTN	48
District 8 (r)	K4KZH	-
District 9 (r)	WA4FMY	-
District 13 (nr)	WA4GH0	184
District 14 (nr)	WB4FDR	57
District 18 (nr)	K4AVX	46
District 19 (nr)	WB4IBO	13

District 20 (nr)	WB4LFL	85
District 21 (nr)	WB4CTV	27

6(17). NORTHERN NEW JERSEY

(28 ranking pts., 10 reports) 1376

Bayonne (nr)	WA21-UH	95
Bernard's Twp. (nr)	WB2TGU	76
Bloomfield (nr)	WA2DRH	32
Denville (nr)	K2SGX	43
Englewood (nr)	WA2CCL	121
Jersey City (nr)	WA2DMF	118
Linden (r)	WB21-HH	-
Livingston (nr)	WB2BAN	135
Monmouth (nr)	WB2BCS	578
Passaic (nr)	K2KDO	178

7(10). MICHIGAN (32 ranking pts., 11 reports) 1489

Calhoun Co. (nr)	WA8VXF	100
Delta Co. (nr)	W8KBZ	84
Genesee Co. (nr)	WB8BOI	197
Kalamazoo Co. (nr)	WA8STV	217
Lenawee (nr)	WB8QV	57
Midland Co. (nr)	WB8AGQ	44
Monroe Co. (nr)	WA8FLK	118
Oakland Co. (nr)	WA8PO	270
Sandusky Co. (nr)	WA8ZPH	81
Washtenaw Co. (nr)	K8RUR	166
Wayne Co. (nr)	WA8VIF	257

8(3). ALABAMA (38 ranking pts., 11 reports) 832

Calhoun Co. (r)	K4HJM	-
Chambers Co. (nr)	WA4V1K	4
DeKalb Co. (nr)	WA4SNO	41
Jackson Co. (nr)	WA4NPI	51
Jefferson Co. (nr)	W4GE-T	413
Lawrence Co. (nr)	W4EYO	-
Madison Co. (nr)	W4YFN	156
Marshall Co. (r)	K4WSS	-
Morgan Co. (nr)	W4ATD	160
Shelby Co. (r)	WB4JWB	4
Tallapoosa Co. (nr)	WA4FOH	-

9(25). WEST VIRGINIA (43 ranking pts., 12 reports) 573

Berkely Co. (nr)	WB41C	70
Cabell Co. (nr)	WB1W	129
Greenbrier Co. (nr)	WA8PTB	29
Hampshire Co. (nr)	W81ZP	6
Hancock Co. (nr)	K8QLW	112
Harrison Co. (nr)	WB8CF	21
Kanawha Co. (nr)	WA8YTP	125
Lewis, Upshur Cos. (nr) (no test held)	WA8NDY	83
Logan Co. (nr)	WB8LQH	-
Pocahontas Co. (r)	K8HQH	-
Scioto Co. (r)	K8RNC	-
Taylor Co. (r)	WB8CYR	-

9(13). NEW YORK CITY LONG ISLAND

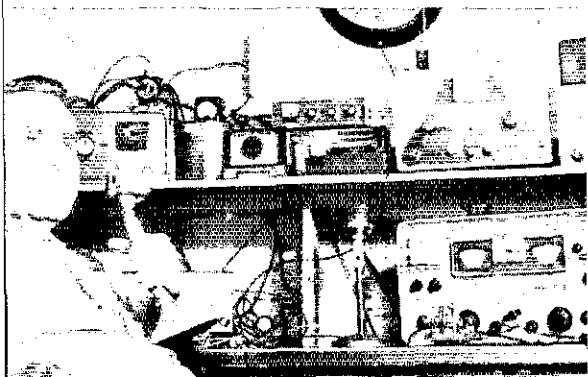
(43 ranking pts., 8 reports) 2916

Huntington (nr)	W2HAL	448
Nassau Co. (nr)	W2FI & W2UAI	625
New York City (nr)	WA2UCP	296
Oyster Bay Village (nr)	K2QPI	8
Queens Co. (nr)	WB2RXB	334
Queens Co. 10 meter (nr)	W2JAG	90
Suffolk Co. (nr)	K2HTX	803
Suffolk Co. (nr)	W2OOI	312

11(12). IOWA (51 ranking pts., 8 reports) 842

Blackhawk Co. (nr)	WA8UNC	195
Buena Vista Co. (nr)	K81VC	48
Clinton Co. (nr)	WA8YGA	133
Floyd Co. (nr)	K8YVU	4

Cam Co. (m)	W0LJJ	109	20(31). SANTA CLARA VALLEY 184 ranking pts., 4 reports)	957	
Scott Co. (m)	K0HZL & K0MST	78	Palo Alto, Mr. View, Los Altos (m)	W6ASH	714
Stacy Co. (m)	W0LYG	205	Redwood City, Menlo Park (m)	W6DLJ	495
Webster Co. (m)	W0PROM	70	Sac Jose, Santa Clara (m)	W6ZRL	659
			West Valley (m)	W6YDF	179
12(16). WASHINGTON 152 ranking pts., 7 reports)		1260			
Adams Co. (m)	W7CFS	29	21(41). MINNESOTA 186 ranking pts., 7 reports)		286
Area 1 (m)	W7YRC	100	Cottonwood Co. (m)	K0JKW	
Area 3 (m)	E7WTG	308	Dakota Co. (m)	K0KJP	92
Area 3A (m)	W7RIW	248	Freshboro Co. (m)	W01LJ	8
Area 8 (m)	W7GVC	452	Hubbard Co. (m)	W0EDM	73
Area 9B (m)	W7RXH	24	Mower Co. (m)	W0ACR	98
Area 10 (m)	K71RD	99	Wabasha Co. (m)	W0W0H	
			Winona (m)	W0BOVV	65
13(7). VIRGINIA 165 ranking pts., 8 reports)		1022			
Alexandria (m)	K4DHB	622	21(39). NORTH CAROLINA 186 ranking pts., 7 reports)		622
Area 6 (m)	W4ZYT	83	Brunswick Co. (m)	W44VNU	140
Area 9 (m)	W4VTI	110	Cumberland Co. (m)	W04MTG	154
Area 11 (m) (no test held)	W04HJ		Durham (m)	W4LFN	100
Area 12 (m)	W4ACC	109	Forsyth Co. (m)	W40R1	75
Fairfax Co. (m)	W04VY	358	Mecklenburg (m)	W44APD	119
Norfolk (m)	W44BUJ	264	Pitt Co. (m)	W44HPY	84
Virginia Beach (m)	K4DCS	98	Wake Co. (m)	W41MN	
14(15). INDIANA 66 ranking pts., 6 reports)		819	23(14). EASTERN PENNSYLVANIA		
Elkhart Co. (m)	W9HWR	127	(89 ranking pts., 6 reports)		580
Howard Co. (m)	W09OLO	78	Bucks Co. (m)	W03RK	
Jackson Co. (m)	K9ONR		Lackawanna Co. (m)	W03AP	139
La Porte Co. (m)	K91HY	213	Luzern Co. (m)	K3AD9	166
Northeast Ind. (m)	K9LSB	247	Montgomery Co. (m)	W031PM	62
Tippecanoe Co. (m)	K9KLO	154	Philadelphia (m)	W03HIT	155
			York Co. (m)	K31FOB	68
14(25). ORANGE 66 ranking pts., 7 reports)		1284			
Inyo Co. (m)	W06YWS	11	24(24). COLORADO 100 ranking pts., 4 reports)		870
Orange (m)	K6CJA	197	Arapahoe Co. (m)	W01FA	270
Orange Co. (m)	W06WOO	79	Jackson, Larimer Cos. (m)	W00QOY	89
Riverdale Co. (m)	W06YXA	507	Metro Denver (m)	K011Q	318
Riverside Co., Desert Area (m)	W061AG	85	Pueblo Co. (m)	W00VTO	193
San Bernardino (m)	K6GGS	436			
West Riverside Co. (m)	W06CZA	169	25(49). WESTERN PENNSYLVANIA		
			(101 ranking pts., 6 reports)		698
16(NIL). SAN DIEGO 70 ranking pts., 6 reports)		1043	Allegheny, Westmoreland Cos. (m)	K3SMB & K3CJD	489
Central District (m)	W61NI	297	Green Co. (m)	W03NAZ	88
Eastern District (m)	W61AI	133	Indiana Co. (m)	W31C1	
Imperial Valley (m)	W06MIW	90	Lancaster Co. (m)	W30L1	74
North San Diego Co. (m)	K6HAY	142	McKean Co. (m)	W300R	47
Southern District (m)	W0610J	192			
Two meters (m)	W06AA1	199	25(7). ONTARIO 101 ranking pts., 7 reports)		595
			Egin Co. (m)	VE3AUI	18
17(16). WESTERN NEW YORK 71 ranking pts., 6 reports)		770	Grey, Bruce (m)	VE3DPO	79
Allegheny, Cattaraugus, Chautauque Co. (m)	W20KS	149	Halton, Wentworth (m)	VE3AYR	166
Chemung Co. (m)	K2DNN	129	Kenora (m)	V13G0Y	21
Glenn Falls Area (m)	K2AYO	173	Norfolk (m)	VE3GCL	35
Oswego Co. (m)	K2DUR	198	York (m)	VE3PJ	142
Tioga Co. (m)	W02TDG	81	Humber Bay District (m)	VF3A5Z	134
Tompkins Co. (m)	W201P	40			
			27(40). GEORGIA 104 ranking pts., 13 reports)		184
18(28). SOUTH TEXAS 78 ranking pts., 7 reports)		487	Avondale Co. (m)	W04NLA	
Bexar Co. (m)	W50MH	280	Chattahoochee Co. (m)	W04PM	
Calhoun Co. (m)	W52PI	71	Chatham Co. (m)	W04DMO	
Denton Co. (m)	W5KHJ		Chauvers Co. (m)	K4ESA	
Gambel Co. (m)	W051X1	58	Dougherty Co. (m)	W04AOM	
Harris Co. (m)	W05ABA		Fulton Co. (m)	W04OC	
Jefferson Co. (m)	W5THW	78	Hull Co. (m)	W0NSO	
Orange Co. (m)	W51CL		Metro Atlanta (m)	W4KRF	184
			Peach Co. (m)	W7YWW	
19(42). WESTERN FLORIDA 82 ranking pts., 8 reports)		546	Richmond Co. (m)	K41DU	
Escambia Co. (m)	W04JCV	133	St. Clair Co. (m)	K4BTA	
Franklin Co. (m)	K4BDY	27	Tift Co. (m)	W04DCB	
Gulf Co. (m)	W4WLB	18	Walker Co. (m)	W04CCO	
Jackson Co. (m)	W4CBA	27			
Leon Co. (m)	W4MOO	98	27(30). OKLAHOMA 104 ranking pts., 4 reports)		788
Osage Co. (m)	W041OU	136	Conance Co. (m)	K5BYF	371
Oklahoma Co. (m)	W4BKC		Gartfield Co. (m)	W05FVJ	156
Orlando (m)	W4BKC		McKee Co. (m)	K5WPP	44
Washington Co. (m)	W04ZIM	77	Oklahoma Co. (m)	W5NL	216



W08YTP, EC Kanawha Co., W. Va., piloted the SET from this station and helped the section move into the top ten during SET '71.

QST for

As always, the Southwest Louisiana ARPSC crew turned out in force for SET. Pictured here are some of the crew, a number of whom were unlicensed helpers. Amateurs in the photo are W5LHW (far left), W5BSR (second from left), K5HAH (fourth), K5DXY (fifth), WA5RRT (seventh), W5SKW (eighth), and W5TVH (tenth).



30(23). NEBRASKA (108 ranking pts., 5 reports)	229
Adams, Webster Cos. (tr)	K0101
Dawes, Sioux, Sheridan Cos. (mr)	WA0JKN
Jefferson Co. (tr)	W0AGK
Seward Co. (mr)	W0DOU
York Co. (mr)	WA0BOK
31(18). SASKATCHEWAN (110 ranking pts., 4 reports)	607
Moosjaw (tr)	V15H
Prince Albert (tr)	V15HO
Regina, Southeast Sask. (tr)	VF5DU
Saskatoon (mr)	VF5RJ
32(35). MARYLAND-DISTRICT OF COLUMBIA (111 ranking pts., 4 reports)	601
Calvert Co. (tr)	W3ZNV
Frederick Co. (mr)	WA3GIX
Howard, Anne Arundel Cos. (tr)	WB6KGB
Washington Co. (tr)	WA3OP
33(42). CONNECTICUT (113 ranking pts., 5 reports)	198
Danbury (mr)	W1ADW
Meriden (tr)	W1YIG
Middlesex Co. (mr)	WA1NIS
Southington (tr)	W1WHR
Stratford (tr)	WA1YP
34(21). MONTANA (120 ranking pts., 4 reports)	430
Deer Lodge (tr)	WA7MKV
Great Falls (tr)	K71GJ
Laurel (mr)	W7LRK
Missoula (tr)	K7IMZ
35(20). EASTERN MASSACHUSETTS (124 ranking pts., 4 reports) (124 ranking pts., 4 reports)	329
Haverhill (tr)	W111F
New Bedford (tr)	W111
Newton (tr)	W1RM
Winthrop (tr)	W1HB
36(22). EASTERN NEW YORK (125 ranking pts., 3 reports)	772
Bethlehem (tr)	W2GJ1 & W2BOV
Schenectady Co. (tr)	W2BRP
Westchester Co. (tr)	WA2JWL
37(45). MISSOURI (126 ranking pts., 5 reports)	247
Benton Co. (tr)	W0HH
Clay Co. (tr)	WA0KUH
Johnston Co. (tr)	WA0BIX
St. Charles Co. (tr) (no test held)	W0RJO
Saline, Henry Cos. (tr)	K0JNK
38(27). LOUISIANA (127 ranking pts., 3 reports)	1811
New Orleans West Bank (tr)	W51K1
Southwest La. (tr)	W5SKW
Webster Parish (tr)	K5WOD
39(29). WISCONSIN (128 ranking pts., 3 reports)	485
Dane Co. (tr)	W97BD
Manitowish Co. (tr)	E9R1Z
Racine (tr)	W9SZL
40(46). ARKANSAS (129 ranking pts., 5 reports)	403
Benton, Washington Cos. (tr)	W5PRZ
UHL Cross, St. Francis Cos. (tr)	K5VBI
Carland, Hot Springs Cos. (tr)	W5SOO
Pulaski Co. (tr)	W5RKO
Schubert, Scott, Franklin Cos. (tr)	W51DM1
41(19). NORTH TEXAS (134 ranking pts., 5 reports)	131
Bell Co. (tr)	W5LVI
Deaf Smith Co. (tr)	K5C1H
Gray Co. (tr)	W5AJ
Hansford Co. (tr)	W5ROS
Tarrant Co. (tr)	WA5SRK
42(58). WESTERN MASSACHUSETTS (138 ranking pts., 3 reports)	393
Hampden Co. (tr)	WA1PJ

Hampshire Co. (tr)	W1CS1	300
Wellesley (tr)	WA1DMC	
43(37). SAN FRANCISCO (148 ranking pts., 2 reports)	278	
Petaluma (tr)	W0PZ1	90
Thibault (tr)	W0RWV	209
44(42). ILLINOIS (151 ranking pts., 1 report)	654	
Cook Co. (tr)	W91PG	654
45(51). IDAHO (164 ranking pts., 2 reports)	210	
Ada Co. (tr)	W7JMH	200
Nez Perce Co. (tr)	W91WV	10
45(NIL). SANTA BARBARA (164 ranking pts., 3 reports)	309	
Morro Bay Coastal Area (tr)	W06PGK	114
San Luis Obispo (tr)	W06MGG	252
Ventura Co. (tr)	K6VBN	43
47(35). SACRAMENTO VALLEY (167 ranking pts., 1 report)	329	
Sacramento Co. (tr)	W06KZN	329
48(38). DELAWARE (170 ranking pts., 2 reports)	28	
New Castle Co. (tr)	WA3DYG	
Sussex Co. (tr)	WA3GSM	28
49(32). ARIZONA (171 ranking pts., 1 report)	298	
Pima Co. (tr)	K7CF1	298
49(54). RHODE ISLAND (171 ranking pts., 2 reports)	24	
Newport (tr)	W111	54
Block Island (tr)	W11VY	20
51(47). MARITIME (172 ranking pts., 2 reports)	377	
Halifax, N.S. (tr)	V11ASN	37
Newfoundland, Labrador (tr)	V101CA	350
52(NIL). NEVADA (180 ranking pts., 2 reports)	244	
Las Vegas (tr)	K7OK	26
Reno Area (tr)	W5SRM	218
53(41). NEW HAMPSHIRE (180 ranking pts., 1 report)	438	
Hillsborough Co. (tr)	W1RCC	438
54(55). SAN JOAQUIN VALLEY (196 ranking pts., 1 report)	188	
King, Tulare Cos. (tr)	W6ASV	188
55(NIL). BRITISH COLUMBIA (198 ranking pts., 1 report)	154	
Prince George (tr)	V17AXH	154
56(48). OREGON (200 ranking pts., 1 report)	91	
Hood River (tr)	WA7KIU	91
57(52). ALBERTA (201 ranking pts., 1 report)		
Calgary (tr)	VF6AZU	
58(NIL). MAINE (202 ranking pts., 1 report)	54	
Aroostook Co. (tr)	K1C1J	51
58(33). LOS ANGELES (202 ranking pts., 1 report)	51	
San Fernando (tr)	WA0B1	51
60(NIL). NORTH DAKOTA (205 ranking pts., 1 report)	26	
McLean Co. (tr)	WA01LO	26
61(50). WYOMING (206 ranking pts., 1 report)	4	
Jackson (tr)	WA9UX	4

Well, that about wraps up the 1971 Simulated Emergency Test. But remember, the '72 bash, to be held on Jan. 29-30, isn't too far off. See you then.

QST

Hamfest Calendar

JULY
1971

S	M	T	W	T	F	S
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Alabama - The North Alabama Hamfest will be held on August 15 in the cafeteria of the John C. Calhoun State Technical and Junior College located north of Decatur on U.S. 31.

Alberta - The radio clubs of Southern Alberta are hosting the combined 37th Annual Waterton-Glacier International Hamfest - Alberta Hamfest at the beautiful Waterton Lakes National Park, July 17-18.

British Columbia - The Pentiction Civil Defense ARC in cooperation with the clubs from Kelowna, Vernon, and Kamloops, announce their Annual International Okanagan Hamfest at Gallagher Lake Lodge and grounds of RR No. 2, Oliver, on July 24 and 25. Motels, trailer, tenting and camping space are available along with showers, washroom, laundry, small lake and pool. Auction, transmitter hunt, contests, games for both young and old. Admission for licensed OMs \$3 plus one piece of modern ham "material." YLs and XYLs \$2, family \$5. Registration begins at 10:00 A.M. Saturday. For further information contact Denny Warner, VETASY, RR No. 4, Crawford Rd., Kelowna, BC, Canada.

British Columbia - See Alberta.

Idaho - See Alberta.

Illinois - The Fox River Radio League will have its annual Hamfest on August 15 at Phillips Park in Aurora. Free coffee and donuts will be served from 9:00 to 10:00 A.M. Advance tickets \$1, \$1.50 at the gate. Talk-in on 146.94 and 3.94 MHz. For further information contact Tom Rogers, WA9WBV, Box 323, Oswego, IL 60543.

Illinois - The Hamfesters 37th Hamfest and Picnic is Sunday, August 8, at Santa Fe Park, 91st and Wolf Road, Willow Springs, southwest of Chicago. Exhibits for OMs and XYLs. Famous Swappers Row. Information and tickets from Joseph W. Poradyla, WA9YU, 5701 S. California Ave., Chicago, IL 60629.

Illinois - The Shawnee Radio Association Hamfest is August 1, at Herrin City Park, Herrin. For more information write William L. Johnson, W9ER1, 502 W. Kennicot, Carbondale, IL 62901.

Illinois - The 14th Annual Hamfest of the Six Meter Club of Chicago will be held Sunday, August 1, at the picnic grove on U.S. 45, 1 mile North of U.S. 30, 5 miles South of U.S. 6, in Frankfort. Food and drinks will be available. Swap and shop section provided. Advance registration is \$1.50, \$2 at the gate. Talk-in on 50.40 and 146.94 MHz. For tickets and information contact Al Bagdon, K9YJQ, 7804 West 66th Place, Argo P.O., IL 60501.

Illinois - The Quad-Co. ARC will sponsor the 14th Annual Hamfest of the Breakfast Club on July 17 and 18 at Terry Park, 3/4 mile east of Palmyra. All other groups are invited to meet at the hamfest, giving prior notice to the hamfest committee. There will be dancing and movies Saturday night. Bring your own basket lunch; sandwiches and soft drinks available on the grounds. Mobile talk-in on 3.973 MHz from noon Saturday to 11:00 Sunday. Games, contests, golfing, and fishing. Bring your swap gear. Camping facilities open from Friday afternoon until Monday morning. Pre-registration until July 7 is \$1, \$1.50 at the gate. Write Hamfest, Quad-Co. ARC, Box 81, Chatham, IL 62629.

Illinois - The Chiburban Radio Mobileers announces its Fourth Annual 160-Meter Reunion on July 25 at Tinty Creek Woods, Grove No. 1,

at 143rd St. and Harlem Ave. (Ill. Rt. No. 43). Food will be available, camping facilities and motels are nearby. Talk-in on 1810 kHz.

Indiana - The 1971 TARS Hamfest is July 11, 4-H Center, Hwy. 41N, Evansville. Talk-in on 3.910, 7.260, 29.6 and 50.4 MHz. Auction, Bingo, contests, displays, and swapper's row. Registration \$2. Details from Morton Silverman, W9GJ, 1121 Bonnieview Dr., Evansville, IN 47715.

Indiana - FM Hamfest Sunday, August 1 near Angola. Free flea market; entertainment for the ladies and kids. Picnic grounds, campsites, boating, food, soft drinks available, rain or shine. Call-in on 146.34/146.76 or 146.94/52.525 MHz. For more information contact Fort Wayne Repeater Assn., Box 6022, Fort Wayne, IN 46806.

Iowa - The Annual Iowa 75-Meter Phone Net Picnic will be held on Sunday, August 15 at Riverview Park in Marshalltown. All are invited. There will be a swap table, pot luck dinner at 12 noon, and much more. More information from J. H. Robinson, O.D., 218 W. Montgomery, Creston, IA 50801.

Kansas - The Annual Kansas-Nebraska ARC Hamfest will be held Sunday, August 1, at the air-conditioned Moose Lodge, 113 W. 5th, Concordia, Kansas. Registration at 9:00 A.M., talk-in on 3.920 MHz. Free coffee and pop, entertainment for XYLs and harmonics, free swap section, covered dish luncheon at noon and presentation of the annual Baker Trophy to outstanding Kansas amateur of the year. More details from Wilbur Naylor, W0WXY, Box 157, Concordia, KA 66901.

Michigan - Cascades ARS announces its Second Annual Swap and Shop to be held Sunday, July 25 at the Jackson Armory, 100 Armory Court, Jackson. Doors will open at 8:00 A.M., auction at 4:00 P.M. Donation \$1 in advance, \$1.50 at the door. Table reservations are \$1.50. Free parking, mobile talk-in on 146.94 and 3.915 MHz. For tickets or information contact Cascades ARS, K8SMC, P.O. Box 512, Jackson, MI 49201.

Michigan - The Delta County ARS announces that their annual U.P. Hamfest will be held in Escanaba on July 31-August 1 at the U.P. Fairgrounds. The two-day affair will include a banquet, display, movies, contests, and a swap-and-shop. Plenty of parking. Advance registration suggested. Write B. F. Tremi, W8KBZ, Route 1, Gladstone, MI 49837.

Michigan - The 5th Annual Midland ARC Picnic and Swap and Shop is July 18 at the Midland County Fairgrounds. For Details, write James Bellows, K8NIF, 4901 Mac Ct., Midland, MI 48640.

Mississippi - The Jackson ARC will hold its annual Hamfest on July 24 and 25. Further information from Dave Thompson, K5MDX, P.O. Box 8371, Jackson, MS 39204.

Missouri - The Zero-Beaters ARC will hold their annual hamfest on Sunday, August 1 at the Washington City Park in Washington. Free auction, entertainment for children and XYLs. More information from Zero-Beaters, Box 24, Dutzow, MO 63342.

Montana - See Alberta.

Montana - The Annual WIMU Hamfest will be held at Mack's Inn, Idaho, 23 miles South of West Yellowstone, Montana on U.S. 191 on August 6, 7, and 8. Pre-registration is \$3.50 per person before July 24. Mail pre-registrations to Owen H. Wood, WA71ZR, 407 North Main, Livingston, MT 59047. Registration at the Hamfest will be \$4.

Nebraska - See Kansas.

New Jersey - The 5th Annual Hamfest and Picnic of the Knight Raiders VHF Club will be on Sunday, August 15, at Westbrook Park, West Milford. This year the emphasis is on two-meter fm. More information from Frank M. Passage,

Knight Raiders VHF Club, P.O. Box 1054, Passaic, NJ.

Nevada - Sierra Hamfest is on Saturday, August 14 at the *California Building* in Idlewild Park, Reno. Information from George Lyle, K7ZAU, 1047 Mark Way, Carson City, NV 89701.

Ohio - The Wood County ARC Ham-A-Rama is July 18 at the Wood County Fairgrounds, Bowling Green, At 10:00 A.M.

Pennsylvania - The Two Rivers ARC will hold its annual Hamfest July 18 at the Balcon Hotel Grounds in McKeesport, located 15 miles east of Pittsburgh. For information write Charles Thomas, 7022 Blackhawk, Pittsburgh, PA 15218.

Pennsylvania - Western Pennsylvania Hams. The 34th Annual Hamfest of the South Hills Brass Pounders and Modulators will be held on August 1 from noon 'til dusk at St. Clair Beach, McMurray, 5 miles south of Mt. Lebanon on Route 19. Swap and Shop, picnic space for the family, mobile check-in on 29.0 and 50.4 MHz. Information and pre-registration at \$1.50 per ticket (\$2.00 at the door) from Lou Cowan, 26 Graper St., Pittsburgh, PA 15227.

Pennsylvania - The Mt. Airy V.H.F. RC (The Pack Rats) will hold its 16th Annual Family Day and Picnic on Sunday, August 8 (rain date, August 15) at Fort Washington State Park, Flourtown. The Delaware Valley Chapter of the QCWA will join us again this year. All clubs are cordially invited. Games and entertainment. Bring your lunch and family. Free soda. Talk-in on 50.2 and 145.2 MHz. Follow the Pack Rat signs on Route 309. No reservations required. \$2 per family.

Saskatchewan - See Alberta.

Tennessee - The 22nd Annual Oak Ridge Radio Operators Club Crossville Hamfest will be held July 17 and 18. On Saturday at 6:30, there will be a banquet at the Holiday Inn in Crossville at which time Mr. George Chapman, WA4BVT, will be the principal speaker. On Sunday, there will be a dutch treat picnic and an extensive flea market. More information from WA4YEM, 102 Emerson Circle, Oak Ridge, TN 37830.

Texas - The North Texas Repeater Assn. is hosting the summer meeting of the Texas VHF-FM Society on August 14 and 15 at the Cibola Inn, U. S. Highway 80, Arlington, TX 76010. There will be equipment displays, technical sessions, hospitality room, fashion show and luncheon. No registration fee; pay only the cost

COMING A.R.R.L. CONVENTIONS

July 3-4 - West Virginia State, Jackson's Mill

July 2-4 - Pacific Division, San Jose, California

September 4-6 - Southwestern Division, Anaheim, California

September 24-25 - North Carolina State, Raleigh

October 9 - Dakota Division, Sioux Falls, South Dakota

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.

of lodging, meals, and entertainment. Refreshments in hospitality room. Room rates and additional details from Glen E. Zook, K9STH, 818 Brentwood Lane, Richardson, TX 75080.

Texas - Swapfest and Picnic on August 1 at the City Park in Levelland. Sponsored by the Northwest Texas Emergency Net and Hockley County ARC, this event is for the entire family. Bring your own picnic basket. Registration begins at 9:00 A.M. Lunch at 1:00 P.M. Caprock Repeater Club meeting at 2:30 P.M. Mobile talk-in on 3.950 and 146.94 MHz or through the Lubbock repeater on 146.34.

Wisconsin - The South Milwaukee ARC will hold its Second Annual Southeastern Wisconsin Swap-Fest on July 17 at Shephard Park (VEW Post 434), 9327 South Shephard Ave., Oak Creek. The activities will start at 7:00 A.M. and run until 5:00 P.M. There is plenty of parking and a picnic area. Hot and cold sandwiches and liquid refreshments available on the grounds. Admission is \$1. More information from WB9EQA, 1900 West Kimberly Ave., Milwaukee, WI 53221.

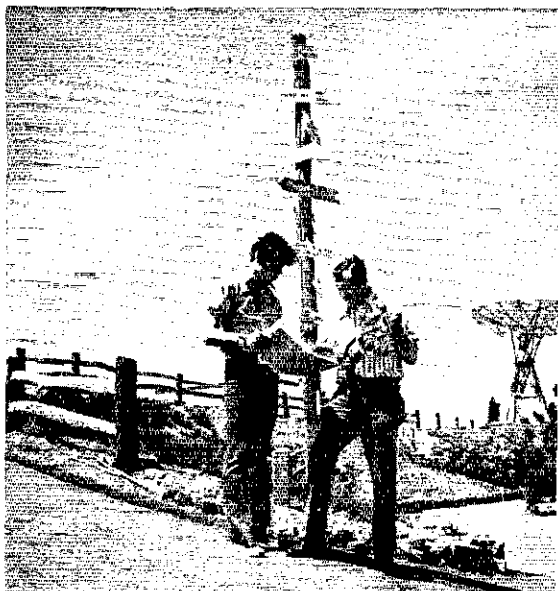
QST

Strays

The Wally Byam Caravan ARC will be operating with the special events call, WF7WBC, during the International Airstream Rally in Portland, Oregon, June 21 - July 8. Operation will be on cw, ssb, and RTTY on 80-15 meters. Contacts will receive a commemorative QSL. - WA8ETX

Preparing to shoot a scene for the new ham radio film, "WA11OX" are student WA11SF and photographer WA11UO. The 10-minute 16-mm. sound-color motion picture, now available for booking from the League's Training Aids Library, tells of the exciting work of amateur radio in the space age. Activities with amateur satellites and moonbounce are dramatically featured at the impressive WA11OX mountaintop site. An underlying theme throughout is the use of amateur radio as an educational tool at the Talcott Mountain Science Center.

July 1971



Happenings of the Month

"EYEBANK" INQUIRY, DOCKET 19245

In the past few years, FCC has called into question some traditional amateur activities — the handling of traffic on behalf of such organizations as the Eyebanks. (There is an amateur "Eyebank Net" meeting twice daily to see which Eyebanks are in need of corneas for transplant, and which Eyebanks have extras available on a given day.) Current Commission thinking is that such activities, even though worthwhile, violate Section 97.39 which forbids *issuance* (emphasis supplied) of an amateur station license to an organization or for its use. In an attempt to resolve the problem, FCC has issued a Notice of Inquiry, Docket 19245, asking for suggestions, with comment deadline of July 1.

Since this deadline will occur before the majority of amateurs have had the opportunity to read about the inquiry and react to it, ARRL has asked for a 60-day extension of time for filing.

The ARRL Board of Directors has directed that the League file comment in the matter, seeking to preserve the maximum possible choice of communications content for the amateur service.

The Commission text follows:

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of

Inquiry into the extent)	
to which amateur sta-)	Docket No. 19245
tions should be used on)	RM-1687
behalf of non-amateur)	
organizations.)	

NOTICE OF INQUIRY

Adopted: April 28, 1971 Released: May 5, 1971

By the Commission: Commissioner Bartley absent; Commissioner Johnson dissenting.

1. The Commission's Rules governing the Amateur Radio Service prohibit issuance of an amateur station license to a "school, company, corporation, association or other organization, nor for its use . . ." (Section 97.39). The only exception is for "a bona fide amateur organization or society." Another Section, 97.107, permits an

exception during declared emergencies when normal communications are disrupted.

2. Over the years, however, amateur stations have been used for non-emergency communications in behalf of certain non-amateur organizations such as the Red Cross, Eye Bank Association, and the March of Dimes. There has been general agreement that these operations are meritorious.

3. Recent developments have required a closer look at the requirements of the rules in relation to operation in the interest of other than amateur organizations. There is evidence of a considerable proliferation of non-amateur organizations with an interest in the use of amateur frequencies and amateur stations for purposes which may well lack the universal acceptability of Red Cross and Eye Bank objectives. Unlimited operation in behalf of such organizations could generate large numbers of new networks and the use of amateur radio as a medium for the organized advocacy of social, political or economic views could pre-empt amateur frequencies to the exclusion of the individual amateur for whom the service was intended.

4. The current rule is clear and unambiguous. It permits no such operation other than as previously noted. Therefore, while the Commission essentially agrees with those amateurs who believe that limited communications in behalf of the Red Cross, Eye Bank Association, March of Dimes, National Cystic Fibrosis Foundation, and similarly oriented organizations are meritorious, we conclude that they are not permissible under Sections 97.39 and 97.107 as they now read and, if the communications are to be permitted, the rules must be amended.

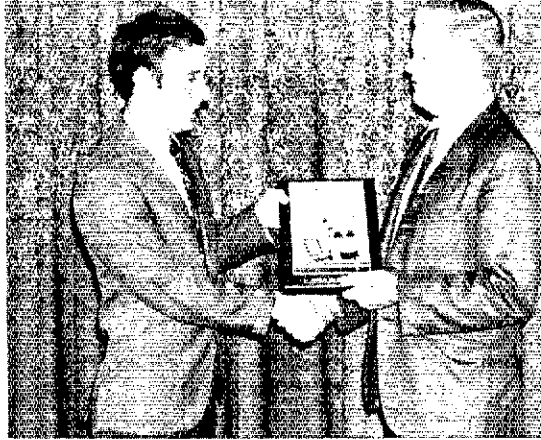
5. If this is done, the question is raised as to whether some restrictions on the kind of organizations to be included and limitations on the type of communications so permitted will be required. The lines of demarcation between organizations to be made eligible and the types of communications to be permitted are by no means clear. It is one of the purposes of this Notice of Inquiry to elicit information and comment on the extent, if any, to which restrictions and limitations should be imposed.

6. Another factor to be considered is that Section 2 of Article 41 of the International Radio Regulations limits international communications transmitted by amateur stations "to messages of a technical nature relating to tests and to remarks of a personal character for which by reason of their unimportance, recourse to the public telecommunications service is not justified." While there is no similar provision applicable to domestic operations,

The ARRL Membership and Publications Committee held a meeting in Nashville, Tennessee, recently — and took advantage of the opportunity for an informal ARRL Forum for Nashville area amateurs. Left to right: Max Arnold, W4WHN, Delta Director; Vic Clark, W4KFC, Roanoke Director; Ed Morris, WB4IBX, moderator; Roy L. Albright, W5EYB, West Gulf Director.



Back in December, 1969, *QST* ran an article by Albert D. Helfrick, K2BLA, "MOSFETs for Tubes - Substitutions in the Old Receiver." ARRL directors picked it as the best article of the month; since then, Hudson Division Director Harry J. Dannals, W2TUK, has been trying to arrange a presentation of the Cover Plaque Award. But K2BLA entered the Army and was stationed at Fort Gordon, Ga., then at Dong Ba Thin, Vietnam, MARS station. He got back to civilian life this spring and now is a research physicist at Kearfott Division, Singer Company. W2TUK (right) finally made the presentation!



Section 3(q) of the Communications Act in effect defines an amateur operator "as a person interested in radio technique solely with a personal aim." Extensive use of amateur radio for any third party would not appear to be compatible with that definition.

7. The Amateur Radio Section of the Electronic Industries Association (EIA) has filed a proposal (RM-1687) to amend Section 97.39 by the addition of a new subparagraph (b) which would read as follows:

"(b) Nothing in this section shall preclude the licensee or operator of an amateur station from transmitting:

(1) Messages in assistance of, or soliciting support for, non-profit public service activities such as the Red Cross, Boy Scouts, United Fund, Eye Bank, etc.

(2) Messages relating to weather conditions, highway conditions, and highway accidents.

(3) Messages relating to the results of national and state elections.

(4) Messages co-ordinating the activities of participants and/or officials during bona fide public sporting events, such as road races, boat races, airplane races, duly authorized parades, etc.

(5) Messages, regardless of their origin, whose purpose is the protection of life and property, or the coordination of efforts directed thereto, during any bona fide emergency in which life or property is threatened."

8. The above examples of organization and activities for which it is proposed to permit the use of amateur stations are clearly not intended to be all inclusive. There are numerous other organizations at least holding themselves out as engaging in public service activities. It is our view that consideration should be given to the desirability and possibility of much more specific criteria.

9. As previously noted, there is general recognition of the public benefit derived from limited use of amateur stations on behalf of such organizations as the Red Cross, Eye Bank Association, and the National Cystic Fibrosis Foundation. Such recognition may not, however,

In April during a local "Home Show," the Staten Island Amateur Radio Association celebrated its 50th anniversary of affiliation with ARRL by staging an "on the air" demonstration for the public. Bob McGuckin, W2EUY, Bob Neuhaus, K2KQZ, and Roy Neusch, W2CF (reading left to right), man the display.

be nearly as universal when considering the possible use of amateur radio on behalf of other non-profit, public service organizations such as political parties, student organizations, various churches and missionary societies and a large number of other and more controversial groups.

10. In order to assist the Commission in making determinations in these important and controversial areas, all interested parties are requested to submit comments and suggestions relevant to the following issues:

I. Are any restrictions on the use of amateur stations in behalf of non-amateur organizations warranted?

II. If amateur radio stations should be permitted to furnish a communication service to non-amateur organizations:

(A) To what types of organizations?

(B) What types of activity or communication should be permitted?

(C) If there is to be a distinction between emergency and non-emergency communications, should emergency communications be limited only to those situations where normal communications are disrupted?

11. This action is taken pursuant to Section 403 of the Communications Act. Comments must be filed on or before July 1, 1971. All relevant and timely comments will be considered.

12. In accordance with provisions of Section 1.419 of the Rules, an original and fourteen (14) copies of all comments, suggestions, pleadings, briefs, or other documents shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION

Ben F. Waple

Secretary



AMATEUR RADIO WEEKS - ETC.

Amateur radio weeks are familiar occurrences to readers of this column - but a new twist has come from the women amateurs of Ohio, who managed proclamation of "Buckeye Belles Week" May 3-9, 1971, by Ohio Governor John J. Gilligan. The statement comments on emergency preparedness, the "fascinating educational challenge," contribution to international friendship and impact of the hobby on the economy as reasons for the Week.

In Montana, Governor Forrest Anderson proclaimed July 12-18 as Radio Amateur Week coinciding with the Glacier Waterton Hamfest July 16-18. Public service in both amateur and MARS hats was the keynote of the request spearheaded by SCM Harry Roylance, W7RZY, and Lee Graves, WA7OBH.

VARIABLE CRYSTAL OSCILLATORS

In December *QST*, the "League Lines" column, we reported briefly that FCC was taking a dim view of variable crystal oscillators for use by Novices. A letter from the Commission to a manufacturer of such devices now okays them with certain reservations. We rejoice for the Novices, who may find such flexibility very useful, but we have mixed feelings too: the FCC letter appears to set up a sort of type approval for the first time in amateur radio, and also for the first time, forbids "unauthorized tampering" with amateur radio equipment. (FCC doesn't make clear who is authorized to service such a unit!)

The letter says:

"On the basis of the conclusive test results submitted regarding the operation of . . . Novice Class amateur variable crystal controlled transmitters, the equipment appears to be acceptable for licensing in compliance with Section 97.7(d)(1) of the Commission's Rules. Acceptability is limited to factory assembled equipment operating in the 80 and 40 meter Novice Class segments of the amateur band and each transmitter produced shall carry on the chassis the warning forbidding unauthorized tampering with the unit. - James E. Barr, Chief, Safety and Special Radio Services Bureau.



CANADIAN NOTES

The Canadian Division, ARRL, has made its own filing with FCC in respect to Docket 19162, saying that the "changes in telephony privileges now proposed are of such far-reaching effect, not only in Canada, but throughout the world, that comment becomes necessary. It is simply impossible to change the operating privileges, habits, and practices of the majority of the world's amateurs without affecting the remainder, and Canadian amateurs would be among those most concerned." The document comments unfavorably on the lack of intergovernmental discussion prior to release of Docket 19162, and to the timing, in which the docket was announced virtually on the eve of an important international conference in Geneva at which the amateurs of the whole world should present a united front. The Canadians further feel that FCC went about incentive licensing the wrong way and thus helped create the pressure for phone expansion to which FCC is now responding. There is also criticism of the lack of buffer space between U.S. phone bands and U.S. Novice bands, in which foreign amateurs could operate cross-band with U.S. hams. Finally, the document details the specific inconveniences expansion of the U.S. phone bands would cause to Canadian amateurs.

Amateur licenses in force in Canada as of March 31 are shown below. After two years of decline (apparently due to the \$10 per year license fees), the number has increased once again, by 2.1 percent.

REGION	1967	1968	1969	1970	1971
Pacific	1711	1768	1777	1728	1778
Western	1138	1166	1108	1096	1117
Central	1231	1255	1163	1177	1171
Ontario	4472	4634	4523	4388	4493
Quebec	2169	2233	2157	2138	2193
Atlantic	1399	1446	1333	1379	1403
TOTAL	12120	12502	12061	11906	12155

Minutes of the

1971 Annual Meeting of the Board of Directors

THE AMERICAN RADIO RELAY LEAGUE, INC.
May 7-8, 1971

1) Pursuant to due notice, the Board of Directors of The American Radio Relay League, Inc., met in annual session at the Shoreham Motor Hotel, Hartford, Connecticut, on May 7, 1971. The meeting was called to order at 9:32 A.M., with

Much of the Board's work got done during recesses as issues were discussed by twos and threes. To conserve space, we'll refer to participants by call: the full names and titles are in the opening paragraphs of the minutes. Here, to start off, are W5QKF (back to camera), W3EPC, and W4ACY.



And here's the group all together during the lunch break on Friday: *Seated from the left.* W7PGY, W6KW, W0PAN, W0GQ, W6ZRJ, W4DQS, W0DX, W0BUO, W4KFC, VE3CJ, W1QV. *Second row, standing.* W1RW, W5QKF, W0SIN, W5EYB, W1AX, W1BDI, W5NW, W2TUK, Treasurer Houghton, VE3RX, W1RW, W7QLE, W8WC, W9HPG, W9PRN, W4WHN, W3EPC. *Top row, standing.* W0BWJ, W1UED, W3PS, W0ECN, W1NJM, W1CER, PR Consultant Waters, K2SJO, K4KQ, W4WBK, W3KT, and W4ACY.

President Robert W. Denniston, W0DX, in the Chair, and the following directors present:

Roy L. Albright, W5EYB, West Gulf Division
 Max Arnold, W4WHN, Delta Division
 Robert York Chapman, W1QV, New England Div.
 Victor C. Clark, W4KFC, Roanoke Division
 Charles M. Cotterell, W0SIN, Rocky Mtn. Div.
 Harry J. Dannals, W2TUK, Hudson Division
 Noel B. Eaton, VE3CJ, Canadian Division
 Sumner H. Foster, W0GQ, Midwest Division
 J. A. Gmelin, W6ZRJ, Pacific Division
 John R. Griggs, W6KW, Southwestern Division
 Philip E. Haller, W9HPG, Central Division
 Harry A. McConaghy, W3EPC, Atlantic Division
 Alban A. Michel, W8WC, Great Lakes Division
 Larry J. Shima, W0PAN, Dakota Division
 H. Dale Strieter, W4DQS, Southeastern Division
 Robert B. Thurston, W7PGY, Northwestern Div.

Also in attendance, as members of the Board without vote, were Charles G. Compton, W0BUO, First Vice President: R. O. Best, W5QKF, and Carl L. Smith, W0BWJ, Vice Presidents; and John Huntton, W1RW, General Manager. Also in attendance, at the invitation of the Board as non-participating observers, were the following Vice Directors: Jesse Bieberman, W3KT, Atlantic Division; Edmond A. Metzger, W9PRN, Central; Franklin Cassen, W4WBK, Delta; Stan Zak, K2SJO, Hudson; Roger E. Corey, W1AX, New England; David O. Bennett, W7QLE, Northwestern; L. Phil Wicker, W4ACY, Roanoke; Allen C. Auten, W0ECN, Rocky Mountain; and Charles J. Bolvin, K4KQ, Southeastern. There were also present Honorary Vice Presidents Wayland M. Groves, W5NW, and F. E. Handy, W1BDI; Treasurer David H. Houghton; General Counsel Robert M. Booth, Jr., W3PS; Canadian Associate Counsel Arthur K. Meen, VE3RX; Assistant General Manager Richard L. Baldwin, W1RU; Communications Manager George Hart, W1NJM; Senior Assistant Secretary Perry F. Williams, W1UED; QST Technical Editor Doug DeMaw, W1CER; and Public Relations Consultant Don Waters.

2) On motion of Mr. Compton, unanimously VOTED that Item 9 (b) of the agenda, authori-

zation for expenses of committees, be transferred to 11 (b); and that an additional item 5 (h) be added to cover reports of the advisory committees, Oscar, and Amsat.

3) On motion of Mr. Thurston, unanimously VOTED that the minutes of the 1970 Annual Meeting of the Board of Directors are approved in the form in which they were issued by the Secretary.

4) On motion of Mr. Chapman, unanimously VOTED that the annual reports of the officers to the Board of Directors are accepted and the same placed on file.

5) Mr. Eaton, as Chairman, presented the report of the Finance Committee; Mr. Gmelin, as Chairman, presented the report of the Planning Committee; Mr. Albright, as Chairman, presented the report of the Membership & Publications Committee; Mr. Haller, as Chairman, presented the report of the Public Relations Committee; Mr. Groves, as Chairman, presented the report of the Merit & Awards Committee; Mr. Gmelin, as Chairman, presented the report of the Special Committee on a Joint Oscar/ARRL Amateur Station; Mr. Chapman, as Chairman, presented the report of the Special Committee on the Establishment of an ARRL Foundation. As liaison directors, Mr. Gmelin presented a report on Oscar, Mr. Clark on Amsat, Mr. Griggs on the VHF Repeater Advisory Committee, Mr. Clark on the Contest Advisory Committee, and Mr. Strieter on the DX Advisory Committee.

6) On motion of Mr. Dannals, unanimously VOTED that the annual reports of the directors to the Board of Directors are accepted and the same placed on file.

7) At this point, oral reports were offered by the officers of the League and the General Counsel, during which the Board was in recess from 10:45 to 11:00 A.M.

8) The Board was in recess for luncheon from 12:16 to 1:30 P.M.

9a) Moved, by Mr. Arnold, that the General Counsel is directed to file comment of the League with the Federal Communications Commission



W4KFC on "transmit" and W1RW on "receive."

concerning the proposals in Docket 19162, seeking amendment of the amateur rules to provide voice privileges for various classes of license as follows:

3800-4000 kHz	Conditional, General, Advanced, Extra
7150-7175 kHz	E
7175-7225 kHz	A,E
7225-7300 kHz	C,G,A,E
7075-7100 kHz	C,G,A,E, Region III pos- sessions only
14175-14200 kHz	E
14200-14275 kHz	A,E
14275-14350 kHz	C,G,A,E
21200-21225 kHz	E
21225-21325 kHz	A,E
21325-21450 kHz	C,G,A,E

and to shift the Novice segment in the 21 MHz band to 21100-21200 kHz; to shift the Novice segment in the 7 MHz band to 7100-7150 kHz; that the Extra Class cw subbands remain at their present width of 25 kHz; and that there be no changes in the present 28 MHz suballocations.

9b) Moved, by Mr. Albright, to amend the foregoing motion by striking the text and substituting therefor: that the frequency allocations proposed by FCC in Docket 19162 for the spectrum 3500-4000 kHz receive the concurrence of the American Radio Relay League, except that it is the opinion of the League that 25 kHz for



Extra Class cw (3500-3525 kHz) should be retained and that consideration should be given to the desirability of harmonically related Novice segments; that the FCC frequency allocation proposal for the 40-meter band contained in Docket 19162 be concurred in by the League, except that the segment 7075-7100 kHz proposed to be reserved for interregional contacts be allocated to the unrestricted use by Advanced and Extra Class licensees; and that the League concur in the FCC proposal contained in Docket 19162 with respect to the 20-meter band, except that the Commission give consideration to retaining 25 kHz for Extra Class cw from 14,000-14025 kHz. But there was no second, so the motion to amend was lost.

9c) Moved, by Mr. Dannals, to amend the original motion to add 3775-3800 kHz for Extra Class licensees only. Moved, by Mr. McConaghy, to further amend the motion to provide that 3750-3775 kHz be available to Extra Class; 3775-3800 kHz for Advanced and Extra; and 3800-4000 kHz for Conditional Class and higher; but, after discussion, on a rollcall vote, the second motion to amend was lost, 7 votes in favor to 9 opposed; those voting in favor were Messrs. Albright, Clark, Dannals, Griggs, McConaghy, Shima, and Thurston; those voting opposed were Messrs. Arnold, Chapman, Cotterell, Eaton, Foster, Gmelin, Haller, Michel, and Strieter. Mr. Albright challenged the propriety of Mr. Eaton's vote, in view of the provisions of By-Law 11 which requests the Canadian Director not to vote on U.S. regulatory matters; the Chair referred the question to the General Counsel, who gave the opinion that the by-law is not mandatory but simply an expression of a desire, and that in order to fulfill his responsibilities as a director, Mr. Eaton cannot be denied the opportunity to vote; the Chair so ruled.

9d) Moved, by Mr. Strieter, to further amend the motion to provide the use of 3800-3825 kHz for only Advanced and Extra Class licensees; 3825-4000 kHz for Conditional and higher; but, after discussion, on a rollcall vote, the second motion to amend was rejected, 3 votes in favor to 12 opposed; Messrs. Arnold, Michel, and Strieter voted in favor; all other directors voted opposed except Canadian Director Eaton, who abstained.

9e) Moved, by Mr. Haller, to further amend the motion to provide that 3800-3825 kHz be available to Advanced and Extra Class licensees; on a rollcall vote, the second motion to amend was adopted, 8 votes in favor to 7 opposed; those voting in favor were Messrs. Clark, Dannals, Foster, Griggs, Haller, Michel, Shima, and Thurston; those voting opposed were Messrs. Albright, Arnold, Chapman, Cotterell, Gmelin, McConaghy, and Strieter; Mr. Eaton abstained. The question then being on Mr. Dannals amendment to provide additionally 3775-3800 kHz for Extra Class, on a rollcall vote, the motion to amend was adopted, 12 votes in favor to 4 opposed; those voting in favor were Messrs. Albright, Chapman, Clark, Cotterell, Dannals, Foster, Griggs, Haller, McConaghy, Michel, Shima, and Thurston; those voting opposed were Messrs. Arnold, Eaton, Gmelin, and Strieter. Mr. Albright again challenged Mr. Eaton's vote; the Chair ruled as before. Moved, by Mr. Albright, to amend that

W2TUK explains a point to W1AX, W1CER, and K2SJO.

section of the original motion referring to 7075-7100 kHz by striking the words "Region III possessions only" and substituting therefor "for unrestricted use by Advanced and Extra Class licenses"; but on a rollcall vote, the motion to amend was rejected, 1 vote in favor to 14 opposed; Mr. Albright voted in favor; all other directors voted opposed except Mr. Eaton, who abstained. The question then being on the original motion as amended, on a rollcall vote the same was ADOPTED, 14 votes in favor to 1 opposed; all the directors voted in favor except Mr. Eaton, who voted opposed, and Mr. Strieter, who abstained.

10) The Board was in recess from 3:40 to 4:00 P.M.

11) On motion of Mr. Michel, after extended discussion, unanimously VOTED (Mr. Eaton abstaining) that the General Manager and Communications Manager examine the possibilities of strengthening some form of liaison between the FCC Field Offices and ARRL to declare emergency frequencies during times of major disaster, and that such situations be publicized with WIAW information bulletins and official bulletin stations.

12) On motion of Mr. Michel, unanimously VOTED that the editor of *QST* list all items of "feedback" concerning technical articles under the "Technical Correspondence" column.

13) On motion of Mr. Dannels, unanimously VOTED that the 1974 ARRL National Convention be scheduled to be held in the Hudson Division at a specific date and city to be later designated.

14) Moved, by Mr. Dannels, that Article 4 of the Articles of Association be amended by substituting the following for the last two sentences: "The Board shall meet twice each year at times and places as provided by the By-Laws. The first meeting shall be called the annual meeting and the second shall be called the second meeting. Special meetings of the Board shall be called by the President upon written request of at least one-half of the membership of the Board as then constituted." After extensive discussion, on a rollcall vote, the motion to amend Article 4 was ADOPTED, 16 votes in favor to none opposed; all directors voted in favor.

15) Moved, by Mr. Dannels, that effective January 1, 1972, By-Law 20 be amended to read as follows: "The annual meetings of the Board of Directors shall be held in the vicinity of Newington, Connecticut, on the third Friday in January of each year. The second meeting of the Board of Directors shall be held in the vicinity of Newington, Connecticut, on the third Friday in July of each year. The places of the meetings shall be designated by the President and notified by the Secretary. The times and places of the meetings may be changed provided that specific provision is made therefor by (1) majority vote of the directors at the next preceding annual or second meeting, or (2) majority vote of the directors by mail initiated by the Executive Committee or on petition of at least five directors, such mail vote to be taken at least 60 days previous to the date proposed for the meeting." After extensive discussion, moved by Mr. Strieter, to amend the motion to provide for



W7QLE listens to W9HPG under the eye of W9PRN.

an annual meeting the first week in February; but there was no second, so the motion to amend was lost. On a rollcall vote, the motion to amend By-Law 20 was ADOPTED, 14 votes in favor to 1 opposed; all the directors voted in favor except Mr. Haller, who voted opposed, and Mr. Strieter, who abstained.

16) Moved, by Mr. Foster, that By-Law 4 be amended to read, "The dues of members of any class shall be \$7.50 per year in the United States and possessions, the Commonwealth of Puerto Rico or in Canada payable annually in advance effective July 1, 1971." After discussion, moved, by Mr. Shima, to amend the motion to make the effective date January 1, 1972. On motion of Mr. Clark, unanimously VOTED to amend the motion by striking the text and substituting therefor the following: "that action in the matter of a dues increase is deferred until the first 1972 meeting of the Board of Directors." The motion, as thus amended, was unanimously ADOPTED.

17) On motion of Mr. Chapman, unanimously VOTED that the General Manager is directed to keep a reserve for Life Membership in an amount, at minimum, to provide equivalent dues income for the life expectancy of such members, plus an amount for contingencies as directed from time to time by the Finance Committee.

18) On motion of Mr. Chapman, unanimously VOTED that the Board reappoints the firm of Ernst & Ernst as auditors of the League for the calendar year 1972.

19) On motion of Mr. Chapman, unanimously VOTED that the Federation of Eastern Massachusetts Amateur Radio Association clubs and its duly elected officials are congratulated by the



VE3RX, VE3CJ, W1QV, W0BWJ, and W0SIN follow a report as it's delivered.

July 1971



1971 ARRL Board of Directors for holding and concluding a second successful National Convention in the City of Boston, 25-27 September 1970.

20) On motion of Mr. Chapman, after discussion, unanimously VOTED that former ARRL directors be provided copies of all directors letters published by headquarters, if annually requested by them.

21) On motion of Mr. Chapman, the following resolution was unanimously ADOPTED:

WHEREAS, Mrs. Cecilia Christensen Hatch, supervisor of the membership records section, has served the American Radio Relay League faithfully and well for 43 years; and, WHEREAS, her friendliness and skill in handling circulation problems has contributed to the growth and stature of the League; and, WHEREAS, she retires from the League's active staff on October 1, 1971;

NOW THEREFORE BE IT RESOLVED that the Board of Directors of the American Radio Relay League, in annual meeting assembled, do hereby express to Cecilia Christensen Hatch, their deep appreciation for her long, diligent and faithful service to the League and amateur radio.

22) Moved, by Mr. Gmelin, that a Legal Advisory Committee be established with the General Counsel as its chairman and with not more than six attorneys from various divisions of the League who are members of the League as members of the committee; selections of the membership of the committee shall be made by the President with consideration given to the recommendations of the General Counsel; the cost of establishing the committee and the cost of its operation for the first year shall be paid by the General Counsel from the operating funds of his office. After extended discussion, on motion of Mr. Chapman, unanimously VOTED that the matter is laid on the table.

23) On motion of Mr. Gmelin, after discussion, unanimously VOTED that the Planning Committee make a study on Board meeting procedures and report back to the Board at the next meeting on possible changes in procedure.



W4WBK and W0ECN, as vice directors, are observers at the meeting.

24) On motion of Mr. Gmelin, unanimously VOTED that the Planning Committee is instructed to continue study with the General Counsel on the matter of League election procedures.

25) On motion of Mr. Clark, after discussion, unanimously VOTED that Rule 4 of the Rules and Regulations concerning Advisory Committees be modified to read as follows:

4. Committee membership for practical reasons should be limited to fewer than twelve, and the exact number and any geographical or other proposed limitation on committee make-up shall be outlined in the original petition for creation of the committee. A member's initial term of office will be either for two or three years, as designated by the president, with approximately one-half the initial members having two-year terms and the remainder having three-year terms. Members may be reappointed for not more than two consecutive terms, but are again eligible for appointment to the committee membership after a lapse of one year.

26) On motion of Mr. Clark, after discussion unanimously VOTED that Rules 4 and 5 of the Rules and Regulations concerning Affiliated Societies be combined and modified to read as follows:

4. At least 51% of the voting members of an affiliated amateur radio society must be Full or Associate Members of the League, and further, at least 51% of the members of an affiliated amateur radio society must be licensed amateurs; except that affiliated status may be granted to regularly organized amateur radio societies in secondary schools and colleges in which the sponsor, faculty adviser, president, or trustee of the society is a licensed amateur and a member of the League, and where the name of the society clearly shows that it is a recognized activity of the school.

27) On motion of Mr. Clark, unanimously VOTED that funding not to exceed \$250 per committee be authorized for each of the advisory committees created by the Board of Directors.

28) Moved, by Mr. Clark, that By-Law 1 be amended to read as follows:

(a) To be eligible for Full Membership, an applicant must be a resident of the United States, its possessions, the Commonwealth of Puerto Rico, or of Canada, or a United States or Canadian citizen temporarily resident elsewhere, and either (1) at the time of application must be the holder of an amateur radio operators license, or a reciprocal operating authorization, issued by the United States or Canada; or (2) a person who has held continuous and unexpired membership in the League since May 15, 1934.

(b) Any person interested in amateur radio shall be eligible to Associate Membership. Upon attaining possession of an amateur license, an Associate Member otherwise eligible under subsection (a) above, shall be transferred to Full Membership upon his application therefor.

VE3RX counsels W4WHN during a break.

QST for

VE3CJ passes out envelopes containing the views of his members toward U.S. phone expansion.

(c) A paid up Life Membership in the League shall be available to any Full or Associate Member, other than a Family Member, upon payment of a fee of twenty times the annual dues rate; said Life Membership enjoys all the rights, benefits and privileges commensurate with the grade of license held; said Life Membership to be non-transferable.

After discussion, on a rollcall vote, the motion to amend the By-Law was unanimously ADOPTED, 16 votes in favor to none opposed; all the directors voted in favor.

29) On motion of Mr. Clark, unanimously VOTED that the Board of Directors commends Deputy Communications Manager Ellen White, W1YYM, for her outstanding performance as staff liaison member of the Contest Advisory Committee during the past two years.

30) The Board was in recess for dinner from 6:10 P.M. to 8:00 P.M., during which period Mr. Corey departed.

31) On motion of Mr. Cotterell, after discussion, unanimously VOTED that the Board have the VHF Advisory Committee undertake a study of repeater standards, frequencies and related items.

32) On motion of Mr. Gmelin, unanimously VOTED to take from the table his motion concerning a "Legal Advisory Committee." After discussion, unanimous consent being given to change the title to "Legal Counsel Committee," the motion was unanimously ADOPTED.

33) Moved by Mr. Griggs, that an ad hoc Committee be appointed by the President to study the feasibility of realigning the American Radio Relay League divisional boundaries, or by weighting the voting powers of the directors, to establish a more equal representation of the membership on the Board of Directors, and that the committee so appointed shall report its findings to the Board of Directors ninety days prior to the 1972 annual Board meeting, together with recommendations. After discussion, on motion of Mr. Gmelin, VOTED that the matter is laid on the table. Messrs. Clark, Griggs and McConaghy requested to be recorded as voting opposed.

34) Moved, by Mr. Griggs, that the General Manager is instructed to make an opinion survey of ARRL members annually in QST on subjects of concern to the members, such matters to be designated by three or more directors and at their request, with results tabulated by the staff and provided to each member of the Board of Directors as an indication of the membership opinion. After extended discussion, the motion was rejected, 1 vote in favor to 11 opposed; Mr. Griggs requested to be recorded as voting in favor.

35) Moved, by Mr. Griggs, that the General Manager and League Counsel shall petition the Federal Communications Commission to request authority from Congress to permit the FCC to establish interference rejection requirements upon the manufacturers of TV and home entertainment



equipment. After discussion, on motion of Mr. Clark, unanimously VOTED to amend the motion by striking the text and substituting therefor the following: "to direct the General Counsel to file comments in response to the Notice of Inquiry in Docket No. 19183 with particular reference to the adoption of standards to minimize the susceptibility of television and other home entertainment equipment from interference from the operation of amateur radio transmitters." The question then being on the motion as amended, the same was unanimously (Mr. Eaton abstaining) ADOPTED.

36) On motion of Mr. Albright, after discussion, unanimously VOTED that expenditures of League funds for operation of the QSL service, expenditures for the defense of amateur frequencies, foreign travel, legal services, and the cost of support to special programs such as the Talcott Mountain Science Center, Amsat, Pueblo repeater, the DARE program, etc., each be specifically identified in the General Manager's quarterly statement of revenues and expenses.

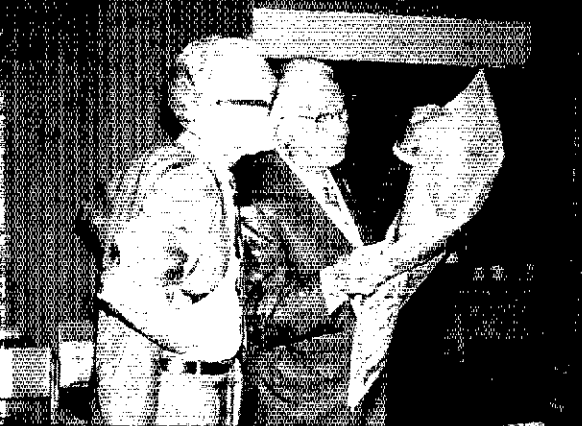
37) Moved, by Mr. Albright, that the League request the FCC to consider permitting theory examination, before applicants take the code test, when so requested by the applicant, and authorizing re-examination on the code test, without additional charge, within 90 days (or upon next visit by the examiner, for those stations other than FCC office locations). After discussion, on motion of Mr. Arnold, unanimously (Mr. Eaton abstaining) VOTED to amend the motion to provide that the subject be referred to the General Counsel for study and appropriate action. The question then being on the motion as amended, the same was unanimously (Mr. Eaton again abstaining) ADOPTED.

38) Moved, by Mr. Albright, that the Contest Advisory Committee be requested to consider the advisability of separate awards for fone and cw 5BDXCC; further move the committee consider



W0PAN cradles his pipe and monitors W2TUK.

July 1971



No Board business here — two Texans, W5NW and W5QKF, check the stock market report in the *Hartford Courant*!

the feasibility of graduated awards or recognition, from DXCC to 5BDXCC, the committee to report its recommendations at the next Board meeting. But there was no second, so the motion was lost.

39) Moved, by Mr. Albright, that Executive Committee actions shall be limited to implementation of policies established by the Board of Directors; further move that Executive Committee authorization for expenditure of League funds shall be limited to three thousand dollars (\$3,000.00) for any single purpose except when specifically authorized otherwise by the Board of Directors. After extensive discussion, moved, by Mr. McConaghy, to lay the matter on the table; but the motion to table was rejected, 3 votes in favor to 10 opposed. After further discussion, the question then being on the original motion, the same was rejected.

40) On motion of Mr. McConaghy, unanimously VOTED that FCC Docket 19163 dated and released February 26, 1971, be brought before the Board, at this time while in official session, for review, discussion and determination of necessary action and/or reply by the specified dates to the FCC. On motion of Mr. Clark, after discussion, unanimously VOTED that the General Counsel is instructed to file comments in response to Docket 19163 which are consistent with those in Minutes 23 and 54 of the 1969 annual meeting of the Board of Directors.

41) On motion of Mr. McConaghy, unanimously VOTED that the subject matter of Minute 31 of the 1970 meeting of the Board of Directors (the "Eye Bank" problem) be brought before this Board, while in official session at this time, for determination, review and promulgation of a reply as requested in FCC Docket No. 19245 released and dated May 5, 1971 "Notice of Inquiry." Whereupon the Board engaged in extensive discussion of the subject.

42) The Board recessed at 11:00 P.M., reconvening at 9:35 A.M. on May 8, with all directors and other persons hereinbefore mentioned in attendance except Messrs. Corey and Meen.

43) On motion of Mr. Clark, after extensive discussion, unanimously (Mr. Eaton abstaining) VOTED that the General Counsel, in collaboration with the President and General Manager, file comments with the Federal Communications Commission in response to the Notice of Inquiry in Docket No. 19245, urging the Commission to reconsider its interpretation of Section 97.39 of the Rules concerning the traffic which may be carried and services which may be provided by amateur stations and, if appropriate, to suggest modifications of Part 97 of the Rules to guarantee

continuation of the policies and interpretation of the Rules concerning permissible and prohibited operation and use of amateur stations observed prior to the interpretation of Section 97.39 as set forth in said Notice of Inquiry and in various letters in recent years of the Commission including that pertaining to the Eye Bank Network.

44) Moved, by Mr. McConaghy, that the Board of Directors petition the FCC requesting change of classification for Technician Class license to Technician I and Technician II; Technician I to retain "experimenter" classification; Technician II to be classified "communicator." On motion of Mr. Clark, after discussion, unanimously (Mr. Eaton abstaining) VOTED to amend the motion to refer this proposal to the Planning Committee for further study and a recommendation at the next Board meeting. The question then being on the original motion as amended, the same was unanimously (Mr. Eaton abstaining) ADOPTED.

45) Moved, by Mr. McConaghy, that an advisory committee on public relations be established by this Board for the purpose of fostering liaison between the ARRL Public Relations Consultant and the amateur fraternity. After discussion, on motion of Mr. Clark, unanimously VOTED to amend the motion to provide that the matter of establishing a public relations advisory committee be referred to the Board's Public Relations Committee for a recommendation at the Board's next meeting. The question then being on the motion as amended, the same was unanimously ADOPTED.

46) Moved, by Mr. McConaghy, that the FCC be petitioned to grandfather Advance Class licenses to the next higher grade (Extra Class) who have attained a life span of 60 years, or higher, plus 40 years of continuous license tenure — with the exception that lapse or break in tenure cannot exceed 90 days. But there was no second, so the motion was lost.

47) On motion of Mr. Eaton, after discussion, the following resolution was unanimously ADOPTED:

WHEREAS, the American Radio Relay League, Inc. is a corporation exempt from Federal Taxation under section 501(c) (3) of the Internal Revenue Code, and WHEREAS, said corporation wishes to compensate its employees and help them provide for their future security, and WHEREAS, the corporation desires to make available retirement income contracts in lieu of salary for certain employees at their option which will qualify under section 403 (b) of the Internal Revenue Code of 1954, and any amendment thereto or successor section, it being the intention of the corporation that premiums paid by the corporation on such contracts will not be considered as currently taxable income to such employees, RESOLVED, that the corporation, through its General Manager or other authorized official, apply to an insurance company for a non-transferable and non-assignable retirement income contract (with or without incidental life insurance protection) on the life of each such employee, and, so long as said employee(s) shall continue in the employ of the corporation, the corporation is expected to pay the premiums for such contract(s), and said employees

W6KW listens to W4WBK; W5QKF in the background.

are to be given the possession of said contracts when issued and are to be the owners of all rights in such contracts, and such rights shall be non-forfeitable, and the General Manager, or other official, is authorized to take all steps necessary to implement this resolution.

48) On motion of Mr. Eaton, the following resolution was unanimously ADOPTED:

WHEREAS, Miss Charlotte A. Clark has served the American Radio Relay League with fidelity and devotion as accountant and assistant to the treasurer for 25 years, and, WHEREAS, her devotion to duty has contributed to the stature of the League, and, WHEREAS, she retires from the League's active staff on October 1, 1971,

NOW THEREFORE BE IT RESOLVED, that the Board of Directors of the American Radio Relay League, in annual meeting assembled, do hereby express to Charlotte A. Clark, their deep appreciation for her long, diligent and faithful service to the League and amateur radio.

49) The Board was in recess from 10:35 A.M. to 10:55 A.M.

50) On motion of Mr. Haller, after extensive discussion, unanimously VOTED that this Board request its General Counsel to assist, as much as possible, the Counsel of the Chicago Area Radio Club Council in efforts to establish the right of licensed amateurs to operate their stations in the City of Chicago.

51) On motion of Mr. Haller, after extensive discussion, unanimously VOTED that ARRL purchase from Dave Bell Associates the rights to the film "This is Ham Radio," and make this film available for distribution to schools and clubs.

52) On motion of Mr. Haller, the following resolution was unanimously ADOPTED:

WHEREAS, Samuel K. Cowles, traffic manager in the shipping department of the American Radio Relay League, in September, 1970, completed 25 years of service, and, WHEREAS, throughout that time he has been an example of devotion to duty and attention to detail and thereby has contributed to the efficient operation and the reputation of the League,

NOW THEREFORE BE IT RESOLVED that the Board of Directors of the American Radio Relay League in annual meeting assembled, do hereby express to Samuel K. Cowles, their deep appreciation and warm thanks for his continued faithful service to the League and to amateur radio.

53) Moved, by Mr. Haller, to take from the table Mr. Griggs' motion concerning redistricting ARRL divisions; but the motion to take from the table was rejected.

54) On motion of Vice President Smith, unanimously VOTED that, supplementing the list of Life Member applicants approved by the Executive Committee at its meeting May 6, 1971, the Board approves the application for Life Membership of Charles M. Cotterell, W0SIN. (Applause)

55) Moved, by Mr. Shima, that a study of the organization and operation of the League's Headquarters be made by Vice President Compton, and that a report with recommendations, if any, be submitted to the directors by mail by January 1, 1972. But, after extended discussion, with the



consent of his second, Mr. Shima withdrew the motion.

56) On motion of Mr. Shima, after discussion, unanimously VOTED that the Planning Committee study the feasibility of petitioning the Federal Communications Commission to establish an FCC Certified Volunteer Examiner program to administer amateur examinations to all persons residing more than 75 miles from a quarterly FCC examining point; examinations administered under this program to be conducted with not less than two examiners in attendance; certified volunteer examiner status restricted to duly licensed amateurs 21 years of age or older who hold an Amateur Extra Class license.

57) Moved, by Mr. Shima, that the General Manager shall present to the Board, at the annual meeting, a three-year operating plan for the Headquarters operations; this plan will outline his proposed future plans in the following specific areas: (1) financial, (2) manpower levels, (3) publications, (4) membership services, and (5) capital expenditures. After discussion, on motion of Mr. Chapman, unanimously VOTED that Mr. Shima's motion be referred to the Planning and Finance Committees for the study of its merits and the Finance Committee will submit a report to this Board in January, 1972. The question then being on the motion as amended, the same was unanimously ADOPTED.

58) Moved, by Mr. Shima, that the third sentence of Article 7 of the Articles of Association be amended to read as follows: "Should the office of Vice Director be vacant, the vacancy shall be filled by appointment by the President." After discussion, on a rollcall vote the motion to amend the Articles was ADOPTED, 16 votes in favor to none opposed.

59) Moved, by Mr. Shima, that effective with the August, 1971 QST augment the column "It Seems to Us" with a column titled "Director Views"; the new column will be restricted to one page and will provide comments from two directors each month; rotation of directors will be alphabetical by division with each director providing information to cover one-half of the page when it's his turn; authors will be identified. But, after discussion, the motion was rejected.

60) Moved, by Mr. Shima, that the American Radio Relay League publicize in the column "Operating Events," CQ Magazine sponsored world-wide DX contests and the world-wide WPX contest. After discussion, on motion of Mr. Gmelin, VOTED to refer the subject of the motion to the General Counsel for study and report at the



WGZRJ borrows an office and typewriter at Headquarters to hammer out a committee report.

next Board meeting. The question then being on the motion as amended, the same was ADOPTED.

61) The Board was in recess for luncheon from 12:45 P.M. to 1:25 P.M.

62) On motion of Mr. Gmelin, unanimously VOTED that the General Manager is hereby authorized to reimburse the division directors for actual expenses incurred by them during the year 1971 in the proper administration of ARRL affairs in their respective divisions, up to amounts as follows:

Canadian Division Director	\$ 1750
Atlantic Division Director	3500
Central Division Director	2400
Dakota Division Director	1400
Delta Division Director	2800
Great Lakes Division Director	2500
Hudson Division Director	2500
Midwest Division Director	2200
New England Division Director	2700
Northwestern Division Director	2500
Pacific Division Director	3800
Roanoke Division Director	2200
Rocky Mountain Division Director	1800
Southeastern Division Director	2500
Southwestern Division Director	3800
West Gulf Division Director	3000

63) On motion of Mr. Eaton, unanimously VOTED that the amounts of \$31.44 for the Atlantic Division, \$23.40 for the Dakota Division, \$180.94 for the Pacific Division, and \$73.93 for the Southwestern Division, be authorized as additional reimbursed expenses for 1970.

64) On motion of Mr. Thurston, unanimously VOTED that to continue the Board's policy of reimbursing Section Communications Managers and QSL Managers of the League for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1971 a total amount not to exceed \$13,500 under terms prescribed by the Communications Manager for SCMs, and the General Manager for QSL Managers, following the general pattern established by the Board.

65) On motion of Mr. Griggs, unanimously VOTED that to continue the Board's policy of reimbursing Section Emergency Coordinators for certain travel in furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1971 a total amount not to exceed \$8,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

66) On motion of Mr. Gmelin, unanimously VOTED that, to continue the Board's policy of reimbursing National Traffic System officials above the section level for certain approved travel in

furthering ARRL organizational activities, the General Manager is hereby authorized to pay during the year 1971 a total amount not to exceed \$6,000 under terms prescribed by the Communications Manager following the general pattern established by the Board.

67) On motion of Mr. Chapman, unanimously VOTED that the General Manager is hereby authorized to pay during the period between January 1, 1972 and the 1972 annual meeting of the Board, expenses against usual authorizations for administrative and committee operations in no greater amount than 1971 authorized amounts.

68) On motion of Mr. Compton, unanimously VOTED: that the Pension Plan of the League as set out in Group Annuity Contract Number GR-1180 and as adopted by the Board of Directors on May 11, 1962, is amended: (1) For present employees, to incorporate a moving adjustment for inflation as recommended by the Insurance Company; the actuarial recommendation of the Insurance Company will follow a plan having the objective of providing more adequate reserves for pensions which will amount to 1-1/4% (per year of accredited service) of the last five years' average compensation for each participant at actual retirement age; however, no change in vesting will occur hereunder, and employees retiring early will have their pensions reduced actuarially as before. (2) For retired employees, to increase their retirement income by 10%; and that the General Manager and Treasurer of the League are authorized to take such action and execute such documents as shall be necessary to carry out this resolution.

69) Moved, by Mr. Arnold, that any member so desiring may request first-class receipt of *QST* at no additional cost to the League. After extended discussion, the motion was ADOPTED, 10 votes in favor to 6 opposed. Messrs. Albright, Chapman, Clark, Gmelin, Griggs, Haller, and Shima requested that they be recorded as voting in favor; Messrs. Michel and Strieter requested that they be recorded as voting opposed.

70) Moved, by Mr. Arnold, that Rule 4 of the By-Laws regarding members be amended by inserting the words "with the exception of a reduced rate of \$4.00 being offered to all newly licensed Novices on a one year, one time basis between the period of 1 January 1972 through 31 December 1973," immediately following the word Canada. After discussion, on motion of Mr. Clark, unanimously voted that the matter is laid on the table.

71) On motion of Mr. Dannals, after discussion, unanimously VOTED that the General Manager prepare a "Special Techniques Handbook" featuring sections on RTTY, repeaters, amateur TV, space communications, facsimile and other special communications techniques as deemed appropriate by the Hq. staff; target date for publication of this handbook is 1973.

72) Moved, by Mr. Albright, that the WIAW bulletin and code practice transmitting frequencies be shifted from those now in use to selected points within the General Class segments. After extended discussion, on motion of Mr. Gmelin, VOTED, 12 votes in favor to 4 opposed, that the matter is laid on the table.

73) Moved, by Mr. Haller, that the League investigate the availability of actual disaster films and tapes showing amateur participation in disaster communications with a view to future use in documenting our public service. After discussion, on motion of Mr. Thurston, unanimously VOTED to amend the motion by providing that the subject is referred to the Public Relations Committee. The question being on the motion as amended, the same was unanimously ADOPTED.

74) On motion of Mr. Dannals (on behalf of Chairman Groves of the Merit & Awards Committee), unanimously VOTED that in recognition of their unusual skill and steadfast determination which resulted in the first 220 MHz earth-moon-earth QSO, the League presents the 1970 Technical Merit Award jointly to WB6NMT, Louis N. Anciaux, Dixon, Calif.; K2CBA, Paul J. Snyder, Petersburg, N.Y.; and W7CNK, Lester L. Whitaker, Tacoma, Wash.

75) On motion of Mr. Chapman, unanimously VOTED that the activities of the Foundation Committee remain in status quo until otherwise directed by the ARRL Board.

76) The Chair announced that the Board would now proceed to the election of four directors to the Executive Committee for the ensuing year. The Chair appointed Messrs. Bieberman, Bolvin and Metzger as Tellers. Mr. Dannals nominated Mr. Eaton. Mr. Michel nominated Mr. Dannals. Mr. Clark nominated Mr. Thurston. Mr. McConaghy nominated Mr. Griggs. Mr. Thurston nominated Mr. Clark. Mr. Strieter nominated Mr. Gmelin. On motion of Mr. Chapman, unanimously VOTED that the nominations are closed. The Tellers announced the results of the balloting as follows:

Mr. Clark	15
Mr. Thurston	14
Mr. Dannals	13
Mr. Eaton	9
Mr. Griggs	7
Mr. Gmelin	6

Whereupon Victor C. Clark, W4KFC, Robert B. Thurston, W7PGY, Harry J. Dannals, W2TUK, and Noel B. Eaton, VE3CJ, were declared elected as members of the Executive Committee for the ensuing term (Applause).

77) The Board was in recess from 3:15 P.M. until 3:30 P.M.

78) At this point Treasurer Houghton briefly addressed the Board, noting that April 1972 will mark his 50th anniversary of service to the League; the assembly arose with applause.

79) On motion of Mr. Chapman, unanimously VOTED that the Planning Committee study the merits of sponsoring League awards for Mobile WAS and Mobile DXCC confirmed contacts.

80) After a report by the General Counsel and extensive discussion, on motion of Mr. Cotterell, unanimously VOTED that the matter of the status of the amateur 220-225 MHz band and proposals affecting it continue to receive careful attention and study by the General Counsel and Executive Committee for appropriate action.

81) Moved, by Mr. Michel, that in view of the fact that the Board has passed a proposal authorizing two Board meetings per year. Item 58 of the 1969 ARRL Board of Directors meeting, authorizing directors to charge expenses incurred attending ARRL National Conventions, be revoked in the interest of economy. After discussion, on motion of Mr. Gmelin, VOTED, 9 votes in favor to 6 opposed, to amend the motion by providing that the subject be referred to the Finance Committee. The question then being on the motion as amended, the same was ADOPTED, also 9 votes in favor to 6 opposed.

82) On motion of Mr. Dannals, unanimously VOTED that the Board acknowledges the dedicated efforts of the members of the Intruder Watch and heartily endorses their continued work; further, the Board urges interested amateurs to join the ranks of the Intruder Watch and assist in this most important contribution to protection of our frequencies.

83) On motion of Mr. Dannals, the following resolution was unanimously ADOPTED:

WHEREAS, the Armed Forces Communications and Electronics Association was founded in May, 1946, and WHEREAS, for 25 years it has provided leadership in the development of practical communications, and WHEREAS, for 25 years it has served as a common meeting ground for civilian and military communicators, and WHEREAS, the American Radio Relay League is proud to be numbered among its group members:

NOW THEREFORE BE IT RESOLVED that the Board of Directors of the American Radio Relay League, in annual meeting assembled, does express congratulations and best wishes to the members of the Armed Forces Communications and Electronics Association assembled at the Silver Jubilee Convention, June 8-10, 1971, at the Sheraton Park Hotel, Washington, DC.

84) On motion of Mr. Dannals, unanimously (Mr. Eaton abstaining) VOTED that the Planning Committee study the possibility of reducing the General/Conditional Class code speed to 10 wpm, in anticipation of future comment to possible FCC action on RM-1724.

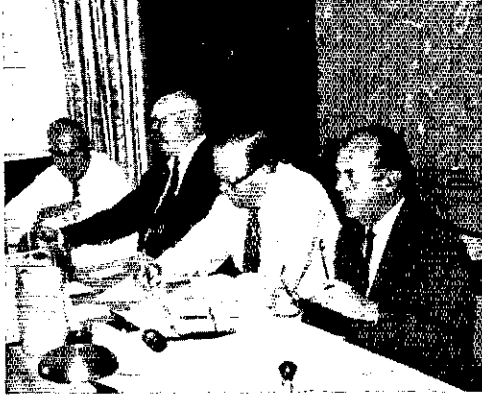
85) On motion of Mr. McConaghy, the following resolution was unanimously ADOPTED:

WHEREAS, Roland B. Bourne, W1ANA, has served as curator of the museum at the headquarters of the American Radio Relay League since July 1963, and WHEREAS, his skill, knowledge and craftsmanship have brought the museum into national recognition, and WHEREAS, he has further contributed to the promulgation of amateur history through "Fifty/Twenty-Five Years Ago in QST" and other magazine articles;

NOW THEREFORE, BE IT RESOLVED by the Board of Directors of the American Radio Relay League in annual meeting assembled, that it heartily commends Roland B. Bourne, W1ANA, by

WØDX and W4DQS pause over coffee while W4ACY seeks a refill.





The gavel and "solid state amplifier" (an old factory gong) are within WØDX's reach all during the meeting, and Counsel W3PS is right along side, too! At far left is WØGQ and next is W7PGY.

suitable plaque or certificate to be determined by the Board, for his invaluable contributions to the League.

86) Moved, by Mr. Strieter, that the 1972 annual meeting be held in Miami, Florida, to coincide with the Southeastern Division Convention in that city on the third weekend of January 1972; but, after discussion, the motion was rejected.

87) On motion of Mr. Best, unanimously VOTED that the Board express its sincere thanks for the untiring work and devotion to the League and to amateur radio by the vice directors, assistant directors, SCMs, BECs, QSL Managers and all members of the League; it is the sense of the Board that their contribution to amateur radio has done much to enhance amateur radio, particularly in the fields of technical development and public service.

88) On motion of Mr. Griggs, unanimously VOTED that the Membership & Publications Committee investigate the desirability of sending QST via first-class mail to all SCMs.

89) On motion of Mr. Griggs, after discussion, unanimously VOTED that the Membership & Publications Committee be assigned the task of conducting a study to determine the feasibility of placing QST again on sale in the newsstands so as to attract newcomers into amateur radio.

90) The Board was in recess from 4:58 P.M. until 5:15 P.M.

91) On motion of Mr. Gmelin, unanimously (Mr. Eaton abstaining) VOTED that the Planning Committee study the feasibility of petitioning FCC to establish the frequencies 50.050 to 50.100 MHz for Technician and higher cw operation.

92) On motion of Mr. Gmelin, unanimously VOTED that the Board of Directors goes on record as giving a hearty thanks to the VHF FM Repeater Advisory Committee for their excellent work in assisting the General Counsel in preparing comments for Docket 18803 during the past year.

93) On motion of Mr. Thurston, unanimously VOTED that the Board extends its appreciation to the Field Engineering Bureau, to the Safety and Special Radio Service Bureau, and the Amateur & Citizens Radio Division of the Federal Communications Commission, and to the Canadian Department of Communications, for their continued assistance and cooperation in administering affairs of the amateur body during the past year.

93a) At this point, the Chair announced the following committee appointments: Finance Committee - Mr. Compton,* Mr. Eaton, Mr. Shima; Planning Committee - Mr. Gmelin,* Mr. Michel, Mr. Foster; Membership & Publications Committee - Mr. Albright,* Mr. Arnold, Mr. Cotterell, (Mr. Clark, alternate); Public Relations Committee - Mr. Haller,* Mr. Griggs, Mr. Strieter; Merit & Awards Committee - Mr. Groves,* Mr. McConaghy, Mr. Thurston, (Mr. Dannals, alternate); Foundation Committee - Mr. Chapman.*

94) On motion of Mr. Shima, after discussion, unanimously (Mr. Eaton abstaining) VOTED that the General Counsel is authorized to include, in the comments to be filed in Docket 19162, request for a rules amendment to provide that the Extra Class licensee be afforded the privilege of requesting assignment of a call sign of his choice if available, upon payment of the appropriate fee.

95) At this point Mr. Booth requested and received unanimous consent to have the minutes show that he had fulfilled the assignment of Minute 24 of the 1970 meeting concerning a study of the role and functions of vice directors.

96) On motion of Mr. Foster, unanimously VOTED that the General Manager is hereby authorized to pay expenses for the operation of ARRL committees during the year 1971, but not to exceed amounts as follows:

Finance Committee	\$ 1600
Planning Committee	1400
Membership & Publications Com.	900
Public Relations Committee	1500
Merit & Awards Committee	600

97) Whereupon, on motion of Mr. Compton, the Board adjourned, sine die at 6:10 P.M.

98) (Time in session as a Board 16 hours, 52 minutes; total direct authorizations, \$77,836.71)

JOHN HUNTOON
Secretary

Minutes of

EXECUTIVE COMMITTEE MEETING

No. 334

May 6, 1971

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., was called to order at 10:30 A.M. May 6, 1971, at the headquarters offices of the League in Newington, Conn. Present: President Robert W. Denniston, WØDX, in the Chair; First Vice President Charles G. Compton, WØBUO; Directors Victor C. Clark, W4KFC, Harry J. Dannals, W2TUK, Noel B. Eaton, VE3CJ, and Robert B. Thurston, W7PGY; and General Manager John Huntoon, W1RW. A number of ARRL directors were also present.

On motion of Mr. Dannals, affiliation was unanimously GRANTED to the following societies:

Amateur Radio Club of the State Univ. of New York At Stony Brook, Stony Brook, N.Y.; Athens H.S. Amateur Radio Club, Athens, Ohio; Auburn University Amateur Radio Club, Auburn, Ala.; Base Amateur Radio Club, Kirtland AFB, N.M.; Bellevue Amateur Radio Club, Inc., Bellevue, Neb.; Choctawhatchee High School Amateur Radio Society, Ft. Walton Beach, Fla.; Cumberland Ama-

* Chairman.

teur Radio Club, Boiling Springs, Pa.; Douglas County Amateur Radio Club, Lawrence, Kansas; East High School Amateur Radio Club, Duluth, Minn.; Eufaula Amateur Radio Club, Eufaula, Ala.; Evendale Amateur Radio Society, Evendale, Ohio; Grant County Amateur Radio Club, Marion, Ind.; Great Plains Amateur Radio Club, Woodward, Okla.; Heights Amateur Radio Club, Wichita, Kansas; Hickory High School Amateur Radio Club, Sharon, Pa.; IBM Amateur Radio Association, Gaithersburg, Md.; IBM Westchester Radio Club, Yocktown Heights, N.Y.; John Burroughs Junior High Radio Club, Los Angeles, Calif.; Katella High School Radio Club, Anaheim, Calif.; LERA Amateur Radio Club, Sunnyvale, Calif.; Louisiana Tech. Amateur Radio Club, Ruston, La.; Madison High School Amateur Radio Club, Madison Hts., Mich.; McDonnell Douglas, St. Louis, Amateur Radio Club, St. Louis, Mo.; Miami Amateur Radio Club, Miami, Okla.; Missions Radio Club of Baptist Bible College, Clarks Summit, Pa.; Mt. Tom Amateur Repeater Association, Feeding Hills, Mass.; New-

berg Amateur Radio Club, McMinnville, Oregon; North Carolina DX Association, Greensboro, N.C.; Northern Illinois Amateur Wireless Assn., Chicago, Ill.; Oswego County Amateur Radio Association, Oswego, N.Y.; Penncrest High School Amateur Radio Club, Media, Pa.; Potomac Area VHF Society, Fairfax, Va.; Presque Isle Amateur Radio Club, Erie, Pa.; Santa Monica High School Amateur Radio Club, Santa Monica, Calif.; Shaker Heights H.S. Amateur Radio Club, Shaker Heights, Ohio; Silver Springs Radio Club, Inc., Ocala, Fla.; Somerset Amateur Radio Club, Somerset, Mass.; State Univ. of N.Y. At Buffalo Amateur Radio Society, Buffalo, N.Y.; Sullivan County Amateur Radio Club, Monticello, N.Y.; Telco Amateur Radio Club, Los Angeles, Calif.; Tri-County Amateur Radio Club, Whitewater, Wis.; University of Hartford Amateur Radio Club, West Hartford, Conn.; U. S. F. Amateur Radio Club, Tampa, Fla.; Western Michigan University Amateur Radio Club, Kalamazoo, Mich.; Wichita Amateur Radio Society, Wichita Falls, Texas.

E=EXTRA, A=ADV., GC=GEN./COND., N=NOVICE

	Present Status	FCC Proposals	ARRL Proposals		Present Status	FCC Proposals	ARRL Proposals
Voice	3800-4000	3750-4000	3775-4000	Voice	14200-14350	14150-14350	14175-14350
Extra	3500-3525 3800-3825	3500-3510 3750-3775	3500-3525 3775-3800	Extra	14000-14025	14000-14010 14150-14175	14000-14025 14175-14200
E+A	3825-3900	3775-3875	3800-3825	E+A	14200-14275	14175-14250	14200-14275
EA+GC	3525-3700 3750-3800 3900-4000	3510-3700 3875-4000	3525-3700 3750-3775 3825-4000	EA+GC	14025-14200 14275-14350	14010-14150 14250-14350	14025-14175 14275-14350
EAGC+N	3700-3750	3700-3750	3700-3750	Voice	21250-21450	21200-21450	21200-21450
Voice	7200-7300	7075-7100 ¹ 7150-7300	7075-7100 ² 7150-7300	Extra	21000-21025 21250-21275	21000-21010 21200-21225	21000-21025 21200-21225
Extra	7000-7025	7000-7010 7150-7175	7000-7025 7150-7175	E+A	21275-21350	21225-21325	21225-21325
E+A	7200-7250	7075-7100 ¹ 7175-7225	7175-7225	EA+GC	21025-21100 21350-21450	21010-21100 21325-21450	21025-21100 21325-21450
EA+GC	7025-7150 7250-7300	7010-7100 7225-7300	7025-7100 ² 7075-7100 7225-7300	EAGC+N	21100-21250	21100-21200	21100-21200
EAGC+N	7150-7200	7100-7150	7100-7150	Voice	28500-29700	28350-29700	28500-29700
				Extra	28000-29700	28350-28375	28000-29700
				E+A	28000-29700	28375-28500	28000-29700
				EA+GC	28000-29700	28000-28150 28250-28350 28500-29700	28000-29700
				N	(none)	28150-28250	(none)

¹ Inter-regional contacts only.

² U.S. possessions, Region III only.

On motion of Mr. Clark, in ratification of an earlier mail action, unanimously VOTED to grant approval for the holding of a Southeastern Division Convention at Miami, Florida, on January 22-23, 1971; and further to approve the holding of a Georgia State Convention at Atlanta on June 12-13, 1971; a North Carolina State Convention at Raleigh on September 26, 1971; and a Great Lakes Division Convention at Muskegon, Michigan, on March 24-25, 1972.

On motion of Mr. Thurston, Life Membership in the League was unanimously GRANTED the following applicants:

Raymond C. Anderson, WB9FLP; Walter E. Anderson, W9NIE; Jack Arnold, K4JY; Kincheon H. Bailey, Jr., W4FMN; Charles R. Barker, K5PGS; Frank J. Barsokine, Jr., WA0JXL; Joseph E. Bartelli, W5PBZ; Andrew V. Beary, WA3DQS; Roy A. Belair, W3NX; Guy Black, W4PSJ; Reginald A. Bogusch, K9AAE; John N. Boland, W4CC; Emmett P. Bonner, W4MXP; Samuel M. Bradsher, WA6CAH; Fred J. Brunjes, K2DGI; Thomas W. Cantwell, WB2GXZ; John S. Comella, W8QXQ; Milton Comer, WA1KNQ; W. H. Curry, Jr., W4RXY; Paul Damanskis, W3KVZ; Adam B. Denison, Jr., W4OFV; Joseph A. Dieteman, W0IQ; Chandler S. Eaton, Jr., W1HF; Ian M. Etheridge, WB4LRK; Lawrence T. Fadner, W3GN/WB8GDL; James Fernane, W3YE; Charles R. Flanagan, WA0WZY; Donald H. Fosburg, WA7KMX; Joseph S. Galeski, Jr., W4IMP; Charles D. Garoutte, W4NXY; Arthur S. Geyer, K8SWW/W0JSW; Herbert B. Gillies, K2GDA; Sheldon A. Glick, WA1UO/WB2OHH; E. Merle Glunt, W3OKN; Henry E. Glynn, VE5VT; Paul Grauer, WA0LLC; Thomas E. Gruis, K0HIF/W0HJV; Stewart Earl Haag, W4MOP; David M. Hackl, K0HCD; Kilian P. Harrington, WA9FZU; Robert N. Hart, W3GFL; Stephen P. Hart, K8EHD; Loren Hosmer, WA6EPP; Paul D. Husby, WA0UCU; Elden L. Kirchoff, WA7KQE; Walter L. Knisely, K3NQF; Stanley M. Krause, WA5WRM/3; Alfred G. Lange, WB6YLG; Al P. LaPlaca, K2DDK; Otha N. Lassiter, Jr., W4KFG; G. Sparks Lunney, K1KSH; Bernard C. Macdonald, Jr., WA0WWS; Bruce E. Montgomery, W4BFR; William Mellenthin, Jr., WB6CUG; Paul Neuman, WB2HEO; Eugene W. Niemiec, K2KJH; Bruce A. Osmundson, WA0IRP; Donald R. Pearson, W6WWT; Allan Brewer Pedin, III, WB4MGA; Bruce Peizer, K2FTE; John E. Plapp, WA5WPI; William T. Powell, K4IAK; William O. Reichert, WA9HHH; C. Robert Reiff, WA8ULW; Charles A. Robertson, W7BVH; Clark C. Rodimon, W1SZ/WB4NVZ; James H. Scott, W9CWH; Walter M. Scott, W3UTJ; Robert T. Shaw, WA7OJW; Larry J. Shima, W0PAN; Kenneth L. Simpson, WA8EJX; Brother Matthew Smith, W0MVD; Harry B. Stein, W3CL; William M. Stone, W4KVI; Jerry D. Stubblefield, WB4EM; John E. Sundstrom, WA9LBS; John H. Thompson, W1BHH; Merrill G. Thoi, WA2MYB; William A. Tynan, W3KMV; Christopher R. Wartes, K7UWT; James E. Walker, K8TDJ; David C. White, Jr., W3TE; Vernon M. Wilson, VE7AKE.

Director Griggs presented a letter from the Associated Radio Amateurs of Long Beach, Inc., withdrawing from sponsorship of the 1972 ARRL National Convention, because of uncertainties of the facilities on the *Queen Mary*.

There being no further business, the Committee adjourned at 11:30 A.M.

JOHN HUNTOON,
Secretary

QST

"It Seems to Us..."

(Continued from page 9)

as for U.S. and Canadian Full Life Members).

Minute 22 might look like a good idea was killed off, but keep reading — No. 32 resurrected the proposal after a solution was found to a minor problem of semantics, and our "Legal Counsel Committee" of six attorneys from around the country was unanimously endorsed.

"Happenings" last month reported on Docket 19183, FCC's inquiry into TVI/BCI and the like; the Board in Minute 35 agreed on a filing in this matter. On Docket 19163, the matter of some "grandfathering" for old Extra Firsts and a drop in the waiting period for Extra from two years to one, the Board (No. 40) directed a filing in favor of the one-year period and in favor of granting the Extra Firsts complete exemption from the present Extra Class tests on the grounds that they had taken a "state of the art" test way back and had remained continuously active for the forty-odd years since, in general keeping up with the art. In the "Eyebank" inquiry, Docket 19245, which is discussed separately in "Haps," ARRL will file comments (Minutes 41 and 43) looking toward maximum freedom of choice by amateurs in the types of traffic they can handle. And that cryptic note in Minute 80 prepares the way for action if RM-1747, RM-1633, and other proposals become an active threat to our 220 MHz band.

This doesn't cover all the actions of the board meeting — studies, reports, organizational matters, commendations and awards haven't been discussed here since in the main no explanation is needed. Nor does this summary cover the total impact of the meeting; to the official record of two days' formal sessions must be added three more days of informal discussion, inspection of the headquarters facilities and records, mutual exchanges between staff and directors, and so on, all of which preceded the crack of the gavel on Friday and which are also important in the efficient functioning of the League. Read the full minutes — but we hope this introduction will help you find your way through them!

QST

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, that we may verify your classification.

ARPS

(Continued from page 63)

On April 24 and 25, thirty San Diego amateurs supplied communications for a glider contest at Torrey Pines Gliderport. Units on both ten and two meters were used for relaying scores the various glider teams made in the contest events. The ten meter equipment was also used for running phone patches for several agencies involved in the glider meet. — WA6AAF, EC San Diego, Cal.

On April 27 and again on May 2, a number of Edmonton, Alta., amateurs supplied communications for charity marches. During the first event, six check points along a 20-mile route were manned while during the second, eight check-points were used in a 25-mile stretch. Two-meter fm was used in both cases to good advantage. — VE6PM.

On May 1, Toledo, Ohio, amateurs also supplied communications for a charity march, this one to support a drug-users rehabilitation center. At least 22 stations, working through the local repeater WBSCQO, helped with maintaining liaison among the eleven-mile course chosen for the march. During the activity, amateurs communicated for three local police departments, doctor and medical staff who were standing by, several ambulances and five Red Cross first aid vehicles. The operation continued for about six hours during which time all local amateurs cooperated in keeping the repeater channel clear. — W8GRT.

For the month of March, thirty-nine SEC reports were received at headquarters enumerating an AREC membership of 13,208. For the same month last year there were forty reports and 14,293 members. So far, 1971 has been a real bumper for AREC. Why not send in your reports? Sections reporting: Alta, Ariz, Ark, Colo, Conn, EFla, EMass, EPa, Ind, Iowa, Kans, LA, Mar, Mont, Nebr, Nev, NLI, NNJ, NTex, Ohio, Okla, Ont, Org, Oreg, Que, RI, SDgo, Sask, SDak, SNJ, Tenn, Utah, Va, Wash, WVa, WFla, WMass, WNY, WPa.

Independent Net Reports

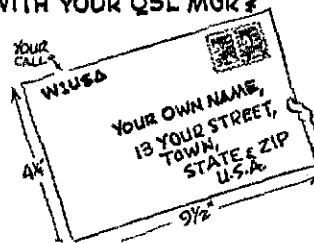
Net	Sessions	Traffic	Check-Ins
All Service	4	20	63
North American Traffic	26	561	493
Clearing House	26	428	305
FCITN	27	88	303
20 Meter SSB Interstate	22	1532	450
Northeast Traffic	30	334	313
Hit & Bounce	30	790	377
2290	44	739	2112



Fifty Years of ARRL

A bound 152-page reprint of the gold-edged historical articles which appeared in the 1964 issues of QST is available from the ARRL for two dollars postpaid. Titled Fifty Years of ARRL, the book covers the highlights of ARRL and amateur radio history during the fifty years from 1914 to 1964, and will make a companion piece to the classic 200 Meters and Down, a reprint of which is also available from the ARRL for two dollars.

IS YOURS ON FILE WITH YOUR QSL MGR?



A.R.R.L. QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 4 1/4 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

- W1, K1, WA1, WN1¹ — Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.
- W2, K2, WA2, WB2, WN2¹ — North Jersey DX Assn., PO Box 805, Ridgewood, New Jersey 07451.
- W3, K3, WA3, WN3¹ — Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, Pennsylvania 19355.
- W4, K4 — H. L. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.
- WA4, WB4, WN4¹ — J. R. Baker, W4LR, P.O. Box 1989, Melbourne, FL, 32901.
- W5, K5, WA5, WB5, WN5¹ — Kenneth F. Ishell, W5QMJ, 306 Kesterfield Blvd., Enid, Oklahoma 73701.
- W6, K6, WA6, WB6, WN6¹ — No. California DX Club, Box 11, Los Altos, California 94022.
- W7, K7, WA7, WN7¹ — Willamette Valley DX Club, Inc., PO Box 555, Portland, Oregon 97207.
- W8, K8, WA8, WB8, WN8¹ — Columbus Amateur Radio Assn., Radio Room, 240 E. Broad St., Columbus, Ohio 43215.
- W9, K9, WA9, WB9, WN9¹ — ARRL 9th Area QSL Bureau, Box 519, Elmhurst, Illinois 60126.
- W0¹ — Reggie Hoare, W0PYP, P.O. Box 115, Mitchellville, Iowa 50169.
- WA0¹ — Lloyd Harvey, W0QGI, P.O. Box 7, Attlea, Iowa 50024.
- K0, WB0, WN0¹ — Dr. Philip D. Rowley, K0ZFI, Route 1, Box 455, Alamogosa, Colorado, 81001.
- KP4 — Alicia Rodriguez, KP4CL, PO Box 1061, San Juan, P.R. 00902.
- KZ5 — Canal Zone Amateur Radio Association, Box 407, Balboa, Canal Zone.
- KH6, WH6 — John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.
- KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.
- VF1 — L.J. Fader, VE1EF, PO Box 663, Halifax, N.S.
- VF2 — John Ravenscroft, VF2NV, 353 Thorncrest Ave., Montreal 780, Quebec.
- VE3 — R.H. Buckley, VE3UW, 20 Almont Road, Downsview, Ontario.
- VE4 — D.E. McVittie, VE4DX, 647 Academy Road, Wintipeg 9, Manitoba.
- VE5 — A. Lloyd Jones, VE5J1, 2328 Grant Rd., Regina, Saskatchewan.
- VE6 — Karel Tetelaar, VE6AAV, Sub. Po. 55, N. Edmonton, Alberta.
- VE7 — H.R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.
- VF8 — George T. Kondo, c/o Ministry of Transport, Norman Wells, N.W.T.
- VO1 — Ernest Ash, VO1AA, PO Box 6, St. John's Newfound-land.
- VO2 — Goose Bay Amateur Radio Club, PO Box 232, Goose Bay, Labrador.
- SWL — Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

¹These bureaus prefer 5x8 inch or #50 manila envelopes.

QSL Bureaus for other U.S. Possessions and for other countries appear in the June and December issues of QST. Note: First Class mail in the U.S. is now 8¢ an ounce. QSL Bureau users should send their manager enough two-cent stamps to cover the envelopes on file.



Correspondence From Members -

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

TRY!

- One comment you frequently read in *Correspondence* is that ssb is too complicated for the average amateur to build his own transmitter. This is simply a lot of bull!

I was over 40 when I became interested in amateur radio and had no technical background. My first receiver and transmitter were built from kits. After that I built my own from scratch, borrowing from the *Handbook* and *QST* for circuits and ideas. I have now built two cw transmitters, one a-m transmitter, two double sideband suppressed carrier transmitters, and two ssb transmitters. One was a phasing type, the other, a filter type. In many ways the ssb rig was easier than the a-m rig. The difficulty comes when a rig is designed for multiband operation with complicated switching circuits. I now use the filter rig on MARS. It is basically the Export Version of IMP, with numerous changes to make it fit my junk box.

I agree that building a duplicate of a Collins or Swan is too complicated for the junk box builder. But a single or two band ssb rig is easily within the capabilities of anybody that can build an a-m rig. All you have to do is try. — *William H. Nunn, K4BQL, Decatur, GA*

FLATTERY

- *QST* authors OD5CC and WA0UZO may be pleased to know that their articles describing a 3-band vertical and combination SWR/VAmeter, respectively, were synopted and translated and appeared in the April 1971 issue of the Russian popular magazine, *Radio*.

If imitation is the sincerest form of flattery, it would seem that the Russian editors particularly appreciate the work of these good men. — *Ned Raub, Jr., W1RAN, New London, CT*

ENGINEERING FEAT?

- I think it was Lew Seick (now K4NE) who contributed to *QST* the first description of a 20-meter vertical made entirely of beer cans soldered end-to-end. Now comes W2GW with a description of an earlier engineering feat, the home-brew condenser (April *QST*).

To a young squirt it is not clear whether all those beer bottles in the washtubs were part of the power supply (the drinking man's filter?) or part of the tuned circuit. In either case the capacitance per bottle, or per pint, etc., would be of interest. For use in tuned circuits it would be essential to know to what extent the dissipation factor was influenced by the potency of the fluid originally contained in the bottle.

To advance the state of the art I propose to investigate such matters. It appears obvious that the colored glass used for beer bottles is of inferior quality electrically, so my tests will be confined to the clear bottles used for other liquid refreshers. Ultimately, some assistance may be required in the test phase, but that must come later. The first phase involves simply the collection of the

necessary dielectric material, and I prefer to do this at my own pace. As you may judge from the errors, erasures and stickovers, this phase is proceeding satisfactorily. — *William L. Smith, K4RJ (Ex-W3GKP), Franklin, NC*

GENTLEMEN'S AGREEMENTS NEEDED!

- Use of the Amsat Oscar B communications satellite will be virtually impossible in certain sections of this country. The reason for this is ever increasing interference from amateur television transmitters in the 420 MHz band. These wide-band signals completely obliterate any type of weak signal reception. If these conditions are allowed to continue, the down-link from Oscar VI will be useless.

Until recently, self policing of operations in the 420 MHz band has been sufficient to maintain harmony among the different types of operation in the band. The frequencies around 432 MHz have traditionally been used for such activity as weak signal tropospheric links, moonbounce, meteor scatter, and satellite communication. Amateur television operators have always used the frequencies 436-440 MHz. In recent years this agreement has deteriorated. In many areas of the country stations are transmitting television on 432 MHz.

The 420-MHz band is wide enough to accommodate everyone interested in using it. Please restate strongly, the League's longstanding position on self-policing on this band. Amateur television would have adequate space without operating within 3 MHz of 432 MHz. If this is done there will be no threat to Oscar VI or any other type of weak signal work. — *H. E. Holshouser, Jr., K4QIF, Portsmouth, VA*

MOTIVATION

- The Mid-South Amateur Radio Association's 20th annual radio school attracted a bumper crop of more than 85 registrants. Included in this total were 65 prospective Novices, including 18 converts (we hope) from another radio service. The average age of the Novice class is 26 years, the youngest being eight years old.

When we asked, "Why do you want to become a ham radio operator?" we got these answers from the registration slips: Interest developed from SWLing for 35 years. . . . My husband is a ham; if you can't lick 'em, join 'em. . . . Two of my children are getting their licenses. . . . To keep harmony in the family. . . . I enjoy helping people. . . . It is a challenge. . . . Don't want to miss out on anything. . . . My ham friends have impressed and influenced me. . . . To find out what's really going on. . . . To talk to people far away. . . . Interest in public service. . . . To get away from CB. . . . Good hobby for retirement. . . . To help in disasters. . . . To operate legally (!). . . . Tired of CB. . . .

We don't know where they all came from, but just think of the upcoming QRM, prospective club members and new ARRL members. — *Franklin Cassen, W4WBK, Memphis, TN*

COSMIC HYPOTHESIS

● Congratulations are in order for Messrs. Villard, Fraser-Smith, and Cassam for their excellent article, "I.D.E.s, Hoaxes, and the Cosmic Repeater Hypothesis." They have brought to light a problem which, unimportant as it may be, still catches the interest of anyone with an imagination.

Of course, there is little chance of the cosmic probe hypothesis being true, but it's a healthy thought, and for any science fiction fan it has excellent possibilities. I'm glad that there are men like these around who care enough about a thing to devote their time and energy to it, and then publish their opinions for all to see. Thank you very much for making some of us at least ask — "What's it all about?" — *Sheldon Gisser, WA1NUI, Norwich, CT*

HARDWARE HANKS

● Do you remember those early days of your amateur radio involvement? The lack of test equipment, the "no-great-shakes" receiver, the either junky and old transmitter or the dangerous homebrew TVI machine which also sent smoke signals on a long CQ? The "whereinell do I go?" feeling when you had trouble or had an urge to learn something or build something?

Many WNs — in fact, almost all new WNs — share these problems. The shelf with an accumulation of back *QSTs* and other electronics magazines, the *Handbook*, a few catalogs and specialized data books is not even a dream of the newcomer who typically doesn't know an antenna from a crystal until he reads the instruction manual. And few prospective OMs know where to find this information.

But a stack of old mags for perusal . . . ah, that's the life! From ultrasonic cw gear to a Maxwell bridge to the transistor dipper half-gunked together on the bench; from cleaning panels to rebuilding the front end of my HR-10 to make it something nice to use. The info — you guessed it — comes from the out-of-print, out-of-circulation piles of old electronics magazines either at the club station or on someone else's shelf.

Now, the sermon. When some guys "retire" from ether-burning they try to sell their personal library or just chuck it out to make room. You see it every month in any magazine's ad pages. Do they really need the scratch? Usually not. Will their local library or ham club take their old books and magazines and make them available to those who need them? Will they be used and appreciated? Might these back issues help turn some "hardware Hanks" into hams who know enough about their rig to keep it from spluttering all across the band over your QSO? You betcha. — *Scott Schrader, WN0CBZ, Fargo, ND*

GREAT

● Amateur radio is great! Why anyone should knock it is beyond comprehension. I only wish that the people running the country were as great as some of the amateurs I have met right here in the U.S.A! — *D. S. Bugnolo, WA1JLV, Portsmouth, RI*

MARINE OPS

● Has anyone listened around the marine bands lately? I've never heard so many atrocious signals and fists! Tune the 8 MHz marine band some night. . . it sounds like a lid-fest! Run together characters, letters, and words. . . chirps, clicks,

rasps, buzzes, and other emissions that are supposedly cw signals. If that stuff was emitted on the ham bands, we'd all have our licenses revoked!

Our traffic may be a little slower and our equipment cheap, compared to the commercial gear, but our signals are clean. I'm anxious to hear someone attempt to justify this electronic pollution. After working with military and commercial radio every day for the past several years, I've become convinced that so-called "amateurs" are far more professional than the "professionals"! — *Lt. Jon M. Pollock, K0YMQ, APO, San Francisco, CA*

HAPPINESS IS . . . QST

● *QST*, over all, is excellent. Although I personally prefer construction articles to awards and club news, still I realize you must appeal to many diverse interests. If anyone should ever ask you if a 31-year-old Novice can find happiness in the pages of *QST*, tell him yes — and cite me as an example. — *Warren A. Singer, WN4TAC, Woodbridge, VA*

FEES

● Methinks we are going about this business of representation to the FCC (on fees) all wrong. Don't we learn anything from history?

Instead of protesting our investments in gear, time, and personal sacrifices for the good and welfare, why not come up with some ham equivalent of not planting some acreage, or a smart depletion allowance scheme, or any one of a number of oh-so-legal gimmicks of not paying our share? Fact is, a good ARRL lawyer (if he is also a sharpie) might even get Uncle to send us some subsidy money, or some comparable pork-barrel handout. It's being done all the time!

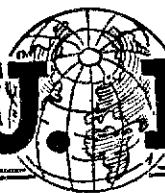
Frankly, I doubt whether the FCC ever read ARRL's presentation. Their minds were made up a long time ago, probably on no more logical basis than the anticipation of the bucks rolling in, so why bother them with facts? — *George Zwick, W2AJQ, Smithtown, NY*

JUNIOR MEMBERSHIP

● I feel that the Special Membership idea is very good. I agree with W4EMP in March *QST* "Correspondence." Personally, I don't mind the \$6.50 dues, but I'm 26, married, and have a steady income. Young boys and girls need a break (in starting their Ham Radio interest). I'm sorry that I didn't have a chance when I was young, but am thankful I finally got the opportunity. — *Dave Menges, WN8GVF, Adrian, MI*

● First of all, all Novices are neither young nor poor. Secondly, W4EMP makes the assumption that only Novices have financial problems, implying strongly that on upgrading ones license, a person becomes financially solvent. This is very interesting, and I am indeed perturbed that I did not receive my endowment when I went up from Novice. Being an unemployed high school student, I certainly wish my good fairy godmother would speed up delivery, as I've been waiting two years now. I hope that you do not follow his advice, and especially try to ignore his somewhat emotional statement about "the boys" spending "that big \$6.50" on crystals instead of ARRL membership. I'm still crystal-controlled myself, and although I could certainly use some more, I spent my big, giant, whopping \$6.50 on ARRL dues, and came through without much trauma at all. — *David George Johnson, WB4JTT, Norfolk, VA*

I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

ONS PROVIDE EMERGENCY COMMUNICATIONS IN EAST PAKISTAN

During the Administrative Conference on Radiocommunications held in Geneva in 1959, the delegates of the member governments of the International Telecommunications Union (ITU) showed wisdom and humanitarianism in adopting Recommendation N° 34, regarding the use of radiotelegraphy and radiotelephony by the Red Cross organizations. The Conference took into consideration that among other activities, the widespread rescue work of the Red Cross is of growing importance, especially in cases of disasters and catastrophes of all causes. In such circumstances, it frequently happens that normal means of communication are overloaded, damaged, or completely destroyed. It is essential, however, to facilitate in any way possible rapid intervention of the Red Cross organizations, national and international. The rapid operation required can only be achieved by using rapid and independent means of communications.

The ITU Conference recommended that administrations should study the possibility of assigning for this purpose, at the upper or lower limits of the amateur bands, one or more common frequencies to stations of the Red Cross.

In Belgium, as a result of this recommendation, a radiotelephone net has been established in agreement with the management of the radiocommunications division of *La Regie des Telegraphes et des Telephones*, the controlling authority in Belgium. The agreement was signed on March 5, 1962, by the president of the Belgian Red Cross, His Royal Highness, Prince Albert, and the President of the *Union Belge des Amateurs-Emetteurs*, ON4VY. Since that time our country has been covered by a national emergency net with fixed and mobile stations operated by amateurs - UBA members - in contact with the Belgian Red Cross headquarters.

The effectiveness of this net has been well tested and proven in many circumstances: surveil-

lance of major highways during heavy-traffic weekends, at major sports events such as the annual Francorchamps auto race, the disaster at Martelange, and so on. In fact, about 120 radio amateurs work in this emergency net, putting their equipment and their skills at the service of their fellow citizens. (Each amateur involved serves as both operator and station technician.)

In November, 1970, a hurricane and floods devastated vast regions of East Pakistan. Several governments, including the Belgian, hurried to send aid to the hundreds of thousands of victims. The Belgian program not only provided direct rescue operations, but also included the provision of essential pharmaceuticals and on-the-spot medical aid. To plan the mission, a reconnaissance group of Belgian Army sanitation experts and engineers worked with Red Cross delegates. The main operation was then set up early in December.

As laid down in the agreement for emergency nets, the Red Cross requested the *Union of Belgian Radioamateurs* to take over the responsibility for radiocommunications to maintain daily liaison between Belgium and East Pakistan. Such communications were essential to the government, the army and the Red Cross to handle the requirements and logistics of the rescue mission. The UBA within a few hours had (1) to locate members whose business would permit their accompanying the mission as radio operators; (2) to locate lightweight equipment capable of effective and reliable long-range communications; (3) to assemble and schedule a group of local amateurs who could spend daytime hours at their well-equipped home stations; and (4) to arrange coordination of the technical information to and from the disaster area so that the requested supplies would be properly expedited.

Starting with the arrival of the reconnaissance party in Dacca, and throughout the stay of the Belgian medical mission, the amateur emergency net maintained excellent communications between Brussels and Dacca.

The army communications system handled the traffic between Dacca and Galachipa, and between Galachipa and the medical rescue boats plying the waters of the delta area. Brussels was informed daily of the mission's needs for material, rescue equipment, spare parts and medicines. The Belgian communications also handled the organization of transport of administrative and

Emergency station OR4CR in Dacca, East Pakistan with operator ON4QJ.



QST for

During March, IARU member societies in Region III met in Tokyo to discuss problems of mutual concern. The meeting was chaired by IARU/ARRL president W0DX. Pictured are the delegates (standing from left) JA1BK, DU1HR, W0DX, VK3KI, JA01A, VU2US, DU1BEN, ZL2AZ, VS6DR; (bottom row) JA1XMK, DU1EA, JA1AN, VK1IZ, and ZL4PG.



technical personnel. Thousands of amateurs around the world monitored this emergency traffic from the Dacca station, which used the call sign OR4CR. The mission finally returned on March 15, 1971.

The installation, operation and removal of the Dacca station was handled by Dr. L. Dierick, ON4JL, who made two trips to Dacca; A. Verduysee, ON5DO; and R. Billen, ON4QJ. The stay-at-home amateurs handling the traffic in Belgium were ON4SZ, ON5KY, ON4QP, ON5GA, ON4LL, and ON4CV.

The organization and the overall responsibility for the net's operation was administered by R. A. Vanmuyssen, ON4VY, General-Counselor of UBA, in direct collaboration with G. Dolphyn, Chief of the National Emergency Service of the Belgian Red Cross. There was magnificent daily cooperation between the Belgian Red Cross, the Belgian Army, and the UBA. The Belgian press in official communiques reported the significant contribution of the Belgian rescue mission.

No one can change the course of history, but each time it has been called upon, the Belgian national emergency net has been ready to help. The word is *service*. — ON4VY

Note: along with the essential official traffic of the mission, about 4000 QSOs were completed between other radio amateurs (115 countries) and OR4CR. The QSL Manager of the station is ON5KL.

NEW AGREEMENTS

Adding to the list of international agreements pertaining to amateur radio, Canada has entered into a reciprocal licensing agreement with Belgium and a third-party traffic agreement with the Dominican Republic. The U.S. now has licensing reciprocity with Jamaica. A full list of such agreements appears elsewhere in this department.

NOTES

The *Japan Amateur Radio League* reports that there are now over 236,000 radio amateurs in Japan. This represents an increase of some 38,000

over the previous year. If this growth rate continues, the number of JAs will likely exceed the number of U.S. amateurs (about 265,000) during this year.

An International Hamfest sponsored by the *Polski Zwiasek Krotkofalowcow* will be held in Augustow, Poland, September 10-12. Technical lectures, and social activities are planned along with a possibility of obtaining a guest SP license. Details are available from the Polish Travel Bureau "Orbis," Congress Section, PO Box 146, Warszawa 1, Poland, or contact your local travel agent.

A station will be operating from the 13th World Jamboree of the Boy Scouts, in Japan from August 1-10. The call is expected to be JH2BSJ.

The *Associazione Radiotecnica Italiana* reports that Italian amateurs are now authorized to use the first figure of their ZIP code instead of the number 1.

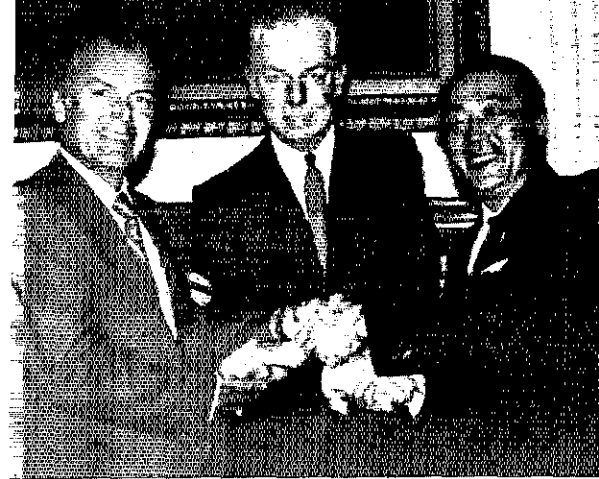
The "Call Areas" will correspond *approximately* to these Regions: IP1 — Piemonte, Liguria and Valle d'Aosta; I2 — Lombardia; I3 — Veneto, Trentino-Alto Adige, Friuli-Venezia Giulia; I4 — Emilia; I5 — Toscana; I6 — Marche, Abruzzo; I7 — Puglia, Basilicata; I8 — Campania, Calabria, Molise; IT9 — Sicilia; I0 — Lazio, Umbria; IS0 — Sardinia (DXCC Country).

Italian islands will assume following prefixes: Isole Toscane (Elba, etc.) IA5; Isole Pontiane (Ponza, etc.) IB0; Isole Napoletane (Capri, etc.) IC8; Isole Eolie (Filicudi, etc.) ID 9; Isola di Ustica (Ustica) IE9; Isole Egadi (Favignana, IF9); Isole Pelagie (Lampedusa, etc.) IG9; Isola di Pantelleria IH9; Isole Tremiti (Tremiti, etc.) IL7; Little islands of Sardinia IM0.

Amateurs who don't wish to use new prefixes may use their old II (or IT1 or IS 1) prefix.

Dr. Misael Pastrana (right), president of Colombia, confers upon Jesus Bernal, HK3BJR (center), the title of Attorney General of the nation, one of the most important posts in the government. At left is Rafael Naranjo, Secretary General. (HK 7UL photo)





Meeting on the occasion of the March IARU Region III Conference in Tokyo are from left, IARU/ARRL president W0DX, U.S. Ambassador to Japan W3ACE, and Japan Amateur Radio League President JA1AN. (JA0IA photo)

Gerald C. Gross, W3GG, ex-HB9IA

It is with much sadness that we report the passing of Gerald C. Gross, W3GG, on May 7. During his career, "Jerry" achieved considerable eminence in the telecommunications regulatory field. A highlight was his service from 1958 to 1966 as the secretary general of the International Telecommunication Union, the specialized agency of the United Nations dealing with regulation of communications.

W3GG first went on-the-air in the 1920s. For a period of time he worked as a physicist for the Bureau of Standards, then transferred to the Federal Radio Commission (later FCC) where he achieved the title of assistant chief engineer before leaving. After serving as a Naval officer during World War II, he was appointed in 1945 to the post of vice director of the International Telecommunication Union, where he went on to become the assistant secretary general and finally secretary general. Since his retirement from ITU in 1966, he founded Telecommunication Consultants International, Inc., in Washington, D.C.

He held membership in ARRL and the Radio Amateur Satellite Corporation and also was a member of the American Institute of Electrical Engineers, and the American Rocket Society.

DX OPERATING NOTES

Reciprocal Operating

(**Bold face type indicates changes since last list.**)

United States Reciprocal Operating Agreements exist only with: **Argentina, Australia, Austria, Barbados, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Finland, France*, Germany, Guatemala, Guyana, Honduras, India, Indonesia, Ireland, Israel, Jamaica, Kuwait, Luxembourg, Monaco, Netherlands,† New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Sierra Leone, Sweden, Switzerland, Trinidad and Tobago, United Kingdom,‡ and Venezuela.** Several other foreign countries grant FCC licensee amateur radio operating privileges on a

* Agreement includes overseas entities.

†† By special agreements, third-party traffic is also permissible with Australian amateurs for traffic regarding amateur satellites, and with JUIITU.

courtesy basis; write League headquarters for details.

Canada has reciprocity with: **Belgium, Bermuda, France, Germany, India, Israel, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Peru, Senegal, Sweden, Switzerland, United Kingdom, U.S., Uruguay, and Venezuela.**

Third-Party Restrictions

Messages and other communications - and then only if not important enough to justify use of the regular international communications facilities - may be handled by U.S. radio amateurs on behalf of third parties *only* with amateurs in the following countries:** **Argentina, Barbados (only U.S. stations/8P) Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.** Permissible prefixes: **CE, CM, CO, CP, CX, EL, HC, HI, HI, HK, HP, HR, LU, OA, PY, TI, VE, VO, W** or **K/8P, XE, XP, YN, YS, YV, ZP, 4X** and **4Z.** Canadian hams may handle these same type third-party messages with amateurs in **Bolivia, Chile, Costa Rica, Dominican Republic, El Salvador, Honduras, Israel, Mexico, Peru, U.S., and Venezuela.** Permissible prefixes are: **CE, CP, HI, HR, K, OA, TI, W, XE, YS, YV** and **4Z.**

DX Restrictions

U.S. amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the ITU under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia and Vietnam forbid radio communications between their amateur stations and such of other countries. U.S. amateurs should not work **XU, XV** or **3W8.** Canadian amateurs may not communicate with Cambodia, Vietnam and Jordan. Prefixes to be avoided by Canadians are **JY, XU, XV** and **3W8.** G5T

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30 on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U.S. 5, the Wilbur Cross Highway. (For WIAW visiting hours, see the schedule in "Operating News.")

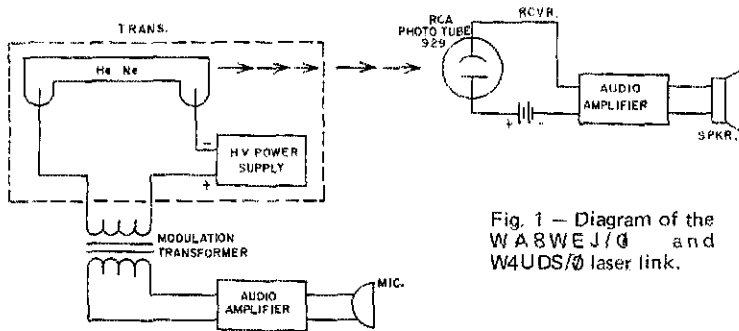


Fig. 1 — Diagram of the W8WEJ/Q and W4UDS/Q laser link.

Amateur Laser Contact Established

The first amateur laser communication, at a frequency of 475 Mega-Mega Hertz, has been claimed by W8WEJ/Q and W4UDS/Q. There has been previous amateur work with one-way laser transmissions.¹ This contact over a 950-foot path, however, is believed to be the first example of a completed QSO.

The stations used were set up inside the U.S. Air Force Academy in Colorado. Signals were sent from one classroom down the hall and reflected by mirror around a corner into another classroom. There were actually two sets of mirrors, one to transmit and the other to receive.

The helium-neon laser is simply an electric discharge tube filled with the two gases named. Just like a neon sign, it glows when a high voltage, (approximately 1500 volts), is applied to the electrodes. When two mirrors are placed at the ends of the tube, and aligned with the optical axis, the light is reflected back and forth. This stimulates the emission of still more light from atoms that are in an excited or high energy state. Our normal sources of light (the excited atoms in a hot filament), give off light by spontaneous emission — light with many different wavelengths and with completely random phase. The laser light, coming from stimulated emission, is unique because it is coherent — all components of the light are of essentially the same wavelength and it is all in phase. When one of the mirrors is only partially reflective, the light it does not reflect is transmitted and becomes the laser beam. Laser is the acronym for Light Amplification by Stimulated Emission of Radiation.

The helium-neon laser has a light wavelength of 0.6328 micrometers which corresponds to the color red. Thus the frequency of the helium-neon laser is 475 Mega-Mega Hertz, or 475 teraHz. The laser was modified for amplitude modulation by using a power transformer as a modulation transformer. Fig. 1 shows the modification. The

receiver was simply an RCA 929 photo tube which sensed the audio variations in light intensity. The audio signal was then amplified and fed into a speaker. W8WEJ and W4UDS modified two of the lasers so they could make a "two-way" contact on 475 teraHz.

The specifications follow for the QSO conducted on February 25, 1971, in the academic building at the U. S. Air Force Academy:

Frequency: 475 teraHz.

Power output: approximately 1 milliwatt light power.

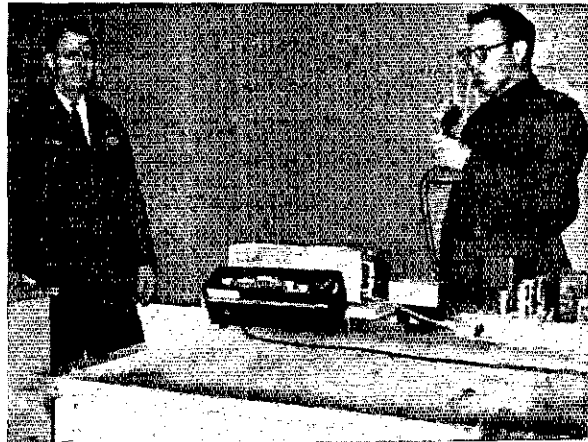
Mode: A-3 amplitude modulated.

The reflective mirror could probably be considered as an antenna. The interesting aspect is the beam divergence of the transmitted signal. The beam diameter is less than 1/4 inch at the laser exit, and spreads to only a foot or less after traveling 1000 ft. The front-to-back and front-to-side is essentially infinite — you cannot see the beam unless smoke or dust is in its path. It would be nice to have a signal that narrow from a 20-meter beam!

The modulated laser is used as a physics classroom demonstration and, without the modulation, as an alignment and measurement tool. Helium-neon lasers of the type used can be purchased or built at a relatively modest cost — \$100 or less. Several articles on laser construction have appeared in magazines such as *Popular Mechanics*. Although the helium-neon laser operates at low power levels, it still constitutes a moderate eye hazard. The lens of the eye tends to focus the very narrow beam to an infinitesimal point on the retina. — William L. Schrader, W4UDS/Q

¹ Pattison, "Operation Red Line," *QST*, July 1963, pg. 66.

W4UDS (left) and W8WEJ are shown at one of the amateur laser stations used in establishing communication at 475 Mega-Mega Hertz. The black case is the laser with the discharge tube shown.





CONDUCTED BY BILL SMITH,* KØCER

EME Activity Resumes

MOOBBOUNCE ACTIVITY around the globe has been low for several months, but Mike Staal, K6MYC, says much of the activity has been renewed. John Morgan, ZL1AZC, is at his new job at New Zealand's Warkworth Tracking Station and has been preparing the station's 100-foot dish for commercial operation. When that is completed, he will turn his attention toward further operation on 144 MHz. John plans a LaPorte rhombic array for 2 meters and has acquired a 10-foot dish for use on 1296 MHz. ZL1AZR hopes to be active again, perhaps by late summer. During his absence from the EME scene, the stack in New Zealand has been taken up by ZL1MO. He had several contacts earlier this year with SM7BAE, Sweden, using sixteen 3-element Yagis, but is now enlarging his array.

In Brazil, PY2CSS has had some success, but no contacts, with an array of 8 Yagis and is now working on a similar array of 16 Yagis. PY2CSS is South America's lone EME station.

F8DO, active several years ago in France, has reactivated his station and is getting good echo returns on his 128-element collinear array. Marius is giving some consideration to a Yagi array for use on a new polar mount. The collinear array is fixed. K6MYC says Italian station IIDMC is also working on an EME system.

In Africa, ZS5RE is building an array of 16 Yagis but is having trouble obtaining some parts needed to get his system working. Inasmuch as he is the apparent lone moonbounce enthusiast in Africa, perhaps some assistance could be given him by stateside operators. Address: Bill Gurr, 695 Kings Way, Amanzimtoti, Republic of South Africa.

In Japan, JA6DR is repairing his wind-damaged EME array and tells K6MYC that he expects to have the antenna working again soon. Note that this report covers 144-MHz EME activity on all six continents, with the news from Africa and Asia being my first knowledge of EME activity on those continents.

Interest in 432-MHz EME is picking-up again. ZE5JJ, Rhodesia, has a steerable 14-foot dish and kilowatt in operation. His results at this writing are unknown.

K6MYC is somewhat pessimistic about the total EME picture. He can not understand why there is not more stateside EME interest. He thinks if more U.S. stations were on, particularly in states where

there is no present moonbounce operation, it would be an incentive for more foreign operation. Mike says there are many stations in the states with everything needed for EME capability except larger antenna systems.

EME is not cut-and-dried, according to Mike, and this apparent belief may be keeping some vhf men from setting up moonbounce systems. Mike says there are many questions yet to be answered. One phenomenon he has come across time and time again, without an explanation for it, is nonreciprocal signal reception, indicating Faraday rotation or polarization inconsistencies. K6MYC and VE7BQH heard this dramatically on their May 5 schedule. VE7BQH heard loud signals from K6MYC prior to schedule time, during Mike's tune-up period. The array at K6MYC was horizontal, and though his signals were loud in Canada, Mike heard nothing from VE7BQH. For K6MYC to hear Lionel, the antenna on the California end had to be vertical. During the first half-hour of their schedule, the signal polarity from VE7BQH kept shifting between straight vertical and 45° left or right tilt. K6MYC's signals at VE7BQH were not detectable until Mike tilted his array about 45° to the right, and then they were extremely strong on both ends of the EME path. Had a third station been active, perhaps something further could have been learned about this polarization phenomenon.

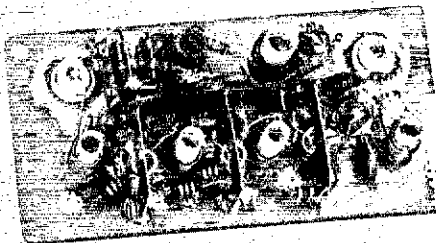
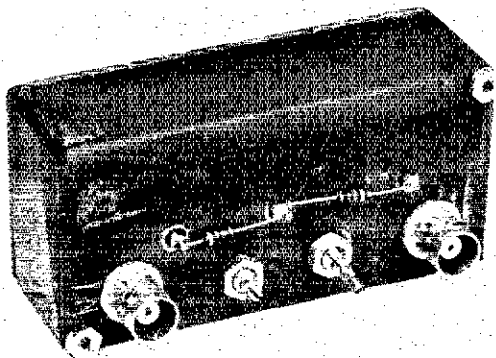
220-MHz EME news this month comes from WB6NMT. Louis reports K9HMB, Illinois, should now be testing for echoes from a 160-element collinear array, fed by a 3CX1000 amplifier. K4IXC is reported working on a 220 EME system in Florida, as is K4GL in South Carolina.

There has yet to be an EME contact made on 50 MHz, but WB6NMT is working towards that goal. Louis is building a 3-wire rhombic, 15 wavelengths per leg, to be operational sometime this fall. Interest in using the lunar route for 50-MHz communication has been low, probably because contacts halfway around the world have been made by other propagation media. But with the peak of Cycle 20 now long-gone, and the likelihood that future solar-activity peaks may be considerably lower than those of the last 35 years, the moon route could be the only one for real 50-MHz DX in years to come.

OVS and Operating News

50-MHz DXers were pessimistic at the time of this writing over the prospects of an interesting summer sporadic E season. Openings through the third week of May were spotty. Even in the lower-latitude states such as Florida, where the season usually begins early, W4GDS and WB4BND

* Send reports and correspondence to Bill Smith KØCER, ARRI, 225 Main St., Newington, Conn. 06111.



Plenty of performance in a small package. This 2-meter converter by W1MTV is about 1 by 1 3/4 by 3 1/2 inches in size, but it works as well as its larger counterparts. The 1/10-watt resistors and BNC connectors provide a sense of scale for the exterior view, while a postage stamp, right, scales the interior. MOSFET rf stages and mixer are in the lower portion of the latter view. At the top is a crystal oscillator and diode multiplier. The box is copper-clad circuit board. Frank tells us that he is now working the bugs out of a Mark II, about half this size!

reported little doing. *E*-watcher WA5IYX at San Antonio observed only 5 minutes of *E* during the entire month of April. Pat says early indications are that this summer may be a repeat of 1969, though by the time this is read, the picture may have changed. (The week ending May 22 apparently marked the real beginning of the summer *E* season, though the band had seen scattered openings earlier.)

After returning with his new wife from their honeymoon, Joe, WA5HMK, caught another 50-MHz tropo opening. The evening of May 17, six was open on tropo from Houston to Muskogee, Okla., 430 miles over a north-south path, as well as a 300-mile east-west path from Houston to New Orleans. Signals were quite strong for nearly two hours. Joe says this is the first six-meter tropo opening he has heard involving what was apparently two ducts and opposite directions. He says there was tropo DX on 2-meter fm, between San Antonio and St. Petersburg, Florida.

The next morning, May 18, WA5HMK noted his first widespread *E* opening of the season. Puerto Rican stations were logged, along with others from Florida to California. Florida stations were working multi-hop into California. K5LZJ, Cleveland, Texas heard all call areas except W1 and copied ZK1AA, Cook Island, for 40-minutes, on what was apparently an *E* to TE link.

K7ICW, Las Vegas, reported an unusual *E* backscatter opening April 20. Al worked Phoenix area stations while beaming northeast, in the early evening hours. WB6NMT noted *E* on May 4 to Texas and on the 8th to Washington and Vancouver. On May 10, WB6KAP worked ZK1AA at 0525 GMT.

K7HIX/4 agrees on the late season, but says that the band was open 5 of the 6 days from May 17 to 22, with the last the best of all. W6IYC says much the same, adding that double hop to Florida was worked on May 22, as early as 0700 local time. Dick heard W5FW and others in his area chasing KL7GLL during the early evening. KL7GLL was also reported around the New Orleans area, but we have no record of contacts.

WA7PKQ, Cheney, Washington, reports an interesting burst of 50-MHz DX beginning at about

1615 GMT May 16. First a VE2 was heard, followed shortly by several W2s calling VE4. Between 1620 and 1715, WA7PKQ worked W2MPK, WA2ENZ, W2OW, WA0WZY, and W2UTH. The 2s are double-hop, which has not been too common between the Northwest and Northeast of late. Though it started late, the 1971 season may have its redeeming features.

From the far Pacific, KR6RI reports the band coming to life May 8, when "I worked 14 JAs and didn't even try!" The JAs report frequent reception of the ZK1AA beacon, many contacts with DUs and VKs, and occasional ones with VS6. Ray also worked JAs on May 12, 14, 15, 20, and 21. On the 20th, KR6RI heard the HL9WI beacon at 0045 GMT, and was able to break it 20 minutes later, for their first 50-MHz QSO. This later developed into a 3-way with KR6RS, 175 miles to the north, on Okinawa. The latter was unable to hear HL8WI, however. KR6RI heard HM1BB, a 1-watt a-m station, for the first time.

From Ewa Beach, Hawaii, KH6GRU reports that he can remote-control the KH6EQI beacon (50.105) at Pearl Harbor from his home. He worked LU3EX April 16, while working on equipment at the beacon location. Reception of KH6EQI during April was reported by VK8KK and KX6HK. Bert, KH6GRU, can be reached via telephone at home, 689-0111, or at work, 432-1532.

A couple of other notes before we leave six meters. K0LCB, Independence, Mo., wants W0PFP to know several stations mistook his April 14 auroral RTTY signals for receiver birdies! K7MWC, Seattle, now has RTTY on 50 MHz and Mike Goshay, secretary of the Chaparral VHF Association in Southern California, says that an organization was recently formed by amateurs in the San Fernando Valley area. The club call is WA6HPI, replacing the more familiar K6HXW of contest fame.

144-MHz DXers reported several auroras during April. The session on the evening of the 14th was the best, as seen from incomplete reports published last month. WB2YQU heard and worked stations as far west as Illinois between 2200 and 0300 GMT. WA8YYW, Michigan, caught the aurora, and was

especially pleased to work VE2DFO. Also in Michigan, W8NBD worked 2s, 3s, 4s, and 8s. WA9QZE was caught with his antenna down on the 14th, but worked aurora on April 9, 11, and 21. Returning to the 14th, K9KQR, near Chicago, logged many stations from Missouri to Connecticut and worked his share of the huzz including VE3DXJ. At Minneapolis, W0LCN, W0LER, and W0RLI worked VE2DFO among others. VE3EMS worked 5 new states and heard several Qs. VE3DSS made 19 contacts with 30 watts!

Spring meteor activity was not especially good. The April Lyrids did, however, allow VE3EMS to work WA0CHK, Mo., on a 20-second burst. W0LER says the shower was poor, but John worked K4FKD, Virginia. He heard nothing from K7BBO, Washington, and K7ICW, Nev., both over long paths, and noted even the random meteor count was below normal. During the May Aquarids, W3BHG, Delaware, worked W5RCI, Miss., on the 6th at 1033 GMT.

K6MYC thanks all those who supported him in his battle with the San Jose City Council over antenna height restrictions. The Santa Clara County Amateur Radio Association and the West Valley Radio Club are backing an ordinance change and the council seems receptive. W6SXO, the San Jose city communications engineer, is working with the city's planning commission seeking a solution. In the meantime, the city has suspended all actions on existing structures over 35 feet, pending outcome of the studies underway.

K2OJD will return to St. Pierre Island August 2 through 13 and will again attempt to work stateside on 144. The dates include the usually productive Perseids meteor shower. K2OJD, who signs EP0CA on St. Pierre, has tried for 8 years to make a 2-meter contact from EP0. His frequency is about 144.02 and he expects to be active mostly in the morning hours. Equipment includes a kilowatt and 32 elements. EP0CA will also be active between 50.095 and 50.105.

In the past several months we've talked about a national calling frequency for Technicians. K1PTE suggests 145.025, saying that is the most popular frequency in New England.

We hadn't heard from Rusty, K4QIF, Virginia, for many months, but he now says he is again active on 144 and 432 and will accept schedules. K4EJQ, Tenn., seeks schedules for the Perseids, especially Colorado, Montana, and Utah. Bunky will also schedule on 432.

220-MHz news is highlighted by WB6NMT and KH6GRU planning tropo schedules between the mainland and Hawaii. WB6NMT has sent Bert a converter and a preamp for antenna mounting. K6IBY supplied an exciter. KH6GRU has 4 6-element Yagis fixed on California, where there will be much monitoring of the nightly transmissions that were planned to have begun around June 1. The WB6NMT beacon, primarily for scouting E_c opportunities on 220, runs from 1500 to 0300 GMT, on 220.005 MHz. More on this in our May column.

In northern California the growing 220 interest can be credited to much missionary work by Don Farwell, WA6GYD, and his 220 News, a little mimeographed sheet full of 220 tips and activity information. If you're in Don's "service area" you should be getting his paper. Write him at 18724 Martha Avenue, Saratoga, CA 95070. In his May issue, WA6GYD says most operation is between 221 and 222.5 MHz. Tuesday and Thursday nights

(Continued on page 150)

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

K1ANI, William J. O'Brien, Ansonia, CT
 W1CUZ, Richard U. Lord, Durham, NH
 W1EGY, Paul E. Sheldon, Sr., Reading, MA
 K1JA, Edward M. Hammer, Lynn, MA
 W1JED, Walter J. Jureczak, Methuen, MA
 K1MAK, Wallis S. Bean, Wollaston, MA
 K1PMK, Thomas G. Dongan, Harwich, MA
 K1FDZ, Joseph F. Dnesl, Hamilton, MA
 W1FCW, George J. Shomsky, Stratford, CT
 K2BPM, Wesley C. Rogers, Center Moriches, NY
 K2HOL, Ralph C. Zollitsch, Buffalo, NY
 WA2HWC, James W. Kirkbright, Rochester, NY
 W2JH, William B. Fricke, East Orange, NJ
 W2VJB, Francis A. Czech, Whitesboro, NY
 WA2WVA, Ieros F. Spangenberg, Short Hills, NJ
 W3GG/Fx-HB91A, Gerald C. Gross, Washington, DC
 W3PVF, Harry Slobodian, Ambridge, PA
 W3RAV, Webster E. Painter, Reading, PA
 W3RTD, Walter F. Rude, Carbondale, PA
 W3SDX, Raymond O. Shelling, Broomall, PA
 W4CFZ, Wayne S. Dean, Lexington, KY
 W4EHW, Dr. Roger W. Arnold, Miami, FL
 K4MSL, Marvin E. Fogle, Lynchburg, VA
 W4OKO, McDonald S. (Mac) McIlwain, Lynchburg, VA
 W4RA, Clyde R. Brewer, Winston-Salem, NC
 W4RYD, Bart J. Lyons, Narrows, VA
 W4SXE, Karl P. MacDowell, Fairfax, VA
 K5HAI, Hilton D. Williams, Maplewood, LA
 W5HWF, Herbert L. Whetsel, Sr., Santa Fe, NM
 K5LJY, Curtis F. Andrews, Pasadena, TX
 K5JKG, Samuel Renaudo, Bartlesville, OK
 K5PGI, William C. Clark, El Paso, TX
 W5ATRB, Woodrow Mitchell, Tulsa, OK
 K6CK1, Kenneth N. Harding, Livermore, CA
 W6DZP, Earl G. Sorensen, Whittier, CA
 W6EJC, Barton N. Carrick, Sacramento, CA
 W6MA, Bertha L. Wallace, Long Beach, CA
 W6MOQ, Douglas Keesler, La Puente, CA
 W6MQD, Joseph L. Wiley, Campbell, CA
 K6DIE, Earl B. Allen, Sr., Winton, CA
 W6SVH, Rev. D. Miles Dawson, Covina, CA
 W6UKE, Roger F. Jackson, Long Beach, CA
 W7BAW, Everett G. Hager, Kimberly, ID
 K7CSL, Elery D. Preston, Jr., Mountain Home, ID
 W7HRC, Harold A. Wade, Seattle, WA
 K7JOO, Gustave V. Schnadt, Billings, MT
 W8ACP, Howard A. Conklin, Mr. Clemens, MI
 W8AMX, Harry S. Brown, Clarksburg, WV
 Ex-8ARK/Ex-W2RGI, Maurice S. "Mac" Thorn, Oneonta, NY
 K8BEX, Frank J. Wiseman, Clarksburg, WV
 W8BXP, Wayne A. Zurcher, Pomeroy, OH
 W8CEP, Dallas Wise, Detroit, MI
 W8GLB, Roy Bybee, Huntington, WV
 K8JLE, Aubrey N. Powell, Detroit, MI
 W8KEO, Jerry A. Koutnik, Bellaire, MI
 W8WJM, David J. Valko, Milford, MI
 W9AIO, Roscoe E. "Bob" Halverson, Washburn, WI
 W9CUU, James W. Hurt III, Indianapolis, IN
 W9ELL, Harold M. Kay, Edwardsville, IL
 WA9GVE, Gerald R. Duncan, Chicago, IL
 W9HZY, Lloyd L. Brandenburg, Hammond, IN
 K9SNH, Dr. Halleck S. Knotts, Columbus, IN
 Ex-9SP, Roland H. Maxson, Milton, WI
 W9VZP, LaClare B. Bales, Delaware, WI
 WA9WIC, Alex J. Petlock, Chicago, IL
 WA9CTP, Raymond E. Pennington, Oakley, KS
 W9EJL, Wiltred L. Wright, Davenport, IA
 W9EBY, Fern F. Koskovich, South Sioux City, NE
 K9EQH, Solomon Hofer, Spencer, SD
 W9CNU, George S. Brooke, Windsor, ON
 VE3HE, Edward H. Whyatt, Toronto, Canada
 VE3ZZ, W. A. Caton, City View, Ottawa
 OK1CX, Karel Kamnek, Praha, Czechoslovakia



How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Why?

*Those were the days, my friend —
We thought they'd never end. . . .*

Statistically inclined correspondents supply interesting data in attempts to solve the irksome Mystery of the Missing QSLs. One W9 says new-country returns were running about 95 percent when he joined ARRL's DX Century Club a decade or so ago; now, starting over on single-sideband, he finds his QSL income down 74 percent. Another careful WB4 analyst calculates his recent radiotelegraph results at 80 percent, his voice returns at 51 percent.

There are, to be sure, many complex variables involved in DX QSLing. The findings of a few W/Ks do not necessarily apply to all, yet lack of contrary data plus a steady flow of less precise concurring opinions convince us that amateur radio's QSL tradition has indeed suffered recent erosion. Oh, postal rates inflation is an inhibiting factor, true, but the value of QSLs kept reasonable pace with such economic variations in the past. Why not now?

Well, for one thing we've had a back-to-back stack of wonderful DX years beginning in the late '60s. Have DX QSOs become commonplace, so "easy" that documentary evidence is superfluous? Is anyone truly amazed by somebody's big collection of multiband Asian pasteboards at the moment? Ho-hum, more VU2s and HS1s. Eyebrows don't raise much even when the stuff is worked with QRP and attic dipoles.

DX prosperity is great for the wireless masses, but side effects may be troublesome. It can breed careless operating, a factor always to be considered in explaining why so many more QSLs are claimed sent than received. Shucks, signals are so good we rarely bother with headphones any more. Communications student WN9DQY discusses aspects of the matter in a recent Newark News Radio Club *Bulletin*:

Mistaken Callsigns

DXing on the ham bands requires more than just a feel for the radio dials. It demands an ear for what's coming through.

*7862-B West Lawrence Ave., Chicago, IL 60656.

To identify a station at the bottom of a pile-up isn't always easy. Add the usual noise level, some fading, an above-normal speech rate, careless pronunciation, or a foreign accent, and it becomes very difficult. Our alphabet, unfortunately, often increases the confusion. Letters can sound very much alike. In fact, some foreigners may not be able to pronounce a certain letter-sound, but rather sounds that fall between two letters — P and B, T and D, L and N, for examples. To see similarities we can divide the alphabet into seven phonetic groups: 1) BCDEGPTVZ, 2) FLMNSX, 3) AHJK, 4) QUW, 5) IY, 6) O, and 7) R. If all the letters were as easy to distinguish as O and R there would be no problem. But most DX calls contain one or more of the letters in the first group. Considering prefixes alone, about 65 percent fall into this category. Numerals are clearer than letters and could hardly be taken for each other. Yet 8 comes close to the sound of H so there is, for example, the possibility of confusing 8P6 with one of Panama's rarer HP6s.

All this emphasizes the importance of using clear phonetics. Without proper phonetics under poor conditions the odds are against "getting it right." The great chance of mistaking callsigns is one reason why QSLs are so highly valued. The confirmation proves there was no such mistake.

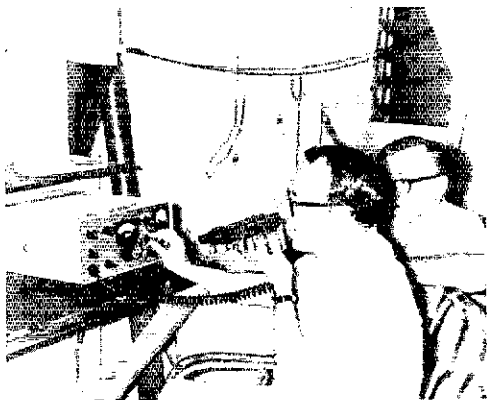
Slipshod radiotelegraphy is just as susceptible to error despite its emission bandwidth advantage. Clumsy spacing can turn CM/s into KW6s, DRDs into BALs, etc., no matter how loud and solid the signals. Add a little QRM, contest fervor or what have you and it's unpleasantly surprising how often calls go into the log wrong at the far end. Sure, "he gave it back okay" because we too often hear what we anticipate hearing.

Anyway, the ionospheric curtain is obviously descending on our current five- or six-year stretch of dazzling propagation conditions. DX QSOs and QSLs automatically get revalued sharply upward after sunspot maxima. We'll all be speaking more clearly, keying more carefully, and listening more

HV3SJ has a QTH for all seasons, especially the tourist season. Chief resident operator Brother Ed normally sticks to phone but DL1CU, who supplies this art, will return to Rome with DL9PF in November for more cw fun.

July 1971





VP5CC was a 4000-QSO February effort by W4s AXL FKG and WB4MKU. Dave, Mac, and Doc did their best to put Haiti into the ARRL DX Test but red tape intervened. They settled effectively for South Caicos where VP5AB was a most helpful observer. That's W4FKG operating, WB4MKU supervising.

intently in the years ahead. DX supply soon will trail demand again, and for some time to come. So better save that wallpaper, OM. You'll need it to convince junior that 10 once was jammed with DX and that 20 used to stay open at night.

+ + +

What:

160 DXers actually look forward to a quieter sun, of all things, and the QSL/QSO ratio is always high around 1.8 MHz. "Another good DX season," is WIBB's summation of 1970-'71 Top Band doings, particularly noting W1HGT's collection of 324 QSOs with 106 DX stations. With his usual thoroughness and enthusiasm Stew generously provides the story in his No. 3 *160-Meter DX Bulletin* of the season's series, some highlights of which follow. . . . The band receives increased attention by DXpeditioners. Operations by TI9CF, PJ0FC, W4BRB/VP7 and W9UCW's San Andres team brought down the house, while the traditional Transatlantic, Transpacific, Transequatorial and World-wide Tests (announcement on p. 97, December '70 QST) plus the initial ARRL 160-Meter Contest, kept action at fever pitch. . . . Our sixes and sevens are turning the west coast into a hotbed of 1.8-MHz intrigue. Easterners may have the European and South America monopoly at present (apparently no Californian has conquered the Atlantic on 160 since W6ML worked G3PU in '64) but beyond the Rockies they're working, hearing, or digging for stuff like CR8AG, JAs 2CLI 3AA 6KBB 6SA 6VA 7AQ 7HQP, 1D1s ABH ABI ABM, JH1LKH, KH6s U

HCM, DR8AG (who has hooked about three dozen JAs), VEs 3ABR 3ANP 3QI 3SD 3XB 5KO 6NK 9GN, VS6DO, and ZS6BT. Note that Sixland and some Seven areas have been switched to the lower band segments in accordance with Loran network changes, also that maximum permitted power inputs have been raised in many regions, FCC actions effective May 1, 1971, as detailed on p. 77, April '71 QST. . . . The local talent sewed up many a 1.8-MHz WAS but WACs remain scarce. A spectacular QSO by VK6NK and G3QLI gave the latter his final continent on 160. . . . Antennas continue as top topic on Top Band. Loaded verticals with lots of radials keep gaining favor but the crowd with high-as-possible horizontals may have a signal-to-noise receiving advantage that pays off. Ws 6EAY 6NMII/4, K0DCE and others with space to spare have joined the Beverage movement (see p. 100, June '70 QST). K5TFG gets S8 in Scotland with his double-dipole beam, horizontal elements 50 feet high spaced about 53 feet (one tenth wavelength at 160!). Phased multiverticals, kites, balloons, rainpouts, long farm fences — anything is worth a try and the boys are trying 'em. Skywires designed for higher bands can produce impressive results, especially when towers and/or extensive feedlines are pressed into service as radiators. Bed springs? Why not, but better tack on a monster counterpoise — hi! . . . Manmade rf pollution is a growing DX problem around 1.8 MHz. TV, powerline hash, Loran sidebands, sparky neighborhood appliances, etc., must be sliced before you hear those weakies. W1BB and friends especially appreciate keeping 1825-1830 kHz as clear of local QSOs as possible when the European game is afoot. . . . Guts and perseverance are trademarks of 160-meter buffs. VE8OK held an urgent antenna party in 40-below weather, and VK5KO once dug into the static for 348 consecutive days with only signals from DL9KRA and commercial DHJ to show for it. . . . Say, need a better ground? They're extremely important on 160. VE5XU learns that Saskatchewan's Watrous Lake is saltier than our Salt Lake, giving the region the highest ground conductivity on the North American continent. Maybe he'll ship you some. . . . QRP enthusiasts find a king-sized challenge on 160 where getting out with full power is difficult enough. WA7ILC says the two-watter of W8KFX puts solid signals out Washington state way. . . . G3YMP mentions formation of a European DX net on 1829 kHz at 2200 GMT or so with numerous Continental countries represented. . . . Practically all of these DX doings are of the cw stripe, painstaking pump-handle work, but conditions occasionally peak to the point where solid single-sideband or straight-a-m QSOs are possible. Among other DX stations reported worked, heard, or heard worked are DJ0MR, DL1FF, EI 8H 9I, GM3s WDF YCB, GW3s UCJ VPL XJC HB9s CM NL, HK0AI, HR2HH, Ks 8HKB/HK0 SIUA/KL7 9CQV/HK0, KL7CL, KP4CB, KV4FZ, OA8V, OE1KU, numerous Gs and OKs, PA0PN, PJs 2CC 2VD 0CC, PY1MGF, TI9I, VPs 1AGA 2EE 2VL 9BO 9GR, Ws 9UCW/HK0 0KUS/HK0, YV1OB, ZDs 8AY 9BM and 9Y4NN. In the thick of things from our side were W1s PL PPN WOC WY, W2s BP BVN DXL EOS EJ FTD IU KHT RAA UEZ, W3s AIS FE GM IN RGQ, W4s F-X GJO QCW YSD ZVQ, W5s RTQ RSZ SBX ZAQ, W6s AMO DOX ERS ITY JHO JHV JNR KWE MAV NUJ QHQ RW VSS YRA,

W9IGW/CE0 with K9KNW, logistically aided by CE3AEV, recently ripped off 3793 contacts on 10 through 80 meters from Juan Fernandez Island. Wayne and Joe made headquarters in the comfortable hostelry slightly visible in the inset aerial view. The place always will be famed as sailor Selkirk's exile, model for Defoe's *Robinson Crusoe*.



KP4s (front, left to right) BJM ES TY CLB, (rear) RK QM DKZ CK CL WD and AST transmit this photographic 73 from a recent Puerto Rico Amateur Radio Society gathering. At right (l to r) KG4s EL NET, Steve of EQ, NEX, Virg of EQ, NEU CS, Ted and Dave of AM, and EK watch the hamfest birdie at Guantanamo Bay U.S. Navy Base. For KG4 traffic check the 14.313-kHz Maritime Mobile Net at 2130 GMT. (Photos via KP4RK and KG4CS)

W7SUFJ DL DOL DZO HZL IC LNG YGN, W8s AH ANO ELL EWC GDQ HID, W9s DL DY YYG, W0s AKW DX JIN NEL PSE, Ks 1PBW 2ANR 2GAL 2GNC 2LBB 3MBE 3ZUG 4BG 4IA 4PY 6CEO 6DIO 6RU 7HQL 7WRW 8BBI 8CRJ 8FX 8RNE 8RRH 9CQV 9IDHV 077H, WAs 1EVZ 2KWB 4JZC 4PXP 4SGF 5KY Y 61VM 81EV 9EYY 9NKT 9UET 0JVS 0UBB, WB9s HUV CJS CTC, VEs 1ASW 2CK 3QU 4AH/W7 5XU 7BDJ 7UZ and 8OK. . . . Up our way the band is cluttered with summer static now but this daunts not trueblue lower-frequency DX diehards. 'Tis mid-winter in the southern latitudes, you know, and the watch is keen for transequatorials when those quieter-than-usual nights do come along. Make ready for the 1971-72 season's fireworks which could begin with a big Australian breakthrough in August. CU on 160!

Where:

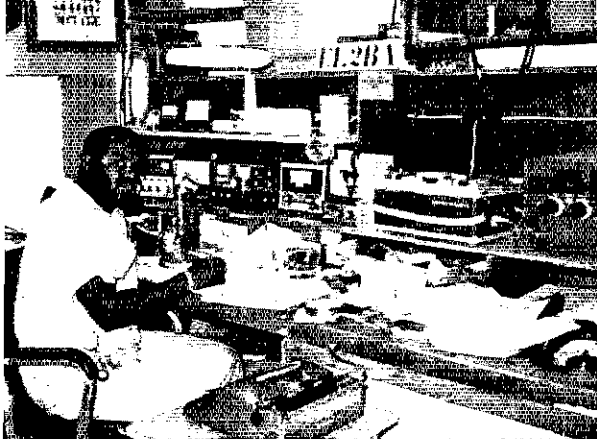
HEREABOUTS - We must all thank W2CTN. Forced to discontinue his QSL services due to reasons of health, for such a tremendous job over the years. Jack's speed and accuracy with those cards brought many of us new confirmed countries. - *HPUE via LIDXA*. . . . Elected "QSLers of the Month" for spectacularly speedy pasteboard pushin' are C21GB, CR4BS, HSIADX, LA9CE, 0X4AF, P16AA, TA3JM, TJIJAW, VK9XX, VP2BGB, VS6AI, YJ8JM, ZK1BM, 7P8AB, and 9H1BW, plus QSL agents Ws 2CTN 7VRO, K4ZCP, KV4AM, VE3s DIC and MR, as nominated in "How's" correspondence from Ks 1ZCH 3YUA 5IID, WAs 2EAH 0UAV, WBs 4ONR 9CJS and VK2JK. Any worthy candidates in your log? . . . Halp! The following italicized colleagues seek hints toward coaxing wallpaper from holdouts mentioned: *W9LNQ, 9M6MG; WA3MSU, C0s 2FA 8RA, CX7BBW, 1R7AG, JX4GN, 5Z4JP; W46CLL, KC6RK, TR8CQ, VP2ED; W48TDY, AP2AD; ON8VH, GB3IX and 5T2UIT*. Any halp? . . . QSL managerial assistance is offered to harried DX ops by Ks 4QPR 5IID, WAs 2HBZ and 8TDY. . . . DXpedition of the Month's assistant QSL managers include Ws 3D1/4GYP 4WWD, Ks 2BKU 2KTK 4CIA 4KH, WAs 1HAA 2EFN 2HRZ 3HRV/2 4OTA 4UXII, WBs 2GQK 2KEC 2IGO and W4SDD. A large bundle of KV4Z cards are now entering the mails. - *W2GHH*. . . . I hold all logs for YS2CEN's operation as HU2CEN and am QSL manager for FM7AA as of April 1, 1971. - *W48TDY*. . . . Those needing QSLs for my mid-April

VEIAL/VP9 QSOs will find me listed only in the latest *Callbook*. Cards to the address of my old VE1JN listing will reach me, however. That Bermuda trip busted me s.a.s.e. (self-addressed envelopes) with IRCs (International Reply Coupons) from W/Ks, please! - *VEIAL*. . . . My gripe is the QSL manager who used my s.a.s.e. (intended for a 9X5 card) to send me propaganda about his "QSL service" with a request for a nickel to forward my QSL to the ARRL Bureau. Bah! - *W4YOK*.

EUROPE - The Italian Post Ministry has authorized our amateurs to use the first figure in their Zip addresses instead of the usual "1" in their calls. Hams of Piemonte, Liguria and Valle d'Aosta whose Zip has the first figure "1" may use the IP1 prefix. Thus Italian call areas will correspond approximately to 12, Lombardia; 13, Veneto, Trentino Alto Adige, Friuli-Venezia Giulia; 14, Emilia; 15, Toscana; 16, Marche, Abruzzo; 17, Publie, Basilicata; 18, Campania, Calabria, Molise; 1T9, Sicily; 1Q, Lazio, Umbria; and 1S0, Sardinia. Smaller Italian islands may use 1A5, Elba; 1B0, Ponza; 1C8, Capri; 1D9, Folie; 1E9, Ustica; 1F9, Favignana; 1G9, Lampedusa; 1H9, Pantelleria; 1L7, Tremiti; and 1M0, little Sardinian islands. *Note:* Italian stations may also choose to continue using their old 11, 1S1, or 1T1 prefixes. - *11ZCT*. . . . Already ran into IP1BMI (11BMI) and 119AUA (1T1AUA). - *K2QHT*. . . . I'm managing SV0WEE's QSLs as of this May. - *W3HNK*. . . . Helped Brother Ed of HV3SI write out many QSLs for 1970 QSOs. - *DLICU*. . . . When using another ham's equipment German licensees add the letter "A" to their calls, DJ1US, for instance, becomes DJ1USA. - *W47LMZ*. . . . That occasional "X" after YU calls, such as YU2CB/x, indicates that a member of the licensee's family is operating. - *LIDXA*.



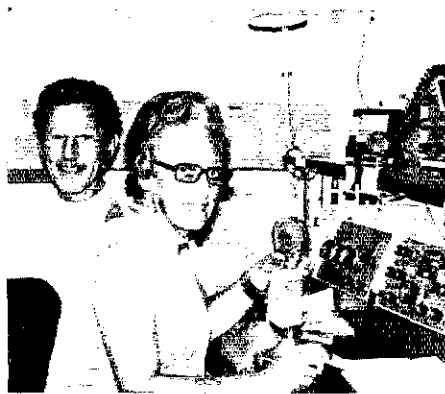
VP2ES, operated by W2BBK and PJ7VL (far right), scored almost two kiloQSOs from Anguilla in mid-February with an HW-100, 2B, 14-AVQ and 80-meter dipole. Doc also put PJ8AA on the air briefly before heading home.



OCEANIA — In answer to BE7BAF's February inquiry as to whether K5es send QSLs, I can answer *no*. Over a period of years I've had seven Samoa QSOs without a single QSL to show for them. I've tried s.a.e. with IRCs followed by s.a.s.e. bearing U.S. postage. — **VK5BS**. . . . I'm QSL manager for YB9AAT commencing with contacts of March 14, 1971. — **W4YUU**. . . . Cards for KJ6CF QSOs, operator Don only, dating from August 21 to September 21, 1970, can go to D. Pierce, 3400 51st Loop, Sandia Base, New Mexico 87116. — **DXNS**.

AFRICA — No logs from 5VZDB yet but I'm in contact with him and expect them shortly. I also manage QSLs for TT8AC, 5ZVWT, and ZS6RM. — **W4SPX**. . . . Effective May 1, 1971, I have replaced W2CTN as QSL manager for 7Q7AA. As usual, cards with s.a.s.e., or s.a.e. with IRCs from non-W/Ks, will be answered first, others later via bureaus. — **K4CDZ**. . . . The Kigali QSL bureau has closed and you may find 9X5s using the Kinshasa 9Q5 bureau. — **UBA**. . . . K6KQK wishes it known that his QSL chores for 3V8AB are only for QSOs of August, 1968. — **WCDXB**.

ASIA — Certainly hate for the gang to lose W2CTN's QSL managing. I'll be handling QSLs now for my old buddy VU2JA. — **W5VA**. . . . Effective April 1, 1971, I am QSL manager for 4X4AE. — **W4NOS**. . . . W0BW received a JT1 QSL direct in three weeks in answer to a self-addressed stamped envelope and mint Mongolian postage from W2SAW's supply. — **LIDXA**. . . . W6KTE says no logs received from XW8AX since June, 1969, and K4BAI still awaits his first HM1BB logs. — **NNRC**.



YS1s JL and JSL, a happy DX team down San Salvador way, are often joined on the air by daughter YS1CL. Jacque and Jackie plan a U.S.A. visit in late summer. (Photo via K2QHT)

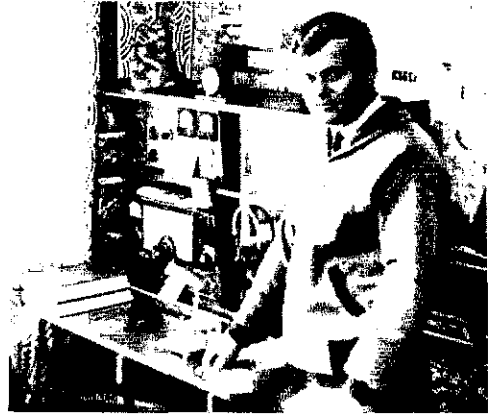
EL2BA runs a fish processing plant in Monrovia when not cruising DX bands with this well-appointed installation. Ben's set-up includes Swan, Galaxy, Realistic, and Telefunken gadgetry. (Photo via K2QHT)

SOUTH AMERICA — Complete 4M1A and 4M5A logs are now on file here thanks to W2GHK. I would like to clear them, so let's have those s.a.s.e. — **W42ZR**. . . . Effective June 1, 1971, 8R1J QSLs go via my address. — **K2DDK**. . . . My card to HK3DA came back marked *muerto*. — **W4YOK**. . . . I am no longer QSL manager for ZP9AC effective May 1, 1971. — **K1HKO**. . . . Cards from Antarctic KC4s certainly come through slowly — **S. Garber**. . . . DXers with s.a.s.e. on file with QSL managers, and those in process of filing or about to file, are reminded to up the ante in accordance with the latest U.S. postal rate advances. And be alert for the next one. Now a few individual recommendations from the mailbag but keep in mind that each is necessarily neither complete, accurate, nor "official." . . .

- C21DC, P.O. Box r, Nauru Island
- DA1IJ, Box 3633, APO, New York, NY 09057
- DA1JP, J. Perkins (WB6PNB), HHC, 34th Sig. Bn., APO, New York, NY 09154
- DJ1US-DJ1USA (via WA7LMZ)
- EA8HT, P.O. Box 9, Arucas, Canary Islands
- FL8LM, M. Lotterie, P.O. Box 468, Djibouti, T.F.A.I.
- FL8PJ, J. Pierrat, P.O. Box 468, Djibouti, T.F.A.I.
- HR5JDC, Neuva Ocotepeque, Honduras
- HS3AFB, Box 4954, APO, San Francisco, CA 96288
- Is 4ALU 5DOF 6CXD 7TGT 8KDB, etc. (see text)
- IB0KDB, Box 143, Palermo, Sicily, Italy
- IC1s PUG SEZ ZGY, c/o DXOTC, Box 143, Palermo, Sicily, Italy
- IT1SPI, P.O. Box 366, Catania, Italy
- KB6CT, c/o Federal Electric, APO, San Francisco, CA 96401
- SZ0DC, P.O. Box 564, Athens, Greece
- VK2BRK, R. Kearney, 13 Kiara St., Canley Vale, NSW, Australia, 2166
- VK2-3-5-6CIF (via W2GHK)
- VK2JK, G. Spencer (W1ZCH), 5 Bond St., Spit Jctn., NSW, Australia, 2088
- VPIJP, Jane Pinkerton, Box 415, Belize, Dr. Honduras
- WA8FPN/KS6 (via WA6BKS)
- YB3AAU, P.O. Box 168, Surabaya, E. Java, Indonesia
- YB3AAY, J. Marino, Jr. (WA3LJM), U.S. Embassy (SU), APO, San Francisco, CA 96356
- Y18JS, J. Stent, Post Office, Vila, New Hebrides
- Ex-ZC4GB-5B4GB-SU1GB (to 9V1QK or via RSGB)
- JC0s AN EG (via OH2NB)
- 5VZDB-5ZVWT (via W4SPX)
- 9X5VA, P.O. Box 30, Butare, Rwanda
- 9X5YG, P.O. Box 117, Butare, Rwanda
- CN8BF (via F6AZN)
- DA1RAF (via G3XIN)
- DX6GI (to Du6RG)
- EI0DX (via EI5BX)
- EL7FD (to ELRL)
- ET3ZU/A (via I1IJ)
- FM7AA (via WA8TDY)
- FY0NA (to F0NA)
- GB2-3ITU (via RSGB)
- GB3FI (via GW3VBP)
- HB0XTG (via G3LOP)
- HB0XTO (to DK3ST)
- HC6MJ (via GRC)
- HQ2GK (via WA8VRB)
- HR2GK (via WA8VRB)
- HR2WTA (via K9PPV)
- Ex-HS3JA (to YB3AAY)
- HW6UIT (via F9OE)
- IC1AA (via I1AA)
- IM0KH (to I1JQ)
- JD1AAZ (via JA1OJE)
- JT1AH (via JT1KAA)
- JWSNW (via LA7RB)
- JY9WB (to EP2WB)

KJ6CF (see text)
 KX6LL (via WA3OYY)
 LU3DGX/p (via LU5DL)
 MP4MBC (via G3XEC)
 QA4DX (via K4OD)
 PA9HOS (to W4HOS)
 PJ9BB (to W2VIA)
 Ex-SM3DSO (to OZ3GS)
 SV0WEE (via W3HNC)
 TA1TS (via TRAC)
 TA3GB (via VE3MR)
 TT8AC (via W4SPX)
 VE1AL/VP9 (see text)
 VK8JH (via VK8HA)
 VK0CC (via VK2BRK)
 VP2AAC (via WB4GGA)
 VP2LAH (via VE3BWY)
 VP2LDD (via VP2LT)
 VP2LY (via VE3BMV)
 VP2SAH (via WB2AMO)
 VP2VAG (via VE3GMT)
 VP2VAH (via VE3ACD)

VP8LZ (via G8DTM)
 VS9MT (via G3LQP)
 VU2CP (via DJ9ZB)
 YB9AAT (via W4YUU)
 ZASZ (via OH2NB)
 ZD8AY (via K3RLY)
 ZF1BA (via WB2CKS)
 ZF1LM (to W8LUI)
 ZF1WF (via K4CDZ)
 ZL4JF/a (via ZL1AUF)
 ZP9AC (see text)
 ZP0BK (via CX1AAQ)
 4U3ITU (to 4U1ITU)
 4X4AE (via WA3NOS)
 5W1AM (via W7YBX)
 5X5AN (via RSEA)
 5X5NA (via RSEA)
 7Q7AA (via K4CDZ)
 8R1J (via K2DDK)
 9Q5BA (via DJ6VN)
 9Q5JD (via ON5IU)
 9Q5MG (via DJ4PS)
 9X5RG (via ON5TO)



UW1BF, husband of chic UA1JL who graced our pages last month, formerly signed UV0IA. Anatoly is an Aeroflot radioman whose fast cw may be heard in the busy RFNV airline nets on 6748 and 11,312 kHz when he's not gunning for DX with this 200-watt Leningrad layout. (Photo via W2MLO)



VP7DL mans a businesslike installation in the balmy Bahamas. According to W1CW of ARRL's DXCC Desk, Winfried has confirmed 289 phone countries in little more than two years.

Your thanks for the preceding QTH catalog should be directed to Ws 1FTX 1YYM 1ZCH 2BTQ 4YOK 6DPV 9LNQ, Ks 2QHT 5HD, WA2s EAH HZR, WBs 4ONR 9CJS, EI4BK, SM3ALR, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich N.72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (J. Heien, 3822 Marshall Ct., Bellwood, Illinois 60104), Northern California DX Club *DXer* (Box 608, Menlo Park, California 94025), Southern California DX Club *Bulletin* (W6EJJ), UBA's *On the Air* (ONS 4AH 5VA), VERON's *DXpress* (PA0s FX LOU to VDV WWP), West Coast *DX Bulletin* (WA6AUD), and 3KM *DX Bulletin* (JA1KSO, JHIEXV). Your turn to feed this kitty?

QST

5B4ES, ham station of the English School Radio Club, Nicosia, is licensed for 24- or 48-hour periods two or three times a year, usually coincident with major operating activities. No other Cypriot amateur privileges exist at present although ZC4 calls are heard from British Sovereign Base areas. W4HJL and K2TNI, over there for two years, join visiting British hams in nurturing the students' indomitable ham spirit in all ways possible, assisting in code lessons, gear maintenance, antenna work, etc. K2TNI is shown operating while a Novice looks on. At right everybody pitches into an antenna problem. Don and Jerry write, "They'll keep working, learning, and hoping for the day when their government revises its limitations and opens the amateur bands on Cyprus."





YL News and Views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

1971 YL - OM Contest Results

EVERY SO OFTEN there is the inquiry - Where can I find YLs? The answer is always the same: YLs are everywhere and anywhere from 80 through vhf, on cw, phone, RTTY, or ATV. One of the surest ways to find them is in the contests. For the women who ask there are Howdy Days in September, the Anniversary Party later in the fall, and for OMs the answer is February and March in the YL-OM.

The 1971 phone winners are, OMs: K5MDX, first; VO2GD, second; and WA6DKF in third place. The OM cw contest winners are W5SZO, first; WA6DKF, second; with W4CHK in third.

YL phone winners were: K7LPZ/VE7, first; HC1KP, second; and W1RLQ, third. The YL cw top three had K7LPZ/VE7 again in the top spot with WA0KVL second, and WASVJW in third place.

"YL News and Views" congratulates the winners of this year's contest, both the ones at the top and those placing high in each District of YLRL.

Bert, W3TNP, summed up most of the YLs' eye-view of the contest when she wrote:

"The family were alerted that they would be minus my services for twenty-four hours, and I began making all the usual preparations. At the magic hour I gave forth with an eager CQ only to be rebuked with, 'This frequency is in use; please QSY!' On the second try, I remembered to ask if the frequency were free only to be told it was a DXpedition frequency. I was by then sure I would never make it, for no one answered. No luck as the logging time went on. Finally the OM suggested, kindly, that I might consider moving to another band. Because I do obey sometimes, I moved to 20 meters and the welcome was instantaneous.

"There was the fun of explaining the particulars of the contest to OMs, which took time but also did give points. I thought I was doing fine until Sunday morning when I heard a DX gal issue a number that was about twice what I had logged. I laid off the coffee breaks, pointed the beam towards Europe and logged a W6! Tried turning the beam west and, sure enough, there were the European OMs answering my call.

"The QRM was fierce and I was most grateful for the patience of the OMs. Their reactions were also interesting. They ranged from comical, constructive (how to run a contest), indignant (get off the frequency), obliging (they moved), tolerant (it will end soon). But, seriously, OMs are terrific operators. I had a great time, added new countries, and made a lot of friends."

*YL Editor, QST. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, CA 91001.

The Winners

YL Phone

K7LPZ/VE7	77,524.00
HC1KP	62,228.00
W1RLQ	37,628.00

OM Phone

K5MDX*	6,063.75
VO2GD	5,644.00
WA6DKF*	3,630.00

YL cw

KL7LPZ/VE724	734.00
WA0KVL*	22,942.50
WASVJW	19,565.00

OM cw

W5WZQ*	2,486.25
WA6DKF*	2,437.50
W4CHK*	1,881.65

YL Phone Scores

W1RLQ	37,628.00
K1QFD*	4,725.00
WB2JCE*	1,380.00
WA2RVD*	1,000.00
WA3HUP	37,050.00
W3TNP	33,756.00
WB4HEY	16,905.00
K4RHU*	13,515.00
WASOVX	13,980.00
WA6AOE	22,248.00
K6DLL*	8,475.00
WA8FSX*	19,575.00
WB8FBG*	9,180.00
WABKM	3,150.00
W8LGY	1,118.00
WA9TVM	21,896.00
WA7MKQ/9*	4,510.00
W9VNG	962.00
WA0YNC*	25,110.00
W0JUV	15,504.00
VE1AMB	2,387.00
VE2ST	22,848.00
VE5FK	7,350.00
K7LPZ/VE7	77,254.00
HC1KP	62,228.00
ZL2JO*	25,460.00
YK3KS*	16,031.00
9M8SPD*	10,468.75
ON4QP*	9,293.00
YV5CKR	6,655.00
SP9KR*	422.50
ON8UL*	377.50

OM Phone

WA1CJR*	2,493.75
W1BAB*	2,362.50
WIHQZ	1,080.00
K1WMO*	472.50
W1DQK	384.00
WA2BZX*	1,472.00
WA0GZA/2*	593.75
WB2POG	500.00
WB2MUK	467.00
W3HQU*	1,387.50
W3BEX*	1,170.00
W3QLW	713.00

WA3IXF	567.00
W3EYW*	360.00
K4BNC*	1,650.00
W4AVY	1,568.00
K4GSK*	1,558.00
K0VRG/4*	1,125.00
W4KMS	540.00
W41UJ*	332.00
K4OVE*	178.75
WA4VFK*	101.25
K5MDX*	6,063.75
WA5QBO*	891.25
W5OB	540.00
W5QNO*	5.00
WA6DKF*	3,630.00
W6RQZ	24.00
K6TUF*	11.00
W7ULC*	1,267.50
W7EOL	1,176.00
K7AOA*	61.25
W8MXO*	300.00
W9NLF*	1,120.00
WA0VBV*	2,662.50
WA0OBG*	1,235.00
WA0FDQ	660.00
W0NDY	546.25
WB0BNR/0	312.50
VO2GD	5,644.00
VE1ASA*	472.80
VE2CO*	747.50
VE2IL*	61.25
VE3CQA*	1,248.75
VE5TA	580.00
VE6UP	475.00
DK2L	540.00
DL9XN*	518.00
HAGA*	112.00
JA1SR*	31.25
JA5FMT*	11.25
JA2JAR*	11.25
JD1ABX*	11.25
JH1EZZ*	11.25
OK3CEA*	2.00
OH2BR	1.00

YL cw

K1NEI	12,240.00
W1RLQ	12,194.00
K1QFD*	10,920.60
K1BUF	6,572.00
WA1KMP*	3,645.00
WB2JCE*	10,640.00
WA2WHE*	7,380.00
WB2PYI	3,115.00
WA3HUP	18,375.00
K3SQX*	4,868.00
W3CDO	285.00
K4RHU*	7,590.00
K4VDO	4,100.00
WA4BVD*	1,990.65
WA5JVW	29,565.00
WA5OVX*	292.50
WA6IRT/6*	6,960.00
K8ONV	13,504.00
WA8FSX*	9,100.00
WA8FKQ*	8,890.00
WB8FBG	4,770.00
WABKM	3,648.00
WA9TVM	14,805.00

WA9EZF*	2,125.00	W5VZU	500.00
WA0KVL*	22,942.50	K5MAT*	498.75
WA0YNC	3,362.00	W5RIT	156.00
K0GIC*	2,465.00	WA6DKF*	2,437.50
VE1AMB	6,273.00	W6GBY	775.00
VE1AE	570.00	K6JQV	437.00
K7LPZ/VE7	24,734.00	W6RQZ	315.00
VK3KS*	15,410.00	WA6TMO*	262.50
YV5CKR*	12,343.00	W6WLV*	178.00
DI5SB*	4,590.00	K6TU	121.00
ZL2JO*	4,522.50	WB6LEX	121.00
ON8UL*	1,185.50	W6CLP	99.00
OH2BE	390.00	W7ULC*	1,760.00
YUISE*	31.25	W7GAF*	137.25

OM cw

WIPEG	525.00	W81DM*	124.00
WIHTE	440.00	W91NO*	1,472.50
W2AAU	1,428.00	W9OU	800.00
K2LFG*	1,000.00	W9RKP*	682.50
K2SHL	672.00	WA9T7D*	450.00
W2RUK*	318.75	WB9FQI*	243.75
W3HQU*	1,387.50	W9WR	240.00
WA3EXX*	937.50	WA9BWY/9*	137.50
W3QM*	810.00	W0KCG*	1,000.00
W3ADE*	780.00	WB0AZD*	930.00
W3RYV*	112.50	WA0YEF*	437.00
W4CHK*	1,881.25	WA0CTX*	390.00
K4GSX*	1,260.00	KH6GL	1.00
WB4OGW*	980.00	HP1BR	418.00
W4IJJ	858.00	VO2GD	1,827.00
W4KMS*	227.00		
K4CAX	12.00	Confirmation logs from	
W5WZQ*	2,486.25	W2UAP, W2SZG,	
W5OB	575.00	W2NCG, W3ARK,	
		W4UE, W6AWY.	

Note: Asterisk after a call means that the low power multiplier was claimed. High score for each YLRL Division receives a certificate. Where only one log was submitted from a DX country or VE district, a certificate was awarded to the sender. If the call is not listed, it was disqualified.

Plan Ahead

K7QGO, 1971 YLRL vice-president and Contest Chairman, has announced that the major contests sponsored by YLRL have been scheduled for the following dates:

- YLRL "Howdy Days" September 22, 23, 24, 1971.
- YLAP, cw October 20, 21, 1971
- YLAP, Phone November 3, 4, 1971
- YL-OM Phone, February 26, 27, 1972
- YL-OM cw, March 13, 14, 1972.

Complete rules will be published two months prior to each contest in *QST* "YL News and Views," as well as in *YL Harmonics*. So mark your calendars now to Plan Ahead!

YLRL Membership

Again there have been inquiries about membership requirements for YLRL. This world-wide YL organization is open to any YL who holds a current amateur radio operator's license. All classes of license are welcome.

Those who are interested in joining may write to their membership chairman: Eastern U.S. Marge Campbell, K4RNS, 65 North Arbor Drive, Ormond Beach, FL 32074; or the Western Membership Chairman Beth Taylor, W7NJS, 14637 S.E. Fair Oaks Avenue, Milwaukie, OR 97222.

1971-72 Buckeye Belles Officers

Officers for the year 1971-72 were elected at the Tenth Anniversary Meeting of the Buckeye Belles, at Bellville, Ohio in March. The following



W3TNP, Bertha Kenas

women were elected to head the Ohio Club: President, K8CKI, Lillian Abbott; Vice-president, K8ONV, S. Mary Ryden; Secretary, WA8BWD, Lucy Benner; Treasurer, WA8EBS, Eila Russell. Certificate Chairman for the Club is K8ITF, Marge Farinet. Custodian of the Memorial Station is W8LGY, Ruth Rickett. At the same meeting Recognition Awards were presented to WA8KQ, K8ITF, WASHWL, K8CKI, K8HDO, WA8EBS, WA8KMT, and K8CEN, for outstanding contributions to the club.

XYL - Again!

The past few months have brought a number of letters protesting the abbreviation "XYL" as an uncomplimentary expression. It is anything but that. The official "Abbreviations for cw" in the 1971 ARRL *Radio Amateur's Handbook*, lists it as "XYL (YE) wife." Not one of us objected to changing our status from Miss to Mrs., so why object to XYL when it is nothing more than the marital status of a woman?

W3TNP, Bertha Kenas

Bertha resented playing second fiddle to amateur radio, so she did what a lot of women have done. She tried to discover what that "fatal charm" of radio was by listening to the OM's contacts and promptly heard that "strenuous" herself. She received her Novice call in 1952 and passed Advanced in December 1968.

Found on 20 meters most of the time, Bertha enjoys the challenge of contest operating, particularly YL-OM and AP, where W3TNP has been high score for the third YLRL District twice, as well as twice in YL-OM. A member of ARRL and YLRL, where she holds the office of Third District Chairman this year, Bert is also a member of the Penn-Jersey YL Club, and has been active in the club in several offices. She is active in the Intercontinental Traffic Net, and checks into as many YL nets as time will permit.

Although she says she is too lazy to apply for certificates, she holds WAC-YL, DX-YL, YLCC, PJ-YL, Blue Ridge YL, and the Grandmothers' Club as tangible proof of her on-the-air activities. Her greatest joys, however, are the intangibles, the satisfaction of being able to assist someone to talk to parents or family from South America, or wherever this particular service is permitted. **QST**

Operating Events

de WTYM

JULY

- 1-5** KØØKC operation, rules p. 102 June.
- 3-4** ByeloRussia Day (DBD Contest), the full 24-hour GMT period starting/ending at 2200Z. (Note that Greenwich Mean Time, GMT, is often abbreviated by the letter Z.) UC2 stations will send RS(T) and the number of their region (00S-01D). All others send RS(T) and QSO number. Send your entry via Box 88, Moscow, USSR.
- 8** W6WOP Qualifying Run (W6ZRI, alternate) at 0400 GMT on 3590 and 7129 kHz, 10-35 wpm. This is 2100 PDST the night of July 7. Copies to ARRL for grading.
- 8-17** The Calgary AR Assn. will operate VE6NQ from the grounds of the famous Calgary Stampede, details p. 102 June.
- 10-12** "Open CD Party" cw, info, p. 102 June.
- 16** WIAW Qualifying Run, 10-35 wpm, at 0130 GMT on 1,805 3.52 7.02 14.02 28.02 50.02 and 145.588 MHz. This is 2130 PDST the night of July 15. Underline one minute of top speed copied, state no aids used (typewriter copy OK), sign and mail to ARRL with your full name (call if any) and complete mailing address.
- 17-18** Ontario QSO Party, see p. 102 June.
- 17-18** Independence of Colombia Contest, p. 102 June.
- 17-19** "Open CD Party" phone, info, p. 102 June.
- 24-25** County Hunters CW Contest, p. 102 June.

AUGUST

- 4** W6WOP Qualifying Run, see July 8 listing.
- 7-8** Ohio QSO Party, sponsored by the Treaty City AR Assn., from 1900Z Aug. 7 to 0300Z Aug. 8 and 1500-2300Z Aug. 8. Each station may be worked once per band per mode. Ohio stations may work anyone; non-Ohio stations QSO Ohio only. Exchange QSO number, RS(T) and location (county for Ohio, ARRL section/country for others). Stations operating on county lines may issue more than one county but only one QSO number. Suggested frequencies: 3540 7040 14040 21040 28040, 39K5 72K5 213K5 285K5, 50.15 50.525 (F3D), 145.4, 145.94/88 (F-M), Novices 3735 71K5 21135. Logs must show dates/times, stations, exchanges, bands, modes and multipliers. Check sheets appreciated. Appropriate awards. Score 1 point per QSO 80-20 meters, 2 points on 15 and 10, 3 points on 160 and vhf. Multiplier is the number of counties (for non-Ohio stations) or ARRL section for Ohio stations. Logs, list of Ohio counties and ARRL sections, printed rules and a list of TCARA club members available on receipt of a no. 10 s.a.s.e., to Scott Lehman W8TGGX, Box 91, Greenville, Ohio 45331. This is the address to mail logs to following the contest. You're urged to check 160 (1805 kHz) at 0200Z May 8, and write for special rules if you're contemplating portable/mobile operation.)
- 10** WIAW Qualifying Run, see July 16 listing.
- 21-22** QRP ARC QSO Party, starts 2000Z Aug. 21 and ends 2400Z Aug. 22, open to all (members and non-members alike). Exchange RS(T), section or country and QRP no. (non-members send power and NR). Frequencies: cw 3540 7040 14065 21040 28040, ssb 3980 7780 14330 21430 28600, Novices 3710 7160 21120. Stations may be worked once per band for QSO and multiplier points. Each member contact counts 3 points, non-member QSOs count 2 points. DX QRP members may claim 4 points per contact. Multiply QSOs by sections or countries. Power mult.: over 100 watts dc input X 1, 25-100 watts dc input X 1.5, 5-25 watts X 2, 1-5 watts output (2-10 watts dc input) X 3, below 1 watt output X 4. Appropriate awards. Readable logs with date/time, exchanges, bands, emissions, equipment, power and score computation with usual declaration must be sent by Sept. 15 to: Elmer J. Worth, K3YNN, 946 Franklin St., Reading, PA 19602. (K3YNN will also furnish info. on the QRP ARC for a s.a.s.e.)
- 14-15** Maryland and D.C. QSO Party, sponsored by the Maryland ARC, starts/ends 2300Z. Open to all, stations may be contacted once on each band/mode, (separate logs for each mode). Cross checks should be kept to eliminate dupes. MDL stations send QSO number, RS(T) and county. (Independent cities of Baltimore and Washington, DC count as separate counties.) All other stations send QSO number, RS(T) and ARRL section or country, as applicable. Score 1 point for each number sent and 1 point for each received. MDL stations use the total number of different sections and countries for multiplier. Outside stations use the number of MD counties or independent cities (total of 25). Appropriate awards. Readable logs with calls, locations, numbers, date/time, reports, county or section/country should be mailed to Carl E. Andersen, K3JYZ, 14661 Claude Lane, Silver Spring, MD 20904 prior to Sept. 15. Usual statement should be included. Enclose an s.a.s.e. for contest summary. Suggested freqs.: cw 3575 7075 14075 21075, phone 3920 7275 14275 21325, novice 3735 7175 21110, technicians 50.175 and 145.175.
- 21-22** Scandinavian Amateur Radio Teleprinter Group World-wide RTTY Contest from 1500Z Aug. 21 till 1800Z Aug. 22 on 80 through 10 meters, single and multipt. Exchange RST and QSO number. QSOs with one's own country on the same continent count 5 points, with another country on the same continent 10 points, with another continent 25 points. QSOs with Scandinavians count double. Multipliers as on the Countries List and, additionally, each district in WK, VE/VO, PY, LU, VK, ZL and JA. The same station may be contacted once each band for additional QSO points AND multipliers. Final score: QSO points times sum of multipliers. Awards to the 2 highest-scoring stations in each class and in each country and call area. Logs, with all info., and a summary sheet must be postmarked by Sept. 20 and sent to S.A.R.L.G. Contest and Awards Manager, Bo V. Orfsson, SM4CMG, Box 1258, S-710 Beflingsbro, Sweden.
- 21-22** Twelfth NJ QSO Party, sponsored by the FD-famous Englewood AR Assn., 1900Z Aug. 21 to 0600Z Aug. 22 and from 1200-2300Z Aug. 22. Phone and cw are the same contest. A station may be contacted once on each band (phone and cw are considered separate bands). NJ stations may work other NJ stations. Suggested frequencies: 1810 3555 3740 3930 7060 7275 14075 14280 21100 21375 28800, 50-50.5, 144-146. Phone activity suggested on the even hours. Exchange QSO number, RS(T) and QTH (ARRL section or country). NJ stations will send county for their QTH. To score: out-of-state stations multiply number of complete contacts with NJ stations times the number of NJ counties worked (max. 21). For NJ stations, W/VE QSOs count 1 point. DX stations count 3 points; multiply total points times the number of ARRL sections (including SN) and NMJ (a max. of 74). KP4 KH6 KL7 K75 count both as 3-point DX contacts and as section multipliers. Appropriate awards. Logs must show date/time, band, emission. The first contact for each new mult. must be indicated and numbered and a check list should be attached to the log. Entry must be received no later than Sept. 10 by the EARA, 303 Tenafly Road, Englewood, NJ 07631. A no. 10 s.a.s.e. should be included for results. Stations planning active participation in NJ are requested to advise EARA by Aug. 7 so that full county coverage may be planned.
- 28-30** South Carolina QSO Party, sponsored by the Low Country ARC starts 2000Z Aug. 28 and ends at 0200Z Aug. 30, full or part-time operation is permitted. The same station may be worked on different bands/modes for extra points. Exchange QSO number, report and state/province/country. SC stations send their county. One point per QSO multiplied by the number of different SC counties for final score. SC stations multiply by the number of different states/provinces/countries worked. Appropriate certificates. Suggested frequencies: cw 1830 3573 7060 14060 21060 28060, phone 3915 7160 14290 21380 28600, novice 3718 7175 21110. Logs showing date, time, band, mode and location of station worked, with claimed score, to be sent no later than Sept. 16, 1971 to Jean J. Hunting, K4RHU, Contest Chairman, Low Country ARC, P. O. Box 5026, North Charleston, SC 29406. An s.a.s.e. would be appreciated.
- 28-29** All Asian DX Contest, cw only, sponsored by the Japan Amateur Radio League (JARL). The period starts 1000Z Aug. 28 and ends 1600Z Aug. 29. Entry classifications are single operator (single or multiband) and multipt, single transmitter. (Multi-mult not permitted.) Exchange a 5-digit serial number which represents RST plus age. YL stations permitted to use 00 (zero zero) for age. Non-Asian stations work Asian stations only for credit, 1 point per QSO. Multipliers of one for each prefix of each Asian country worked on each band (JA1, JA2, UA9, UA8, UA0, etc.). Note that while JDI Ogasawara (Bonins) is Asia, Minamitorshima (Marcus) is Oceania. Total score is sum of prefix multipliers on each band. Appropriate awards. Log in GMT, note new multiplier first time contacted, use separate sheets for each and include a full summary. Note: KA contacts do not count. Dupes in excess of 2% may be cause for disqualification. Logs must be received by the JARL Contest Committee, Box 377, Tokyo, Japan no later than Nov. 30, 1971. One IRC sent with your log will bring you the contest results (and index for 1972) next year.
- 28-30** Delta QSO Party

SEPTEMBER

- 1-9** Nebraska State Fair operation of KØØNEB.
- 2** W6WOP Qualifying Run.
- 5-6** Nebraska QSO Party.
- 11-12** VHE QSO Party
- 11-13** Washington State QSO Party
- 12** Frequency Measuring Test
- 15** WIAW Qualifying Run
- 22-24** YI. Howdy Days

105

Operating News

GEORGE HART, WINJM
Communications Manager

ELLEN WHITE, WIYYM
Deputy Comms Mgr.

DXCC: ROBERT L. WHITE, WICW
Contests: ALBERT M. NOONE, WA1KQM

A Pitch for Appointment. We're not especially adept at sales pitches, but the year-end statistics for 1970 showed a 13% decrease in SCM appointments. This was so horrifyingly unbelievable that we double checked it, still got the same figure, and decided that there was no alternative but to accept the statistics at their face value. Why a gain in 1969 and a loss in 1970?

Whatever the reason, a drive to recoup the losses seemed in order, and a first step in this direction was made in April *QST*.¹ Forms sent out for contest participation are starting to include appointment application forms again. The campaign is under way to bring the appointment fraternity back into its proper orbit in terms of numbers as it so long has been in terms of quality.

A favorite method of increasing numbers, these days, seems to be to decrease quality — decrease it, that is, by lowering requirements, by making participation easier and more “fun.” No objection to having fun, of course — quite the contrary, in fact — but the principal objective to appointment has to be to seek to improve amateur radio as a service by direct service to the public, by service to other amateurs or by self-improvement to enhance our image. There is no present intention to lower the qualifications to increase numbers; they have already been lowered enough (perhaps, in fact, this is one reason for the decline — no challenge, no incentive!). What we need to do is find more amateurs, especially from among the younger set, who are interested in the above objectives and willing to work to achieve them. This may not be a majority of amateurs, but it is certainly a larger contingent than now holding appointments.

The two “station-level” appointments showing the sharpest decline in 1970 were Official Observer and Official Bulletin Station. The former dropped off by 24%, the latter by 18%. They still numbered, at that time, 440 and 416 respectively, so we aren't down to the “bare bones” yet. Perhaps all we have lost, really, are the “faint of heart.”

But this is not the place, nor the time, to discuss 1970 statistics. These are old hat. What is needed is a bringing to the attention of the amateur fraternity — or at least those who are interested enough in operating to read this column — the fact that these appointments exist, that they were created for you, that they give you a certain status and standing among your brother amateurs and a chance to do something besides satisfying

your own compulsion to self-importance (which can get very tiresome, both to you and others, after a certain length of time).

So in this and succeeding columns, we hope to give some of the inside dope on each of the five “station level” appointments — dope which anyone can get from headquarters for the asking, but this requires a spontaneous spark of interest. We hope that these discussions will be the spark that will ignite your interest.

The Official Observer. When we mention that this appointment requires at least four years of experience as a general class licensee or higher, it may seem to contradict what we said earlier about the desirability of attracting the younger element. Not so. To the type of amateur needed for this responsible appointment, four years as a general can be racked up prior to age 20. What this appointment does call for is the more responsible element in amateur radio, because its responsibilities are close to those appointments in the leadership category which only maturity in experience can live up to.

SCMs generally are mighty fussy about whom they appoint as OO's, as well they might be, because of all appointments this is the one most respected by FCC in their efforts to enforce amateur regulations — efforts they are hard put to maintain because of insufficient staff. Thus, we amateurs are largely depended upon to keep our own house in order. This doesn't put the OO in the light of a policeman or enforcer, however. Only the commission's monitors have the power to police. It makes the OO's position even more responsible, because he must make his observations and reports in the light of one who is trying to help errant amateurs avoid giving amateur radio a black eye through violation of regulations. What a feather in our cap, what a boost in the respect for which the amateur service is held by its regulating agency, if the reason for lack of FCC monitoring can be that it is not needed, rather than that it is not possible! In these days of defiance of authority, this would put our service in an exalted category by itself.

Yes, we need more observers. Not just anybody who can be talked into it, but mature, responsible experienced, qualified amateurs who are interested in preserving the reputation of the amateur service, well deserved in the past, for succeeding in keeping its own house in order without the upraised axe of FCC monitoring enforcement. Are we describing you? If so, fine, get a CD-187 application and “get aboard.” The job is exacting, but it pays well — not in money, but in satisfaction.

¹“Is There Point to Appointment?” Apr. *QST*, p. 105.

WIAW SPRING-SUMMER SCHEDULE

(April 25-October 31)

(Specific frequencies shown below indicate general operating periods)

The ARRL Maxin Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 p.m.-1 a.m. EDST, Saturday 7 p.m.-1:00 a.m. EDST and Sunday 3 p.m.-11:00 p.m. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed May 31, July 5 and September 6.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000						
0020-0030 ¹		3,700 ²	14,020	14,020	7,150 ⁴	14,020
0030		3,700 ²	14,100	14,100	7,150 ⁴	14,100
0100						
0105-0130 ¹		3,820	50,120	145,600	1,820	21,270
0130						
0230-0300 ¹		3,555		1,805		3,555
0300	RTTY-OBS ³	RTTY-OBS ³		RTTY-OBS ³		
0310-0330 ⁴		3,625	14,095	7,095	14,095	3,625
0330	Phone-OBS ²			Phone-OBS ²		
0335-0400 ⁴		7,220	3,820	7,220	3,820	7,220
0400	CW-OBS ¹			CW-OBS ¹		
0420-0430		3,700 ²	7,020	3,945	7,150 ⁴	3,520
0430-0500		3,700 ²	7,080	3,945	7,150 ⁴	3,555
0500						
1700-1800	21,28 ⁵	21,28 ⁵	21,28 ⁵	21,28 ⁵	21,28 ⁵	
1900-2000	14,280	7,255	14,280	7,255	14,280	
2000-2100	14,100	14,280	14,095	21,28 ⁵	7,080	
2200-2300	21,28 ⁵	21,100 ⁶	21,28 ⁵	7,255	14,280	
2300-2330				RTTY OBS ^{3,7}		
2330						

¹ CW OBS (bulletins, 18 wpm) and the code practice on 1,805, 3,52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145,588 MHz.
² Phone OBS (bulletins) 1,82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145,588 MHz.
³ RTTY OBS (bulletins) 3,625, 7,095, 14,095, 21,095 and 28,095 MHz.
⁴ Starting time approximate. Operating period follows conclusion of bulletin or code practice.
⁵ Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
⁶ WIAW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
⁷ Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
⁸ Sent with 170-Hertz shift.
 Maintenance Staff, Wis QIS WPR, WAINEU. *Times-days in GMT. Operating frequencies are approximate.

WIAW Daytime Weekend Code Practice? Most members, when asked if they are in favor of some additional ARRL service, are inclined to say "Sure, why not?" It's like voting for motherhood; but motherhood is what has caused our population explosion, and casual, "why not?" votes for more services are what has caused the overload at headquarters.

Now we have the proposition for WIAW daytime code practice on weekends. We already have it on Saturday and Sunday evenings at 2330 and 0230 GMT (7:30 and 9:30 P.M. EDST), and in the mornings each week day, 7:30 P.M. EDST is 4:30 P.M. PDST, which is certainly daytime, so in a manner of speaking we already have daytime code practice on weekends - but of course this isn't what the proposition calls for. What is wanted is more code practice weekends similar to the morning code practice on week days. There are practical difficulties involved, but experience has shown that these can be overcome if there is enough demand. Let's hear from those in favor.

Staff Notes. Two of our younger CD staffers have recently acquired their DXCC awards - Bill Reichert, WA1NFS/WA9HHH and Al Noone, WA1KQM/WB6SAZ. Congrats, Bill and Al.

At the same time, we have to announce the departure from the staff, on June 15, of Bill Reichert. Bill is returning to W9-land where he hopes to work for the state police in his native Illinois. No replacement at this writing mid-May - WINJIM.

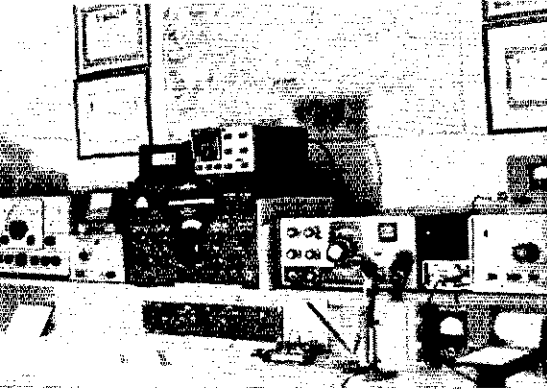
WIAW CODE PRACTICE

WIAW transmits code practice according to the following schedule. Approximate frequencies are 1,805 3,52 7.02 14.02 21.01 28.02 50.02 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.

Speeds	Local Times/Days	GMT
10-13-15	7:30 PM EDT dy	2330 dy
	4:30 PM PDST	
5-7½-10	9:30 PM EDT SnTThS	0130 MWFSn
13-20-15	6:30 PM PDST	
5-7½-10	9:00 AM EDT MWF	1300 MWF
13-20-25	6:00 AM PDST	
35-30-25	9:30 PM EDT MWF	0130 TThS
20-15	6:30 PM PDST	
35-30-25	9:00 AM EDT Tth	1300 TTh
20-15	6:00 AM PDST	

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To permit improving your fist by sending in step with WIAW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and May QST practice text to be sent in the 0130 GMT practice on the following dates.

- July 12: It Seems to Us
- July 20: Correspondence
- July 23: League Lines
- July 29: ARPS



Meet Your SCM

Here's that active SCM from Ohio, Richard A. Egbert, W8ETU. Both phases of this SCM's activity (on-the-air and office) evidence great attention to detail and efficiency. This is his 25th year as a ham and he holds the Extra Class license. He is a member of the Columbus AR Assn., Buckeye Net, Ohio SSB Net, DXCC, an A-1 Operator and *QST* author. Dick is married and has 3 licensed youngsters.

The subject of practice text for the following sessions is *Understanding Amateur Radio*, Fifth Edition.

Aug. 2: Using the Meter, p. 195
 Aug. 6: The Variable-Frequency Oscillator, p. 198

APRIL CD PARTIES

The following are high claimed scores; they read, from left to right: appointee, total score, number of QSOs, number of sections and number of hours of operation. Final adjusted scores will appear in the July CD Bulletin. — *W1A/QM*

Call	Score	QSOs	Sections	Hours
W2JZK	279,480	815	68	20
K1VIM	269,445	776	69	20
W6DKI	266,250	74	75	18
K7NIV-8	255,850	724	70	20
W3IN	234,650	716	65	20
W6DON	204,775	621	65	17
K4BAI	198,990	596	66	14
W4LO	192,290	567	67	17
W6ZVC	191,360	59	64	20
W3GIBUR				
	184,620	539	68	16
W1BY	176,880	522	67	13
W8SHI	176,220	530	66	16
W8SPOS	170,940	533	66	16
W1DAI	169,325	514	65	18
W3AJZ	168,520	529	64	19
W50GZ	164,775	500	65	18
K4SND	161,920	500	64	16
W1PI	156,345	407	67	13
W8AZV	141,120	444	63	
W6GJJ	140,160	438	64	12
W6WA	138,040	415	64	
W6RI	129,465	404	63	13
W2SZ (WA2)UX, op.	126,480	403	62	11
W821U	125,550	393	62	17
W9PJ	124,160	383	64	13
W7GHI	123,880	392	62	15
W2XAL	121,695	392	61	
W8YAR	120,780	396	61	15
K3VZ	114,075	331	65	12
W4WHK	111,150	316	65	12
W6LR	110,360	356	62	17

Call	Score	QSOs	Sections	Hours
W1YK (WA2)CI, op.	109,800	359	60	9
W8PDU	104,005	335	61	7
W1AX	103,950	308	66	4
W2DHS	103,740	359	57	13
K6AZJ	102,175	331	61	7
W2RAN	100,835	297	67	6
Phone				
W4JLD	130,000	400	65	12
W6DKI	128,520	401	63	17
V13BD	127,260	397	63	19
W1ZK	124,800	377	65	17
W8SHI	116,480	360	64	15
W50GZ	73,370	242	58	15
K6LUC	65,125	236	55	18
W3AJZ	56,650	200	55	8
W8NOH	52,300	187	53	7
W6GJJ	49,800	180	53	10
K4BAI	48,510	191	49	7
W8RI	43,900	173	51	6
W6GPI	44,755	167	53	13
W8CBI	42,575	122	49	6
W6MOI	36,750	143	50	6
W6KYA	36,015	143	49	7
W1AX	35,140	125	54	3
W6DKI	34,800	139	48	2
W6CPP	34,500	130	50	7
W6PR	32,900	138	47	11
K2HBA/K1G				
	31,275	132	45	15
W6WGH	30,680	109	46	2
W8EDU (WA3)GJ, op.	26,320	107	47	2

MAY 15 FMT RESULTS

The May 15 ARRL Frequency Measuring Test went off in fine fashion, for a change! The umpire measured the frequencies for the early run at 3519.538, 7084.749 and 14062.228 kHz. The late run checked out at 3523.134, 7014.292 and 14060.034 kHz. A total of 114 participants reported their results, with a total of 2133 measurements. All those who measured the frequencies and got their results to Headquarters by May 26 are shown in the following tabulation. W1AW carried early news of the official readings starting last May 27. Interested in an Observer appointment? Check with your SCM, see page 6. Plan to participate in the September 12 FMT, full details in the August issue. Yes, this is a Saturday night!

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 accord it as of equal merit all those reports computing 4(10ths parts per million (or higher) accuracy. A participant must submit a minimum of 2 measurements to qualify for this listing.

W1BGW W8ZFAR W2FWK WA2K6B W3CPR WA3LLK K3WIK K4BE W4FMW W4HPN W4JUI W4MC W4NTO K4RTA K5FJZ W5FMO WA5FTP75 K5MAT W5QLO WAGUNA4 W6BAAL W6BXR K6DM W6MTJ K6MZN W6RQ WA7DUY W7EJD WA7MUW K8HA W8NWU W9AFD W9CAA K9KRW W9MNY WA9UJR W80AEX K0AZJ W0IQW W0SUD Ireland W1PLJ.

In the following tabulation, error percentage can be determined by moving the parts-per-million decimal point (the figure shown in parentheses) 4 places to the left. Class I QOs must demonstrate an average accuracy of better than 71.4 parts per million, Class II QOs must show at least 357.2 ppm.

(.5) WA5ZBJ W6CBX W6FB K0ZOD. (6) W2AIQ WA4BXZ. (8) W3CPU K9WGN. (9) K6ASK/6 W0DQS. (1.1) W1DDO. (1.4) K0TOV. (1.6) W1RF W0LYC. (1.8) W5KYD K6CL W8DPW. (1.9) W9HPG. (2.1) W5NDW. (2.8) W3FYK. (3.0) W2JLV WA5LES. (3.2) WA1QE W89AD0. (3.7) W9II. (3.8) W1AYG. (4.5) K4BMS K5HYE. (4.8) W85CAV. (5.1) WA3KSO. (5.2) W7FIS. (5.3) W3BFF. (5.6) W898GA. (6.0) W0EFN. (6.1) W8EEO. (6.2) K6EG. (6.5) W6AUC. (7.1) K9WMP. (8.9) W6WRJ. (9.0) V6BHM. (10.1) K4JK. (10.4) K3STU. (11.6) W89AH. (13.3) WA2VLS. (14.7) W4HU. (14.9) WA1JZC. (15.7) VE6MJ. (16.5) WA2CCF. (16.6) VE5DP. (19.1) W89BOH. (19.8) W3ADE. (21.9) W3PT. (22.8) W2BHJ. (23.1) W0PHY. (24.8) W3GN. (26.0) W5FHW. (30.5) W5CVL. (34.6) W89VNI. (36.6) WA1GCE. (46.7) K8TD. (47.1) W9UC. (47.9) W6CBF. (50.4) WA0MAG. (56.1) W84CBJ. (64.9) K7ZJS. (113.4) WA3APO. (125.8) Rayer E.E. Jr., (138.7) WA8UPL. (183.2) Haber, R.J., (193.1) W82NYK. (350.9) WA0QPM. (429.6) W9MKL.

QST

UPCOMING: Sweepstakes phone Nov. 13-14, cw Nov. 20-21; VHF Sweepstakes Jan. 8-9; Simulated Emergency Test Jan. 29-30; DX Competition phone Feb. 5-6, Mar. 4-5; cw Feb. 19-20, Mar. 18-19

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and Endorsement" listings.

APRIL 1-30, 1971

New Members

W8GZ	347	WB2IYM	130	JH1OQW	106	DK3DZ	103	UK5VAA	101	UV3IX	100
OH2OV	320	W5VIP	119	WA2IVB	106	F9GO	103	WA6CSO	101	VF1AC'K	100
YV5ANF	317	KH6AG	118	W8HGH	106	K4EPI	103	W7RTV	101	W1UBM	100
W6FW	307	KX6GD	116	W9LON	106	WA7GWL	103	W7CTX	101	WA1NFS	100
ZP5GS	222	UY5MV	115	JA3HFG	105	YU2FVW	103	YU3NR	101	WA2KWB	100
W8BDO	202	W1BUT	114	W3MNE	105	UA0ZB	102	F6AOZ	100	WB2MOI	100
W8PGW	180	YU4FDH	112	W5RTX	105	WA2KEA	102	DLSSC	100	W82ZHM	100
YV5AMH	175	K3PLT	110	EP2CB	104	WA2LQO	102	K5EYU	100	WA3JH	100
CN8CS	163	W4FGX	110	K7NHV/8	104	W4QNA	102	K5FNV/0	100	WA5SUE	100
K2BDG	137	DJ9JF	109	UT5HD	104	K8FUX	101	LA9GG	100	WA5ZIB	100
K6OZ	130	WA2DZU	108	WA2QLZ	104	K8UNG	101	UA1B	100	W8DSO	100
		WA9TVM	107			UK2BBB	101			W9YRC	100

YV5ANF	316	F08BY	143	WASKPL/HR1	123	9H1CD	113	W1AZP	108	W7FXL	104
W6FW	300	K2BDG	136	DL3RA	122	W5YJP	112	JH1OQW	106	L1LKA	103
ZP5GS	202	1LZOF	135	1W7UH	121	G3YJ	110	UQ2NW	106	K0DBN	103
1LYV	188	JY1	133	W8NSS	120	K3GZE	110	W4KJL	106	LZ2EE	103
YV5AMH	175	W8BDO	130	1LZDG	118	K6KT	110	W8DFL	105	4X4CY	101
CN8CS	162	1LPL	127	DJ3AR	117	WA9VYX	110	K6PO	104	W1FTX	100
OK1ADP	150	HC2HF	124	1ICMO	113	DL4DR	108	W61IS	104	WA1AGR	100
		VE3DF	124			UK2BBB	108			WB4INC	100

Endorsements

In the endorsement listings shown, totals from 120 through the 249 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.

W1DK	340	K2LGJ	280	W4PLM	250	W3YJK	200	K6MP	160	W4VJH	140
W9HB	335	K6OZL	280	W7VRO	250	W5DRW	200	K4URF/6	160	WA4LDM	140
F3AT	325	SMSAM	280	W8BQV	250	W5LJV	200	PJ2PS	160	WA6GOR	140
W5IO	325	W2NNJ	280	WA8LDC	250	W6HQN	200	W2PSU	160	W8ODY	140
W0BN	325	W6JKR	280	W9LAX	250	WB6WHM	200	WA4YVQ	160	W9HTF	140
W2ZTV	320	WA6GFE	280	W1HGA	240	W8DUA	200	WB4JER	160	WA0KTA	140
W5EJT	320	K1DRN	270	WA3HGV	240	W8LBM	200	W5RUB	160	FM7WN	120
W6RGG	320	K6GAK	270	W6QL	240	WA81NJ	200	WA5RXT	160	JA3FGJ	120
K4YYL	315	W1EOA	270	WA8PYL	240	W9GHO	200	WA8TDY	160	K3RDT	120
SM7ANB	315	WB2NYM	270	K4CEF	220	K4DSN	180	WA8VRB	160	K4PFK	120
W2YCW	315	W8QXQ	270	SP2AJO	220	K4OD	180	WA0UCU	160	K6NN	120
W6UOQ	315	VE5KG	260	WA2CCF	220	K6SSN	180	DJ2IW	140	W1EFF	120
OH2LA	310	WA3IUV	260	WA5VDH	220	K9FNC	180	DJ4FT	140	W3BZN	120
W6GB	300	W5KYD	260	W7OY	220	OK2ADP	180	DL0WW	140	W4UPT	120
W9AZP	300	W9KOD	260	W9YYG	220	VE3BS	180	EL2BZ	140	W4VJH	120
WA0KDI	300	K3MNI	250	DJ9ON	200	WA2HIU	180	K3YUA	140	W4VSV	120
K4CTA	290	K4BBK	250	K4CYU	200	WB4GPI	180	PYICZR	140	W5IJW	120
K6GLC	290	K5ZJK	250	VE4TT	200	W5LUJ	180	WA1JKJ	140	WA6INK	120
W1ECH	290	K6DYQ	250	V08CC	200	W6IVZ	180	W2OZO	140	WA6OUF	120
W7KS	290	K7RLS	250	W2YLS	200	W6WLY	180	WA2BCT	140	W86VGF	120
XE1KS	290	OE8RJ	250	WA2CLE	200	K3AMI	160	W3SDV	140	W8BJ	120
DJ1CG	280	W1HGA	250	W3AIZ	200	K4CDZ	160	W3WI	140	W8KYD	120

W2ZTV	320	WA0KDI	280	VE5KG	240	W4PLM	200	W1EEP	160	VE2TZ	120
W5IO	320	1BBAF	270	W1HGA	240	WB6WHM	200	WA2DXI	160	WA1JPF	120
W9HB	320	JA1BWT	270	WB2FMK	240	W9MOK	200	WA4YVQ	160	WA2DHF	120
W2PTM	310	K1DRN	270	K1INO	220	W0GGW	200	W6KG	160	WA2MBF	120
W3JK	310	W0YDB	270	K4DJC	220	K1GKU	180	W8LBM	160	WA4TMP	120
W0AAA	310	DJ1CG	260	K3ZJK	220	K4BBK	180	JA1HBC	140	W5HF	120
ZL3NS	310	PY2DSQ	260	W1BAL	220	K5UKN	180	K7DVK	140	WA5VDH	120
11AA	305	W2IOQ	260	WA2CCF	220	K6SSN	180	VU2VAE	140	W6ZTJ	120
W6RGG	305	CX2CN	250	WA3IUV	220	W3ATO	180	W2FLA	140	WA6LFN	120
EA4JL	300	W1HGA	250	WA4ZYQ	220	WA4DWR	180	W2OZD	140	W7DOZ	120
W9DNF	300	WB2NYM	250	WA8PYL	220	WB4GPI	180	W2PSU	140	W8BOV	120
W6GB	290	W4QAW	250	1LZFT	200	DJ8BO	160	FM7WN	120	W9QLM	120
XE1KS	290	W6ISL	250	W2WNW	200	EA3SA	160	K2HLK	120	WB9AOH	120
VP7DL	280	W0GYM	250	W3CM	200	K6JWQ	160	K4DSN	120	W0JKM	120
WB2RLK	280	K7RLS	240	W4DFK	200	K8YDR	160	K4VJ	120	WA0UCU	120
W8JTD	280									ZL2ACP	120

• 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, John L. Penrod, K3NYG - SIC: W3DKX. RM: W3EEB. This spring, two bills were introduced in the House of Representatives (Delaware) affecting amateur radio. Delaware amateurs are requested to be on the lookout for any state legislation that would affect our hobby. Renewals and new appointments: WA3MSU as OBS, W3DEO as OPS, WA3KZQ, K3KAJ, WA3KFR as ORS. K3NCL was the first winner in the First State ARC transmitter hunt. W3RHG worked state No. 33 on 2-meters. Officers for the U. of Del. ARC during the '71-'72 term are WA3GSM, pres.; Pamela Addy, vice-pres.; WA3OBY, secy. treas.; WA3GKI/WB9, trustee. WA3NRV now is W3GNM. WA3FRV is constructing antennas. W3HKS took part in the Apr. CD contest, W3CZK now is retired and looking for the sunny weather of Fla. to live. Traffic: W3DXK 27, WA3GAY 10, WA3DOM 4, W3HKS 2, K3NYG 2, WA3FRV 1.

EASTERN PENNSYLVANIA - SCM, George S. Van Dyke, Jr., W3HK - SEC: W3ICC. RMs: W3EML, W3MPX, K3MVO, WA3AET, K3PIF, W3CDB. PAMs: K3PSO, WA3GLI, VHF PAM: W3FGQ. OO reports were received from W3KEK, K3DRT, K3WRY, W3GNA, W3JD. OBS reports from WA3AFI, W3CBH, K3WRY and WA3OGM. OVS reports from K3WRY, W3CL, W3PST, WA3OGM. BPLs: W3MPX, W3EML, W3VR, W3CUL, WA3OGM. PSHR: W3MPX, K3OIO and WA3OGM.

Net	Freq.	Operates	QNI	QTC	RM/PAM
EPA	3610	6:45 P Dy	352	362	W3MPX
PFN	3960	M-F	519	292	K3PSO
PTTN	3610	6:00 P Dy	291	177	WA3AET

New ECs appointed are W3JD Montgomery Co., WA3LUU Tioga Co. W3CC still needs lots of help, how about you for your county? New officers for the Abington ARC are K3SOO, pres.; W3OJF, vice-pres.; W3LUC, secy.; W3GSG, treas. Penn Crest Senior High School, WA3QLD/WN3OLD, pres.; W3OJN, vice-pres.; W3MVO, treas.; WA3MSO, sponsor. WA3OGM reports he is taking over the EASN, daily 2330Z on 3726 kHz for the summer. WA3JRV is active on PTTN. Heavy traffickers W3CUL and W3VR are back in EPA. EAN held a meeting in Phila. W3EML reports nets switched to EDST without a hitch. An EPA dinner meeting was held in Dillsburg and was well attended by all nets, cw and phone. WA3ATQ is doing her part to keep ham radio in the public eye giving talks to women's groups. Morse telegraphers met at WA3LAK's QTH as part of the national anniversary circuit honoring "Morse." Thanks to W3BNR we update the net rosters for routing traffic. The Mt. Airy VHF ARC had its 15th annual Ladies Night and Banquet at the Buck Hotel. The Pack Rats now have regular weekly nets on 50.2, 145.2, 221.4, 432.3 and 1296.1. If you are a VHF'er look for them each Mon, starting 7:30 P. Welcome to W3GNA from W7-land. WN3OOZ's dad proved he could do it too and is now WN3OPT. The Drexel Univ. W3MGF is active again with K3OIO operating. The VHF contest was a real windup! Traffic: (Apr.) W3CUL 3413, W3VR 640, W3EML 516, W3MPX 394, K3BHU 346, WA3EXW 271, K3PIE 248, WA3OGM 193, W3CDB 152, K3OIO 123, WA3PLP 98, WA3ATQ 81, K3MVO 78, WA3LAK 69, W3HK 63, K3PSO 58, WA3AFI 51, WA3IYC 49, W3HKN 39, W3VAP 39, WA3LVC 37, W3AXA 28, W3BNR 25, W3ADE 16, W3PC 16, W3OY 13, W3KCM 11, W3MQP 11, W3CBH 10, K3KJH 8, W3BUR 6, W3CL 6, WA3JRV 4, W3RTT 4, WA3IAZ 3, K3KKO 3, W3PST 3, WA3BUQ 2, W3LU 1, W3GNA 1, W3GCK 1, W3JD 1, W3MGF 1, WA3POA 1, K3WRY 1, W3YPF 1. (Mar.) WA3IYC 30.

MARYLAND-DISTRICT OF COLUMBIA - SCM, Karl R. Medow, W3FA - SEC: W3LOY. PSHR winners for Apr. are

W3ZZT, W3TN. BPL: W3TN. MDD in 31 sessions handled 140 QNT 9.2. MDDS in 24 sessions handled 52 QNT 5.0. MDCTN in 17 sessions handled 42 QNT 13.3. MTMTN in 10 sessions QNT 7.1 spent Apr. planning bigger things. W3HXF is a new OPS. WN3OEN and WA3GML joined AREC. WA3GKN renews his OPS. The MDCTN almost to a man plan to acquire OPS appointments. W3ZZT is hard at work on his 90-footer amid much neighbor problems. W3EZY gave the CD a big push. WA3OFR announces the reopening of the 6-meter traffic net Sun. at 0030Z on 50.4 MHz. WA3NYU keeps track of FCC doings by the local papers. K3PDF got his old call W3BK back. The Maryland Mobileers challenge the 2-meter termite to a hidden transmitter hunt. K3JYZ reports the last MD QSO party had W3CRE, W3HQU, W3YVQ the winners with county leaders WA3GVP and WA3GUL. The MD-DC party this year Aug. 14 to 15 start and stop at 2200 GMT. All hands all modes up 75 kHz. See announcement, MDD/MDCTN and anybody interested in the Hollenfield area 358, 359, 360, at Patapsco State Park near Baltimore, July 18 all day. W3COW thinks he will get a W4 call for Fla. WA3OFR, WA3IVW and WN3OJF run the WCHS radio club and report a successful carnival with amateur traffic. The FAR has a new pecking order: W3JPT, W3HXF, W3CDO, K4LMB, W3CPM with W3HWZ and W3AIV, the executive committee. WA3OFR says he is overworked but has great plans for vhf activities. W3BHE and son WA3PKS keep regular schedules. W3FOV has mobile 2-meter gear. WA3MIF passed his General Class exam. W3GEL his Extra Class and is angling for two letters. W3OKN keeps the northeast hopping. WA3GKN is about to be a grandpa. WA3IV reports by radio. Traffic: (Apr.) W3TN 282, W3OKN 109, W3EZT 82, W3FA 80, WA3LWT 61, W3ICV 60, W3GEL 40, K3GZK 32, W3FZV 31, WA3IIV 26, WA3MSW 20, W3LOV 18, WA3MIF 7, WA3EOP 2, W3ZNW 2. (Mar.) W3FZV 51.

SOUTHERN NEW JERSEY - SCM, Charles E. Travers, W2YYP - SEC: W2LVW. PAMs: WB2FJE, W2YYP.

Net	Freq	PM/Day	Sess.	QNI	T/c.	Mgr.
NJN	3695	7:00	60	790	444	WA2BAN
NJFPTN	3950	M-S	30	630	180	WA2IAE
NJISN	3740	8:00 Dy	15	61	28	WA2EVH
NJPON	3925	Su	4	79	12	WB2FJE

Mercer Co
VHF 145.9 8:00 F 4 24 1 W2YYPZ

The Englewood Amateur Radio Club, Inc. invites all amateurs to participate in the 12th N.J. QSO Party, 1900 GMT Sat., Aug. 21, 1971 to 0600 GMT Sun., Aug. 22 and 1200 GMT to 2300 GMT on Sun., Aug. 22. Full details in the operating events section, this issue. Stations planning participation in N.J., are requested to advise the EARA by Aug. 7. Congratulations are being received from the many friends of W2BAY, who is celebrating his 50th anniversary as a licensed amateur. K2JJC is a recent OPS appointee. Congrats to WA2EVH on his appointment as Net Mgr. of NJSN. K2ARY reports transmitting bulletins to the membership. The DVRA is now an official Navy MARS station. Members affiliated are W2ZI, K3CPI, K2SNK and WA3NEO. WA2FG and OM are planning to attend the Midwest YL Convention. Traffic: WB2VJF 128, W2ORS 35, K2RXB 35, WA2KAP 18, W2JI 15, WA2KWB 14, W2YYPZ 14, W2ZQ 14, WA2GS 11, WA2BLY 9, WB2SFX 8, W2IU 3.

WESTERN NEW YORK - SCM, Richard M. Pitzernise, K2KTK - Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. The list of section nets appears in the Apr. column. W2RUT reports he is QRV again after an absence for rig failure. W2ROF has sold his house and has a new 60 x 12 trailer - some mobile! W2IXA submitted the necessary pasteboards for 5BDXCC. W2EMW is moving to Texas. W2CIP spoke on FCARS to the Auburn Club. Dave also gave an FR slide show on the Alpha-701 in ear at the RACS luncheon. WA2AWK claims that if it ever stops raining he has a new tower awaiting lift-off. NYS reports handling 291 messages with 721 check-ins in Apr. K2EJK succeeds WN2KZM as secy. of the Walton Radio Association. WN2KZM had signed up for a few years with the Air Force. K2JFB and W2RUF have fired up a new Novice Net, Sat. mornings on 3730 kHz. Congrats to Father Dave, C10AF, formerly of Buffalo, now on Easter Island for making 58WAS. Imagine working the 50 states on 80-meters from there! Sorry to report the passing of Burr Carpenter, W2RBJ. You guys ain't sending me much info, so no input, no output. W2OE made BPL. Traffic with * indicating PSHR: W2OE 385*, WA3ICU 278*, W2FR 159*.

W2MTA 128*, K2KQC 122, W2RUF 104*, W2FZK 67, K2KTK 64*, W2MSM 58, W2VND 58, W2FEB 53, W2ROF 45, W2ZHLI 42, K2DNN 30, K2OPV 25, W2DBU 24, WA2MPC 11, W2BYKY 11, W2LQP 9, WA2TLB 8, W2PVI 7, W2WS 7, W2MS 6, K2ZMI 6, W2LAF 5, WA2PZD 5, WA2AIV 5, WA2DHS 4, W2CFP 4, K2FTJ 1.

WESTERN PENNSYLVANIA - SCM, Robert E. Gawryla, W3NEM - SEC: W3KPI, PAM: K3ZNP, RMs: W3LOS, W3KUN, WA3IPU. WPA CW Net meets daily 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. 3585 kHz at 6:30 P.M. It is with deep regret that we record the passing of W3KLD and W3PVF as Silent Keys. W3KWH, Steel City ARC, reports that VU2QU, from India, was a visitor at their last meeting. They also report that W3NKM was appointed Asst. Dir. of the Atlantic Division. The Foothills ARC says W3ATQ was visiting in Conn. and operated WIAW. W3IDO spent a week in Mexico. QUA RAE reports that K3VXE has left the area for a short stay as a commissioned officer with Uncle Sam's army. W3QWG is a new Novice in the Aliquippa area. The CD of Erie County and the Radio Association of Erie with their communications truck, participated in a CD drill at Corry, Pa. on Apr. 30. Stations participating were W3KPI, W3KPM, K3CKO, K3VLP, WA3AWB, WA3GIV. The WPA annual picnic will be held Sun. Aug. 8, 1971 at Cook's Forest State Park. All traffic men (phone and cwt) and all ECs and AREC members plus any other interested parties are invited. The WPA Traffic Net had 484 QNI, 30 sessions, 490 messages. KSSN had 108 QNI, 21 sessions, 31 messages. Traffic: WA3IPU 233, W3ATO 226, WA3NAZ 198, W3NEM 197, W3KUN 187, W3LOS 172, K3ZNP 145, WA3LDA 115, K3HKK 98, (W2KAT/3, W3NEM ops), W3MEB 63, W3IYI 48, W3UT 35, WA3MDY 22, K3HCT 19, K3SIN 15, W3SN 11, W3IDO 6. Total 1780.

CENTRAL DIVISION

ILLINOIS - SCM, Edmond A. Metzger, W9PRN - SEC: W9RYU, PAMs: WA9CCP and WA9PH (vtd). Cook County EC: W9HPG.

Net	Freq.	Time(Z)/Days	Tfc.
IEB	3940	1400 Su	-
ILN	3690	00:30/0:300 Dy	224
NCPN	3915	1300/1800 M-S	94
III PON	3014	14:30/2245 M-F	478
III PON	145.5	0200 MWF	34
III PON	50.28	0200 M	5

WB9EBK won the first Annual ILN ARRI QTC contest. Bernard Kahn of Rogers Radio Communications Services, Inc., presented his "Total Radio Communications in the Chicago Area" talk to the last meeting of the York Radio Club. W9HRY reports the traffic count of the Ninth Region Net was 513. Three stations that dropped the "N" are WB9EJW, WB9GAZ and WB9JRM. WB9BYZ received his General and is operating a YAESU FTD-560. WN9HAD is a new Novice in the Crescent City area. The Chicago FM Club will hold their Radio Expo '71 July 10 and 11 at the Lake County Fairgrounds, halfway between Milwaukee and Chicago at the intersection of US 45 and Ill. 120. K9YSH is the new pres. (and editor of Ham-Gab) of the Hamfesters Radio Club. WB9DPU left W9-Land for San Antonio and the USAF Apr. 29. W9HY/W9GFF reports that the Ill. QSO party date has been moved from Aug. to Nov. 6 and 7 this year. Details will be published in this column at a later date when all plans are formulated. WA9TVI has a new harmonic named Julianne. The Chicago Amateur Radio Club is compiling plans for an Old Timers night. WA9REI is active on 146.7 fm teletype. WB9EJS is completing his RTTY gear. WB9ADQ is mobilizing with his TR-4. K9RAS moved to W4-Land in June. W9GDW reports that his son WA9HCL is neglecting ham radio to keep on the Dean's list at ISU. W9JTO received his BS in EE from Carnegie-Mellon U. New officers of LARK are W9GJB, WA9BZR, WA9NEJ and K9ZWY. New appointments include WB9AWY as ORS, WB9AUR as OBS and W9IFX as OO. WN9GWS and WN9GUU are new Novices who graduated from the Decatur Radio Club radio class. WA9NVV celebrated his 25 years with General Telephone Co. with retirement and a dinner in his honor. W9YII is the only BPL recipient for Apr. Traffic: (Apr.) W9NXG 177, WA9OBR 166, K9AVD 145, W9YH 136, WB9AWY 127, W9IOT 88, W9EIJ 79, WB9EBK 76, WB9FHI 63, WB9DPU 49, W9LNO 45, W9JXV 43, W9FLF 37, WA9LDC 30, K9WGN 29, WB9BXX 28, W9PRN 20, WA9RTR 20, K9SHK 11, WA9NZF 7, WA9LHO 5, WB9ADO 3. (Mar.) WB9FRE 13, WB9ADQ 1.

INDIANA - SCM, William C. Johnson, W9BUQ - SEC: W9FC, RMs: W9IC, W9HRY, WA9WMT. PAMs: K9CRS, WA9OXH, (vtd) W9PMT.

Net	Freq.	Time(Z)/Days	Tfc.	Mgr.
IEFCN	3910	1430 Dy 21:30 M-S 2:30 Dy	288	WA9ORX
QIN	3656	0000 Dy 0400 Dy	168	WA9WMT
11N	3740	0100 Dy		WA9ZKX
PON	3910	1245 Su 18:30 M-S	86	WA9UMH
PON VHF	50.7	0200 M-Th	23	WA91IN
Hoosier VHF			34	W9PMT

It is with deep regret that I report K9SNH of Columbus and W9HZY of Hammond as Silent Keys. Muncie Area ARC officers are WA9ZES, pres.; WA9RHS, vice-pres.; WA9VEL, secy.; WN9GND, asst. secy.; WA9UKQ, asst. treas.; WA9YGD, act. chmn. Purdue ARC officers are K3YWI, pres.; K9BCT, vice-pres.; WB9AUI, secy.; WN9ELV, treas. The Columbus ARC presented certificates to WA9H-F, K9VPM and WA9PUM for outstanding work done for the club this year. Don't forget the annual picnic of the ITRC July 11, 1971. W9ICU bought a travel trailer and is touring the western states this summer. W9RTH retired from the Phone Co. and will have more time for radio. K9APH is mgr. of the Central Ind. PON VHF Nets. IPON traffic for Mar.: IE-F34, VHF-26. QIN Honor Roll: W9BDP 20, W9JBU 17/15, WB9ANT 15, W9HS 15, W9QLW 15. Welcome back to W9DUD, W9EMJ, K9EVL, W9LUM and K9VHY. WA9OXH is busy erecting a new tower and antenna system. Amateur radio exists because of the service it renders. Traffic: W9JYO 202, W9JBU 199, K9FZK 188, W9HRY 166, WA9WJA 111, WA9OHX 105, WA9WNH 86, WA9VZM 127, WA9WMT 67, K9EYV 42, W9BUQ 38, W9PMT 31, W9UEM 30, W9FHH 26, WA9UHY 20, K9YBM 19, K9CBY 18, W9HWR 18, W9LHM 18, K9RPZ 17, W9JOH 15, W9RTH 15, K9DHY 13, W9KWB 13, W9DZC 11, K9ILK 11, WA9OAP 10, W9CMT 9, W9YX 9, K9VHY 8, WA9BVL 5, K9JQY 5, WB9BAP 1, W9BDP 1.

WISCONSIN - SCM, S.M. Pokorny, W9NRP - Asst. SCM: Joseph A. Taylor, W9OMT, SEC: W9NGT, PAMs: WB9CKE, K9FEL, WA9OAY, WA9QKP, WA9PKM. RMs: WB9FFY, K9KSA.

Net	Freq.	*Time(Z)/Days	QNI	QTC	Mgr.
WSBN	3985	2300 Dy	1281	273/722	K9FHH
BEK	3985	1800 Dy	630	127/105	WA9QKP
WIN	3662	0115 Dy	238	114/102	WB9FFY
BWN	3985	1245 M-S	505	345/325	WA9OAY
WSSN	3662	00:30 TTS	44	16/14	K9KSA
WS2RN	145.35	0230 Dy	166	3	WA9PKM
SW6RN	52.4	0300 M-S	176	4	WB9CKE
WRN	3620	01:30 Su (RTTY)			K9GSC
W-PON	3925	1801 M-F	378	68	W9EMC

*All nets one hour earlier during Daylight Saving Time period. The WSSN is presently on summer vacation and will resume normal schedule again in Sept. The Green Bay Mike & Key Club provided communications for a local hunger march on May 8. Don't forget the WNA picnic July 11 at Hartford. W9CXY offers a nice traffic-handling tip: when handling traffic sometimes QSYing to 7 MHz helps breaking through the summer QRN. Dane County had a "Green Tornado" drill in May. EC W9ZBD and WA9CDY were a moving hidden transmitter on .44 with six mobiles chasing under the control of K9KSA. Congrats to new Amateur Extra WA9PKM, also for renewed OPS appointments to W9EJ and K9FHH and ORS to WB9DXX. Reports from the fellows in the section who attended the Dayton Hamvention, indicate they all had an excellent time and W9NRP had a chance to operate portable 75 again at his place in Arkansas earlier in the month. Traffic: (Apr.) W9CXY 419, W9EJ 400, K9CPM 300, WB9ABF 183, WA9YSD 159, W9DND 119, K9KSA 113, WB9BJR 101, K9FHH 94, WA9UNN 68, WB9GPG 58, WB9DXX 57, K9IPS 53, W9NRP 45, W9KRO 39, WA9OAY 36, W9DXV 32, WA9BZW 27, WB9DAK 23, W9MOT 23, WA9ZTY 22, WA9PKM 18, W9RTP 18, WA9IHR 11, WA9LRW 10, WA9JDW 9, K9VFR 9, W9KXK 7, WN9DJG 1. (Mar.) K9LGU 44, W9RTP 9.

DAKOTA DIVISION

MINNESOTA - SCM, John H. Halstead, K0MYE - Asst. SCM: Edna M. Thorson, WA0RA, SIC: WA0MZV, RMs: WA0IAW, W0AAR, PAMs: WA0DWM, WA0HRM, K0FLT. Remainder of coming events: The Picnic picnic will be held on July 18 at Whitewater State Park at St. Charles; the St. Cloud ARC picnic will be held on Aug. 8; Grand Rapids ARC and OGB picnic will be held on Aug. 15 at Gunn Park in Grand Rapids. More information on MSN and MSPN. WA0QWE and W0KNR are

(Continued on page 116)

RIGHT ON



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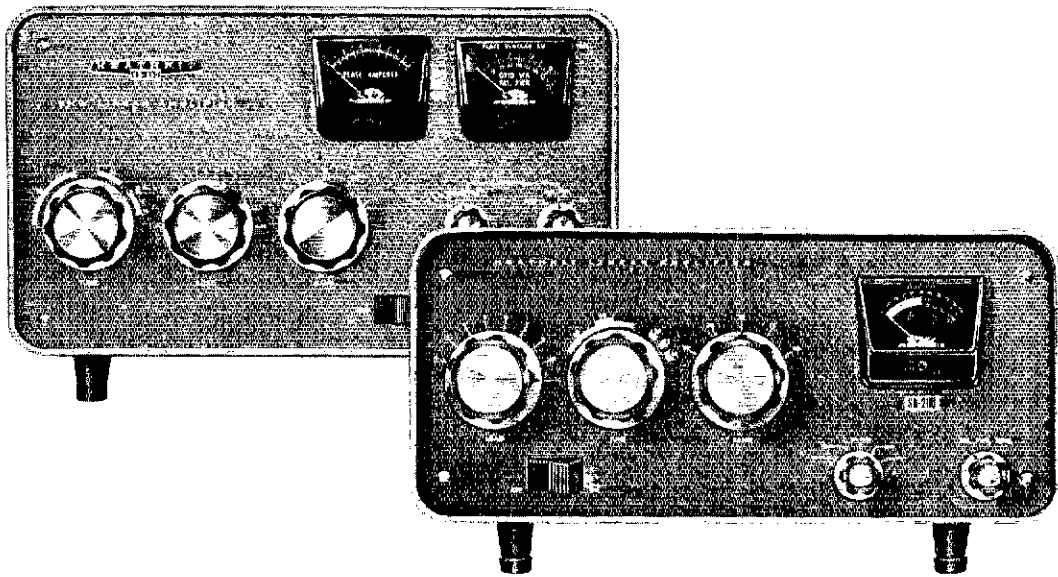


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The Heathkit SB-200: 1200 watts P.E.P. for \$220!*
A completely self-contained, compact, desk-top unit with built-in solid-state power supply that sets you up with 1200 watts SSB, 1 kW CW with 80 through 10 meter band coverage. And it requires only 100 watts P.E.P. drive, so it's compatible with almost all popular transmitters and transceivers.

Designed to outperform anything in its class! The SB-200 kit provides either a pair of 572-B's or T-160-L's (equivalent in specs) for final amplification — fan cooled and shielded for maximum TVI protection. Other features include a pre-tuned cathode input circuit for maximum efficiency, low distortion; ALC output for automatic exciter control; circuit breaker protection; built-in SWR meter and antenna relay that automatically switches to the exciter when the linear is off; 120/240 volt operation.

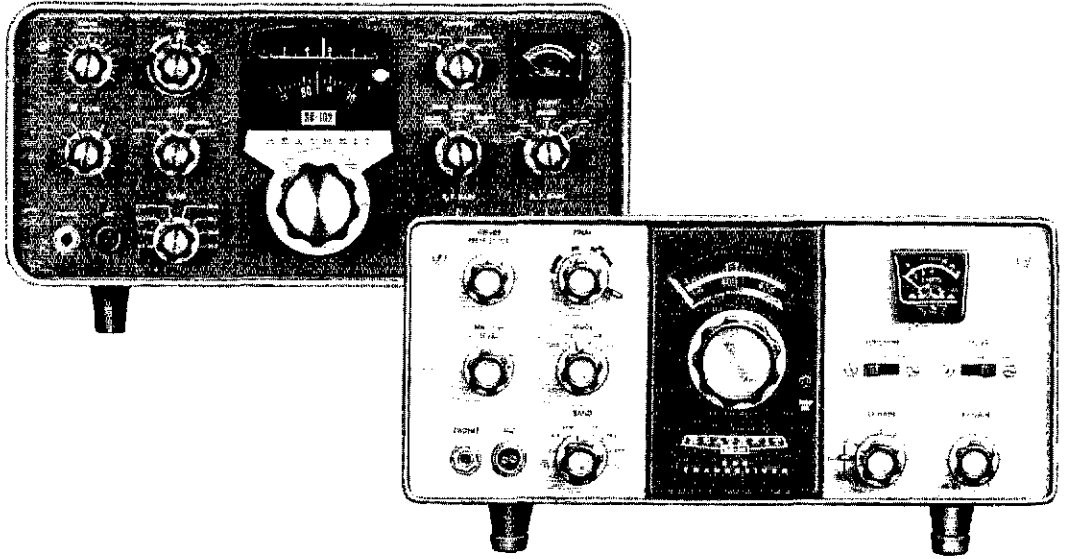
Sturdy, lightweight construction! You build your SB-200 on a heavy-gauge, one-piece aluminum chassis that is partitioned for extra strength and proper isolation of components and circuitry. The extremely clean arrangement allows you to have your SB-200 on the air 15 to 20 hours after you begin assembly. All you need are normal bench tools and a VOM for alignment. Order now!
Kit SB-200, 41 lbs., mailable **220.00***

The Heathkit SB-220: 2 kW P.E.P., just 349.95!*
Here's the one that the competition tries to measure up to! The SB-220 utilizes two conservatively rated Eimac 3-500Z's in grounded grid circuitry to provide up to 2000 watts P.E.P. SSB input or a full 1 kW on both CW and RTTY! The broadband pretuned pi-input delivers maximum efficiency with low distortion over 80 through 10 meters.

All the power you can use requires only 100 watts drive. Has built-in solid-state 120/240 volt supply. Features include circuit-breaker protection; zener diode regulating operating bias to reduce idling current for cooler running and extended tube life; a large quiet fan; ALC to the driving unit to prevent over-driving; front panel switch-selected monitoring of grid current, relative power and high voltage.

Fast, easy tune-up! Just set the band switch, push CW-Tune/SSB rocker switch to CW-Tune position, adjust Tune & Load controls for maximum relative power. Push the rocker switch to SSB position and you're ready with a full 2 kW P.E.P. input — in the CW-Tune position you've got a full gallon for code or RTTY transmission. Bring your rig up to the performance limit, now. Order your Heathkit SB-220 today!
Kit SB-220, 69 lbs., mailable **349.95***

How to get into top gear without paying top dollar:



Run with the performance/value leaders — Heathkit SB-102 or HW-101 transceivers!

Heathkit SB-102 SSB/CW Transceiver: \$380!* Full 80-10 meter coverage with unequaled stability and dial linearity thanks to the all solid-state Linear Master Oscillator with 1 kHz calibration. The SB-102 stabilizes itself in half the time, tracks more accurately than any other rig on the market! The new receiver section delivers an S+N/N ratio of less than 0.35 μ V for 10 dB. Front panel selection of built-in 2.1 kHz SSB crystal filter or optional 400 Hz crystal filter. And there's a dial resettable to 200 Hz; 180 watt PEP SSB input, 170 watts CW input; switch selection of upper or lower sideband and CW; built-in sidetone for monitoring; built-in 100 kHz crystal calibrator; Triple Action Level Control to reduce clipping and distortion; built-in VOX, and complete metering.

Fast, easy assembly! The incomparable SB-102 goes together with simple circuit board/wiring harness construction. Order your SB-102 today, and get on the air with the world's finest rig!

Kit SB-102, 24 lbs., mailable **380.00***

Kit SB-600, 8 ohm matching speaker with mounting space for AC supply, 7 lbs., mailable **19.95***

SBA-301-2, 400 Hz CW crystal filter, 1 lb., mailable **21.95***

Kit HP-23A, AC supply, 19 lbs., mailable **51.95***

Kit HP-13A, DC supply, 7 lbs., mailable **69.95***

SBA-100-1, mobile mount, 6 lbs., mailable ... **14.95***

Heathkit HW-101 80-10M Transceiver: 249.95!* Descended from the fantastically popular HW-100,

the HW-101 has even more features and it costs a nickel less! The new receiver has sensitivity better than 0.35 μ V for 10 dB S+N/N. Image and IF rejection are better than 50 dB. Ball-bearing dial drive, with 36-to-1 ratio, is coupled with a new preselector circuit and thermal stabilized FET VFO with 5 kHz readout for solid, drift-free tuning. And there's front panel selection of SSB or optional CW crystal filter, too! Order yourself a Heathkit HW-101 now and join a growing family on the air!

Kit HW-101, 21 lbs., mailable **249.95***

Kit HS-24, mobile speaker, 4 lbs., mailable... **8.95***

GH-12A, push-to-talk & VOX microphone, 1 lb., mailable **8.95***

HDP-21A, grip-to-talk desk mike, 4 lbs., mailable **29.95***

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PS-3000 3KW Supply 400 350

CENTRAL ELECTRONICS reg. NOW
RM-8U Ad. for MM-7 Scope \$ 5

CLEGG reg. NOW
418 Thor DC sup-mod \$139 \$ 89
Allbander 179 85

EIO
We have a new ALPHA 70 linear left at the OLD PRICE of \$195.

EICO reg. NOW
315 Deluxe Sig. Gen. Kit \$ 69 \$ 54
536 VOM Kit 17 12
536 VOM Wired 73 19
591 Car Burglar Alarm 15 12
430 4" Scope Kit 80 60
100) Battery Eliminator Kit 33 28
79) Sol. St. Pwr. Sup. Wired 22 17

751 AC Supply Kit \$ 79 \$ 54
751 AC Supply Wired 109 79
752 DC Supply Kit 79 54
752 DC Supply Wired 109 79

The Eico power supplies listed above provide all the necessary operating voltages for the Eico model 753 transceiver. Those output voltages are: 750V DC at 300ma, 250V DC at 170ma, and -100V DC at 5ma. The AC supply also provides 12.6V AC at 4 amps, has a built-in speaker, and is 5-1/2" x 7" by 8 1/2" by 11-1/2" x 4". The power supplies come with interconnecting cables to match the Eico model 753 transceiver. By changing the power plugs, these supplies should work with the National NCX-3, NCX-5, NCX-200; Swan single-band units; and Swan 240's. They can be made to work with most Heath kits by removing a series resistor in the bias supply. They might also work with the Collins KWM-2 by adding an adjustable potentiometer in the bias circuitry. Persons wishing to use these supplies with other than the Eico 753 should have some electronic background and the ability to make the necessary modifications. AES does not furnish information on converting these supplies for use with units other than Eico. These supplies are a real buy for those who have an Eico 753 or like to tinker.

GALAXY reg. NOW
GT-550A 80-10m Xcvr. \$550 \$387
2000 A Linear Supply \$495 \$349
SC-35 Speaker Console 19 15
RK-22 Mars VFO for Gal. V's 79 59

SAVE \$100 - Galaxy FM-210 12 volt 2 meter FM transceiver (reg. \$229) with PA-210 35 watt Mobile Amplifier (reg. \$149) for only \$278.

GONSET reg. NOW
551-011MK IV Linear \$525 \$395
902A DC Sup. for 900A 2m 62 49
912A DC Sup. for 910B 6m 62 49
7469 CD Kit for Comm. IV 39 19

HY-GAIN reg. NOW
DB-1015 2el. 10-15m Beam \$109 \$ 89
3D-150B 159-175mc Jaypole 125 75
HB2-54 4 stacked 2m helos 60 29

JOHNSON reg. NOW
6N2 Converter 14-18m wired 89 49

KIRK reg. NOW
1322 2 el. 10, 15, 20m Quad \$159 \$119
808 4 el. CB Quad 149 99

LINEAR SYSTEMS reg. NOW
250-B 6v DC Supply \$145 \$ 45
350-B 6v DC Supply 165 62
400-12 12v DC Supply 145 35

MOSLEY reg. NOW
MA-3 10, 15, 20m mob. arr. \$ 10

NATIONAL reg. NOW
NCXA MK II AC Supply 120 59

RAYTRACK reg. NOW
6 meter, 2kw PEP, Linear \$649 \$549

Regency Monitor Receivers for 2m FM Ham Band (less Crystals) reg. NOW
TMR-1H Single channel \$109 \$ 79
TMR-12H 12 channel 129 99
TMR-8H 8 channel Scanner 149 119

Regency Monitor Receivers reg. NOW
PR-35B 30-50mc Tunable \$ 69 \$ 49
AR-136 Aircraft Receiver 89 69
M-40 30-50mc Tunable 12vdc 150 89
M-160 Hi-band Tunable 12vdc 150 89

Regency Citizens Band reg. NOW
Imperial I CB Set \$329 \$249
Ranger 12ch 12vdc CB Set 175 95

SBE reg. NOW
SB-34 80-15m 12:110v \$449 \$339
CB-LA Linear Amplifier 259 219
SB9-VOX Accessory Unit 38 24
SB-61MB Mobile Mtg. Bracket 12 7
SB2-CW CW Copodator 42 27
SB2-MC Mike (dynamic) 16 12
S4-XC Crystal Calibrator 29 28
SB3-DCP Mob. sup. for SB2-LA 249 149
W-72 cable for SB3-DCP 8 6

SIGNAL ONE reg. NOW
CX-7 Transceiver \$2195 1695

SONAR 25-50mc Tunable FM Receivers reg. NOW
FR-101 (110v) \$ 89 \$ 69
FR-102 (110 & 12v) 114 89
FR-101DX above plus 1 str. 134 99

ISO - 175 Mc Tunable FM Receivers
FR-102 (110v) \$ 89 \$ 69
FR-102D (110 & 12v) 114 89
FR-102DX above plus 1 str. 134 99

SQUIRES-SANDERS (as-is) reg. NOW
55-1v Video Bandslicer \$495 \$ 45
55-1RS Noise-Silencer strip 100 15
55-1RS Speaker 35 15

SWAN reg. NOW
30-10m Converter Kit \$ 15 \$ 10
240 Sideband Selector Kit 15 10

VARITRONICS reg. NOW
FDPM-2 and BP-1 \$267 \$188
FM-20M Mobile amps 150 89
FM-20BM Base amp 235 125

AMECO
CB-2 2m conv. \$ 19
CB-2 6m conv. 19
CN-50 (14-18) 29
CN-144 (14-18) 34
TX-63 VHF Xmr 99

CENTRAL ELECT.
QT-1 Anti-trip \$ 9

CLEGG
SQUIRES-SANDERS
22el 2m Xcvr \$169
66 in 6m Xcvr 169
99 in 6m Xcvr 69
Thor 6 (RF only) 99
417 AC sup-mod. 75
418 DC sup-mod. 75
2ous VHF Xmr 289
Interceptor Rec. 239
Interceptor B Rec. 239
Venus 6m SSB Xmr 189
416 AC supply 69
S-200 Receiver 49
Apollo Linear 169

COLLINS
75A-2 Receiver \$219
75A-3 Receiver 269
75A-4 (ser.#601) 349
75A-4 (ser.#1821) 449
75A-4 (ser.#1821) 449
32v-3 Xmr 179
32v-3 Xmr 179
30L-1 Linear 395
625-1 VHF conv. 299
312B-4 6m. control 149
516F-1 AC supply 75
516F-2 AC supply 115

R. L. DRAKE
2B Receiver \$189
R-4A Receiver 299
R-4C Receiver 349
SC-2 2m conv. 54
SC-6 6m conv. 49
CPS-1 supply 12
CC-1 conv. console 19
TR-3 Transceiver 375
T-4X AC supply 65
T-4X Xmr 299
T-4X Xmr 279
TC-2 2m Xverter 225
TC-6 6m Xverter 175
2NT Xmr 109
725RD mike 9

VFO
722 VFO \$ 34
730 Modulator 34
753 SSB Xmr 129
751 AC Supply 49
130 KF Sig. Gen. 44

ELMAC
AF-6B Xmr \$ 69
PMR-8 Receiver 79
PSR-612 DC supply 19

ESPAY
R350 Receiver \$195

GLOBE/GALAXY/WRL
Scout 680 Xmr \$ 34
PB-1 Booster 19
L-1 L. R. Xmr 69
DSB-100 SSB Xmr 49
SB-175 SSB Xmr 59
Galaxy V Xmr 239
AC-35 AC supply 65
DC-35 DC supply 75
DC-384D DC supply 49
KF-550 wattmeter 55
DAC-35 dx. console 75
VDB-III 9
R-530 Rec. w/3 extra filters 595
SC-530 Speaker 19
FM-210 149
AC-210 AC/DC 29
booster

GONSET
Comm I 6m \$ 69

GONSET
Comm II 6m \$ 69
Comm IIB 2m 89
Comm IV 6m 169
GC-165 2m Xcvr 149

902A DC supply 39
910R 6m Xcvr 199
911A AC supply 39
Thin Pak 19
G-76 DC supply 59
G-77 Transmitter 49
G5A-201 Linear 155

HALLICRAFTERS
S-3BE Receiver \$ 79
SX-62 Receiver 189
SX-62A Receiver 275
SX-71 Receiver 149
SX-100 Receiver 149
SX-101 Mk III Rec. 139
SX-101A Receiver 199
SX-110 Receiver 99
SX-117 Receiver 49
SX-120 Receiver 199
SX-122 Receiver 175
SX-130 Receiver 149
SX-146 Receiver 179
S-200 Receiver 49
R-46 Speaker 9
R-47 Speaker 9
HA-19 Calibrator 122
HT-32 Transmitter 229
HT-32A Mk III Rec. 139
HT-32B Xmr 299
HT-37 Xmr 199
HT-40 Transmitter 49
HT-44 Transmitter 219
H1-46 Transmitter 239
PS-150-120 AC sup. 75
HR-150 Rack 15
SR-400 Xcvr 595
SR-500 Xcvr 225
SR-600 AC supply 49
HA-5 VFO 19
HA-10 L.F. tuner 19

HAMMARLUND
HQ-35 X Receiver \$119
HQ-110AC Receiver 129
HQ-110AC Rec. 169
HQ-170 Receiver 169
HQ-170C Receiver 179
HQ-180C Receiver 239
HQ-180AC Rec. 249
HQ-205 Rec/CB X 99
CB Transmitter 189
SP-600 Receiver 175
SP-600 JX-26 275

HEWLETT PACKARD
410BR V T V M \$125

HICKOCK
271 Tube tester \$150

HUNTER
1000A Linear/Sup. \$175
2000B Linear 245

HEATHKIT
CR-64 Receiver \$ 39
HR-20 Receiver 89
SB-300 Receiver 225
SB-301 Receiver 249
SB-310 S W Rec. 249
XC-6 6m conv. 25
SBA-400-4 6m conv. 19
DX-40 Transmitter 34
TX-1 Transmitter 115
400 Xcvr. 420 VFO 259
350 (late) Xcvr 289
5W-117C AC supply 75
500 Xcvr 334
HX-20 Transmitter 129
HX-20 6m Xcvr 175
SB-110A 6m Xcvr 289
SB-110A 6m Xcvr 289
SB-401 Transmitter 275
SB-401 Transmitter 249
SB-200 Linear 119
SB-500 2m Xverter 149
SB-620 Scanalyzer 67
VF-1 VFO 17

HW-10 (Shawnee) 139
G-11 DC supply 99
HW-16 Noise xcvr 99
HW-17A 2m Xcvr 125
HE-10 DC supply 34
HF-23 AC supply 45
HW-171 DC supply 19
for HW-17A 24
HW-172 FM adaptor 19
for HW-17A 19
UT-1 AC supply 24
HRA-10-1 calibrator 9

SR-78 Receiver 119
IU-22 elect. switch 25
5U-125 Q-Multiplier 12
JOHNSON
Kanger I \$ 89
Yallant I 139
Pacemaker 149
Invader 2000 139
Courier Linear 475
6N2 VHF Xmr 85
KNIGHT
T-175 6/10m Lin \$ 59
TR-106 6m Xcvr 79
LAFAYETTE
HA-460 6m Xcvr \$ 79
KT-320 Receiver 59
NATIONAL
NC-66 Receiver \$ 39
NC-88 Receiver 69
NC-98 Receiver 79
NC-155 Receiver 99
NC-190 Receiver 139
NC-270 Receiver 115
NC-300 Receiver 139
NC-300-C6 6m conv. 29
HRD-60 Receiver 225
HRO Speaker 14
HTS-2 Speaker 14
NTS-4 Speaker 14
XC-27 calibrator 15
XC-300 calibrator 9
NCC-3 Xcvr 169
NCX-5 Mk II Xcvr 389
NCXA AC supply 75
200 Xcvr 239
AC-200 AC supply 59
NXC-600 Xcvr 299
AC-500 AC supply 69
P & H
AFC-2 Compressor \$ 19
LA-400C Linear 99
2-150 SSB conv. 169
POLYTRONICS
PC-2 7m Xcvr \$199
PC-6 6m Xcvr 139
RME
4300 Receiver 89
4301 SSB adaptor 39
VHF-126 conv. 99
VHF-602 Xmr. 49
Clipper 9
RAYTRACK
DX-2000L Linear \$495
SIDE-BAND ENGINEERS
SB-33 Xcvr \$179
SB2-DCP Inverter 25
SB1-LA Linear 149
SB1-MC mike 9
SB-34 Xcvr 279
SB2-LA Linear 189
SINGER
PK-1 Panadaptor \$ 95
SWAN
5W-240 (late) xcvr \$169
117AC AC supply 69
400 Xcvr (only) 169
400 Xcvr. 420 VFO 259
350 (late) Xcvr 289
5W-117C AC supply 75
500 Xcvr 334
117XC AC supply 80
14-17 DC supply 100
14C DC module 45
405 MARK osc. 39
270 Xcvr 335
NS-1 noise silencer 29
250C 6m Xcvr 325
TV-2 2m xverter 225
TV-2B xverter 249
TEHPO
OC-ONE DC supply \$75
UTICA
650A 6m xcvr/VFO \$79
PS-1500 supply 39
WATERS
Codax keyer \$ 49
369A Reflectometer 59

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back on, the air after hospital stays. WAØPRS is very active as an OO and traffic-handling on cw. KØSNC now is W9LON and living near Chicago. Winona amateurs were well organized for the expected flood, which thankfully did not materialize. WAØIAW and WAØHRM are learning to fly. KØZXE is operating temporarily from Langdon, N.D. WAØVYV received his A-1 Operator Award. WNØCGT reports he is active in MIN thanks to the helping hand of WNØYWA. WAØRRA, asst. SCM, is developing a fine group of Novice traffic-handlers on MJN. She also is encouraging a Novice in Wausau, Wis. who is trying very hard for BPL. Traffic: (Apr.) WAØVAS 766, WØOBR 365, WØZHN 206, WØBUC 183, WAØEBZ 179, WAØIAW 149, KØZRD 98, WØØBRG 96, WAØVYV 95, WAØVYT 89, WAØRRA 83, WAØEPX 82, WØWFA 82, KØMVF 75, WAØPRS 71, WAØYMI 71, WAØTFC 63, KØZXE 59, WØLYP 52, KØORK 45, WAØMMV 38, WAØTOT 37, WAØQWF 36, WØPET 30, WAØHRM 29, WAØVYB 26, KØFLT 24, WNØCAP 21, WAØQAK 20, WAØUWT 17, KØJTA 16, KØICG 14, WØAAU 13, WAØSGJ 11, WAØYFR 10, WNØYWA 10, KØZHI 10, WØBUO 8, WAØJPR 8, WAØNOH 8, WØØCNB 7, WØKNR 7, WØUMX 7, WAØVP 5, WAØEZO 4, WØISJ 4, WAØZCG 2, WØPAN 1, WØSZJ 1. (Mar.) KØICG 20.

NORTH DAKOTA - SCM, Harold L. Sheets, WØDM - SEC: WAØAYL. OBS: WØØATI. PAM: WØCAO. RM: WAØRSR. OD: WØBF. WNØCJP and WNØCED passed their General Class exam and WNØCED went further and garnered his Advanced Class license. Congrats. WAØZPI will be in Montana for a few months using his WA7GVT call. He reports that there is a new YL Novice coming up in Dickinson. Field Day is being planned with fishing and operating on the agenda. New rigs reported were a new Tempo in the shack of WØDXC while WØDM got the new HW-101 on the air with the help of WAØDAS and WAØVMA with good results. KØOVT has been having some success with a 2-watter on 40-meters. KØPYZ is again training some new beginners and reports eight staying with it. WØDM has three up for Conditional and six for Novice. WAØMSJ and KØYSF have been promoting amateur radio with their mother who will be a Novice soon. KØYSF modified an HW-101 for Novice work for her. Make plans for the International Hamfest at the Peace Garden on July 10 and 11. The Forx Amateur Radio Club will sponsor a N. Dak. OSO Party late in Sept. The N. Dak. CW Net closed down for the summer and will be reinstated in early fall.

Net	kHz	CDST/Days	Sess.	QNI	QTC
Goose River	1990	0900 Su	4	64	1
YL WX Net	3994	0730 Su-Su	9	139	131
NDRPN	3996.5	0900 Su	12	310	11
		1830 S-Su			
NDRACES	3996.5	1830 M-F	22	732	39

Traffic: WAØSUF 21, WØDM 14, WAØSJB 14, WØCPS 11, WAØBIN 10, WØCDO 10, WØMXF 6, WAØJPT 2.

SOUTH DAKOTA - SCM, Ed Gray, WAØCPX - Recent ORS appointees are WAØLYO, WAØTNM and WAØYAK. WAØLYO has his 813 linear finished and on the air. WØHXI from Cedar Rapids, Iowa has moved to Centerville, owns and operates Fisher TV-Electronics. WAØONL now is on the air from a QTH west of Vermillion. WAØVJG of Centerville reports equipment problems. Your SCM is taking a position with the Cooperative Extension Service in Rapid City. WNØEHP and WNØEGY are new Novices active from Salem. It is with regret we note that KØEQH is a Silent Key. FM activity is gaining popularity in the Rapid City, Sioux Falls and Brookings areas. Repeaters are or hopefully will be operating in these areas shortly. Net reports: NJQ - Noon Net 552 QNI and 17 formals; Early Evening 600 QNI and 9 formals; Late Evening - 1257 QNI and 70 formals.

DELTA DIVISION

ARKANSAS - SCM, Jimmie N. Lowrey, WA5VWH - SEC: WSPBZ. RM: WA5TLS. PAM: WA5KJT. Congratulations to WNSCEL on passing his General Class exam and to K5JUC on passing his Extra. W5SOO has a new FT-101 that he is using both fixed and mobile. W5HFG has a new R-599, T-599 and TH6-DXX. W5OYH has plans to put up a new five-element 20-meter beam. The OZK picnic in North Little Rock was a lot of fun for everyone who attended. The Fort Smith area amateurs have again started holding transmitter hunts on most week ends.

Net	GMT/Day	Freq.	Mgr.
OZK	0000 Dy	3790	WA5TLS
Razorback	2330 Dy	3995	WA5KJT
PON	2130 M-F	3925	W5MJO
APN	1100 M-S	3937	W5VFW
CAREN	0100 Th	146.94	W5ODF
		146.34	
LX INFO	2:48 M	3860	W5FEFL
EC Net	2:00 Su	3995	W5PBZ

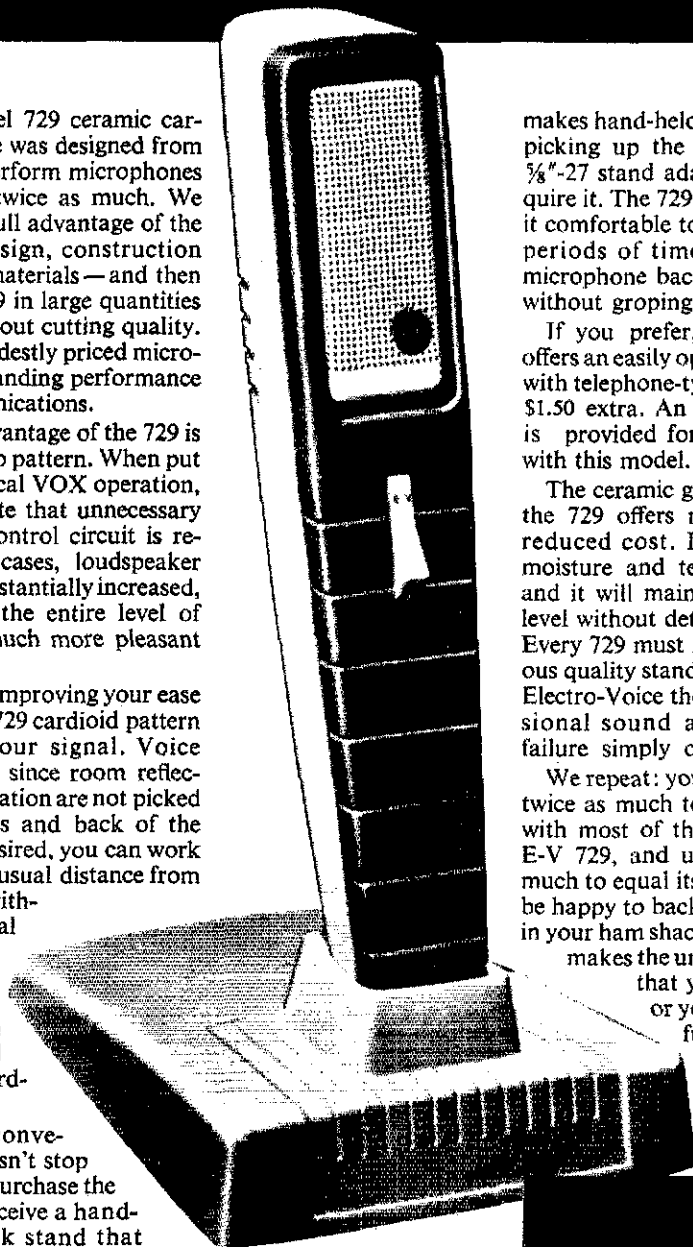
Unless you pay \$30⁰⁰ or more,
you can't buy a microphone as good
as the E-V 729...for only \$17⁴⁰*!

The E-V Model 729 ceramic cardioid microphone was designed from the start to outperform microphones selling for over twice as much. We did it by taking full advantage of the most modern design, construction techniques, and materials—and then producing the 729 in large quantities that cut cost without cutting quality. The result is a modestly priced microphone with outstanding performance for voice communications.

The biggest advantage of the 729 is its cardioid pickup pattern. When put to the test of critical VOX operation, you'll quickly note that unnecessary tripping of the control circuit is reduced. In most cases, loudspeaker volume can be substantially increased, as well, making the entire level of your operation much more pleasant and effective.

But more than improving your ease of operation, the 729 cardioid pattern also improves your signal. Voice quality is crisper, since room reflections and reverberation are not picked up from the sides and back of the microphone. If desired, you can work at up to twice the usual distance from the microphone without losing essential audio clarity. This working flexibility simply cannot be matched by an omnidirectional microphone, regardless of price.

And the 729 convenience story doesn't stop there. When you purchase the Model 729 you receive a handsome slip-in desk stand that



makes hand-held operation as easy as picking up the microphone, plus a 3/8"-27 stand adapter should you require it. The 729 shape and size make it comfortable to hold, even for long periods of time. And putting the microphone back in its base is done without groping or fumbling.

If you prefer, the Model 729SR offers an easily operated rocker switch with telephone-type contacts for only \$1.50 extra. An extra set of contacts is provided for controlling a relay with this model.

The ceramic generating element of the 729 offers many advantages at reduced cost. It is impervious to moisture and temperature changes, and it will maintain its high output level without deterioration for years. Every 729 must meet the same rigorous quality standards that have made Electro-Voice the standard in professional sound applications where failure simply cannot be tolerated.

We repeat: you have to pay at least twice as much to find a microphone with most of the advantages of the E-V 729, and up to three times as much to equal its performance. We'll be happy to back up our claims right in your ham shack. For Electro-Voice makes the unequivocal guarantee that you must be satisfied or your money will be refunded. Write for free E-V catalog and list of the E-V distributor nearest you.

*Model 729 amateur net. Model 729SR (illustrated) \$18.90 amateur net.

ELECTRO-VOICE, INC., Dept. 712Q, 631 Cecil St., Buchanan, Michigan 49107

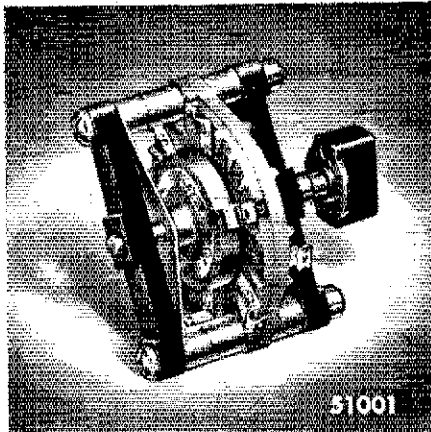
Electro-Voice[®]

A SUBSIDIARY OF CULTON INDUSTRIES, INC.

Designed for



Application



51001

15,000 VOLT R-F SWITCH

The No. 51001 features high voltage insulation and a non-arc tracking and arc resistant molded frame. Both collector and switched contacts break contact. Additional features include heavy duty silver contacts and insulated mounting. The No. 51001 has self-cleaning wiping action on contacts, insulated shaft, and is available with two to six contacts.

ADDITIONAL FEATURES:

- Positive Snap Action
- Contacts Break Clean
- Positively Non-Shorting
- Large Air Gaps
- Long Leakage Paths between Contacts
- Rugged Construction

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS



Traffic: W5NND 44, WA5TLS 33, WASEVW 30, W5SOO 24, W5VFW 12.

LOUISIANA - SCM, J. Allen Swanson, Jr., W5PM - SEC; W5QB, RM: WA5VOE, PAM: WA5NY. The gang up Alex was promise the biggest hamfest ever Aug. 28 and 29. Contact WASEVU for details. W5CKJ has been awarded a Distinguished Service Award for his editorship of "QRM." W5CKI reminds us to look for the Alligator Net Fri. 0130 GMT 3925 KHz. Anyone looking for skeds on 6-meters check into the AREC Net Wed, 0100 GMT 50.4 MHz. W5EXI expects to produce, through his school, some 20 new hams for the area. W5WLU topped his previous score in the Sweepstakes contest last fall. His score was the highest in the state. WNSAAA headed up the Lafayette area Field Day operations. WASEVU, W5AGNM, W5JHP, W5AXD and W5ASER were presented with Certificates of Appreciation by our Dir, for helping newcomers to amateur radio. W5HNW has a new Thunderbird beam up and is having a ball. W5AWU recently gave a fine discussion on antennae before the GNOARC group. WB2UFG/5 made BPL. W5DXA reports the new 6-meter net is going great guns. There is a new 444-449 MHz repeater in NOLA, W5AEG, K5AJK and W5TYI have earned their LAN certificates. W5TVH recently operated as KZ5UB and YN1WLG. WNSDRW is a new addition to our ranks. My apologies to those who have not received answers to their requests from me. Had a stay in the hospital for awhile. Thanks for the get well cards, fellows! Traffic: WB2UFG/5 281, WA5VQE 226, W5MI 197, WA5WBZ 39, W5EA 12.

MISSISSIPPI - SCM, Walker J. Coffey, W5NCB - SEC; WA5JWD, RMs: W5SBM, W5ATMC, PAMs: W5JHS, W5KFY, K5MDX. Appointments: WA5KYB, W5ASSIM as OPSs: W55DVD as OVS; W5ASSIM as EC; W5ATMC as RM and "head knocker" for the new Miss. Novice Net. K5LUW is an Extra Class and W5MPO an Advanced Class licensee. K5MDX scored 1.46 megapoints in the DX test. W5SBM made the PSIR, W5ELN and W55DWD are trying to get a 50.6 net going on Thur. at 1930 CDT. W5ECL is working on ham directories. The NE Miss. Amateur Radio Assn. is an ARRL affiliate. TARC has worked hard on its Novice program and it has paid off with a lot of new hams on the air. JARC is working on its Jackson Hamfest plans for July 24, 25. Make plans to be there fellows. Welcome to new hams WNSDOC, W5DKV, WNSDWL, WNSDXG, WNSDZC, WNSDZQ, WNSLCV, WNSLDU, WNSDEC, WNSSEGF, WNSEHA, WNSEHW, WNSEHY, WNSBVP.

Net	Freq.	Time(Z)/Day	Mgr.
GCSBN	3925	2330 Dy	W5JHS
CGCHN	3935	0100 Dy	W501B
MSBN	3990	0015 Dy	WA5UYW
MTTN	3665	0045 Dy	W5SBM

Traffic: WA5YZW 137, W55BM 10R, W5WZ 77, W5NCB 72, W5EDT 71, W5AFIN 32, WA5UIH 17, W5ATMC 15, WNSAHL 11, W55BIF 10, WA5YJA 9, W5ATW 8, W5BW 6, W5ASSIM 6, WA5KYB 5, W5KEY 4, W5LL 3, K5MDX 3.

TENNESSEE - SCM, Harry A. Phillips, K4RCF - SEC; WB4ANX, PAMs: W4PEP, WA4EWW.

Net	Freq.	Time(Z)/Days	Sess.	QNI	QTC	Mgr.
TSSB	3980	2330 M-S	26	1654	102	E4MOI
LPN	3980	1145 M-F	31	1623	70	K4MQI
FEPN	3980	1040 M-F	22	650	16	WA4EWW
TPON	3980	2330 Su				WB4BHZ
TN	3635	0000 Dy	24	117	91	K4AMC
ETVHH	145.2		9	65		WB4IOB
ETVHF	50.4		12	246	2	WB4IOB
ETTM	28.7	6200 W&F				WA4QXC
MTTM	28.8	0200 T & F	9	85	1	WA4GIS

The MARA (Memphis) has in the Milton McCoy Memorial Group, five receivers and two transmitters for issue to deserving young hams. WA4YEM, Crossville Hamfest chmn, reports that everything is set for another good Hamfest July 17, 18. The Banquet will be at 6:30 P.M. CDST on the 17th at the Holiday Inn, Crossville. WA4BVT, of the Oak Ridge National Laboratory will be the speaker. WB4DYJ is planning a 2-meter emergency net in the Oak Ridge area. The Oak Ridge ROC provided communications at the Marina and Boat Dock site for the July 4 celebration in Oak Ridge. W4OGG reports good participation in the Tenn. party. W4RKO is now an Advanced Class licensee. Traffic: W4OGG 281, WB4DAJ 91, K4AMC 65, W4RUW 54, WB4MYZ 27, WA4YEM 26, WA4UAZ 22, W4WBK 21, W4ZJY 16, WA4GLS 11, W4PEP 10, WB4ANX 9, WB4MP1 9, WA4CGK 7, WB4FVM 6, W4SGI 4.

GREAT LAKES DIVISION

KENTUCKY - SCM, Ted H. Huddle, W4CID - SEC; K4YZU, RMs: W4BAZ and WB4NOZ, PAMs: K4MAN and WA4GTO, BPL: WA4MKH.

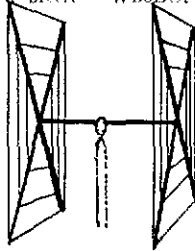
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made ordinary, everyday, run-of-the-mill antennas. No, no, no. We make winners through superior materials and design. WA1JFG won the New England Round-Up championship with our 3-element 15-meter beam by a margin of 5,982 points! In QST since '53.

QUADS Totally satisfied with quad. Worked DK4VJ, SM7DLH, XE1AB, DM4SEF, FL8SR, 66AUM, HK7YB in few hours. Instructions a breeze WB8DOI

CUBICAL QUAD ANTENNAS

— these two element beams have a full wavelength driven element and a reflector (the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a fool-proof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!



10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.
Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' x 1 1/4" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 3/8" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD.	\$37.00
10-15 CUBICAL QUAD.	32.00
15-20 CUBICAL QUAD.	34.00
TWENTY METER CUBICAL QUAD	27.00
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TEN METER CUBICAL QUAD.	25.00

(all use single coax feedline)

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BEAMS

"Just a note to let you know that as a Novice, your 3-El. 15 Beam got me RI Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"

Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; 3/4" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20.	\$21	4 El 10.	\$20
3 El 20.	27*	7 El 10.	34*
4 El 20.	34*	4 El 6.	20
2 El 15.	17	8 El 6.	30*
3 El 15.	21	12 El 2.	27*
4 El 15.	27*		*20-ft. boom
5 El 15.	30*		

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MNV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ51KN, KZ5OWN, HC1LG, PY5ASN, FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4II, and over a thousand other stations!

V40 vertical for 40, 20, 15,	
10, 6 meters.	\$14.95
V80 vertical for 80, 75, 40,	
20, 15, 10, 6 meters.	\$16.95
V160 vertical for 160, 80, 75,	
40, 20, 15, 10, 6 meters.	\$18.95

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

Net	QNT	QTC	Net	QNT	QTC
KRN	398	27	kyn	355	228
MKPN	583	84	EUATN	68	6
KTN	1152	181	pon	80	17

WB4KUC and WA7DPO/4 are on 2-meter fm and looking for other eastern Ky. stations to join, K4YZU, K4CKJ, WA4AVV, WB4ILF, WB4TDW, WB4PNX and WB4RVO made the trip to the Dayton Hamvention. The Louisville Red Cross station, K4CSH, has been moved to the new building. Official Observers are urgently needed to maintain our self-policing program. This carries a big plus with the FCC. Any volunteers? WB4RVO is building new 4-400s. W4BAZ has his 6-meter rig working. Don't miss the family ham picnics this summer. Monitor 3960 and 3600 for details. DL5ND is now in Lexington and signing K4HHG. Traffic: WA4MKH 263, WA4DYL 139, WB4PTC 108, WB4PVC 91, W4BAZ 80, W3CID 75, WB4KPE 70, K4MAN 68, K4PW 56, K4DZM 55, K4TRT 43, WA4AGH 42, WB4QMC 42, WB4EOR 39, WA4VZZ 38, WB4AUN 32, WB4MQR 27, WN4PSJ 22, W4OXM 20, WN4PSP 20, WA4WSW 19, WB4HTN 15, WA4MXD 15, K4UNW 15, WB4ILF 14, WA4FNI 13, WA4AVV 12, K4AVX 12, WA4HLW 12, WA4WOZ 11, W4BTA 8, K4QHZ 6, W4OYI 4, K4DMU 2, WB4GCV 2. Total traffic: 1504. Reports: 35.

MICHIGAN SCM, Ivory J. Olinghouse, W8ZBT - SFC; W8MPD. RMs: W8PIM, W8R1N, W8WVL, K8KMO, W8DIT. PAMs: W8TAN, K8MJK, K8PVC. VHF PAMs: W8CVQ, K8AFM.

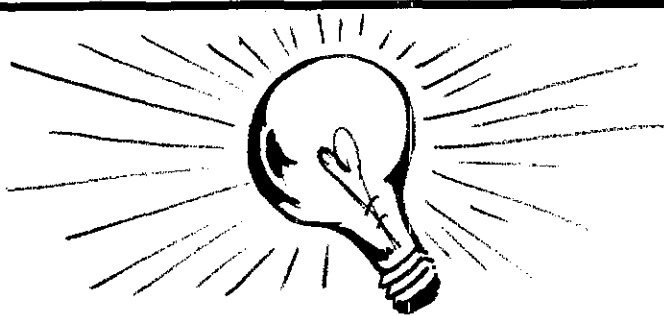
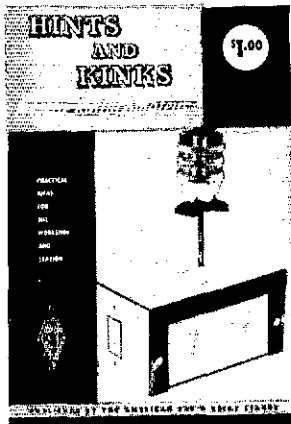
Net	Freq.	Time/Days	QNT	QTC	Sess.	Mgr.
QMN	1663	2300 Dy	1149	444	90	W8PIM
WSSB	3935	0000 Dy	862	152	30	K8PVC
BR/MEN	3930	2230 S-F	869	53	26	W8TAN
UPEN	3920	2230 Dy	395	30	29	K8MJK
GLEFN	3932	0130 Dy	660	102	30	K8PVC
PLN	3953	1600 Dy	1710	292	30	K8LNF
Mi.6M (Mar.)	50.7	0000 M-S	317	17	23	W8LRC

I regret to report W8CEP among the Silent Keys. BR/MEN officers for 1971 are W8TAN, mgr.; W8KHB, asst. mgr.; W8LJU, secy-treas.; they will take office at the Net picnic July 18. Van Buren County ARC officers for 1971 are W8ZAX, pres.; W8YYL, vice-pres.; W8PRJ, secy.; W8QGV, treas.; W8QHJ, act. mgr. Oak Park ARC elected W8TJL, pres.; K8PNZ, vice-pres.; W8AEO, secy.; K8NKB, treas. Kalamazoo ARC had a good graduating class - WN8s, JH, JNA, JMW, JMX, JMZ, JEA and JDK. W8VRB now is

HR2GK in Honduras. WN8JAO is in Mesa, Ariz. and soon will have a 7 call. K8ZJR now is a General Class licensee and WN8JDN is new at Plymouth. W8NBD is a new OVS at Westland. W8HFO is a new General at Jonesville. GCRC set up a booth at the Hobby Show in Flint displaying and operating amateur gear for amateur radio publicity. W8ZCO now has an HW-12 in his car. W8GXI has a new Heath station on the air. W8MLF has a new Hi-Gain quad on a 48-ft. tower. W8RBJ, W8MLF and W8DJS are constructing a new 80-meter broad-band antenna using coax and ladder line. W8DOD built a vox and electronic keyer for his Galaxy and they both work F.B. W8HRT is now General Class at Grand Rapids. W8NBD has been busy working 2-meter aurora. W8WVF is having a lot of fun working 432 MHz. CMARC had an antenna raising operation Apr. 17 that was a super success with 17 members turning out, the whole job was completed in less than two hours. The Lansing 2-meter am net is doing fine, regular check-in of 13 stations representing 13 surrounding cities. Next in coverage is the 2-meter fm net and third place would go to the 10-meter net. W8DT has been busy with 36 patches for the boys in Antarctica. The Michigan P.O. Net picked W8TDA as Amateur of the Month for Apr. Traffic: (Apr.) W8YYR 327, K8KMO 291, W8WZF 256, K8LNF 156, W8LNU 143, W8PIM 124, W8RTN 97, W8LXY 92, W8ZAV 90, W8MO 81, W8LYA 79, W8ZBT 75, W8GBC 72, W8LEU 67, K8PVC 65, W8SH 65, K8DYI 59, W8TAN 54, W8WVL 50, K8ZJU 45, W8ONZ 42, W8FX 41, K8MJK 40, W8U 38, W8HJZ 37, K8JL 35, W8NOY 31, W8DIT 30, W8DUL 27, W8FZ 26, W8WYI/B 24, W8VM 19, K8ACO 16, W8DCN 16, W8IUC 16, W8UES 15, W8DT 14, K8PLO 14, K8JHA 11, W8ANR 10, W8RYB 10, W8GBU/B 10, W8ZDE 8, W8BEZ 7, K8AEM 6, W8TBP 6, K8TY 6, W8CUP 4, W8BDO 4, W8FZL 4, W8BGFN 4, W8WVV 4, W8AGO 2, W8JEZ/B 2, W8NBD 2. (Mar.) W8KBZ 53, K8MJK 34, K8ALM 6, W8WSM 5.

OHIO - SCM, Richard A. Fgbert, W8FTU - SFC; W8OUU. RM: W8IMI. PAM: K8UBK. VHF PAM: W8ADU. Aft. section net reports:

Net	QNT	QTC	Sess.	Freq.	Time(Z)	Mgr.
OSSBN	2179	867	60	3972.5	1430/2245	K8UBK
BN	609	414	59	3880	0200/2300	W8IMI
O6MtrN				50.61	2300	W8ADU
				50.16	0100	
OSN	134	46	30	3580	2225	W8WAK
BN RITY	197	73	30	3605	2200	W8YUB



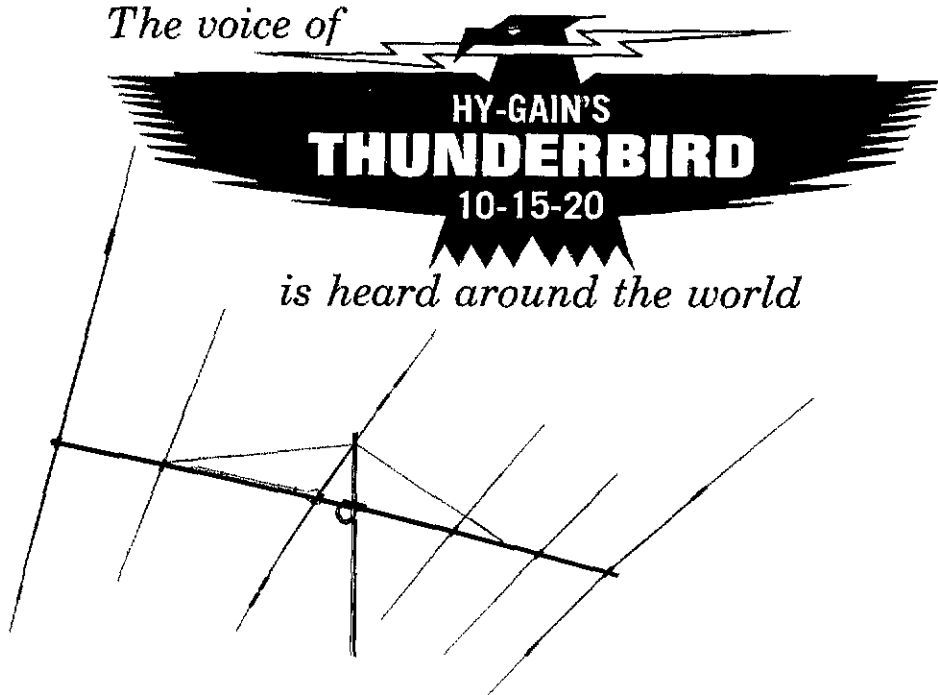
All those little ideas that can improve your operating, building, experimenting, etc.

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- * Thunderbird's "Hy-Q" traps provide separate traps for each band. "Hy-Q" traps are electronically tuned at the factory to perform better at any frequency in the band—either phone or CW. And you can tune the antenna, using charts supplied in the manual, to substantially outperform any other antennas made.
- * Thunderbird's superior construction includes a new, cast aluminum, tilt-head universal boom-to-mast bracket that accommodates masts from 1¼" x 2½". Allows easy tilting for installation, maintenance and tuning and provides mast feed-thru for beam stacking.
Taper swaged, slotted tubing on all elements allows easy adjustment and readjustment. Taper swaged to permit larger diameter tubing where it counts! And less wind loading. Full circumference compression clamps are mechanically and electrically superior to self-tapping metal screws.
- * Thunderbird's exclusive Beta Match achieves balanced input, optimum matching on all 3 bands and provides DC ground to eliminate precipitation static.
- * SWR less than 1.5 to 1 on all bands.
- * 24-foot boom... none longer in the industry.
- * Extra heavy gauge, machine formed, element to boom brackets, with plastic sleeves used only for insulation. Bracket design allows full mechanical support.
- * Interlaced, optimum spaced elements for higher gain and better pattern control.
- * 3 active elements on 20 and 15 meters. 4 active elements on 10 meters.

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Fabulous 3-Element Thunderbird, Jr.
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Model 390
Suggested retail price, \$99.95

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Looking for something to cover the gaping hole you made in the shack wall when you grabbed the high voltage during the DX Contest? Or do you want something practical to improve the appearance of your shack?

This big 30 x 40 inch 8-color map is just the thing! Each country prefix is shown on the country and in the marginal index for easy reference.

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AMERICAN RADIO RELAY LEAGUE
Newington, Connecticut 06111

BPLs for Apr. went to W8QCU, K8ONA, W8LT and W8TFL. Section Net certificates for regular participation in the Ohio Slow Net were earned by W8GVX, W88CWD, W8ZNC, WA8QL, W8DYF and W8RUO. PAM K8UBK was presented with a plaque by members of the Ohio Single Sideband Net commemorating his ten years as Net Mgr. Ohio Slow Net Mgr. reports that the top QNL for Apr. was W8LIZ. Sincere congratulations to Great Lakes Division Dir. W8WC who was awarded "Ham of the Year" at the Dayton Hamvention, which had 4700 in attendance. W8FZF is now WN9GD in Indianapolis. Congrats to new Advanced Class W8HZK. W8REMY will soon leave Ohio for a tour in Portugal with the Air Force. Miami Valley Amateur Radio Contest Society's officers are W8MCR, pres.; W8MOP, vice-pres.; W8JLO, secy., treas. Warren ARA's W8VTD piled up 292,824 points in the ARRL DX Contest. The Inter City RC's Home Brew Contest first place winner was K8ZPL, who submitted a receiver. Goodyear ARC conducts a novice code and theory class. The Warren Hamfest will be held at Yankee Lake Park on Aug. 22. The South East ARC (Cleveland) provides code practice on 50.8 MHz at 9 P.M. local time on Thurs. Dayton ARA is sponsoring a Worked All States by Slow-Scan TV. Contact W8DPW for details. ECYRO W8ERR reports a total of 277 man hours expended in ARRL/RACES net operation for the first quarter in his area of jurisdiction. New appointees are W8JMD as OPS, W8KIC as OO and W8JMD and W8SZU as ORSs. W8BWV was appointed EC of Ashland and Richland Co., and W8DON assumes EC duties for Hardin, Marion and Wyandot Co. Among those groups taking part in American Cancer Society Drives were Queen City Emergency Net and Central Ohio ARRL. Northwest Ohio ARRL furnished communications for a "March for the Bridge", intended to raise funds for drug users rehabilitation. Ohio State U. ARC's new officers are W8CLF, pres.; W8GFI, vice-pres.; Larry Larson, secy., and W8CEB, treas. OSSBN certificates were sent to W8AVS/8, W84LF, W8MZZD/8, W8ED/8, W89MWT and W9WBA. Traffic: (Apr.) W8ETX 366, W8OCU 287, K8ONA 244, W8SZU 222, W8CUT 218, W8LT 215, W8DWL 206, W8PMJ 169, W8GVX 154, W88ALU 148, W8MOR 147, W8AVS/8 136, W8TEL 133, W8CHT 115, W8ETW 105, W88CWD 103, W88ND 103, W88HG 95, W8JMD 94, W8RBIH 87, K8LGA 86, W8WAK 80, K8UBK 78, W8DHY 76, W8LPI 74, W8PBS 70, W8BULF 67, K8BPX 60, W8EEZ 52, W8FTU 52, W8RYP 52, W8GNI 50, W8JD 48, W8QZK 48, W8OF 43, W8GRG 41, K8BYR 36, W8QFK 34, W8DX 34, W8ZUK 32, W88AYC 31, W8BHL 31, W8VKE 31, W8EBC 30, W8GVT 27, K8DJI 25, W8BLAM 25, K8LHE 24, W8YIB 24, W8FGD 23, W8HX 22, K8LH 22, W8FXD 21, W8ZGC 21, W8GED 20, K8OYR 20, W8DEA 19, W8GOF 19, W88AJC 17, W8OXO 17, K8RXD 16, W8RD 15, W8JEB 14, W8EBS 13, W8VND 13, W8AJZ 12, W8FNC 12, W8GFS 12, W8VVP 12, W8ERR 11, W8AJW 9, W8FZS 9, W8RSP 9, W8STX 9, W8GRT 8, K8LXA 8, W8CKY 7, W8MGC 7, W88MH 7, W8OUU 7, K8YET 7, W8ARW 6, W8HOO 6, W88NOQ 6, W8EPA 4, W88HP 4, W8FSS 3, W88YAO 3, W88HYA 2, W88HVB 2, W88MCR 2, W88AZN 1, W88CKI 1, W88LH 1, W88FWX 1. (Mar.) W8LX 50, K8LXA 22, W8AJW 8.

HUDSON DIVISION

EASTERN NEW YORK - SCM, Graham G. Berry, K2S2N - Asst. SCM/PAM: Kenneth M. Kruth, W2VJB, VHF PAM: W2YQU, RM: WA2VYS. All section stations please note: SEC now is Chuck Starks, W2URP; county ECs please send him details of your present local setups to verify records. Other ARRL appointees check with W2URP to update listing, frequency capabilities, etc. Thanks go to W2KGC for lengthy service as SEC. Appointments and renewals: W2PKY the new EC for Schoenectady County; W2LYO as OPS. Renewed: W2SHH, W2FOA, K2DNR and K2CBA as OVSs. On the club circuit: Director W2TUK, Vice-Director K2SJO and SCM were at the Overlook Mt. ARC in Apr. The Communications Club of New Rochelle heard W2TUK at the annual pre-board meeting. The Harmonic Hills RL annual dinner meeting was held Apr. with K2BOI in charge. The Albany ARA had W2ODC on RTTY and a dinner dance Apr. 17. Schoenectady ARA heard W2JFV on tubes at the Apr. Raffle meeting. Yunkers ARC speaker was K2YM on FETs, ICs and power transistors. So many new club-backed and group-backed fm repeaters in the area that any listing would be out of date overnight! If your club activities aren't listed here, you didn't let the SCM know what you're up to. - "nuf said? Individual stations heard from: New General Class tickets on the way for ex-WN2s KDC and KDD. Congrats. WA2FAH is ops. Chm. of the Albany club. W2FSGS was top scorer in the Colonial HS "Operations Day." W2IB and K2S2N are sharing teaching chores at New Rochelle Club's theory course. The W2SZ Club at RPI elected W2ZULS, pres.; WA2EUX, vice-pres.; W2SON, treas.; WA2JYM, secy.; KH6DLK, equipment sapper. Good to see the

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Albany, Schenectady and Overlook Mt. clubs represented at the Hudson Council meeting with Director in Apr. Where was your club? The Council now has 45 member clubs from the Hudson Division. Another BPL for WA2FBI in Apr. Welcome back from the Army to WB2VUK. WB2JLR reports new SB-301 in the line. WB2YQU worked K4 and VF3s via 4/21 aurora and Ws 1-213141819VE2 and 3 on 4/14 aurora. WB2FJ is all set for the VHF contest - 6-meter up to 1296 MHz. Traffic: (Apr.) WA2FBI 217, WA2VLT 126, WA2VLS 120, WB2VJB 75, WA2VYS 63, WN2LXF 47, WB2IXW 41, K2UYK 36, K2SJM 32, W2URP 26, WB2FUV 25, WA2GMT 25, W2ODC 23, W3SZ 21, WN2KDC 19, WA2HHO 17, WA2EAI 13, WB2FWK 6, WN2SJH 2. (Mar.) WA2FIQ 34.

NEW YORK CITY AND LONG ISLAND - SCM, Fred J. Brunjes, K2DGI - SEC: K2OVN. RM: K2UAT. HF PAM: WA2UWA. VHF PAM: WB2RQF. The following are major AEC nets, join one!

Brooklyn	28.64 MHz	50.35 MHz	146.17 MHz
Brooklyn	28.64 MHz	50.40 MHz	145.26 MHz
Richmond			145.88 fm
New York	29.5 MHz	50.48 MHz	
Queens	29.5 MHz	50.20 MHz	145.62 MHz
Nassau	28.72 MHz		145.32 MHz
Suffolk		53.51 MHz	146.82 fm
Brookhaven		50.46 MHz	146.82 fm
Huntington	28.73 MHz	50.46 MHz	145.59 MHz

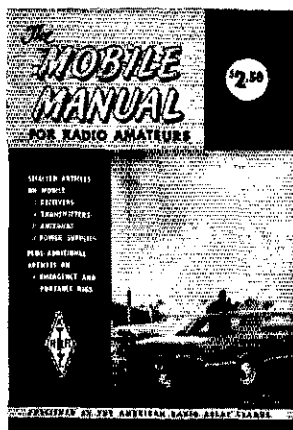
Note: Nets usually open 2000 local Mon.! During these summer months activity tends to fall off in regard to net activities. If you wish to check into a net be it ARLC/RACES or a traffic net, and find things kind of quiet, try the following scheduled time of the net meeting. At periods of low activity on the nets, the NCS may close the net earlier due to lack of activity/traffic. With regrets I announce the passing of W2BY to the roster of Silent Keys. WA2LJS is burning the airwaves with a new Swan 500-CX. W2LXC is looking for some ATV pictures on 439.25 MHz. How about you ATVers getting together. Contact SCM for coordination if you wish! WA2JZX is sporting a new kw linear and reports the gang at CBS TV getting ready for some 4500 MHz fm activity. K2JFE reports a successful Home Show participation by the Staten Island ARA with demonstrations of amateur activities. W2PF is replacing the antenna system. WB2WFI reports giving the boys at school an education as to what ham radio is all about. Congratulations to K2DDK and

K2DGI on their recent Life Membership. WB2FJX installed a new rig - SB-401, SB-303 and a room heater, SB-220! He hopes to have a CL-33 skyhook up soon. New club officers at NYU, W2DSC: WB2DZZ, pres.; WB2FJX, vice-pres.; WB4QZG/2, secr. Many thanks to the many stations that participated in the ARFSC efforts during the Salute to Israel parade. Special thanks to WB2FXN for coordinating the operation. It is efforts like this and the Staten Island Home Show that offer the public the proper image of amateur radio and a better understanding of our potential in the community. The Hudson Amateur Radio Council plans a repeater located in Hempstead (WHLI tower) to coordinate their activities. It will operate on 2-meters with an input of 146.10 and output on 147.00; and will be "open." The repeater will also provide service for Nassau County ARLC/RACES activity. New officers at are W2EJY, pres.; W2JZQ, vice-pres.; W2PFF, treas.; WB2HMF, taking notes! K2DGI will be touring Europe next month with GH2BZ. They'll be mobile so keep an ear out! Traffic: (Apr.) W2GKZ 398, WB2LZN 330, WB2UFG 281, WB2LGA 238, WB2DLJ 111, WB2WFI 72, W2EC 70, WA2HOP 31, W2LGG 24, W2PF 11, WN2QAY 11, W2DBQ 9, K2JFE 9, K2AAS 1, W2EW 1, WA2JZX 1. (Mar.) WA2HOP 61.

NORTHERN NEW JERSEY - SCM, Louis J. Amoroso, W2ZZ - SEC: K2KDO. RMs: WA2BAN, WA2DRH and WA2TAF. PAMs: K2KDO, K2SGX and WA2TAF.

Net	kHz	P.M./Days	Sess.	QNTY	Mgr.
NJN	3695	7:00 Dy	30	515	300 WA2BAN
NJN	3695	10:00 Dy	30	275	144 WA2BAN
NJN	3740	8:00 Dy	15	61	28 WA2FVH
NJEPTN	3950	6:00 M-S	30	630	180 WA2TAF
NJARN	50425	8:00 M-F	23	165	14 K2SGX
FVETN	145710	8:00 Dy	30	108	36 WA2JNO
ECTN	145800	8:30 M-S	29	132	70 WB2LTW

New appointments: K2DOT as EC for Belleville and vicinity. WA2JIM as EC for Clifton and vicinity. WB2LTW as ORS and WB2HEO as OVS. W2TP received 5BDXCC No. 85 and is the first N.J. station to qualify for both 5BWAS and 5BDXCC. W2OHH and W2BXA are planning an fm repeater for NJDXA. W2OST is the newest member of that club. WB2AEU has his tribander up again. W2CVW needs cards on 40 and 80 for his 5BDXCC. W2ZZ with a lot of help from K2IBW is finally on 2-meter fm with the progress



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*** QST "10 Watt One Tube Transmitter"**

Page 25, 1971 QST MARCH

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*** ARRL "R.F. Actuated C.W. Monitor"**

Page 183

Permits the operator to monitor his C.W. sending and also can be used as a code-practice oscillator.

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*** ARRL "A 75-120 Watt C.W. Transmitter"**

Page 184

Designed to satisfy the C.W. requirements of either the novice or higher class licensee. A spot position is provided on the function switch which permits identifying the operating frequency in a band.

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*** ARRL "Matching Indicator For Low Power"**

Page 556

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Voice-operated relay provides automatic transmit-receive switching. Eliminates the need for push to talk operation. Can be used with tape recorders, etc.

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* Kit includes all electronic and electrical components, knobs, wire and project instructions. One crystal supplied where applicable. Does not include chassis or other metal material, screws or housing, or batteries.

*** ARRL "An FM Pip Squeak For 2 Meters."**

Page 21 QST 1971 MARCH

A 2 watt 2 meter F.M. Transmitter. Ideal for portable or field use and on repeater networks. Operates on 12 volts either from car battery, D size cells (10 required) or 12 volt lantern battery.

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*** ARRL "All Band Electronic T.R. Switch"**

Page 571

Self-contained T.R. Switch including power supply. Incorporates a tuned circuit which will add gain to your receiver. Operates 80 thru 10 meters.

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*** ARRL "Low Noise Converter For 50 MHz."**

Page 405

A Converter giving approximately 30 db gain. Noise figure is approximately 2.5 db. Designed for an I.F. frequency of 28-30 MHz. Operates from 12 volt-40 MA power supply or battery. (Battery not included in kit.)

B&W Kit No. A121 Price \$43.50

*** ARRL "Low Noise Converter 144 MHz."**

Page 407

A Converter giving approximately 30 db gain. Noise figure is approximately 2.5 db. Designed for an I.F. frequency of 28-30 MHz. Operates from a 12 volt-40 MA power supply or battery. (Battery not included in kit.)

B&W Kit No. A122 Price \$48.50

ARRL "Trap Antenna"

Page 367

An ideal Antenna system when space is not available for a full length antenna. Operates from 3.5-30 MHz at a full K.W. Kit includes coil, capacitor, insulators, center feed insulator (B&W CC-50) and plastic.

B&W Kit No. A124 Price \$21.50

ARRL "Two Broad Band Toroidal Balun"

Page 350

Low-loss high frequency ferrite core balun kit. Can be used to match 50 ohms balanced to 50 ohms unbalanced, 75 ohms balanced to 75 ohm unbalanced, 75 ohms unbalanced to 300 ohm balanced type antennas. Power rating of 1KW from 1.8-40 MHz. Kit includes core, wire, coax connector, feed thru insulators and project instructions. Does not include metal or housing.

B&W Kit No. A125 Price \$10.95

*** ARRL "Wide Range Transmission**

Line Coupler" Page 364

A coupler designed for multiband antenna system with built in SWR indicator. Rated at 1 KW - 3.5-21 MHz.

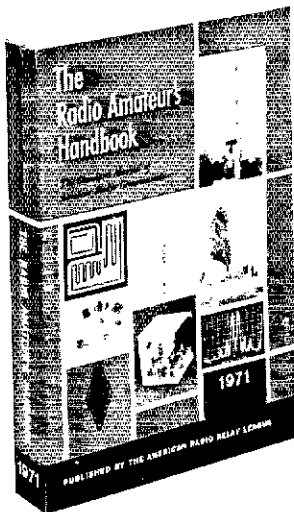
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line. W2ZEP has a new SB-401 working and modified for full QSK with SB-301. WA2JIM passed the Advanced Class exam. WA2FVH is the new mgr. of the NJNN. Contact WA2CCF if you plan portable operation for next month's N.J. QSO party. W2NKD has been appointed communications coordinator of Union County C.D. WB2MEE has a new 100-watt mobile fm rig installed in his car. Director W2TUK informed us that many NNJ members sent him comments on the new FCC Docket. K2KDDQ still is looking for more ECs and the SCM needs more OOs. Please write if interested. The K2DFL group will hold a Hamfest Aug. 15 at the Westbrook Park in West Milford. Traffic: WB2VPR 234, WA2BAN 204, WA2EPI 201, WB2DDQ 189, WB2LW 137, K2RXQ 106, WB2NOM 103, WA2ERZ 90, K2KDDQ 83, WA2FVH 68, W2ZEP 58, WA2YXO 54, W2CU 52, WA2FUI 46, WA2CAK 38, WR2WNZ 38, K2OOJ 29, K2DFL 28, WA2CCF 27, WA2JNO 27, WA2KHQ 27, WA2UOO 25, W2ZZ 24, K2DDT 23, W2EWZ 22, WB2JAL 22, WA2JNO 17, K2MFX 16, WB2BCS 12, W2CVW 12, W2ABL 6, WA2LDX 5, WN2QNT 4, K2ZFI 3, K2CBG 2, W2TFM 1.

MIDWEST DIVISION

IOWA - SCM, Al Culbert, K0YYU - SEC, K0LYB. Congratulations to WA0NYU of Mason City on receiving 5HWAS No. 52, which I believe to be an Iowa first. W0DDV is the new Iowa Army MARS director, and W0PEP is the new Iowa Navy MARS director. The Iowans Amateur Radio Society of Iowa State U. received a commendation award from the Iowa Civil Defense staff for their efforts after the Calif. earthquake. It was K0LYB's and my pleasure to speak at the Apr. meeting of the Cedar Valley ARC at Cedar Rapids and to see that fabulous contest machine of K0AZJ's afterward. A new ham in Sumner is WN0DFD. I was saddened to hear of the passing of W0EBY. Some new calls were heard representing Iowa during the Apr. CD Parties. An informal group has been operating at 3977 kHz whenever a severe weather watch is in effect for the purpose of relaying sightings and information to the Des Moines Wx Bureau, so you might give a listen the next time a watch is announced. The Pony Express Ride to raise money for Camp Sunnyside was a tremendous success, and a hearty thanks to the many hams who helped by providing mobiles and relay service. Well, I hope everyone has sufficiently recovered from their FD hunt with Mr. Murphy and the insect world.

Net	QMI	QTC	Mgr.
Ia 75-meter (noon)	1518	113	K0LYB
Ia 75-meter (even)	1312	51	W0YES
ILCN (6W)	157	50	K0AZJ

Traffic: W0LCX 730, K0DDA 123, K0AZJ 89, WA0AUX 61, W0MOQ 54, WA0VZH 43, K0LUZ 24, W0PPI 21, WA0AIW 14, WA0OTQ 5, W0BW 4, WA0RKR 4, K0LKH 3, WA0YIW 3.

KANSAS - SCM, Robert M. Summers, K0BXP - SEC, K0LPE. PAMS: K0JMF, K0ENU. RMS: K0MRI, WA0TZK. VHF PAMS: WA0CCW, WA0IRO. Information for all net operators: The 10th Regional Net will operate mostly on 7105 kHz during the summer, using 3545 kHz as alternate frequency, 2 sessions, 0045Z and 0230Z. The Hiawatha ARC recently toured the Cooper Nuclear Power Plant at Brownsville, Nebr. W0PB and K0NI attended the Dayton Hamvention. The Mid States Mobile Monitoring Service reports another fine month handling 88 QTC, 86 phone calls, 110 mobiles, 977 fixed stations in 120 hours of operation. A job well done by K0ENU and his crew. W0RXD, LC Zone 6A reported 14 stations assisting with communications for "Project Concern/Walk For Mankind." Approximately 1698 individuals completed the 20 miles. An estimated \$28,000 was donated for the miles walked. The Kansas Highway Patrol can use extra communications at various times. The Salina Club is contacting the Highway Patrol in their area. How about the rest of us? The first annual Pason picnic was a real success. Look for it again next year.

Net	QMI	QTC	Secs.	Mgr.
QKS	480	162	60	K0MRI
HBN	635	61	22	WA0UPA
K5BN	1208	97	37	K0JMI
KPN	236	20	18	K0JMI
QKN	004	24	29	WA0TZK
Zone 1, 75	69	3	4	WA0GZP
Zone 1, 2	90	10	4	WA0GZP

Traffic: W0INH 343, W0HI 306, K0MRI 132, WA0LBB 130, W0BHT 122, K0BXP 71, K0JMF 70, W0CCI 65, WA0TZK 53, WA0JHC 48, W0CH 37, W0PB 33, WA0GL 27, K0LPE 19, W0BIX 12, WA0GWH 11, K0GZP 10, K0FXN 8, W0FDI 8, W0ICL 5, WA0SLV 5, WA0SRO 3, WA0GZP 3.

MISSOURI - SCM, Robert J. Pawler, W0BV - SEC, W0FEN. New appointments: W0DSW as OPS, WA0NVZ as OO Class IV,

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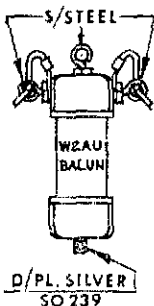
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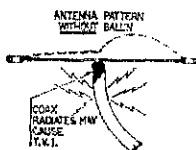
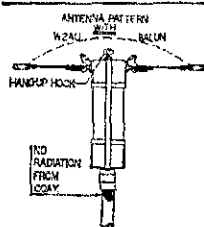


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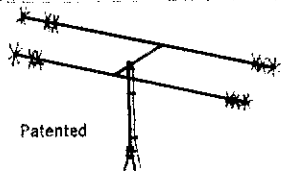
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W0GC as EC for Buchanan County, WA4OWY/0 as ORS and OPS. Appointments renewed: W0BV as OVS, WA0EMS as OPS. Net reports:

Net	Freq.	Time(D)Days	Secs.	QNI	QTC	Mgr.
MoPON	3963	2200 M-S	25	455	59	WA0IAA
MEN	3963	2230 MWF	13	160	83	K0KUD
AREC	3963	2240 M				W0ENW
MoSSH	3963	2300 M-S	28	1139	89	W0RTO
MON	3585	0000 Dy	30	180	112	K0AEM
MON 2	3585	0245 Dy	30	142	70	W0FH
PHD	50.45	0030(GMT)	4	110		WA0KUH

Please note that MoPON, MEN and MoSSH are now all on 3963 kHz. It is hoped that the common frequency will make things easier for stations with emergency or routine traffic for Missouri. All amateurs with an interest in emergency work are invited to report into the ARFC net, which is primarily an information net. Congratulations to: K0BLX, who now is a faculty member in the Electricity and Electronics Dept. at Central Missouri State in Warrensburg; to W0BTT, who passed General Class; and to new Novice W0EMF in Kukuville. W0ODU reports renewed interest in cw in the Joplin area, with several amateur building keyers and using them. The Tri-State club will give ARRL membership to the first member each year to upgrade his license. Mrs. C.O. Gosch, widow of W0BUL, has established an award in his memory. Traffic: W0HH 307, K0AEM 215, W0BV 125, W0HJN 101, W0AAW 42, WA4OWY/0 41, W0ODU 39, WA0TAA 25, WA0KDF 22, W0HVJ 13, WA0KUH 8, W0BVI 3.

NEBRASKA - SCM, V.A. Cason, K00AL - Asst. SCM; Velma Sayer, WA0CH, SEC; K0ODE, Appointment; WA0ITF as OPS. Renewed appointments: K0FRU as ORS; WA0QMZ and WA0SOP as ECs. Apr. net reports:

Net	Freq.	GMT/Day	QNI	QTC	Mgr.
NSN 1	3982	0030 Dy	1062	29	WA0LOY
NSN II	3982	0130 Dy	919	23	WA0LOY
Nebr. 160	3995	0130 Dy	297	159	WA0CJ
NMN	3982	1330 Dy	1243	36	WA0JUE
WNN	3950	1400 M-S	561	34	W0NIK
AREC	3982	1430 Su	189	1	W0RZ
CHN	3980	1830 Dy	1320	43	WA0GHZ
DFN	3980	2100 M-F	437	16	W0FEB
DFN (Mar.)	3980	2100 M-F	476	15	W0FEB

W0FEB and WA0DZA have joined Silent Keys. WA0OCW is now home and on the air and recovering satisfactorily from his accident. Box Butte Co. EC K0WPP reports 2-meter AREC Net QNI 21. WA0BOK has 75-meter mobile again. A new ham in Chadron is WA0PMC from Kansas. A total of 215 signatures were accumulated on the congratulatory telegram to K0ULO and K0YTD. The Nebr. QSO Party starts Sept. 050000Z and ends 062300Z. The Lincoln ARC will use the call K0NFB at the Nebr. State Fair, Sept. 1 through 9. All Nebr. stations are urged to participate in the QSO Party. Traffic: (Apr.) W0LOD 196, WA0SCP 121, WA0CJ 28, K0KJP 36, W0CAU 28, W0HOP 24, W0TOD 24, W0NIK 20, WA0OEX 19, W0CSW 18, W0IAY 18, K0JTN 18, WA0YGI 18, WA0OEI 16, W0DYM 14, WA0GHZ 12, W0VEA 12, WA0PC 10, W0LFV 9, WA0KGD 8, K0ODE 8, K0SIA 8, K0IAL 7, K00AL 7, W0RWM 7, WA0BK 6, WA0ER 6, W0BEN 5, W0IXB 5, WA0TMG 5, W0ATU 4, WA0FEI 4, K0HNT 4, WA0JUE 4, W0LJO 4, WA0PB 4, WA0VT 4, WA0AG 3, WA0LOY 2, WA0OQX 2, W0SWG 2, W0YFR 2, W0NYM 1. (Mar.) W0AGK 4.

NEW ENGLAND DIVISION

CONNECTICUT - SCM, John J. McNassor, W1GVT - SEC; W1HHR, RM; K1FIR, PAM, K1YGS, VHF PAM; K1SXF.

Net	Freq.	Time/Day	Secs.	QNI	QTC
CN	3640	1845 Dy	60	591	379
		2200			
CPN	3965	1800 M-S	30	394	170
		1000 Su			
VHF 2	145.98	2200 M-S	22	77	44
VHF 6	50.6	2100 M-S	27	106	17

High QNI: CN - WA1GHI, W1KV, W1MPW, W1CIT and W1OBR. CPN - W1GVT, WA1JVV, W1MPW, K2SXF and K1YGS. SEC W1HHR suggests all ECs hold a Summer Mobile Drill, a Hidden Transmitter Hunt with free pizza to the winner! Mobile rigs are ideal for EC work. Director W1QV spared no effort to get your comments on items to cover at the ARRL Board Meeting, hope you contacted him. The Tri-City ARC had a fine attendance at their 22nd Annual Hamfest and a very complete program for the day. My thanks to PAM K1YGS for arranging the 18th Annual CN/CPN Dinner Meeting which was enjoyed by many after some difficulty in choosing the date. The Danbury CARA also held their Annual Dinner Meeting. Repeater activity is increasing. more information please?

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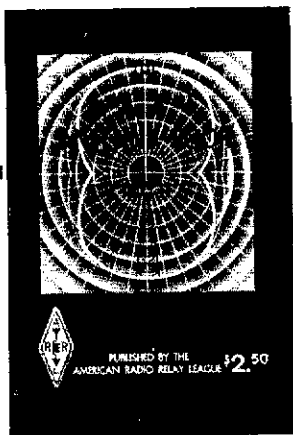
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New officers of the Taft School ARC are WA3PME, pres.; WNØZVF, vice-pres.; WB2CHO, advisor. Note: AVIS may be No. 1 but Murphy's Marauders are No. 2 and moving up fast! Congratulations to WN1MWB and WAIN1R both for General and Advanced Class license; WN1E11, Tech.; WN100U, WN10MZ and WN10WE, Novice; WAINMZ and WA1KMP, 20-wpm sticker and W1WEE for giving over 40 Novice exams! My sincere thanks and appreciation to all for the many cards, messages and good wishes while I was in the hospital. Traffic: (Apr.) WA1JV 276, W1EFW 244, K1E1R 178, W1CTI 160, K1FOT 127, WA1GFH 122, W1MPW 107, K1SXF 102, K1YGS 51, W1GVT 40, WA1JMO 37, W1KV 33, WA1OP 19, WB2CHO/1 16, WA1MOW 15, W1QV 14, W1YBH 10, W1HHR 9, WA1JGA 8, W1CUH 7, W1BDI 6, W1YBI 4. (Mar.) K1FOT 111, WA1GFH 105, W1CTI 97, WA1MOW 26, W1DQJ 10, WA1JGA 8, W1CUH 7.

EASTERN MASSACHUSETTS - SCM, Frank L. Baker, W1ALP - SEC W1AOG received reports from ECs: W1s RPF, LE, K1s NFW, ZUP, DZG and WA1DXI. K1MAK is a Silent Key. W1AKC is home from Fla. W1JBY will soon be on several hands. The 6-Meter Crossband Net had 18 sessions, 73 QNIs, 1 traffic. NEEPJ had 4 sessions, 93 QNIs, 5 traffic. K1EPL was in and out of the hospital. WN1OOB is a new YL in Brockton. Congrats to WA1GAE who has been named as a consulting scientist by the Raytheon Co. WA1EBG is moving to W. Barnet, Vt. WA1CUH is on 2. K1DZG is going on a trip to VOI-Land. K1KED has an NCX-1000. WINCK is home from Fla. WN10MM is on with a DX-60B and HR-10B. W1s NF, CMW attended the Morse Club dinner in Boston. WINF has been a ham for 69 years. K1NFS has retired. K1WSM is out of the service. K1YHZ is RO and JC for Weymouth and W1TQO and K1SRN are Asst. ECs. The Somerset HS ARA, WA1ONR members, all on 6, are: WA1s JYJ, MZS, MZL, MAA, K1D, W1MKN, WA1HSN are new ORSs. Appointments endorsed: W1s FJJ, DAL, AEC and K1BUF as ORSs; W1s AOG, AEC, as OPSS; W1s DBY, PST, K1ZUP as ECs; W1AOG, WA1DFL, as OVSs; W1ALP as OBS. EM2MN had 22 sessions, 151 QNIs, 148 traffic. WA1FSI made PSHR. WA1MSB reports the Early 80 Free Net had 163 QNIs, 53 traffic. W1UX has a new 56-ft. tower. WA1BYM is building a phase-locked loop vfo. WA1KZE is on 6 and building slow-scan receiving gear. WN1s MGL, MJW, MJX passed the General Class exam. W1QV attended a meeting of the So. Eastern Mass. ARA, W1AEC. WA1DXI has appointed K1UAQ as an asst. EC. W1AECY is having transmitter trouble. W1AX and W1ALP attended the annual banquet of the Norfolk Co. RA. W1FJJ, in Japan for 3 months on business, had the call JA6YAO was in the cw DX test; his mother WB4TUN, is in Fla. WA1KJT won the 1971 QRP QSO Party in this section. The Bedford Radio Club, W1SS/L was on the air from the original Marconi station site on Cape Cod, the 70th anniversary of old "CC." WN1NPV is on the air; WA1KFIJ is on many hands and handling traffic. WA1GFM spoke on "Frequency Synthesis" at the Middlesex ARC. The Capeway RC met at K1HP's. W1EYU is back from Fla. W1YTB is home from the hospital. The 70 cm repeater now is on the air; antennas were installed by DL2AA/W1, W1EXC and K1HRV who is mobile on 70. WA1IEB is dir. of the Guardian Angel Service Net. W1OJM made BPL. W1AEG is redesigning his shack. There are 85 hams listed in Braintree. K1YHZ has Extra Class. W1SMO is in the hospital. W1BFZ, RO for Quincy, has quite a group working with him and getting things activated. W1BVV, RO and EC for Braintree, has some new equipment on the way. New calls are WN1s OOO, OON, WA1s OOM, OPI, OOE. Traffic: (Apr.) W1OJM 509, WA1EYU 410, W1PEX 335, W1QYY 305, WA1FAD 203, WA1FF 115, W1MKN 78, WN1MSB 72, W1UX 71, WA1FSI 69, K1PR 60, W1ABC 57, WA1BYM 42, WA1MFG 30, WA1TX 27, W1DOM 26, WA1HSN 25, K1LCQ 24, WA1AKR 21, WA1KZE 20, W1AOG 8, WA1DJC 5, W1AEC 4, WA1FNM 1, K1OKE 1. (Mar.) W1QYY 284, K1PBF 53, WA1FSI 45, K1PRB 37, WA1BYM 35, WA1MJD 29, K1WVW 7, WA1MHJ 5. (Feb.) K1WVW 20. (Jan.) K1WVW 21.

NEW HAMPSHIRE - SCM, Robert C. Mitchell, W1SWX - SEC: W1LUD, RM: WA1GCE. New appointees: K1ACL, K1YMH and WA1MXT as ORSs; WA1GCE as OO, OPS and OVS. Congratulations to new hams WN1OES, WN1OMH and WN1ONV. Also welcome W1INZ, R1YIA and W6DAS to Raytheon and Manchester. W3EML reports WA1JTM handled the most traffic in Feb. during the Calif. earthquake. It was the highest traffic month in TCC history. W1RCC is building a solid state 2-meter fm rig W1BYS is active on the 2-meter fm repeater. W1BPW has a new ladder to help replace loose and rusty hardware on his beams. WA1GCE reports the following active NCS stations on VTNNH; K1RCS, WA1MXT, W1UBG, K1YMH and WA1JTM. This net had 155 check-ins and 98 traffic. Total net time was 653 minutes. WA1JH1, Maine, reports into the cw net often. W1JY/6 writes he will be glad to get back to NH. WA1AQS is active on 75-meter mobile. Traffic:

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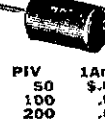
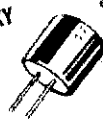
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1000	.22	.22	.59

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DRAKE MARKER	329.00	278.00	MOSLEY CL-36	171.00	135.00
DRAKE T-4XB	495.00	415.00	MOSLEY MP-33	105.00	85.00
DRAKE TR-4	699.00	590.00	MOSLEY TA-33	133.00	106.00
GALAXY GT-550	550.00	420.00	MOSLEY TA-36	167.00	134.00
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K1BCS 176, WAIGCE 136, W1UBG 89, K1YMH 42, W1SWX 9, W1BYS 1, W1AJTM 1.

RHODE ISLAND — SCM, John E. Johnson, KIAAV — SEC: W1YNE. RM: W1BTV. PAM: W1TXL. VHF PAM: K1TPK. RISP report: (Mar.) 31 sessions, 594 QNI, 59 traffic. (Apr.) 30 sessions, 539 QNI, 64 traffic. Endorsement: K1HZN as EC for Providence. W1YNE as SEC and OO. (Class 1). The Rhode Island Net now meets daily at 2345Z on 3540 kHz. All cw hams are invited to join. W1YNE has been active on the KIAABR Repeater with his Regency HR-2 and has wruked several foreign stations. The PRA Club of Providence will sponsor a Rhode Island QSO Party Dec. 11 and 12, 1971 commemorating fifty years affiliation with ARRL. W1OP officers elected were K1HZN, pres.; W1LAD, vice-pres.; W1NCC, secy.; W1KKE, treas.; W1BYH, W1OTE and W1ALGD, board of dir. The club plans a dinner dance and Field Day on Block Island. Your SCM would like to thank all the hams for the many get well cards received while I was in the hospital. Members of the W1AQ Club had my station ready to operate as soon as I returned home. Traffic: (Apr.) W1TXL 73, K1QFD 24, WAICXF 9, K1VYC 9, W1AIBW 8, K1CEP 2. (Mar.) W1TXL 41, W1YNE 26, K1QFD 15, K1VYC 8, WAICXF 5, K1CEP 3, W1AIBW 3.

VERMONT — SCM, E. Regnard Murray, K1MPN —

Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
Gr. Mt.	932	2130 M-S	489	54	W1JLZ
Vt. Fone	3935	1300 Su	120	4	W1K6M
Vr. PO	3909	2200 Su	68	14	K1BOB
Carrier	3945	1300 M-S	381	7	W1B1L
VTSR	3909	2130 M-S	523	82	W1HSG
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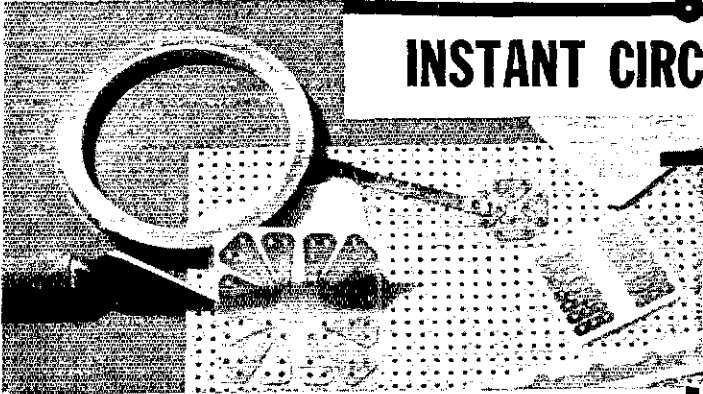
Our sincere thanks to all who contributed to make Vt's Green Up Day last May a success. Amateurs made it possible for CD Hdq. in Montpelier to keep up-to-date progress reports all day during operation. Through your efforts, Vt. leads the nation in this respect. W1AIM was promoted to Capt. in the Air Force. W1MRW completed his WAS. We'll miss K1SHC who is a Silent Key. Traffic: K1BOB 109, W1MRW13, K1MPN 12.

WESTERN MASSACHUSETTS — SCM, Percy C. Noble, W1BVR — SEC: W1ADNB. CW RM: W1DVW. 75-Meter PAM: W1MFB. VHF PAM (Berkshire Co.): W1KZS. It is with deep regret that we report the passing of W1NY and K1PMK. Our sympathy to their families. The SEC reports that the Sun, morning AREC Net had 4 sessions with a QNI of 40 and traffic count of 9. The 10- and 6-meter nets were also active, both with a QNI of 23. The CW RM reports that W1MN had a QNI of 129 with a traffic total of 91. Top five in attendance were: W1BVR, W1DVW, W1ALNF, W1AIBF, with W1LPI and W1MFB tied for 5th place. The 75-Meter PAM reports that W1MPN had 46 QNIs during its 14 sessions and handled 37 messages. Top five were: W1MFB, W1ALNF, W1KZE, W1DVW and K1SSH. OO W1LPR sent out 16 notices during Apr. W1JKLN is on 6 with an HA-460 and a five-element beam. W1I2S now has an SB-200 linear. The following are new asst. FCs in Hampshire Co.: W1KJD, W1KTC and W1MCK; the AREC meets the last Fri. of each month in the Northampton CD Radio Room at 7:30 P.M. A new organization — the WM AREC Repeaters Assn. has the following officers: W1CSF, pres.; W1ADNB, vice-pres.; W1AIBF, treas.; W1KTC, secy. with W1KJD on the board of dir. The CMARA club membership now is 98. Field Day exercises will be held at Moose Hill. The HCRA Apr. speaker was a representative from National Co. Traffic: (Apr.) K1SSH 162, W1DVW 88, W1ALNF 76, W1BVR 74, W1MFB 52, W1H1 21, W1I2S 1. (Mar.) W1KLN 14, W1LGD 5.

NORTHWESTERN DIVISION

ALASKA — Acting SCM, Kenneth R. Klopf, KL7EVO — 5 on fellows who made the hunt trip to Ikaeketa let us hear about it on the air. I'm sorry to say this, but because of health KL7FWH has had to resign as the Fairbanks IC. I hope the next IC has half her energy and devotion. Any takers? There are also other leadership and station appointments available in Alaska. KL7IS is monitoring 3905 with a solid-state receiver. W17HFV at Ft. Richardson and W17HFJ in Anchorage are new check-ins on 3735. A short time ago KL7CAH's birthday came up — said he was 37 — don't kid us the Sourdough Net on 3915 has been going longer than that. K1OPX/KL7 has had wild training in survival — on upper sideband too. KL7MD finally got some new jugs. We all appreciate his cw work, especially the newcomers. KL7GR1 is converting Akiak to hamdon, so should have some new signals from that area. Contrary to printed rumors there are no repeaters active in Alaska. I hope this situation changes. Traffic: (Apr.) KL7CAH 100. (Mar.) 114.

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IDAHO - SCM, Donald A. Crisp, W7ZNN - SEC: WA7EWV. Idaho RACES: W7YON. The Idaho FARM Net meets on 3935 kHz each day at 0200 GMT. The Idaho RACES Net meets on 3991.5 kHz week days at 1415 GMT. The Idaho PO Net meets on 3930 kHz on Tue., Thurs. and Sat. (GMT time) at 0130 GMT. The 39th Annual WIMU Hamfest is scheduled for Aug. at Mack's Inn, Idaho 23 miles south of the west entrance to Yellowstone park. Camping facilities are available. It is with regret that I report the death of K7CSL who was killed in an auto accident. W7FTN has retired. Need a program for your club meeting, banquet, or hamfest? Contact your SCM, W7ZNN or SEC, WA7EWV. Please report your traffic activity to your SCM. Handy report cards are available on request. FARM Net report: 30 sessions, 1092 check-ins, 34 traffic handled. PO Net: 13 sessions, 105 check-ins, 24 traffic handled. Traffic: W7IY 64, WA7BDD 60, W7ZNN 29, W7FIS 5.

MONTANA - SCM, Harry A. Roylance, W7RZY - ASST. SCM: Bertha A. Roylance, K7CHA. SEC: W7TYN, PAM: WA7IZR. VHF PAM: W7IAC. The Gallatin Radio Club provided communications for the Marchers of Mankind, W7HZ was in the hospital for a short time. W7GWW also was in the hospital but is back home and getting ready to work his mine. K7SRA has his 2-meter mobile in a new Ford. WA7BLJ is also on 2. WA7PDC operated in the last CD party. W7EKB is alternate NCS of PAM. WA7OOO is planning to go on 6-meter fm. W7KJX is back in Helena and retired. W7IR is making a good showing with 2-meter fm in Bozeman. He is working Butte, Anaconda, Helena and Townsend with 20 watts and a GP antenna. I look forward to seeing you all at the WIMU Hamfest on Aug. 6, 7, and 8. The Radio Club in Miles City is reforming and we will be hearing more from the eastern part of the state. A new appointee is WA7OOO as an OBS. Traffic: W7EKB 275, WA7IQS 244, WA7IZR 61, W7LKB 21.

OREGON - SCM, Dale T. Justice, K7WWR - SEC: W7HLE, RM: K7GGQ, PAM: K7RQZ. WA7KIU reports for the Oregon State Net sessions 22, check-ins 116, traffic 57. WA7FTN ran 654 patches to S.E. Asia. W7HLE is building a vertical collinear array for 2-meters. WA7HKV is taking over as IC in Klamath county. Traffic: K7NTS 196, K7QEG 128, WA7KIU/7 91, WA7ES 85, WA7ICX 75, K7OUF 63, WA7KRII 32, W7HLE 23, K7WWR 20, WA7MIF 11, W7LT 10, W7MLJ 9, WA7MOK 5, K7KPT 3.

WASHINGTON - SCM, Harry W. Lewis, W7JWJ - The Walla Walla Radio Club, W7DR, will sponsor their 25th hamfest Sept. 26 and 27. In commemorating this silver anniversary event the club will have available all sorts of silver goodies. Washington State Amateur Radio Week will take place the second week in Sept. with the Boeing BEARS annual QSO Party to take place during the last week end. The WARTS NTN picnic will be held the second week end in July. Monitor the net frequency for details. The Radio Club of Tacoma will have a booth at the Western Washington State Fair this year. During the first week in Sept. B.C. hams will have the usual booth at the Pacific National Exhibition in Vancouver. K7LRD of Spokane is home again and recovering from a recent heart attack. As of this Sept. W7BA will have made BPL each and every month continuously for exactly 20 years. Looking back at Loyd's totals per month we find that they range at times almost up to five thousand and seldom below 1500. K7JRE is looking for contacts with contest orientated radio clubs. WN7OYI is looking for anyone interested in 2-meter cw work.

Net	QNI	QTC	Sess.
NSB	794	47	30
NSN	261	92	30
WSN	263	104	30
WARTS	1560	120	30

Traffic: (Apr.) W7BA 709, W7PI 344, W7KZ 140, WA7HKR 136, K7CTP 131, W7AXI 91, W7MCW 69, W7BUN 41, W7BO 38, W7QFE 23, W7JWJ 16, WA7AVI 14, W7AJB 9, W7IEU 9, W7APS 34, (Mar.) W7BA 808.

PACIFIC DIVISION

EAST BAY - SCM, Paul J. Parker, WB6DHH - W6AKB keeps active on Mission Trail and WESCARS as often as he can. W6ITD is building a new linear with a pair of 3-500s. W6IPW reports the traffic flow seems to be back on an even keel after the earthquake. WB6VEW has been busy at work and his QNI on NCN has been lower than usual. The NCN (Northern Calif. Net) meets daily at 1900 and 2030 local time on 3630 kHz and handles traffic for the majority parts of Calif. and Nev. W6AR is really having fun working DX and always scores a few rare ones every month. FB Bill, K6TX says JAs seem to be easily found on 40 cw in the

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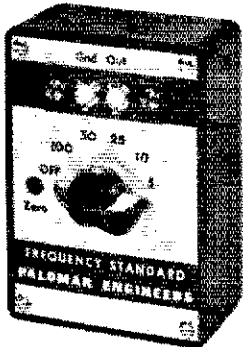
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A.M. hours. Novices: Please check in on 21,150 kHz Wed. at 2000 local time. Maximum code speed is at 5 wpm. Welcome to WN6HZR and WN6IBT. WB6PYJ finally knows what its like to have a beam. Traffic: 1 Apr. J W6IPW 412, WB6VEW 14, K6IX 6. (Mar.) W6IPW 290, WB6VEW 9, W6AR 7.

HAWAII SCM, Lee R. Wical, KH6BZF - Asst. SEC: KH6BZF, RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. OSL Mgr.: KH6DQ. FC's: KH6s GPQ, L.P. BAS, GLU, GKD, KH6NO/KH6 and KC6EJ. RACES: Net Coordinator Dick Hamada, Radio Officer.

Net	MHz	Time(Z)/Days
Friendly	7.290	2030 M-F
World-Wide Boy Scout	21.360	1800 S
Confusion (Patches)	21.400	0030 All
Pacific Interisland	14.335	0830 M-W-F
Micronesia	14.335	0800-1-Th-S-Su
S.E. Asia	14.320	1200 All
Pupule	7.290	0630 All
Pacific Typhoon*	14.265	* *

*During typhoon alerts. Remember: The Pacific Division regional convention will be held in San Jose, Ca. at the Hyatt House July 2, 4. Write Associated Radio Clubs, P.O. Box 6, San Jose, Ca. 95103 for details. KDDAS/KH6, is at Paccommarea F and I group. KH6GMP reports that his harmonic WI6HLW, worked VR5DK in Tonga. Ex-KH6GHI now signs W4EFB at Jacksonville, Fla. W7ED, ex-KH6KS reports that KH6ARM will soon be migrating to Calif. Ex-KH6ADY signs K6UYK/6. KH6OR spoke to the Hono ARC on linear amplifiers. W1LV and W0BWJ were /KH6 recently and met many of the fellows. KH6CCL is back on the bands from his new home in Waialai-Nui. W0DAD/KH6 is back after a recent business trip, also KH6CD and KH6BM are back from the Far East. KH6LP, reports his daughter recently was married. KH6HLZ is the Commander of Defense Communications Agency-Pacific at Wheeler AFB. WASNNE/KH6, K2DUV/KH6, KH6HDB, KH6SP and KH6GQW will soon be leaving the area. K3CTT/KH6 moved to a new QRM free QTH. KH6FOX made a fine comprehensive repeater directory for input to the League's Directory. FOCCPAC hopes to start a new club MARS station soon. ZM7AG has created quite a stir on the bands. Ex-KH6FSC has been checking in from HL9VU. KH6BON now is with Hawaiian Electric in their Computer Dept.

NEVADA - SCM, Leonard M. Norman, W7PBV - SEC: L.L. Mike Blain, WA7BEU, W7OQF and K5HWD/7 both built HT-220 Handie-Talkies. W7IEV, ex-W3ANP, installed his tri-ex LM-470D the easy way using a Grove Hydraulic 45-ton crane with a 127-ft. boom. WA7DKC has opened a new Allied Store in Las Vegas. W7YNE still has her OM W7VVC pushing coffee beans. WA7KFSY has 434 miles of wiring and conduit in his new 20-million dollar ham shack, open house July 2. The annual Sierra Hamfest is scheduled for Aug. Contact K7ZAU for details. Mobiling in Nev. and the Western states remember WPSS, 3952 during hours of darkness and WCARS, 7255 daylight hours. FM repeaters in Nev.: Reno K7UGT 34/94. Las Vegas/Boulder City plus spot coverage into Ariz., Calif. and Utah: W7AKE, 147.180/147.840; WA7GWP, 146.850/147.500; WA7HXO, 34/94; K7UGE, 34/94. K7UGE is monitored around the clock and has a 3-minute timer on it.

SACRAMENTO VALLEY - SCM, John F. Minke, III, W6KYA - The Nevada County ARC has been busy raising funds for a trailer to transport their emergency equipment. SFC W6SMU and your SCM were guests at the Apr. dinner-meeting hosted by the Nevada County ARC at Nevada City. We would be more than happy to attend any Sacramento Valley Club meeting. Please let me know. WA6AEK, WN6ARK, WA6HBF, WB6RHC, WB6RHD and W6VVD provided 2-meter communications for the Chico March of Dimes march. K6IEM is now on 160-meters and says the G7ARS has moved its net from 1930 to 1870 kHz. K6GG has been finding 15-meter ssb very good just about sundown. The RAMS provided communications for the Walk for Development held in Sacramento. The Cbers somehow got involved, but when the sun rose high in the sky and the CB "DXers" took over, the RAMS showed that amateur radio communications is far more effective than that of the CB group who called themselves CRASH. In recent issues of QST there have been letters both pro and con regarding the Section Activities portion. We SCMs who write these columns can only write about news we receive. In other words, the more interesting the column is directly proportional to the news we receive. Let's hear some feedback out there. I would be interested in hearing from you non-SV amateurs who read the Sacramento Valley part. Since the new TH6DXX has been up at W6KYA, it has been performing very well. Have a nice summer, everybody.

SAN FRANCISCO - SCM, Kenneth S. McTaggart, K6SRM - W6FAJ is happy over the new 160-meter frequencies that have been made available. W6FCX is recovering nicely from surgery. K6UGS still is busy with school but finds time for WESCAR and new antenna projects. WA6NAA is active on the Weather Net from Eureka. W6WLW is asst. mgr. on NCN. WB6KMI is moving to new quarters in Sonoma Valley. WA6NOZ is moving to W6PCE's home. W6HCE has been very active in Cancer drives. W6RQ is tech. editor of the Pioneer Radio Club's paper and reports membership is up to 82. A number of S.F. hams are active in the North Peninsula Electronics Club. WB6YMW is editor of their paper. Active Keys. The Bay Area Novice Net meets on 21,150 kHz at 8 P.M. Wed. The maximum speed is 5 wpm. WN6ITH is a new S.F. Novice. W6RVQ remains active on several nets, including North American SSB on 14285 kHz, San Joaquin Net on 3915 kHz and Mission Trail Net on 3928 kHz. WA6MDI and XYL, WA6QJU, have a new harmonic. WN6BTF now is WA6BTF. WB6KSS is a regular on NCN/2 from Marin county, using an SB-101. The Petaluma Amateur Radio Klub held a joint exhibit of radio communications for the Explorer Scouts along with the local PD. W6PZE is active on Navy Marine Corps MARS nets. W6SLX is busy as pres. of the Humboldt ARC. Check the expiration date of your ORS, OPS, etc. and contact me for renewal. Traffic: (Apr.) W6KVQ 256, WA6BYZ 227, W6WLW 144, W6SLX 25, WB6FZN 7, W6RNL 7, W6BWW 6, W6FAX 4, WB6KSS 4, W6PZE 2. (Mar.) WA6BYZ 269, WA6NAA 2.

SAN JOAQUIN VALLEY - SCM, Ralph Saroyan, W6JPU - The Fresno ARC held its annual Hamfest at the Tropicanna Motel May 7 and 8, 1971 with 320 in attendance. W6MXR and K6EIA were visitors to the Hamfest. K6EYF from Sacramento and K6CKN ole time ssb operators were at the Hamfest. The Trowel Radio Club had a breakfast meeting with 32 in attendance. W6JMP is recovering from an operation. W6QFR had some transceiver problems. K6QPF has a Drake R4B and TX4B. W6DPD has a Drake TR-22. W6JUK has a TR-22 fm transceiver. The W6JPU 2-meter fm repeater is going strong. WB6HYL has a 2-meter fm repeater. K6OZL made 483,000 points in the ARRL CW DX Contest. W6YKS reports 6-meter activity slow. WA6COP worked Vt. and Del. on 5 bands, all ssb. W6AL is VR2EK. WB6JRL is on 2-meter ssb. Two-meter activity in the Fresno area is on 145.025 MHz. The Southern San Joaquin FM Net meets every Tue. at 7:00 P.M. on 146.88 MHz. W6ARE is building a kw amplifier. KN6ROU has a 15-meter beam. W6MUV teaches prospective Novices radio theory and code. WB6LCM has a Kenwood fm transmitter and receiver. W6IMB operates 2-meters from Mt. Breckenridge. W6JUK has forty-elements on 432 MHz. Traffic: WA6JDB 10, WA6CPP 2.

SANTA CLARA VALLEY - SCM, Albert F. Gaetano, W6VZT - W6AUC visited some W3 and W4 stations while in Washington on business. WA6LFA is having trouble getting his RTTY machine working. W6MMG spent a week in Scotland and found that GM hamming seemed to be at a low ebb. WB6GFJ reports that he has over fifty thousand DX cards with no self-addressed envelopes from their owners. You guys could help Ross a great deal if you would send him a self-addressed envelope so he can clear up the mess he has. W6VUW now is K6WR. For those of you interested in vhf (220 MHz) you will find most of the activity in this area between 221.0 and 222.5 MHz using horizontal polarization on Tue. and Thur. nights starting about 7:30 local time. The Bay Area Novice Net meets every Wed. at 8:00 P.M. local time on 21,150 plus/minus 10 kHz and is controlled by W6URA or WB6ZHD. The speed is five words per minute maximum. WB6ZTZ has accepted the job of vice-pres. for the SCARA Club. Traffic: W6BVB 285, K6KCB 251, WA6LFA 224, K6DYX 166, W6NW 129, W6VZT 120, W6DEF 87, WA6NHD 82, W6AUC 57, W6YBV 43, W6IOU 7, WB6GFJ 6, WA6DKF 5.

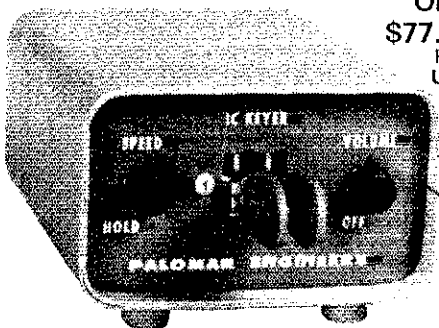
ROANOKE DIVISION

NORTH CAROLINA - SCM, Calvin M. Denipsey, WA4UQC - SEC: W4EYN. PAM: W4AJT. VHF PAM: W4HJZ. WA4FFW is the RACES officer for Alamance County. WB4GTC is the asst. They have a good program and feel they can take care of any emergency that may arise. K4CIA received 5BDXCC No. 75. W4TYF was mobile in Fla. during Apr. K4GHR has informed me that the North Carolina FM Repeater Assn., Inc. has been organized with K4RUQ as pres.; K4AZA, vice-pres.; K4GHR, secy.-treas. and W4BUZ as FCC liaison officer. They list 11 N.C. repeaters. WB4QJA operated from the Scout Camporee recently.

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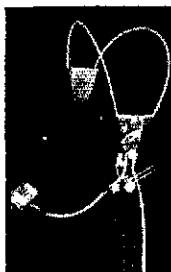
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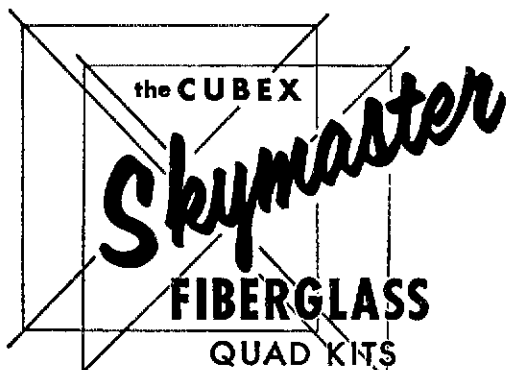
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Traffic: (Apr.) W4EVN 169, W4OZL 53, WN4PNY 48, WB4JMG 23, W4WXZ 30, K4VVG 26, K4MC 25, WB4MTG 14, WA4UQC 11, K4ODX 10, WB4BGL 8, WB4QQY 8, WA4VNV 3. (Mar.) W4RWL 21. (Feb.) W4RWL 48.

SOUTH CAROLINA — SCM, Mrs. Elizabeth Y. Miller, WA4EFP SEC: WA4ECJ, Ast. SEC: WAWOM, PAM: WA4GAW, RM: K4LND, K4OCU is returning to CN. W4KPN and WB4NNY are converting some lunch boxes to 50 MHz. WB4QNP had a ball in the cw CD party even though the QRM, QRN was thick. WB4QNP and WA4RMZ are doing an FB job on CN. The U. of SC ARC continues publishing bulletins and teaching code and theory classes. W4NTQ more QRP than usual; lost plate transformer to Murphy's Law Apr. 10. A two-meter repeater is being planned for Bishopville. Welcome to WB4NSH as EC for Lancaster County. Please note change of time for Carolinas Net as listed below. The Camden Ham Picnic will be held Aug. 1 in Kershaw County Park. SC QSO party is in the planning stage for latter part of Aug. Watch for details in next month's QST.

Net	Freq.	Time(Z)/Days	Mgr.
SC SSBN	3915	2300 Dy	WA4GAW
SCPN	3930	1600 M-S 1230/1930 Su	
CN	3573	2245 Dv	K4LND
SSN	3573	0200 Dy	WB4ETF

SSBN 135, CN 93, Traffic: K4LND 176, W1OA/4 63, W4MTK 45, W4NTO 37, W4MC 32, WA4EFP 28, K4ULT 23, W4WQM 13.

VIRGINIA — SCM, Robert J. Slagle, K4GR — Asst. SCM: A.E. Martin, Jr., W4THV, SEC: WA4PBG, Asst. SEC: WB4CVY, PAMs: W4OKN, WA4YXK, RMs: WA4LEU, WB4NNO, W4SHJ, W4SQJ travels constantly yet turns in a traffic count as a goal for most of us. WB4RNT is mobile with a 27-ft. Explorer and 4 kw generator. WB4KBJ also mobile catupring. WA4WQG mobile is operational - has 2610 counties versus 2188 for W4JUI, who headed for "C" T and May 5. WB4FDT is doing a fine job with Virginia Ham and is working on a Drake line. WB4DRC/8 made the Dayton Hamfest with WA4PBG. SEVWA's TIDEWATER WC4BRT was declared a total success with official visits by Congressman Whitehurst and Mayor Rhodes of Virginia Beach, Roanoke Division Director W4KFC visited Lynchburg and Sterling Park clubs; reports W4YZC, W4WBC, K4POL, K4EZL, and K4MD are new on 2-meter fm. WB4PWP has come alive on VSRN. K4JYM jigs me on inactivity on cw nets. K4LHB is vhfing on 6, 2, 220, 432 and 1296 MHz. K0PIV/4 is distracted by duty to Comm. Tech. School at Cheltenham, WA4INS sweating a Drake 2B. Congratulations to WB4QXT, ex-WN on Apr. 7. W4KAO has the tower up and antenna complete. William and Mary ARC are in need of gear. Contact WB4JMD. W4DM faithfully reports doldrums in hamdom. Congratulations to the Potomac Area VHF Society on affiliation with ARRL. Director W4KFC got most of LO Greensboro resolution on 75-meter phone allocations sponsored by WA4JIF and K4CGY adopted as League position to FCC; this shows that the Board can be awakened by the League Membership. Keep it up! Traffic: (Apr.) WB4NNO 557, K4KNP 290, W4UQ 263, WB4HRA 154, W4SQJ 152, WB4CVY 116, K4GTS 116, WB4KSG 114, WB4RNT 83, W4TE 60, W4OKN 48, K4KA 44, WB4KIT 44, WA4PBG 37, K4FSS 34, WB4NSF 31, WB4KBJ 30, WA4WQG 26, WA4HOW 18, WB4FDT 13, WB4SIK 13, WA4NJG 12, WB4DRC/8 11, W4SHJ 10, W4LOO 9, K4POL 9, WB4GMC 8, K4JM 7, WB4FLT 6, W4KFC 6, WB4PWP 6, K4JYM 5, K4LHB 4, W4OP 4, K0PIV/4 4, WA3IYS/4 2. (Mar.) W4SQJ 364, WB4CVY 170, WB4NSF 35. (Dec.) WB4PWP 9.

WEST VIRGINIA — SCM, Donald R. Morris, W8JM — SEC: WA8NDY, RM: WB8BBG, PAMs: W8DUW, K3CHW, W8IYD. Phone Net Mgr.: WA8LFW. I regret to report the passing of K3BEX and W8AMX, both from Clarkburg. W8AST passed the Extra exam and along with K5CA, K8CFT, W8FER, W8HTR, W8JED, W8LYV, W8RTHX and W8WDK operated 3 stations at the Raleigh County Home Show in Beckley. W8AEC worked Canada during the Aurora openings on 2-meters and heard stations in Va. and Mo. The Werton Radio Club meets the last Mon. of the month and are working on a new club name. W8LBT does most of his operating after midnight. WB8AKQ and WB8BBG made PSIR, W8BT and W8NR operated aeronautical mobile on 2-meter fm with excellent results, using low power. Governor Moore proclaimed the week of June 27 to July 3 as "Amateur Radio Week in West Va." The West Va. Phone Net held 30 sessions with 425 stations passing 97 messages. The CW Net had 59 sessions, 227 stations, 104 messages handled. K8BCF and K8LSN plan maritime mobile operation this summer. K8OYG has a 15-meter quad up so his wife, WA8DOY can snag rare DX. W8DUW attended the Y.I.R.L. Midwest Roundup in Cleveland. Traffic: WB8CYB 156, WB8AKQ 137,

W8BBG 98, W8BPOS 78, W8LFW 22, W8JM 20, W8ZNIH 16, W8AST 13, W8DUIV 11, W8AEC 8, W8CKX 5, W8BMS 3, K8QW 3, W8ETI 2, W8FZP 2, W8KAN 2, W8ANDY 2, W8RTHX 2, K8ZDY 2, W8BAKR 1, W8BAOE 1, W8CKN 1, W8LFZ 1, W8LBT 7.

ROCKY MOUNTAIN DIVISION

COLORADO - SCM, Clyde Penney, W0BHL0 - SEC: W0BQOY. RM: W0LRN. PAMS: W0AWG, K0IGA, W0LRW, W0CXW. The ARRL Rocky Mountain Division Convention was held in Colorado Springs, Colo. July 19 and 20, under the sponsorship of the Pikes Peak Radio Amateur Assn. was very well attended, with an excellent program and was enjoyed by everyone. Our sincere thanks to the PPRAA for a most enjoyable and productive convention. It is with deep regret that Colo. amateurs transfer the name and call of an "Old Timer", Max McCartney, W0DEF to the list of Silent Keys. He will be sorely missed by all. Net traffic for Apr.: Hi-Neon QNI 1038, QIC 68, 18 phone patches, time of 976 minutes for 30 sessions. Colo. Code ONI 220, QTC 123, time of 881 minutes for 29 sessions. Eye Emergency QNI 642, time of 759 minutes, 175 eyes requested, 42 eyes shipped. Traffic: (Apr.) K0ZSQ 577, W0WYX 222, W0LQ 191, K0JSP 152, W0LLA 100, W0LRW 80, K3TEZ/0 50, W0BAOL 42, W0LRN 41, W0CXW 36, K0ECR 30, W0SIG 30, W0YCD 28, K0IGA 20, W0YNP 17, W0LCE 16, W0MOH 13, K0MNQ 12, W0JGF 11, W0ALK 8, W0BHL0 7, K0DAP 2, K0DAQ 2. (Mar.) K0ZSQ 678, W0MOH 81, W0LRN 65, K7OPO/0 54, W0YCD 33, K0MNQ 17, W0YNP 8.

NEW MEXICO - SCM, James R. Prine, W5NUI - The La Mesa Bean Feed was very much a success with about 150 attending the event. Our favorite chef K5ECQ was absent because of illness. The new officers of the Mesilla Valley Radio Club are W5OPN, pres.; Chuck Lewis, vice-pres.; W5BHN, secy.; WASOMY, treas. The Alamogordo ARC is making good progress with monthly meetings the first Mon. evening and a Sat. breakfast get together. W5UH has installed a new 80-meter antenna with center fed open wire line and doing an excellent job. The reorganization of the SEC should be completed by next month and full details will be provided. Traffic: K5MAT 268, K5DAB 105, W5NON 49, W5RE 38, W5MYM 20, W5SUNO 20, W5OHH 18, W5PDY 14, W5BLU 11, W5DMG 10, W5MIY 9, W5DAD 4, W5AXC 2.

UTAH - SCM, Carroll F. Soper, K7SOT - SEC: W7WKF. RM: W7GCX. The Utah Council of Amateur Radio Clubs held their first meeting for 1971. New officers elected are WA7ARK, pres.; WN7NHF, secy. and WA7OKQ. W7ZJS has returned to Salt Lake after 15 weeks in New York City and has been reappointed as an OD. Sixteen OD notices were sent for the month of Apr. W7DIA, NCS for RACES, reports 8 sessions, total number check-ins 113 for Apr. The RACES net meets Sat. and Sun. on 3987.5 kHz, all amateurs are welcome. Traffic: W7GCX 150, W7EM 149, K7SOT 24, W6NHA/7 16, K7CLO 10, WA7HCQ 5, WA7MEL 5.

WYOMING - SCM, Wayne M. Moore, W7CQL - SEC: K7N0X. RM: W7GMT. PAMS: W7TZK, K7SLM. OBS: K7SLM, K7N0X, W7SDA, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3930; YO, Tue., Thur., Sun. at 1930 on 7108; Jackalope, Mon. through Sat. at 1215 on 7260; Wx Net, Mon. through Sat. at 0630 on 3920; PO Net, 1900 Mon. through Fri. on 3950. Note the new times and frequencies of the YO Net. These will be in effect until Sept. 1, then back to 3608 daily at 1830. W7GMT and yours truly are two of the ones who lost their antennas during the Apr. snow storm. A couple of new ones on the air now are WA7MCX and WA7NHP. Another new one in Green River is WA7MGA. W7HEB spent a rough week in the hospital during Apr. but is back on the air again. Don't forget the hamfest July 17 and 18 in Casper; it promises to be something you won't want to miss. Traffic: W7SDA 65, K7VWA 64, W7GMT 62, W7TZK 52, W7YWW 30, K7WRS 22, K7SLM 21, W7BHH 17, K7TAQ 10, WA7LEA 3, WA7AUV 2, K7OAE 2, W7RPV 2, K7TWK 2.

SOUTHEASTERN DIVISION

ALABAMA - SCM, James A. Brashear, Jr., WB4FKJ - SEC: W4DGH. RM: W4HFU. PAM: W4WLG, WA4CCV is the new NM of AFNO. K4JK has been appointed as an OO. Sorry to hear of the death of WA4MZT. As usual, the Birminghamfest was a tremendous success and if you missed the Sat. night dinner, you missed a good one. It was a real pleasure to have our SE Division Dir., W4DQS, attend the Birminghamfest and participate in the AEN meeting. My apology to WB4ADT for the error made in presenting a plaque for high SS score (cw) to K4HPR. A new plaque, for WB4ADT, has

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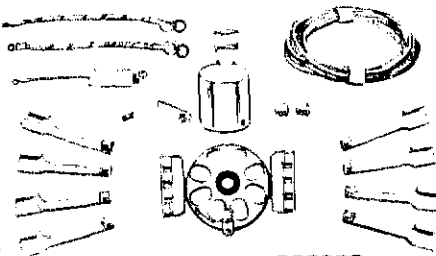


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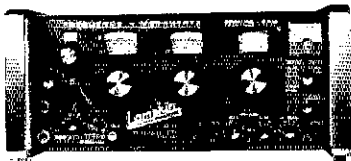
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been forwarded. I hear quite a few stations check in on our nets that I fail to get a station activity report from. Even if you don't handle any traffic, let the rest of us know what you have going on ham-wise. WB4OKT, NM for AEND reports the warm pretty weather was primarily responsible for activity dropping in Apr. on AEND. Possibly, the change to DST and decreased signal strengths also contributed to the decline. Thanks to W4WLG for preparing the report for me that appeared in the May QST. Traffic: WB4OKT 135, WB4EKJ 93, WB4JMH 92, WN4SVX 62, WB4KSL 50, WA4VEK 47, WN4SON 34, K4AOZ 30, WN4SVH 22, WN4SBD 17, K4BFA 16, WB4OVR 16, WN4SFV 13, WB4NLK 3.

EASTERN FLORIDA - SCM, John F. Porter, W4KGI - Asst. SCM: Regis Kramer, W4LE, SEC: W4IYT. Asst. SEC: W4SMK. RMs: W4ILE, K4EHY. PAMs: W4OGX 75 and W4SDR 40 WB4PWF and XYL (members of the West Palm Beach ARC) received excellent publicity for Good Samaritan act in rushing needed drugs to dying children in Onito, Ecuador. Paul Harvey featured them on his May 4 broadcast. In Apr., W4BNE and crew (W2GTO/4, K2GSP/4, K4EUK, K4YHC, WB4PZJ, WB4ONZ, WN4RHY, W4CJ, W4AXB) passed 236 Red Cross Easter Greetings overseas. FB Ray. New hams are WN4TUR, WN4TUP, WN4TUN, WN4TUO and WN4TUO, all students of BARS radio classes. BARS is now incorporated. Good work fellows. The Hollywood ARC are having excellent turnouts at their regular meetings. K4IEF has received 5BDXCC No. 79. WA9QVT/4 has departed for Korea. WB4HJW is the new pres. of Tamiami ARC in Venice. New officers of the West Palm Beach ARC are WB4NPN, pres.; WB4POB, vice-pres.; WB4NXX, secy.; W4LFD, treas. WB4OMG, K4FAC and K4IEF made the PSHR for Apr. I must record the passing of Dr. R.W. Arnold, W4EHW who joined Silent Keys on Apr. 17. He was the founder of the Gator Net and consistently its most faithful member. W44SCK, W4BNE and W4DFU made BPL in Apr. Fellows I keep getting traffic reports late each month. The seventh of the month is the deadline. Don't forget the Hamfests coming up this fall in Melbourne and Tampa. Plan ahead. Check your appointments for overdue endorsements. Get them in if you wish to continue in good standing. Traffic: (Apr.) W44SCK 545, W4BNE 477, WA9QVT/4 366, K4EAC 316, WB4LAA 284, W4FPC 246, WB4OMG 206, WA4IJD 150, W4DFU 131, WB4PWD 123, WB4HJW 105, WB4HKP 104, W4SDR 102, W4FFF 94, W4NGR 92, W4HED 80, W4ILE 79, W4LSR 79, K4IEF 70, W4YTX 63, WB4FYI 48, WB4CHD 45, W4IA 45, W44NNB 40, 8R1Y/W4 34, W44IHD 34, WB4AIW 33, W4DFP 29, W4GUI 28, K4JWM 28, W4SMK 28, K4DAX 24, K4BLM 22, WN4RGO 18, W4TJM 18, W4KGI 17, W4ZAK 16, W4BKC 14, W4LAD 14, K4QG 14, W4IYT 12, W4ZHG/4 11, WN4SZS 8, K4EBF 5, WB4AID 3. (Mar.) W4LSR 36, W4BNE 29, WB4PKP 20, WN4RGO 3.

GEORGIA - SCM, A.J. Garrison, WA4WOU - Asst. SCM: John T. Laney, III, K4BAI. SEC: WA4VWV. RMs: K4BAI, WB4JXO. PAMs: K4HQI, W4LRR.

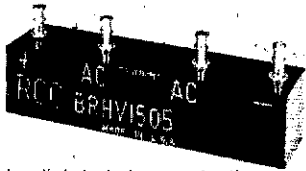
Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
GSN	3595	2300/0200 Dy	762	301	K4BAI
GRN	3975	0000 Dy	938	112	WA4VWV
GTN	3718	2200 Dy	-	-	WB4JKO
Ca. Cracker	3995	1200 Su	136	4	WA4IQD
Teen Age Fmne	3985	2030 Dy	-	-	WB4PFI

The Confederate Signal Corps has a top notch 2-meter fm net going in Atlanta. They meet Mon. night at 2300Z and average between 55 and 60 QNI. The net is headed up by K4CFN. GRN reports that high QNI for Apr. is: W4LUA, W4SOE, WB4CRH, WB4SKO and W4KRE. WB4RTP recently was promoted from Novice to General Class. WA4ZHC is sporting a new 75S-3B, 32S-3 and SB-200 linear. Would like to say welcome to W4BFQ, who recently OSYd from Fla. to Marietta. WA4VWV and W4KRE were guests of the Lanierland A R Club on the evening of Apr. 27. We understand that WB4PGG, pres. of the Lanierland Club has a new it. up, son at his QTH. W4LRR reports using stacked dipoles on 2-meters with much success. Traffic: WB4RUA 188, W4YDN 176, WA4RAV 124, W4EFP 108, K4BAI 107, WA4WOU 84, W4AMB 50, W4PIM 48, WA4VWV 35, W4RNL 33, K4FLR 28, W4CZN 26, WB4SPR 17, W4RFI 13, K4NM 10, W44LI 9, W4BFO 8, WA4ZHC 7.

WESTERN FLORIDA - SCM, Frank M. Butler, Jr., W4RKII - SEC: W4IKB. RM: K4LAN. RITY: W4WEB. PAM: W4NOG. VHF: W4UUF. Pensacola: New hams are WN4UNR, WN4UPK and WB4USP. W4NOG ran 152 patches this month, mostly with Coast Guard cutter Sebago. K4BAD/4 was appointed as ORS; he also is working on RITY gear. W4UUF wants a rest from VHF PAM job; are there any takers among you VHFers? The FFARA is starting a new code and theory class with K4BAD and WA30DA/4 as the team leaders. The local 6-meter net moved to 50.4 MHz as of May 2. Milton: WB4TZN just got his ticket, and is on 75-meter ssb. Fort Walton Beach: About a dozen hams provided communications on

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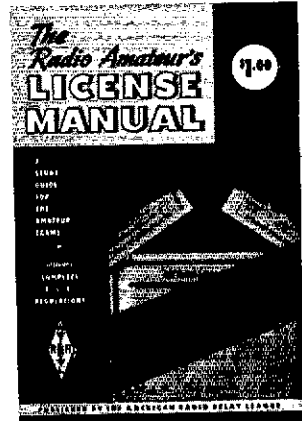
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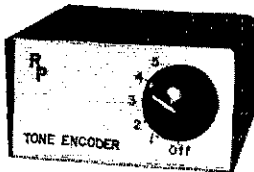
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2-meter fm for a two-day sports car rally. WB4GPI ran up a part time score of 44,000 points in the CD Party. West Fla. still is a "rare" section in these contests. W4FDJ has renewed OBS and OPS appointments. WB4NRM, W64PEV, WN4QVJ, WN4RBD, WN4TAO and WN4UEK moved up the ladder after recent visit to the Mohle, Ala. FCC office. A new code class is underway, taught by WB4KOX. Panama City: WN4UFR and WB4UNF are new hams. W4YWV was appointed as OS. K4VYV and WB4LEL were active in Fla. QSO Party. Chiplew: W41KB has a new Cygnat-270 for mobile use. Traffic: (Apr.) K4VYV 254, K0BAD/4 83, 8R1Y/W4 24, WB4EQU 20, W4RKH 15, W41KB 13, W4NOG 7, W4FDJ 4. (Mar.) K4CFS 8.

SOUTHWESTERN DIVISION

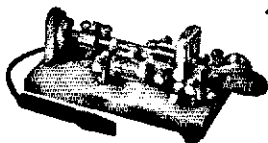
ARIZONA — SCM, Gary M. Hamman, W7CAF — SEC: K7GPZ, RM: K7NHL, PAM: W7UXZ. The annual meeting of the Old Pueblo ARC and Arizona ARC of Tucson and Phoenix, respectively, resulted in a pot luck lunch, swap meet and softball game at Casa Grande. Tucson recovered the trophy from Phoenix by outscoring Phoenix 19 to 6 in softball that cool Sun. afternoon. The annual Ft. Tuthill Hamfest will be held July 30, 31 and Aug. 1 at the Coconino County Fairgrounds 6 miles south of Flagstaff. Talk-in frequencies will be 3.992 and 146.94 MHz. Activities include transmitter hunts, entertainment, Sun, pot luck lunch, camping and a swap table. For more information write W7CAF (adr. on p. 6). Recent additions to the Extra Class rolls are W7DLL, K7EXF, W7PG and W7VXG. WN7MAE passed the General Class exam. WA7MCK was recently appointed as an OBS and will be giving bulletins on 7.040, 21.340 and 28.630 MHz from Phoenix. Stations earning Section Net Certificates for outstanding Apr. participation are K7EMM, WA7GAE, WA7HIT, WA7XC, W7OUE and K7UYW. K7BDD and WA7GDC were regrettably added to the list of Silent Keys. Pre-registration for the SW Convention at Disneyland over Labor Day week end closes July 15. PSHR: K7NHL 45, W7CAF 43, WA7MAD/7 40, K7UYW 34. Traffic: K7NHL 141, K7UYW 121, WA7MAD/7 69, W7CAF 68, K7EMM 36, WA7GAE 29, W7DQS 26, K7UOK 21, W7OUE 19, WA7NQA 11, WA7XC 10, WA7JCK 5, W7LLO 5, W7FVD 2.

LOS ANGELES — SCM, Harvey D.D. Hetland, W6KZI — Asst. SCM: Don Fetheridge, K6UMV, SEC: WA6QZY. Section emergency/mobile frequency is 146.82 MHz fm repeated to 146.70 MHz. W6L reports 150 attended the spring dinner meeting of So. Cal. QCWA where W6DXV, W6EJ, K6MAG, W6PKH, W6UK, W6WT and W6YVT received 50-year certificates. K6ASK enjoyed the Apr. CD party from his new QTH. WB6ZVC is busy on his 58WAS effort. The TRW Systems ARC meets on 7.280 MHz Sat. at 10 A.M. for a net which provides a good opportunity for those interested in earning the TRW/ARC certificate. WB6PAV is working on a QRP rig. W6NJU repaired his 40-meter beam. W6BHG's activity has been limited by two strokes as well as rig troubles. W6YRA repaired their four-element quad, and they hope to reactivate the Collegiate Amateur Net this fall. Interested college stations may contact W6FIT. The Lockheed ARC had a good turnout for their annual hamfest. The TRW ARC held a banquet to commemorate their ARRL affiliation and SCM WA6KZI presented pres. WA6JHD with their Charter of Affiliation. Other clubs desiring or considering club affiliation with ARRL may write Hq. for a club kit. W6DTR presented a program on "Junk Box Gadgets" to the Downey ARC. WB6TX presented a talk on 220 MHz activity to the Palmsades ARC. Results of the recently held SCM election were W6INH 634 and WA6KZI 587. Gene, W6INH, assumed the responsibilities on May 19 and all files and materials of the SCM have been placed in his possession. Hence, this is my 24th and final column as your SCM and I wish to extend my appreciation to those who provided me with information and invited me to their club meetings. W6INH's address is on page 6 and I hope that he will have your continuing support. Why not invite him to your next club meeting? Repeater information: WB6ZDI fm 146.61 MHz in 147.33 MHz out; W6FNO fm 146.82 MHz in 146.70 MHz out; W6QK 145.66 MHz fm in/ 147.28 MHz am in 145.30 MHz fm out; WA6FLH fm 146.22 MHz in 147.39 MHz out. Traffic (Apr.): (BPL/PSHR): K6ASK 522, W6BHG 2/0, K6L 11/0, W6DGH 27/12, K6EA 19/0, W6FD 14/0, W6EJT 13/31, W7GAQ 4/0, WB6GHH 0/23, W6L 19/31, W6INH 348/44, W6JVC 50/14, WB6KGE 9/22, WA6KZI 0/2, W61YY 151/24, W6USY 0/50, WA6ZKI 32/10, WB6ZVC 114/35, WB6RBD 76/0. (Mar.) W6BHG 27/0, W6MMW 17/0, W6OFO 40/10, W6YRA 2/3, WA6ZKI 21/0.

ORANGE — SCM, Jerry L. Verduff, W6MNY — Asst. SCM: Richard W. Birbeck, K6CID, SEC: W6COR. RMs: W6RNX, WB6AKR. W6QBD is a new ORS and received a nice writeup in the Lucerne Valley newspaper. A Newport ARS member WA6IVA has been appointed as EC for the Orange County 40-meter ARC. His

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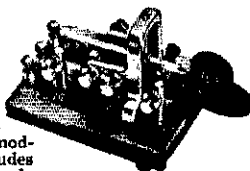


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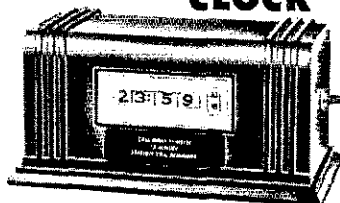
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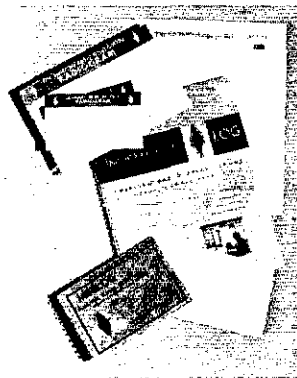
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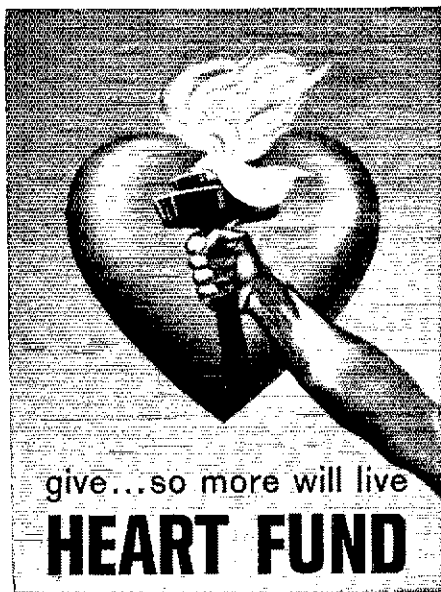
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net meets Mon. at 2100 local on 7270 kHz. The Anaheim ARA has joined with EC WB6WOO to help with the Orange County 2-meter AREC FM Net which meets Tue. at 1930 local. Anaheim ARA is supplying the repeater for the net with input am on 145.62, fm on 146.52, and output on 147.52 MHz. The section's AREC is vastly growing thanks to the efforts of SEC WB6CQR and the hard working ECs. RM WB6AKR is QSK with a new homebrew TR switch and HA-1 keyer. WN6EAM has received the 15 wpm code proficiency certificate. OBS W6WRJ worked his alma mater. W9YB at Purdue, in the Apr. CD party. OVS K6YNB says his 432 MHz station is now fully operational. SCN now meets at 0130Z daily; SCNT Sat. and Sun. at 2330Z, both on 3690 kHz. Section Net Certificates have been issued to WB6AKR, W6QBD, WA6YWS and WB6ZOK for SCN participation. OBS W6BAM continues to send ARRL bulletins on 7145 kHz Tue., Thurs., and 7080 kHz on Mon., Wed., Fri. OPS W6BUK was chmn. of the OOTC party and got to check the logs. OPS W6GB has obtained 301 countries for DXCC. EC WB6YXA is planning to go RTTY. OO WA6JZZ is the proud father of a new baby boy. OVS WB6RAL reports the So. Cal. VHF Club Information Net is now once again civil defense oriented. Be sure to register for the Sept. 4, 5 Southwestern Division Convention at the Disneyland Hotel before July 15. Send \$12.00 to W6KNE, 1306 Sheppard Dr., Fullerton, Ca. 92631. I'll be there hosting an ARPSC meeting Sept. 4. PSIR: W6MNY 47, W6QBD 14, W6CPB 1. Traffic: (Apr.) W6MNY 75, W6WRJ 36, W6QBD 33, WB6ZOK 15, K6GGS 6, WB6YXA 4, WB6AKR 3, WA6FOO 2, W6GB 2, WB6RAL 2, W6VOZ 2. (Mar.) WB6AKR 19, WA6FT 1.

SAN DIEGO — SCM, Richard E. Jeffler, WA6COE Paul Thompson, W6SRS, takes over as SCM for this section. Send your reports to W6SRS, 7331 Hamlet Ave., S.D. 92120. My thanks to all those who have made the past two years so pleasurable. Station activities: WB6LYG and WN6CHK received their Advanced Class license. Many stations on both 10 and 2 participated in the glider meet again this year, WA6AAF heading up the group. W6INI, EC and Asst. SCM, has been working to form an intra-section AREC officials 75-meter net for mutual assistance in times of disasters. El Centro hams WA6MIW and W6JHR have a new Swan 5004X and 270-B in the same house, while W6PUM is a new Advanced Class licensee with a 500-CX too. WN6JXF is a new Novice in El Centro. Club activities: Everyone survived the Field Day, I'm sure! Clubs were very active this year. W6KW, Southwestern Division Dir, spoke at the May IVARA meeting. The El Cajon ARC now has over 90 members! Their May meeting had video tapes of 2 TV shows they did for channel 2-Cable in Apr. The SD DX Club met in May at the home of W6PT in Vista. No. Shores had W6BGF talk and demonstrate traffic handling while the Palomar RC had its Apr. meeting supplied by Swan. 73s to all de WA6COE. Traffic: W6VNO 435, W6JOU 260, W6LRJ 259, W6BGF 145, W6MI 77, W6L YG 75, WN6CHK 34, W6DEY 26, W6YKF 20, WA6COE 15, W6INI 13, WB6JOI 8, WA6MIW 2.

SANTA BARBARA — SCM, Cecil D. Hinson, WA6OKN — SEC: W6IIA. RM: W6UJ, WA6WVC is making progress toward his DXCC award. WA6DEI had his ORS appointment endorsed for a second term. New EC appointees in the section are K6YZR (who replaces WA6MGG) and WB6PGK. The Estero ARC has formulated plans for Field Day and report they now have 35 members. The Los Padres VHF Society has been formed in Santa Barbara to promote vhf and uhf activity. They held their first social event, a picnic, near Ojai and a second event near Lompoc. Those interested in vhf/uhf activity should address their correspondence to the Los Padres VHF Society, 2677 Montrose Place, Santa Barbara, Ca. 93105. The Santa Barbara ARC Net meets each Mon. at 1930 local time on 145.8 MHz. WA6ODZ now is on 2-meter fm with an 80-D. WB6GDL lost his 50-ft. tower in a recent storm but has a new one up so the Jr. ops 1WB6ENU and WB6ENZI will be able to operate. WB6WKC is reported to be a recent arrival on 2-meter fm. Traffic: W6JTA 61.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, L.E. Gene Harrison, W5LR — Asst. SCM: Gene Pool, W5NF-O. SEC: W5JSM. PAM: W5BOO. RM: W5OGZ. The 7290 meeting at Lake Whitney had a total attendance of 125. The Communications Manager's OO Newsletter of Apr. reports a drop in the number of appointees. FCC says OQing is one of our most important programs. Many F Tex amateurs attended the Lake Murral affair. W5IZU, Asst. SCM F Tex, reports the Swan 500-C quit. W5BCYS is new in Central Tx., others include WA5VBK, W5BCOS and W5BJL. Much QRM on WIAW's code speed runs. The SEC publishes the Lone Star bulletin for Army MARS. He also wrote W5LYB regarding Docket 19162. The recent tornado in Hereford missed W5JSM's house by 100 ft. W5KHF resigned as asst. SEC. The Garland ARC will match FD points with the Richardson Wireless Klub. The NoTex DX Assn. is now being

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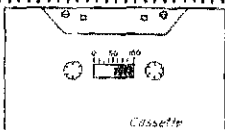
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(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

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QS 7-71

organized per WSKYD. W5GWF ran up a good score in the recent CD party. K5FNL attended the NTEB held in Breckenridge. K5ABV's OD certificate was recently endorsed. WASRAG, Midland ARC pres., reports his group supported the Detroit resolution. The Richardson Wireless Klub reports Warren Bruene gave a talk on Linear Amplifiers at a recent meeting. The KC ARC of Ft. Worth elected W5QU, pres.; WASVOC, vice-pres.; W5YD, secy. K5SXO is a new ORS appointee. W5HBC sends traffic report. RM W5QZ has a ball working 160-meters with 70-watts. The Apr. CD party showed more NTEX stations than ever before. Sorry I have missed so many Silent Keys. When you read this FD will be history. Temple ARC is going strong. The Irving ARC sent FB letter to W5EYB regarding emergency procedures. Dallas ARC now has 154 members thanks to a strong and determined group. WASVJW received her 30 wpm sticker. W5AJ is pres. of the Pampa ARC. Traffic: (Apr.) WASVJW 218, WASRUF 60, W5NFO 52, W5JSM 48, W5QZ 37, W5UF 18, WASSMI 17, W5EVS 12, W5HVF 11, W5LR 3, W5SAAR 2. (Mar.) W5NFO 26.

OKLAHOMA - SCM, Cecil C. Cash, W5PML - Asst. SCM; W.L. Smoky Stoyer, K5OOV. SEC: W5FESN. RM: W5YRO. PAMs: W5MF-X, W5WHIV, K5DLE and WASZRU, QSL Bureau: W5QMJ. Repeaters: Enid W5OYE 146.34/146.94 (1477 Hz day) - Oklahoma City W5YTI 146.34/146.94 - Tulsa W5LVT 146.34/146.94 - Ponca City W5HZZ 146.37/146.97. Some of the old timers in Okla. will remember the familiar voice and fine cw of K5AUX who is now W0NQG of Rapid City, S.D. After retirement W5JJ is doing a lot traveling. The Muskogee ARC, W5EJK, held an auction which netted the club about \$40.00. W5PWN wife of W5FW is a student at Cameron State College. TV is here to stay so we should take a close look at SSTV. W5TXX/5, a student at OSU, reports he and W5NOO of Tulsa hold regular schedules on the Okla SSTV net on 3.845 MHz. Mike reports sending pictures all over the U.S., also to Europe and on one occasion to Russia. Congratulations to Extra Class licensees W5TRS and W5PCB, to Advanced Class W5ZNF, W5SAZS and W5BTT and to General Class W5YQP, W5YQQ and W5SBE.

Net	KHz	Local Time	Sess.	QNT	QTC	WX
OPEN	3915	800 Su	4	184	7	
OPON	3913	1700 M-S	22	431	342	
STN	3850	1730 M-S	26	437	44	
GTWXN	3913	1745 M-S	26	485	23	204
QLZ	3682.5	1900 M-S	27	76	77	
SSZ	3682.5	2145 M-S	27	71	32	

Traffic: K5TEY 1203, W5YRO 482, W5AZOO 86, W5FW 63, W5FKL 54, W4FESN 34, W5PML 33, W5NZM 13, W5JJ 12, W5MFX 12, K5WPP 12, K5OCX 2.

SOUTHERN TEXAS - SCM, E. Lee Ulrey, K5HZR - SEC: K5HXR. PAMs: W5FUA, W5KLV. RM: W5EZY. Congratulations to new ORS W5GZX and OBS W5OVH. Renewed appointments: W5ZPD as OPS and W5AUZ as ORS. OBS: W5BTO and W5IQV cover SE Texas with bulletins on all vhf nets. RM W5EZY reports the Slow Speed Net on 3770 kHz is doing nicely with about a dozen stations nightly. EC W5JCL says the Orange County 6-meter net has met for 364 days a year since 1957, also one of every seven members of Orange ARC is an ordained minister. Congratulations to W5RBB and K5ROZ on the PSHR again. OO reports were received from W5NGW, W5RBB and W5VW. Besides his OOing W5NGW teaches code and theory classes. EC W5KR has begun planning for the hurricane season. How about you? The first 7290 Traffic Net get together was a huge success with about 150 attending. K5ILL is a fine chef and fish fryer. Members of the Austin ARC handled messages for visitors to their booth during the Natural Science Center Safari. K5RVF has added a 2-meter fm rig and is on a vacation trip to South America. I acknowledge reports from W5LPO, W5ZPJ, K5HGB and K5TSR. EC W5FJN is resigning for health and personal reasons. We'll miss the sage advice from Armadilloville. VHF PAM W5FUA reports he has some new OVS appointees lined up. The Corpus Christi VHF Repeater group furnished communications for the Buccaneer Parade. W5AUB reports 18 mobiles and walkie-talkies were used.

Net	KHz	Sess.	QNT	QTC
TEX*	3770	60	420	221
TIN*	3961	30	174	195
7290 Tfc	7290	44	2106	736

*NTS. Traffic: (Apr.) W5EZY 139, K5HZR 137, W5MXY 88, W7WAH/5 79, W5GZX 66, W5RBB 56, W5ABQ 50, W5VW 34, W5BGE 27, W5BHO 23, W5FJN 23, K5MXX 13, K5RVF 11, W5TFW 9, W5CBT 7, W5KA 7, K5HUA 3, W5KLV 3, W5AUZ 2. (Mar.) W5MKV 73, W5ZPD 34, W5FBI 4.

CANADIAN DIVISION

ALBERTA - SCM, Don Sutherland, VE6FK - SEC: VE6XC. PAM: VE6ADS. ECs: VE6SS, VE6AFQ, VE6AZU. ORS: VE6TY, VE6WG, VE6ATH, VE6LZ. OOs: VE6HM, VE6TY, VE6MJ, OVS:

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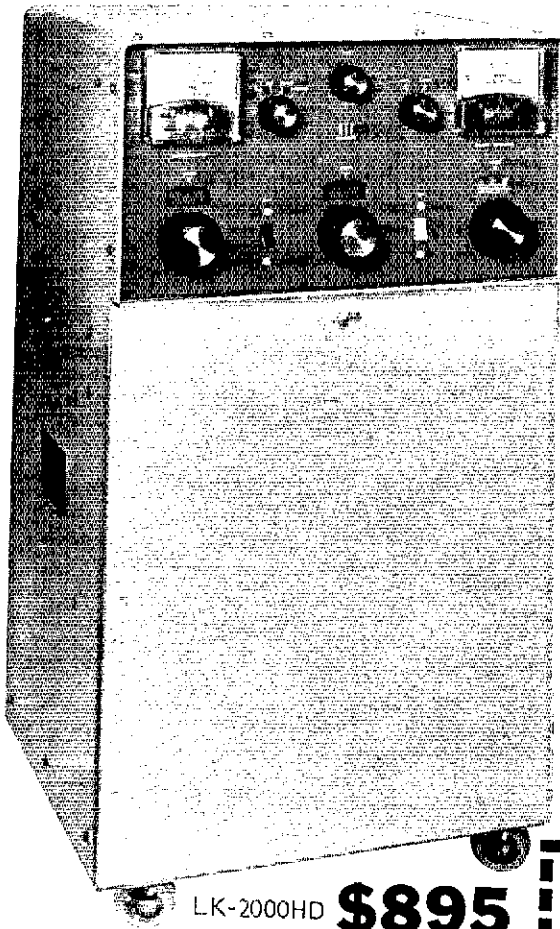
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VF6MX. GPSs: VE6ASL, VE6ATH, VF6SS, VE6ADS, VE6UJ is recovering nicely after an operation. VE6XX is home from the hospital. VE6AFQ is recovering slowly in the Lethbridge Auxiliary Hospital and welcomes visitors. How about someone volunteering to handle the EC work for VE6AEO. The AMA BEBA campaigns will be carried again this summer. Any hams traveling during holiday week ends can assist by checking into 3770 kHz with their mobiles. July 17 and 18 is the combined Alberta, Glacier-Waterton International Peace Park Hamfest. Contact VE6ABS or VE6NE, both of Lethbridge for full particulars. VF6NQ/6 will be operating from the Calgary Exhibition and Stampede July 8 through 17. Should work a lot of VE3s during the Ont. QSO Party July 17 and 18.

BRITISH COLUMBIA - SCM, H.E. Savage, VF7FB - British Columbia's Centennial Year, and I have seen the certificates and they are worth working for. Some two hundred have been mailed. The second big event is the Green Key (RTTY) contest. I have seen that plaque and it would make you feel proud of being able to work Green Keys. VE7BYU and others are proudly showing off their 12-channel rigs. VE7BVU is in the hospital. North and West ARC members joined into the clean up of the city, and VE7BYK proved how to bury a mobile car in the sand. VE7BAF has his Class "A." VE7BF is homebrewing an ssb rig. As of last report VE7AC is back and pounding the key. Traffic: WA7NXO/VE7 142, VE7LL 41, VE7BLO 22.

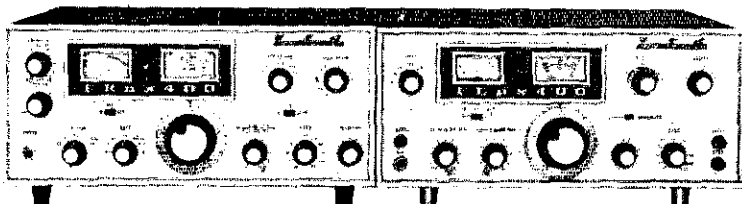
MANITOBA - SCM, Keith C. Witney, VE4FJ - MTN is on its summer schedule. VE4AQ is on sidebar and VE4MA is experimenting with facsimile. VF4KO and VE4JX are on 432. The swap and shop net is Sun. nights after the phone net. The WARC auction at the Red River Comm. Coll. was a success. MTN has not missed a session since Oct. 8, 1970. Traffic: VE4FQ 45, VE4RO 30, VE4KF 20, VE4QJ 6, VE4YQ 6, VE4FU 4, VE4NE 4, VE4AP 3, VE4CR 3, VE4JF 3, VE4JA 2, VE4JK 2, VE4LN 2, VE4LA 1, VE4SK 1, VE4XQ 1.

ONTARIO - SCM, Holland H. Shepherd, VE3DV - The big news is the Ont. QSO Party. Times 1700 GMT July 17 to 2400 GMT July 18 all bands and no power restrictions. Look for scoring details in QST and Ontario Amateur. It has been decided to proceed with the CW Net - Training Net and the first session will commence at 6:30 P.M. local time on approximately 3700 kHz Mon., Oct. 4. Please note two pre-requisites, be able to send and receive at least 12 wpm and have a copy of the ARRL booklet "The Radio Amateur's Operating Manual." Course director is VE3CYR, 217 Prince St., Peterborough. Although most of the really progressive Ont. ARCs actively support public service such as the "Miles for Millions" by providing a good part of the communications at the check points and the first aid posts they still have trouble getting enough volunteers. I recommend a couple of hours on a 2-meter fm circuit for everyone. The amount of traffic handled during the Ottawa Miles for Millions by the OVMRC Inc. was astronomical and showed a professionalism far beyond the ability of the average traffic nets. All amateurs should consider it an honor to assist your club in events of this nature. ARRL/CARL/DOC officials met in Ottawa late in Apr. to prepare briefs on FCC proposal to expand U.S. bands segments. They also spent time on special access repeaters. New officers for CARF are VF3AHU, pres.; VF3CRL, vice-pres.; VF3DEX, treas. Don't forget the RSO Convention at Hespeler Oct. 22 and 23. The Guelph ARC is the 1971 sponsor. The SCM now has a 2-meter fm base and mobile. Have a good summer gang. Traffic: VE3DV 205, VE3GI 169, VE3DPO 117, VE3ERU 115, VE3BUR 74, VE3FXI 45, VE3AUU 22, VE3FRG 16, VE3EWD 14, VE3CRW 6, VE3NO 5.

QUEBEC - SCM, Joe Unsworth, VE2ALE - SEC VE2BTZ reports that VE2AKM reports ARFC work to him on a regular monthly basis. VE2DLC was appointed as ORS. VE2BZD please take note. There are about 236 members in Quebec ARFC out of about 2400 hams in the province, not much interest it appears. No comments were received from VE2DLD pour le mois D'Avril, Les Amateurs de la region Lac St-Jean tres occupie a fin mois d'avril et le premier semaine de mai au cause de disastre chez St. Jean de Vianney et les conditions de 75-metre n'etais pas tres bonne. The CTS of Canada is celebrating its 75th anniversary year. VE2BVY reported on Rond-point 71 operation during Apr. VE2NV was presented with the 5RDKCC plaque at recent MARC meeting. VE2BZD reports that the Laurentian club score was down over last year for DX contest 71. With the snow gone and yards cleaned up perhaps the boys, YLs and XYLs will be more frequent on the bands. It appears that there were no serious failures with any of the repeaters in operation during the recent winter months and a few of them will be extended during summer months to increase area covered. Traffic: VE2DR 61, VE2ALE 57, VE2AP 19, VE2APT 14, VE2BTZ 14, VE2BVY 12, VE2EC 11.

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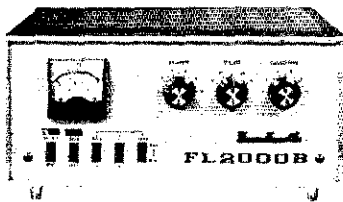
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SASKATCHEWAN - SCM, Barry Ogden, VE5BO - That time again to pep up the portable power plants and oil the wind chargers in readiness for Field Day! SATN, phone and AREC nets all show an increase in check-ins, FB traffic, RTTY and 2-meter interests are growing. Mobile operation is slowly on the increase, but still a long way from what it was. Healthy discussions of comparative merits of Quad versus Yagi proves there will be more perches for the birds and stronger signals going out in VE5-Land. The NSARC new call is VESFFP. SARL has issued over 100 Homecoming 1971 Awards! FB. Much pro and con re FCC proposals should provide acceptable solution. Now that VE5BY has retired as VE5-Land Radio Inspector, maybe some truth's will out re the hidden 10 gallon jug! Traffic: VE5SC 31. QST

World Above 50 MHz

(Continued from page 96)

beginning at 7:30 local time. Antenna polarization is horizontal, and most rigs are a-m.

Elsewhere on 220, VE3EMS has VE2BZD's kilowatt working into a 32-element array. WB2YQU has 100 watts and stacked 11-element Yagis. W4EHS, ex-W1CCH, is new on 220; Ormond Beach, Florida.

432-MHz news is mainly from K2RIW this month. Dick has a kilowatt amplifier using two 4CX250Bs in parallel, on a wide strip-line, delivering nearly 700 watts output, as measured on laboratory-type equipment. He's been working from W1GAN to K4QIF recently, under marginal band conditions. This rig will be in operation from Mt. Equinox, Vt., the weekend of August 14. They may have 1296 along, too, with 20 watts output, a low-noise converter, and the 12-foot portable dish shown in December, 1970. QST

K2RIW reports growing ATV activity, and is keeping 1-P.M. schedules each Sunday. Broadcast-quality pictures have been received from K2RYT, WA2ACW, W2OMU, and K2UYH. More than 70 ATV enthusiasts showed up for a recent meeting at the North Brunswick, NJ firehouse. Frequency allocations have been discussed in detail, with 435.5 MHz for "Channel 1" and 441.5 MHz for "Channel 2," now agreed upon.

1296-MHz operators in New England have taken exception to my remarks in the May column. K2JNG sent a partial list of area stations active on 1296 using crystal-controlled equipment. The list included the calls of no less than 30 W1, 2, and 2 stations which Walt says are regularly active - and that most have worked 5 states with distances involved covering considerably more than 30 miles. Walt says, "you do n't buy gear for this band, you build it." Alright you fellows, how about some details on typical tropo work and equipment being used? And photographs are always welcome.

A 1296-MHz net has been formed by the well-known Pack Rats, of the Mt. Airy VHF Club. The net meets Monday evenings at 10 P.M. EDT with K1SFF/3, Ottsville, Pa., at the helm.

And finally, W4HHK has received confirmation from NASA of his 2300 MHz reception of signals from the kittyhawk during Apollo 14's lunar mission.

Texas FM Society Summer Meeting

The North Texas Repeater Assn. will host a meeting of the Texas VHF FM Society, August 14 and 15 at the Cibola Inn, Highway 80, Arlington, Texas. For more information contact Jack Mason, W5NSQ or Glen Zook, WA5STI, 818 Brentwood Lane, Richardson, TX 75080. QST

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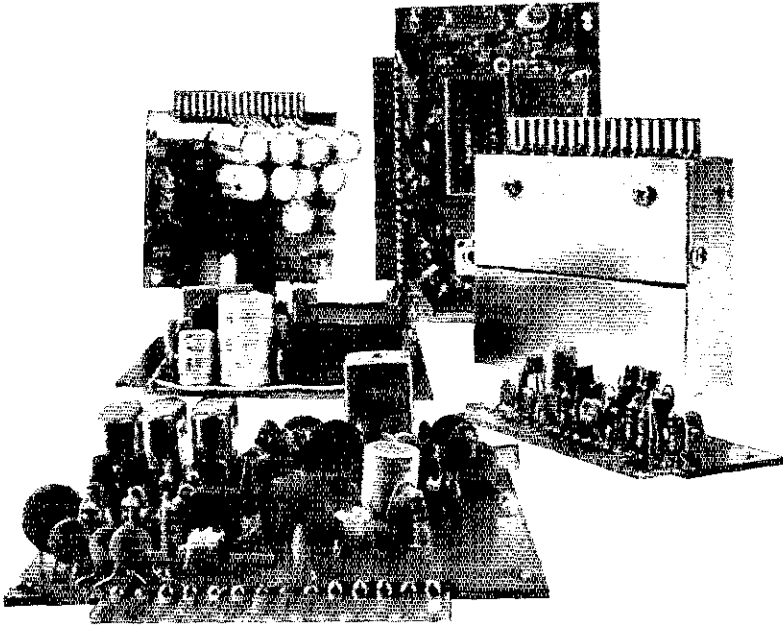
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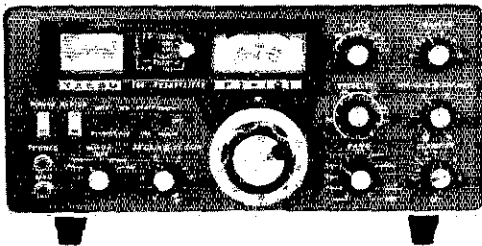


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HAMFESTERS 37th Hamfest and Picnic Sunday, August 8, 1971, Santa Fe Depot, 91st and Wolf Road, Willow Springs, Illinois, southwest of Chicago. Exhibits for OM's and X's. Famous Swappers Row. Information and tickets, Joseph W. Poradyla, WA91WU, 3701 S. California Ave., Chicago, IL 60629

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QSLs, SWLs, WPE samples 10c. Nicholas & Son Printery, PO Box 11184, Phoenix AZ 85017

100 two color glossy QSLs \$3.25. Yutz Printing W3LXY Pottsville PA 17901.

FRAME Display, and protect your QSLs with 26 pocket plastic holders. 3 for \$1, 10 for \$3. prepaid and guaranteed. Tepabco Box 198T Galatien TN 37066.

QSLs 100 3 color glossy \$4; 200 \$6; globe, eagle or straight key on front; report form on back; free samples. Rusprint Box 7575 Kansas City MO 64116

3-D QSLs - the modern concept that makes all others old fashioned. Samples 25c (refundable). 3-D QSL Co., Monson 2, Mass. 01057.

CREATE a QSL with a "Sampler instruction kit" 25c. Samco, manufacturer of Xtra Glass and regular printed QSLs. Write Samco, Box 203, Wyncitskill, NY 12198

QSLs, Second to none. Same day service. Samples 25c. Ray, K7HLB, Box 331, Clearfield, UT 84015

CANADIANS, Hallicoyfers SX101A \$230. Heath SR-401 (includes crystal pack) \$440. Both in perfect shape. Dave Hughes, R.R. #4, Duncan, BC

CANADIANS - Complete station for sale. Excellent condx. SB200, SB300, SB400, w/manuals, spkr, VE2FJ, Sept fls, PQ 418-962-6064

GINGY Stag Hamfest: The 34th Annual Stag Hamfest will be held on September 26, 1971, at Stricker's Grove, Cincinnati, Ohio. Lots of food, flea market, model aircraft flying, and contests. Identify My Hamfest and win prize. \$5.00 covers everything. For further info., contact John Brunning, W8DSK, 6307 Fairhurst Ave., Cincinnati, OH 45213

WARREN ARA 14th Hamfest - Still the friendliest. Sunday, Aug. 22, new site: Yankee Lake, on Ohio Rt. 7, five miles north 1-80. Picnic, swimming, playground. Prizes, displays, giant free flea market. For details & map, send card: Hamfest, Box 809, Warren, OH 44480

WANTED - All types of tubes. Top prices paid for Varian and Eimac. Jaro Electronics Corp., 150 Chambers St., New York, NY 10007.

WE BUY all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, NY 11551

CASH paid for your unused tubes and good ham and commercial equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NY 10012.

WIRELESS sets, parts, catalogs bought, traded. Lavery, 118 N. Wyeombe, Lansdowne PA 19050.

AMATEUR museum buying old radios, books, magazines, catalogs, parts. Selling QSTs and CQs. Erv Rasmussen 164 Lowell, Redwood City CA 94062.

WANTED: An opportunity to quote your ham needs. 32 years a ham gear dealer. Collins, Signal/One, Drake, Galaxy, Tempo, Kenwood, Henry 2-K, and all others. Also \$25,000 inventory used gear. Request list. Chuck, W8UCG, Electronic Distributors, Inc. 1960 Peck St, Muskegon MI 49441. Tel: 616-726-3198

RECEIVING & Industrial Tubes, Transistors, all brands - Biggest discounts, Technicians, Hobbyists, Experimenters - Request Free Giant Catalog and save! Zaytron 469 Jencho Turnpike, Mineola, NY 11501

SPIDERS for homeless quads. Hellarc welded aluminum. A's Antenna, 1339 So. Washington St., Kennewick, WSN 99336

WE buy electron tubes, diodes, transistors, integrated circuits, semiconductor and resistors, Astral Electronics, 150 Miller St., Elizabeth NJ 07207. Tel. 210-354-3141

CAPACITORS - brand new 275ufd electrolytics at 500wvdc. Ten for \$19.50, Mehauff, KJHP, P. O. Box 642, Manetta, GA 30060

TELETYPEWRITER machines, parts, bought-sold, S.a.s.e. list Typetronics, Box 8873, Ft. Lauderdale FL 33310

WANTED: Teletype machines, parts, Models No. 28, 32, 33, 35, 37. Cash or trade for Drake equipment, Alltronics-Howard Co., Box 19, Boston MA 02101. (Tel: day or night 617-742-0048)

1000 PIV @ 2 amp, new epoxy diodes includes disc bypass & bypass resistors for \$4.50. Diodes only 10 for \$2.50. New 490 MF @ 500 volt Electrolytic caps. \$1.60 ea. Postpaid USA. East Coast Electronics, 123 St. Boniface Rd., Cheekiwaga NY 14225

WE'RE trying to complete our collection of callbooks at Hq. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111

WANTED - For personal collection. The Radio Amateur's License Manual, Edition 12, WICUT, 18 Mohawk Dr., Unionville CT 06085

SAVE on all makes of new and used ham equipment. Write or call Bob Gimes, 89 Aspen Rd., Swampscott, MA 01907. Tel: 617-598-9700/617-598-2530

VERY in-ter-est-ing Next 6 issues \$1. "The Ham Trader," Sycamore, IL 60178

CLUBS: Send membership list for QSLs. World QSL Bureau, 5200 Panama Ave., Richmond, CA 94804

AMPLIFIER 4-1000A, TR-44A rotor, antenna parts. 371 Jackson Ave., Hempstead, NY 11562. Tel: 516-481-2021

TRANSFORMERS rewound, Jess Price, WACLJ, 507 Raehn, Orlando, FL 32806

WANTED: Hallicrafters S-30 Radio Compass, Howard Hoagland, 639 North Sierra Bonita, Los Angeles, CA 90035

R-390/URR Collins Digital read-out receiver, 0.5 - 32 MHz. Good working condx. \$475. W8CV, Longpoint, Pontiac, MI 48053. Tel: 313-PE3-1021

DUMMY loads, 1 kw, \$9.95; phone patch, \$8.95. Wired, \$4.00. Ham-Kits, Box 175, Cranford, NJ 07016

PRIVATE collector wants old, wireless gear. Buy, trade, Dick Sepic, 1945 E. Grange-grove Blvd., Pasadena, CA 91104

HARDBOUND QST's 1951-1970, K2GBH 12401

WEST Coast hams buy their gear from Amrad Supply, Inc. Send for flyer. 1025 Harrison St., Oakland CA 94607

AMATEUR paradise vacation, Livingstone Lodge, Mascota Lake, N.H., cosy cabin for two weekly, \$55. Swimming, fishing, boats, sports, ham radio, hot showers, fireplaces, light housekeeping children half, camp sites, literature. A. Q. Livingstone, W2QPN

WANTED: R390, R390A, R389, 61J4, 51S1, Rascal, Nems-Clarke, marconi receivers. SWRC, P.O. Box 10048, Kansas City, MO 64111

COLLINS equipment 75S-3B with 500 Hz filter \$680; 32S-3 with 516F2 PA, \$770; 32S-3 mic \$45; 312B-2 station control \$150; 1/2 yr old with minimal use, any or all, make offers. W4AMY, Box 4763, Clemson, SC 29631

LOOKING for skeds with YLs. Interested in astronomy, hovercraft vehicles, astronautics, politics of technology, robotics, computers, airroads, aerostats, electronics, and art. W8PVI Extra Class Nicholas Leggett, Department of Political Science, Johns Hopkins University, Baltimore MD 21218

QST's for sale 1954-1970, Kirkman, 5800 L, Lincoln, NE 68510

GREENE - center insulator with or without Balun - a tough number to beat - free flyer. Greene Insulator, 3 Pilgrim Dr., Bedford, NH 03102

FOR SALE: Hammarlund HQ-100, \$50. Dumont 241 oscilloscope, \$75; Heath Electronic Scope switch, \$10; Little Lulu 6-meter transmitter, \$25; Johnson 6N2 with VFO, \$85; Radio Labs 205 Signal Generator, \$10; contact Gus Wilson, WINPG, ARRL HQ, 225 Main Street, Newington, CT 06111

R-390-A wanted. Have General Electric Progress Line and TPL fm gear to trade. Moomaw, W4P7Z, 304 Valley View, Staunton, VA. 24401 - area 703, day 886-1618, night 886-1428

SELL: SX-111 \$75. Amec PCLP \$10. CB-2 w/ps \$20. Knight swr bridge \$10. TR-44 w/cable \$25. Dyna FM-3 and SCA-35 perfect, \$175. Steven Weinstein, 865 Walton Ave., Bronx, NY 10451

ATWATER Kent 1927 TRF radio. Operational condition. Make offer. W4DCDF

WANTED: Central Electronics 10B, and Collins 32S-1, Bob Nagel, K6HER/7, Box 58, Moscow, ID 83843

SWAN 350 ac/dc supplies, spurious filter, \$335; SB-301, excellent, \$225. K3MNI, 3361 Langdon St., Phila., PA 19152. Tel: 215-725-2373

FOR SALE: Swan 250 with matching 210 vfo and power supply. Ron Allen, W482JN, Route 6, Zanesville, OH 43701

SELL: 6 meter station, SR46A, mike, xtals, squalo, A-1 condx. Kosoff, W42MEK/1, 136 Scamman, So. Portland, ME 04108

TRADE: GT 550 no ps for good revr, 75S1, SX117, etc. or HT33 linear. K9RJO, 4958, W. Potomac, Chicago, IL 60851

MASTER mobile K-73 750W 80-10 linear, built-in 12.5v supply, w/remote control and output meter LN \$150. WB9FBJ, Williams Resort, Townsend, WI 54175

SWAN Cymel 270B, little used. Excellent condition. With manual, dc supply, \$300 plus shipping. Chas. Thomas, 1911 Forest Dale Dr., Silver Spring, MD 20903

MP1 Collins power supply with cable \$187, Hustler RM15 and RM20, both for \$12.50. W9PTH, 701-31st, South Bend, IN 46615

COLLINS: Have three complete rigs and this one goes; KWMA 2A; 516F2; 312B5; 301L Complete package \$1150, fob San Diego, W6q1, 2311 Lucerne Dr., San Diego, 92106. Fone 714-423-6891

BIRD 743 w/element, APR-5A, APR-1 w/3 plug-ins, \$75 each; New Varitronics PA-50A \$100; LN TS-186D frequency meter 100-10,000 MHz, \$49; trade list vhf/uhf sase, W4API, Box 4095, Arlington, VA 22204

FOR SALE: Aeromator gaw. tower 85 ft, four legs, 35 ft mast. Gln pole, prop pitch rotor; antennas: Mosley S402 TA36 and Telrex 6M 11el 36f boom. Will ship. Joe Engressia, 9050 SW 117 Av., Miami, FL 33156, (305) 274-0760

GEERTSCH FM-6; measures or generates frequencies 20-1000 Mc. 10014 accuracy. readout no charts necessary. \$350. FM-4A available from W4API for \$150 will extend range this fine instrument to 18GC. Thomas, Juniper Place, Colts Neck, NY 07722

FOR SALE: Hammarlund HQ-110AC-VHF \$169, Eico 753 \$95, 723 \$29, Ilen-loc PM-1 \$29, Heath SB-620 \$85, HD-15 patch \$7, three Notice Pack for SB-620 \$10, Beige 3 P.M. 615-647-2891, Fred Harris, W44URA, RFD 4, Box 122, Clarksville, TN 37040

DRAKE R4B still warranty \$395, Valiant I \$100, ST-3/4 RTTY \$11, \$65, SB-610 monitor scope \$55, RM-15 swr bridge \$10, TRC-30 1W walk-talkie \$25, Model 15 RTTY and stand, on air \$15, Heath R/C GD-13 \$170. All excellent and working perfect. Cash only, you pay shipping. Gary Confey, Rt. 80, Killingworth, CT 06417, Tel:ca (203) 669-8744

WANTED: 1 to 4 H.V. rectifier tubes; 3 B 28, State prep/condition first letter. W4VRO, Ray Crawford, P.O. Box 324, Rosston, GA 30682

WORLD-RADIO has guaranteed used gear with terms-trial. TR3 - \$349.95; TR4 - \$399.95; Ranger - \$99.95; 6N2 - \$79.95; 32S3 - \$499.95; NCL2000 - \$329.95; \$119.95; HQ100C - \$129.95; HQ145A - \$199.95; 2B - \$179.95; R4 - \$299.95; R4B - \$329.95; HQ170 - \$199.95; HQ170A - \$199.95. Free state-book* for more. 3415 West Broadway, Council Bluffs, IA 51501

WANTED: Collins 32S3, accessories & cables for transceive with 76S3B. Also 516F2 power supply. Mint condition, no modifications. State serial no., firm price, phone number, & address. Will pick up within 200 miles of 0711. Ray Nyquist, KR6QG, 3356 Gutawa Ave., Grandville, MI 49418

SELL: HA-1-T.O. keyer & Vibro key \$70; Eico 717 keyer & Vibro key \$70; Eico 666 dynamic tube tester & novar-compactron adapter \$35. Stuber, W8VSL, Amherst, OH 44001

DRAKE TC-6, SC-6, GPS, and cables, \$200 f.o.b. T. Balan, 5577 Waterbury Ave., Maple Hts., OH 44137

WANTED: Heath SB-200 linear, W2ELW (609) 654-4218, OD-5 Stokes Rd., Medford, NJ 08055

MOVING: sacrifice 2 new \$65 and 1 used \$46 radar correlator TSN-206/SP orig. cost \$255. George Sandford, K2PGH, 111 Highway Terr., Hackettstown, NJ 07840

SB-101 with cw filter, SB-600 with built-in ac power supply. Excellent condition. \$275 fob. Must sell to meet medic. expense. WB4DAQ J. Riggsbee, 2632 - 47th Ave. W. Bradenton, FL 33507

HEATH HW-30 lunch box. Excellent condition, with manna mike and 1 xtal, \$30 ppd. in USA. Walter Murphy, W4SOUV 2735 Hampton, Fort Neches, TX 77651

TELEEX lifetime Yags, models 1M636 and 15M532, near n.e. condition, each \$195. Also model 20M546, \$250. K2GXI, 12 Yorktown Rd., Buffalo 14226

SR-104, SB-600, HP-29U, RM-15, wired by profession! excellent condition. Will deliver, 200 mile radius \$37. W4ZEMW, 56 Orton Rd., W. Caldwell, NJ 07006

SELL: SR180 transceiver and HP23 power supply \$175. Robt Thompson, 5801 N 79th St., Milwaukee, WI 53218

COLLIANS X455K Q200 filter for 75S3B, \$70, Dealer I SignalOne, Alpha Seventy, Collins, etc. buy used sb gear. Douglas Electronics, 1118 South Staples, Corpus Christi, TX 78404

SELL: HW-12-A, HP-13, mike, speaker, mobile antenna calibrator, Excellent, \$150. R. Vlach, Benson, MN 56215

AN expense-free vacation, two or four weeks in Mexico for ham. Write for information to XE 1 NE, Box 2807, Mexico CI Mexico

HAMMARLUND HQ-145C, crystal calibrator, speaker, manu excellent condition, \$165. Mark Weber, 1111 University Blk West, Wheaton, MD 20902

UPGRADE your license! You need Posi-Check. Original, expertly devised, multiple-choice questions covering all areas tested in FCC exams. Same form as the FCC exams. Keyed answers, explanations, IBM sheets for self-testing. Over 300 questions and/or diagrams for each class. Each class complete in itself. Basic questions duplicated where they apply. New prices because of new postage rate. General Class \$4.25, Advanced Class \$4.50, Extra Class \$4.75, including first class mailing. Add 25c each copy for air mail. Send check or money order to Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, IA 50322

QST 1924 to date. Antique ham equipment, excellent condition. Write for List, W9AXH, 1720 East 81st St., Indianapolis, IN 46240

TRADE: GT550 with ac supply, vox and calibrator all in perfect condition. Interested in 743E or 8220 or best cash offer. Jim Fleming, 7528 Brynmawr, Chicago 60631. 776-8179

SELL: Clear out prices, clean merchandise, KWM-1, 616E-1 dc supply, cables, ear moult, custom ac supply, 2335, HT-30 sub transmitter 10, 20, 40, 80 meters 100, Swan 400, 410 vfo, voc, 117K ac \$265. Complete parts high power supply. Many miscellaneous items transmitting tubes. Write for needs. W2CUZ, D. B. Whittemore, 35 Masterton Rd., Bronxville, NY 10708

"HOSS Trader Ed Moor" says he will not be undersold on Cash deals! Shop around for your best price and then call or write the HOSS before you buy! New Equipment: Galaxy III-500, \$389; Swan 270 C, \$349; New Drake TR-6, regular price \$599.95, with matching used AC-4 supply, for \$1,000 more; New 2000 watt Gonset Mark IV linear, reg. \$525, cash price \$395; New Rohm 50 ft foldover tower, prepaid, \$229; New Mosley Classic 33 and Demo Ham-M rotor, \$209; Used equipment: T-4-B, \$359; R-4-B \$339; Ham-M \$85; HT-32, \$189; Moory Electronics Co., P.O. Box 506, DeWitt, AR 72042. Tel: 501-946-2820

FOR SALE: Henry HJK linear, 8 months old \$695, Collins 32S3 mint \$495, Collins 116F2 mint \$100, W9HOG, Alan Kogerup, 703 Huntington Ln., Schamburg, IL 60172. Phone: 312-894-1328

TEKTRONIX type 491 solid state portable spectrum analyzer; Tektronix type RM603 rack mount oscilloscope; General Radio 1021-33B vhf signal generator 40MHz to 250 MHz; Hewlett Packard 302A wave analyzer 20Hz to 50kHz; Hewlett Packard 411A vt millivoltmeter 500kHz to 1 GHz. K4YVL, Box 1294, Jupiter, FL 33458

FOR SALE Leaving for Europe - Hammarlund HQ-170A VHF, HX-50A, HXL-ONE. Excellent condition, 14 yrs old. Each \$150. John Rightmyer, 601 South 4th St., Hamburg, PA

SB-110A, ac supply/SB-600 spkr. microphone \$250. Franklin Davy, 39 Third St., Frenchtown, NJ 08825

SIGNAL/ONE, Alpha Seventy, Collins, Kenwood, Tempo, Standard, Vaxitronics, Galaxy, Hy Gain, Mosley and all other leading brands. All inquiries answered. Douglas Electronics, 1118 South Staples, Corpus Christi, TX 78404

WN9EJO asked the draft board to put his name at the top of their list, they did. I am selling his Novice station. Knight Kit R100A receiver excellent \$34, Heath DX35 transmitter \$23. Heathkit Hamband receiver RX-1 \$120. All with full manuals ninety day guarantee on all above except tubes. Also home brew SWR meter per handbook \$4, and brand new Hy Gain trapped antenna Model 20. M. Krauthoff, N89 WI6800 Cleveland, Menomonee Falls, WI 53051

SELL Heathkit SB640 and SB101 without supply, SB200, SB630, SB601, D104 mike, HD10 keyer with vibroplex key. Best offers. Ken Wilkerson, 311 Second St., Farmville, VA 23901

LIKE new HQ-170A triple conversion rcvr, \$135. DX-40 xmtr, \$25. WA5NQE, 701 Carolyn Ave., Austin, TX 78705

HQ-170 best offer over \$125. Pick up or you pay shipping. Bernie W2ZGUH, 1117 Doughty Blvd., Lawrence, NY 11559. Tel: 516-FR-1-0673

WILL sell: Heath GR-81 receiver \$26; CR-1 crystal receiver \$9; AM-2 antenna meter \$10; Havey-Wells TRS-50C, VFO, APS-50, mike \$63; Johnson Signal Sentry \$9, 250-20 LFF \$14; Allied R-100 receiver \$59, X-10 calibrator \$7; BC-453-B \$13; BC-454-E, p.s. spare tubes \$19; WR-1824 microphone \$18. Bradley, 321 N. Fullerton, Montclair, NJ 07042

NEW: Signal-Ones, Kirk antennas. Min. used: KWM-2, 32S-3, 75S-3B, R-4-B, 74X-B, FT101, NCX55H. Attractive trades, quotations, brochures. Don Payne, Box 526, Springfield, TN 37172. Nites (615) 584-5643

RCA RTTY diversity system consisting of two CV57/URR T.U. and one CV57/URE comparator in desk top rack and manual. 10 to 1000 cycle shift \$200. Model 19, model 14 typing perforator with keyboard, model 14 T.D., power supply, line unit, audio T.U. with scope and meter \$200. John Christy, W6JX, 14245 Dickens St., Sherman Oaks, CA 91403

COLLINS R-390A good condition \$525. Ken Letcher, W5YFN, 2306 Carver Dr., Roswell, NM 88201

SELL: microphones: Turner, ceramic PTT 350C; Astatic DN HZ PTT/stand. Both cables & plugs, K90YB, 4807 Fairfield, Ft. Wayne, IN 46807

ROHN heavy duty three section 40 foot self supporting tower, non-tit, non crankup. Pick up only, \$45. W5IHD

COLLINS S/Line, complete with station console, 75S-3B, 32S-3 and power supply. Used excellent with original factory cartons. \$1200 or best offer. H. Moore, Box 119, League City, TX 77573. Tel: 713-932-7058

GROUNDED grid filament chokes, 30 amps \$5. Plate chokes 800MA \$3. 3-30MCS, PP2548 William Deane, 8831 Sovereign Rd., San Diego, CA 92123

HW-32A, HP-23A (ac D/S), HRA-10-1 calibrator, HS-24 speaker, GH-12A mike, homebrew audio QRM filter, 1.1/1 SWR inverted "V" with 60' RG58U and connectors. Guaranteed mint. Cost \$207 nine months ago. Sacrifice for best offer over \$160. Lt. Carmody, U.S. Naval Facility, Box 60, FPO NY 09597

COLLINS 5134 rcvr. Less mechanical filters and cabinet \$285. 32V2 xmtr with many spare 4032 tubes \$75. Prop-pitch motor \$18. Telrex 10M beam \$15. W. Pilon, 1 Hemans Court, Worcester, MA 01605

SELL: QST 1962 to 1970 inclusive except July 1962, make offer. W2NQR

NOVICES - LIX-60B \$65, HA-800 \$100, Station \$155. Excellent condition. Steve, WNPFV, 31 Crocus Lane, Commack, NY 11725

MANUALS - \$6.50 each: R-390/URR, R. Convalso/URR, SP-600JX, URM-25D. Hundreds more. S. Convalso, 4905 Roanne Dr., Washington, DC 20021

FOR SALE: Heath SB-610. Brand new and perfect. \$79. WA0BZD, Sisseton, SD 57262

WANTED: Collins receiver 75S-3C or 3B. Give condition, price, serial no. C. F. Bell, Box 876, Burlington, IA 52601

DX-60B \$70, HG-10B \$35, or both \$100. Used one year in excellent condition. All manuals. You ship. WA3MPP, Aaron, 1220 South Negley Ave., Pittsburgh, PA 15217. Phone: 412-521-6064

6M Gonset Comm. III \$65, TR-4 rotor \$35. Ted Suddarth, 54868 Quince, South Bend, IN 46628

NOVICES: Need help for General Ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, Box 6015, Norfolk, VA 23508

TOROIDS & teletype. Lowest prices anywhere. 40/\$10 postpaid. 32KSR printer, reconditioned: \$225. Mite UGC 41 too! Model 14, 15, 19, 25, 32, 33! Many more bargains. List, stamp please! Van, W2DIT, 3022 Pinnacle, Sterling, NJ 07880

VHF/UHF frequency meters, VFO or generator 85-1000 Mc, 144-148, 220-225, 400-450, schematic, calibration book. Portable \$108, rack mounting \$88, no calibration book \$68. Nylon climbing belt with lanyard \$20. R388/5133 Collins receiver \$295. Link, 1000 Monroe Tpk., Monroe, CT

GOING audiophile - NCX-5 excellent plus well built heavy duty homebrew power supply. Xtal calibrator. Mobile mike, \$365 New Vibroplex original bug plus case \$15. 24.5 MHz xtal \$3. Kilowatt Pi-network, rotary coil, swr mt, rack mount plus metal enclosure \$25. All ppd 48 USA, Ken Bauer, 6358 Lyric Ln., Falls Church, VA 22044

SALE: Ten-Tec KR-20 keyer, new \$45. Johnson matchbox, 276v/swr bridge \$35. Jim Cox, K4JAF, Rt. 2, Harrison, TN 37341

SB101 w/HP22 \$345; Clegg Venus 6M w/booster \$265; Swan TV2 \$145; SB200 \$195; DX60A \$49; R388/URR receiver \$375; 75A4 one filter \$325; Eico 753/761 \$120; Johnson 6 & 2 \$70; SB300 \$175. List of others for sale. W2FNT, 18 Hillcrest Ter., Linden, NJ 07036. Tel: 201-486-6917

SELL: WRL duo-bander 84, excellent, \$90, 80 watt Eico stereo amplifier, Corina 3070, \$50, Lyman Blossom, W9MM, 517 Fibert Rd., Oreland, PA 19075. Tel: 215-V6-4958

FREQUENCY scaler divides-by-ten to 160 MHz. 20MV sensitivity. Use it to extend the range of your counter. Worth \$300. Limited quantity at \$129.95. Vanguard Labs, 196-23 Jamaica Ave., Hollis, NY 11423

SB301 - 1 filters \$225. SB401 with crystal pack \$250. Drake R-4 \$200. All mint. Stern, WA4QXA, 6980 Roswell Rd., Apt. J-1, Atlanta, GA 30328

FOR SALE: Hallicrafters SX-111 receiver \$105. R4TSC, 2832 Wesleyan Ln., Winston-Salem, NC 27106. Tel: 919-0728-3053

HENRY 4K-2 linear amplifier, specially built. Separate fr deck. D. Anderson (213) 478-6738

SWAN 350 updated to 350C, excellent condition, complete with both ac and dc power supplies \$350. W6WY, 1901 Park Dr., Los Angeles, CA 90026

COLLINS R391 with manual, excellent condx. \$760. Firm. W8QXO, 121 Parana Dr., Newark, OH 43055

FOR SALE: The following brand new equipment: assembled Heath HW-16 with 3-ft x-ft \$159. RCA W-38 VOM \$29. Lafayette 4D-0104WX vert. antenna \$33. Lafayette 52 ohm dummy load \$20. All equipment never used, guaranteed. Mike Young, 801 Main, Corinth, MS 38834

WANTED: Hallicrafters model HA-5 VFO. Please state price and condition. K8OSK, Richardson, TX 75080

WANTED: manual or schematic for Dumont 322 oscilloscope. W1PAA, H. Mason, 34 Dickinson Rd., Noroton, CT 06820

WANTED: Buy or borrow schematic or manual for Tecraft TR20/144: twoer or tenner in gud shape. Write W2ZHS, 61 Beacon Hill Rd., Ardley, NY 10822

EICO 753 transceiver AC-751 power supply excellent \$135. TE-7-01 Omega-T noise bridge \$15. Charles Yeager, 4345 Louise St., Saginaw, MI 48603. Tel: 1-517-792-4492

FOR SALE: SBE 34 mike mint condition \$210. WB6MVK, 102 Northrop Pl., Santa Cruz, CA 95060

DEALERS! all major lines CB/ham equipment at lowest prices. We urge that you contact us before you buy. Delmar Electronics Inc., 280 N. Wellwood Ave., Lindenhurst, NY 11757

WANTED: Unique wire tuner - cash. W2EYG, 12051

HOOSIER Electronics authorized dealers for Drake, Hy-Gain, Ten-Tec, Galaxy, Regency. All equipment new and fully guaranteed. Write today for our low quote. Hoosier Electronics, Dept. C, R.R. 25, Box 403, Terre Haute, IN 47802

SWAN 250C, 117XC, 210 VFO. Eleven months old, \$495. New condition, original cartons and manuals. Certified check, postage paid. Tom Stephens, WB8GVZ/4, 3960 Macon #10, Memphis, TN 38122

WANTED: Hallicrafters HT-41 linear. H. M. Johnson, Milton, WI 54553

COLLINS 75A-4, SN3804, three filters, Excel. cond. \$350. John Messer, C-4-40 Hillside St., East Hartford, CT 06108. Phone: 203-528-7488

SELL: Hallicrafters SX-101A, Model R-48 speaker; Viking Valiant II; Hallicrafters HA-1 receiver; Vibronex key, \$500. Barry Wright, 439 West Idaho St., Weiser, ID 83672

NCX-5 MK-II w/acc \$300, DX-100 \$65. Heath hi-fi amp 15w mono \$30. Homebrew ZM vfo \$5. Dave Dix, 676 Shadowlawn, Westfield, NJ 07090

FOR SALE: 4el, 14 MHz beam, 4" dia 40" boom and 3el, 21 MHz beam, 3" dia 20" boom both w/2", dia 10" pipe supports w/angled mounting plates, home brew but professional quality. Prop pitch motor, Seisins, cables and control unit. Also 1KW "Loudenboomer" w/3-400Z and 3000V, 6kVA power supply, 572A bridge rectifier w/variac. Also 61" Vestro tower. Sell cheap. Make offer and pick it up, whole or part, Jim Higgins, W2C-WK, RDI, Box 188-E, Jamesburg, NJ 08831

CRYSTALS 7133, 333 kHz 8321, 429 kHz 46.10 MHz 50.54167 MHz 52.85 MHz \$1.00 each. 146.333 MHz \$2.00 each. K9DSV, Bob Mullen, 3910 West Jarvis, Skokie, IL 60076

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord, NC 28025

COMPLETE HF and 144-MHz station, Drake T4XR, R4R, TC-2, 6S-4. Mint condition, original boxes, \$775. W9JZR, 1108 North Yale Dr., O'Fallon, IL 62259

SIX meter Gonset Communicator III for sale. Excel. condition. Xtal, PTT mike, halo antenna, mobile plugs, \$125. Gordon Steen, 400 Washington St., Middletown, CT 06457. Tel: 203-346-4426

JUST bought HW-101; sell HW-22A, as new \$92; HW-12, good condition, \$80, f.o.b. Fitz, WA3QKLD, P.O. Box 281, Laceyville, PA 18623

JRAKE TR-4, AC4, dc mobile p/s, RV4 remote vfo & speaker, still has original tubes. First certified check for \$675, f.o.b. (will deliver L.A., S.F. areas). H. Dalton, 20433 Flntgate Dr., Walnut, CA 91789. Tel: 714-595-9979

SB-301, perfect condx, \$250, pick-up only. K2LCK, 516-277-3196

SELL: HT-37, Clean, gud wkg condx -- \$150. WA0BGL/Q, Box 633, Ellsworth AFB, SD 57106

WANTED - used Collins 30L-1, 2 meter fm base, RTTY converter. Any or all may need repair. Please state condition and price. W9BRBN, Nick Swan, R.R.2, Ludington, MI 49431. Phone: 616-843-2162

HEATH SB-400, 2N/200, Twoer \$35, RCA SB-1 \$50, 250-23 matchbox \$40, AN/PRR-5 receiver, best-30 Mcs \$50, TA-31 Jr. \$20, precision 612 tube tester \$20, 200C signal gen. \$30. W6GAR, Mike Davis, 3400 Gale Ave., Long Beach, CA 90810

"BUY the best" Signal One just returned from factory with newest modifications in perfect condition. Ship anywhere in original cartons on receipt of cashier's check for \$1500 firm. Reply: Daniel McCaskill, M.D., 1520 Amalfi Dr., Pacific Palisades, CA 90272

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CONTACT us for new or reconditioned Collins, Kenwood, Tempo-One, Drake, Galaxy, Hy-Gain, Mosley, Henry linear towers, antennas, rotators, other equipment. We try to meet any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler, MO 64730

WANTED: Used equipment, Collins KWM-2, a.c. power supply and speaker; Collins 30S-1 linear; Drake TR4, a.c. power, speaker, Drake L84 linear. H. F. Cushing, WB1XZ, 5224 Bobbie Ave., San Jose, CA 95130

MOTOROLA P338AM 2 meter fm, new ni-cads, 2 channel xmit, tone, \$130. Eico T20 90 watt cv xmit, \$50. Randy Thompson, WA9YII, P.O. Box 505, Paxton, IL 60957

SWAN 500C xcvr with 117X ac supply, 14C dc module, VX2 Cox \$50, WH ship. Also Johnson kw matchbox svr \$50. WA9SZZ, 944 Lincoln, Manitowoc, WI 54220

RADIO club sale: Best offer takes HT-32, 2A/2AQ, 75A2, SP400X/ps, Globe vfo, Eico 723, Eico oscilloscope, HG303, 19" 7 foot rack, many parts. Pick-up preferred. Columbia University Radio Club. Contact WA2LNU, 212-789-5029

GOING trailer mobile: selling contest winning station, mint 5154, GSB 100, SB-163 w/ manuals; finals, supplies, parts, tubes, 4-300A, 4-1000As. Offers, lists, W6AGU, Box 1275, Paso Robles, CA 93446

SELL: Hallicrafters SX-144 receiver + R-51 clock-speaker; Conar 400FT xmitter; joystick ant. All new, never used, exc. cond; \$250. Roger Ellis, R.R. 1, Owens Rd., Maple Park, IL 60151

RESISTORS, capacitors, tubes, parts, surplus. Free catalog. DRB Electronics, Box 196, Corvallis, OR 97330

ROBOT SSTV camera with lens and extra cable and monitor lens. 2hr live hours \$725; Drake L4B \$475. Heath SB-610 \$50. HD-15 phone patch \$20, Twoer \$45. Hallicrafters HA-2 with pacer \$130, Ham-M \$75. Mosley CL-36 \$100. Top Band 16 tubes \$25. All in excellent condition. Will ship all but 16 tubes prepaid. WA8ASV, Charles Secrest, 1211 Milbourne, Flint, MI 48504. Tel: 313-239-0025

MORRIS bandswitching 10 mtr - CB transceiver for sale. Ide for small boats or cars, \$45 plus postage. W2GFR, 238 Poplar Ave., Pompton Lakes, NJ 07442

NOVICE crystals: 40-15M \$1.60, 80M \$2.10. Free flyer. N. Stinnette Electronics, Umatilla, FL 32784

SALE: SBE-33 excellent condition. New tubes. One owner \$300 or best offer. W6NPS, Box 565, Mount Shasta, CA 96007

WANT to buy transceiver with matching ac power. Also Drake T-4XB and R-4B. Or what have you that is clean and priced right? Richard Sebars, 417 North Ferry, Ottumwa, IA 02501

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HQ-215 receiver in mint condition, with speaker, \$355. WA1NGL. Tel: 203-888-5656

SELL: NC-300 "Dream receiver," very good, manual, \$140 plus shipping. Rob Huckaby, Georgia Tech Box 36261, Atlanta, GA 30332

WANTED: Hallicrafters HT-33R linear. Must be good to mint condition with good final. Also want Motorola HT-200 w/acc. Handi-Talkie. Send price and description to Glenn, WA2PS/P.O. Box 2322, Newburgh, NY 12550

SELL: FTDX-560/cw filter, 30900Z linear kw dc/pep, SB-6 scope, Gerry Huber, 80 Park Ave., Emerson, NJ 07630. Phone: 201-281-6463

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WANTED: Schematic and parts list for Type R-100 frequency receiver. W1JRR

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DRAKE 4A, T4X, MS4 speaker and ac supply. Excel cond. \$650. K2GGM, 725 Redman Ave., Haddonfield, 08033. Tel: 609-429-9497

WANTED: VFO for Knight T-60 transmitter. State price condition. Ronald Hutchinson, WN9AWN, R.R. 3, Salsub MO 65281

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WANTED: Repair and instruction manual for Knight transmitter Mod T 150A and manual with associated receiver. Quote price. William Payne, 8103 Austin St., Schererville, IN 46375

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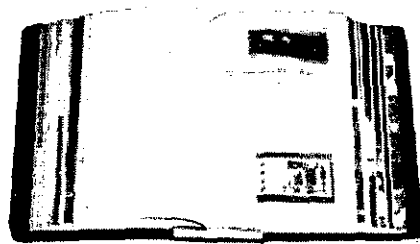
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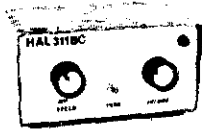
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<i>Maps</i>	122
<i>Membership</i>	146
<i>Mobile Manual</i>	124
<i>Operating Necessities</i>	143
<i>Publications</i>	145
Amrad Supply	123
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Barker & Williamson	125
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Bill's	141
Camp Albert Butler	136
Circuit Specialists Co.	133
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Cubex Co.	138
Curtis-Electro Devices	148
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Electro-Voice, Inc.	117
Foreign Language QSOs	145
Gofham	119
Greene Insulator	150
HAL Devices	158
Ham Radio Center	145
Harrison Radio	160
Heath Co., The	112,113
Henry Radio Stores	5
Hi-Par Products	148
House of Dipoles	145
Hy-Gain Electronics	121
International Crystal Mfg. Co., The	7
Ithaca Data Service	150
JAN Crystals	139
L. A. Electronics Sales	140
Lampkin Laboratories, Inc.	140
Lattin Radio Laboratories	143
Macdonald Signs	142
Millen Mfg. Co., The James	118
Mini-Products, Inc.	128
Mobifers	137
National Radio Institute	134
Falomar Engineers	136,137
Pennwood Numeratron	143
Pickering Radio Co.	129
Poly Paks	131
Radio Amateur Callbook, Inc.	130
Rectifier Components Corp.	141
Robot Research	139
Rohn Mfg. Co.	1
RP Electronics, Inc.	142
Savoy Electronics, Inc.	4
Simon Side Band Company	148
Skyline Products	148
Spectronics	149,152,Cov. III
Swan Electronics	Cov. II
Ten-Tec, Inc.	127
Top Band Systems	150
Trigger Electronics	151
Unadilla Radiation Products	127
Unique Products	134
Valley Technics, Inc.	144
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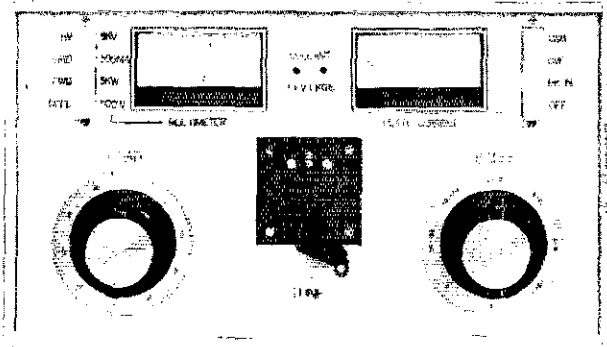
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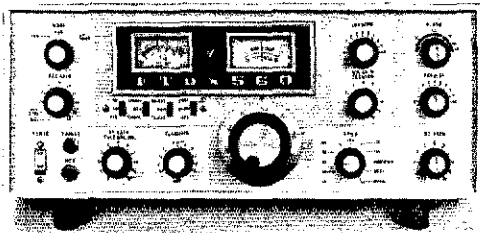
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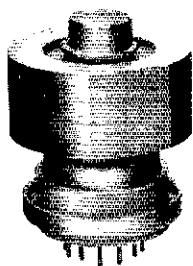
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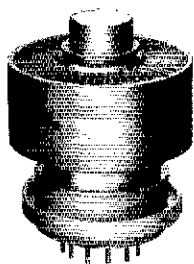
All prices F.O.B. Signal Hill, Ca.

EIMAC's new 8873 family covers the electromagnetic spectrum from DC to 500 MHz.

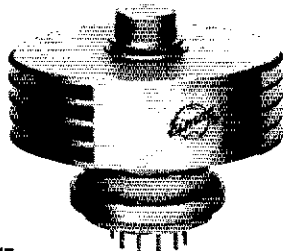
No need to compartmentalize your thinking when you contemplate EIMAC's new 8873 family of zero bias triodes. This tube for all seasons has three interesting configurations that allow you unprecedented design freedom: conduction cooling to heat sink (8873), axial cooling (8874) and transverse cooling (8875). Your choice to overcome today's design constrictions.



8873
CONDUCTION COOLED
ANODE



8874
AXIAL COOLED
ANODE



8875
TRANSVERSE COOLED
ANODE

Consider that the 8873 family provides up to 1000 watts PEP input or 500 watts continuous duty input per tube to 500 MHz. Low grid interception allows low drive power to be combined with low intermodulation distortion in linear service.

Observe that while the 8873 family performs in superior fashion as a linear amplifier in SSB service, it is also ideally suited for high gain, class-C FM or AM service in the VHF/UHF range. Electron control by EIMAC's new segmented, self-focusing cathode and unique aligned grid structure provide the key to this improved performance. The grid, moreover, is terminated in a low inductance contact ring about the base of the tube, permitting very effective intra-stage isolation to be achieved up to the outer frequency limit of operation.

Note that these rugged triodes are exceptionally well suited for class-B audio service as well as for pulse operation demanding high peak current capability at modest drive power.

Remember the 8873 family of triodes covers the electromagnetic spectrum from DC to UHF with ease, meeting widely divergent requirements in a package you can hold in the palm of your hand. Use these compact tubes in table-top design where space is a scarce commodity or where high density packaging is imperative.

Write EIMAC today for details and circuitry on the 8873 family of grounded grid triode tubes. Another example of EIMAC's ability to provide tomorrow's tubes today. EIMAC, 301 Industrial Way, San Carlos, California 94070. Phone (415) 592-1221.

