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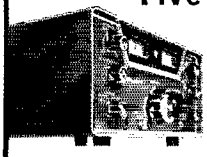

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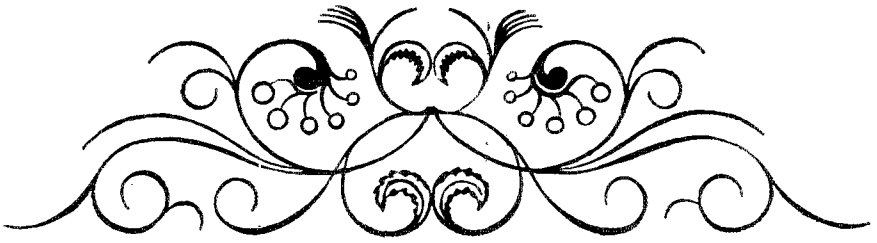
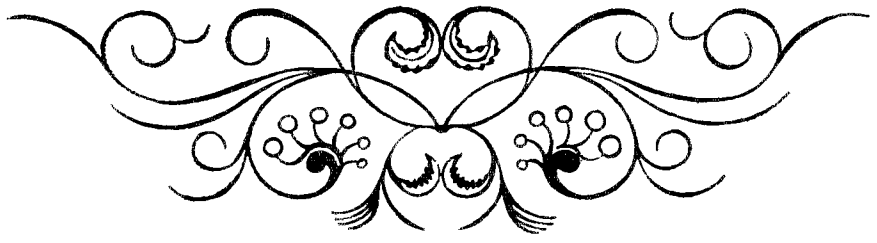


Night falls and you are alone in your ham shack . . .



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QST

DECEMBER 1964

VOLUME XLVIII NUMBER 12

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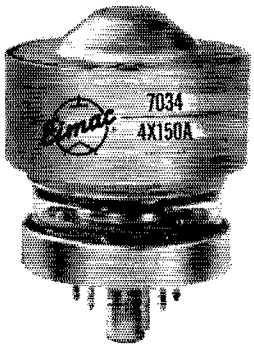

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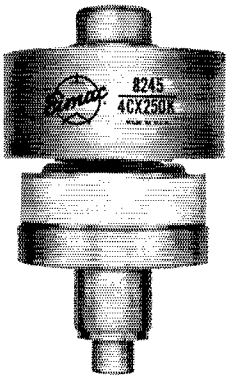

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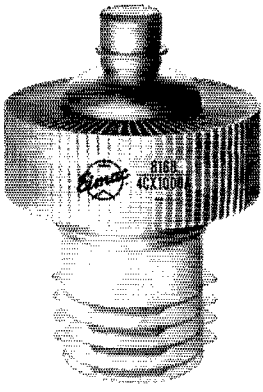

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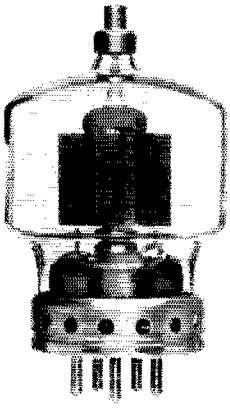

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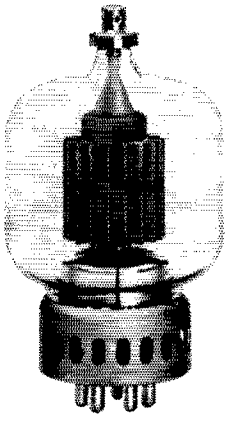

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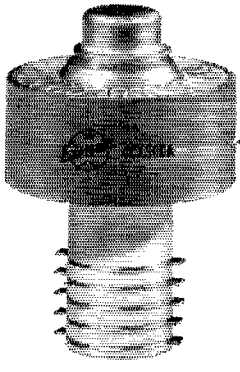

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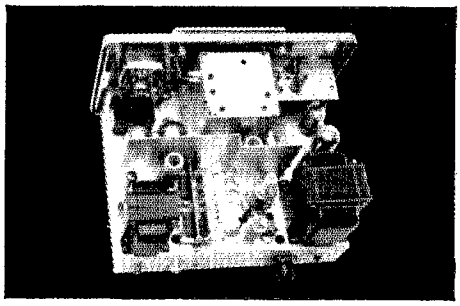

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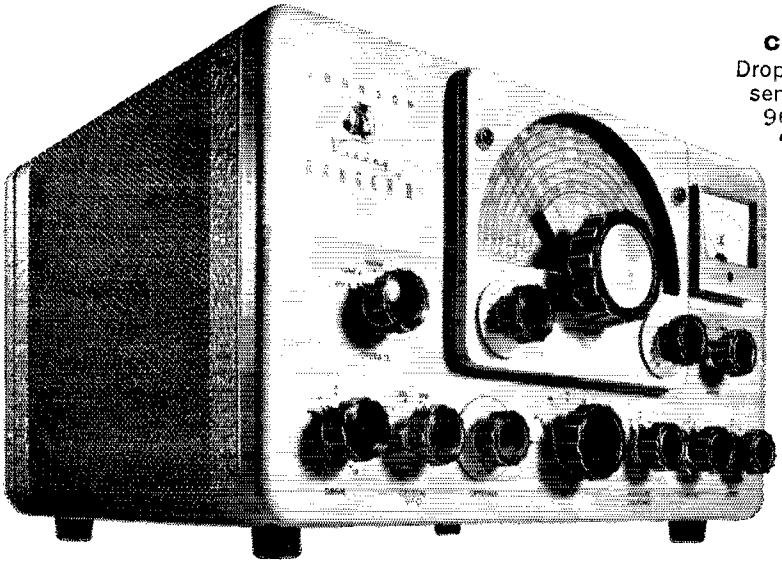

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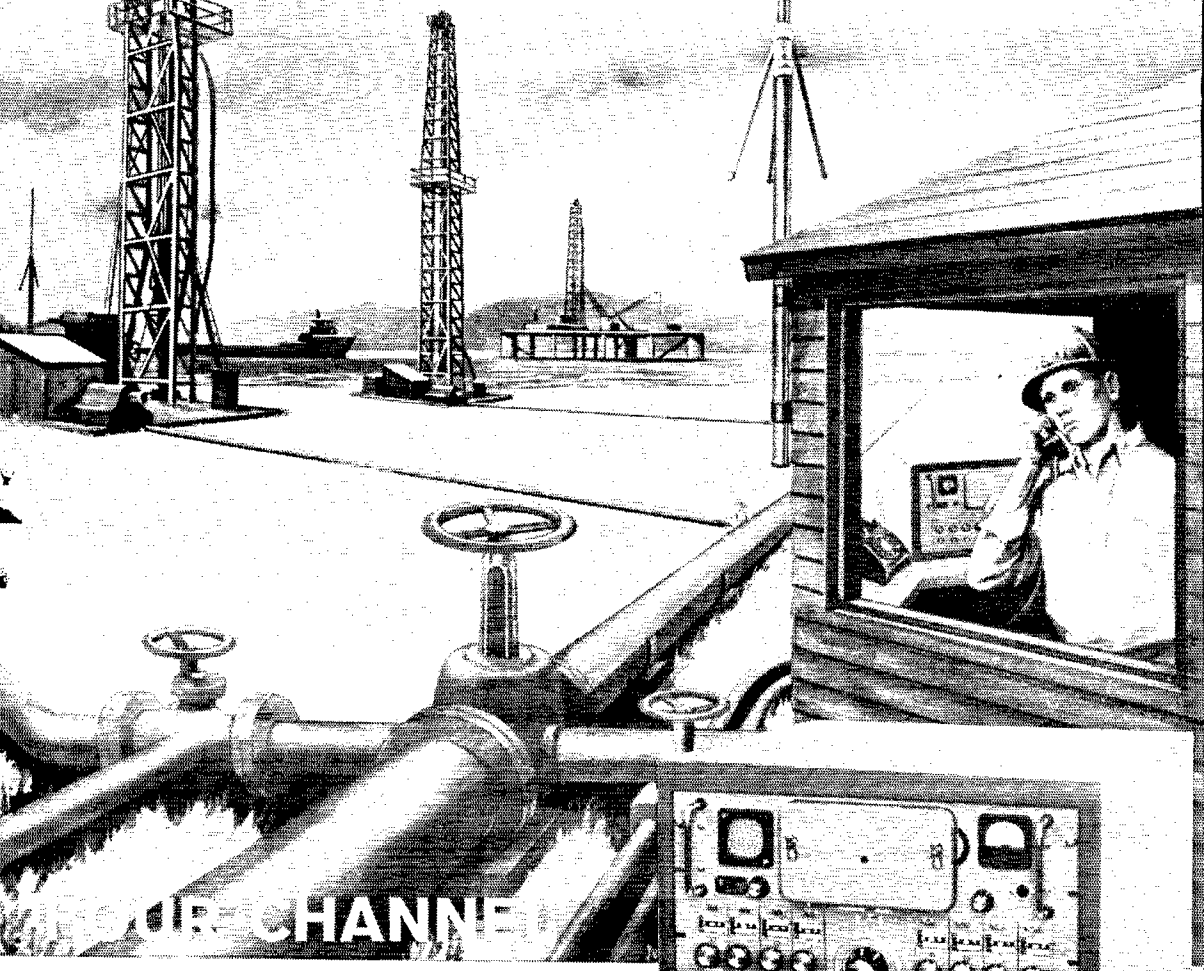

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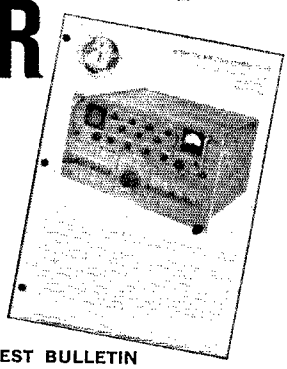

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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

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

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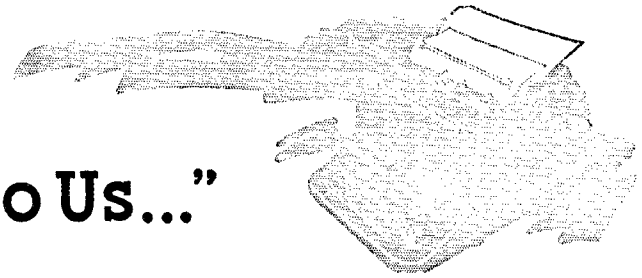


"It Seems to Us..."

DX Contest — Changes?

AT its 1964 meeting the Board of Directors expressed concern at the growing number of amateur contests of all sizes, shapes and descriptions. Hq. was asked to examine the pattern of ARRL contests looking toward lessening the impact on normal activities in the bands while still accomplishing their objectives.

ARRL contests are the granddaddies of nearly all others. The DX competition was initiated in 1927, the Sweepstakes in 1930, Field Day in 1933. There have been many changes since those early days; for example, both DX and SS originally were solid two-week affairs, later reduced to nine days, still later cut back to weekends only.

But, especially during the past dozen years or so, we've seen everybody and his brother starting new contests — some worthy, some certainly of questionable usefulness. The result is that practically every weekend is involved with some such activity in one part of the world or another, and in some instances doubling up with two or three on the same weekend. The impact on ham bands has been considerable, and the Board simply raises the question of whether this is a desirable situation. Our Board cannot force the many other groups to cease or modify such activity, but hopes that if the League shows leadership in taking a good, hard look at our own activities with a view toward revision, perhaps others will do the same.

One result has been a change to reduce the Sweepstakes operating period to one weekend instead of two. As this reaches you, shortly after the 1964 SS, we expect a flood of comments will be arriving at Hq. either endorsing or damning the change on the basis of actual experience. Such views will, as always, be taken into account for possible further modifications of the rules.

At this writing no change has been made in the DX contest arrangements, and 1965 will follow the basic pattern. But here again it would be most helpful if during the 1965 weekends, amateurs — participants and onlookers alike — would keep in mind what constructive changes might be made in the 1966 pattern and let us know those views. Would a single c.w. and a single voice weekend still accomplish the objective? Do the multiple weekends tend to monopolize, beyond reason, useful frequencies to the extent routine (non-participating) activities are crowded completely out? If the latter is the case, can we justify such a monopoly for four weekends — *i.e.*, does the contest fulfill a sufficiently important function to justify any inconvenience which may be forced on others? If the contest should be made shorter, would it be better to keep four weekends but reduce the number of hours in each, or to cut to two weekends? Would changes work to the advantage of the hard-core contest man, or the casual entrant, or the non-participant?

We think it fundamental that, especially in a worldwide DX contest, the minimum time is 24 hours — to permit our old globe to make a complete revolution and give everyone a sampling of the conditions which vary throughout such a cycle. But should it be longer? And if so, how much?

We are open-minded to all suggestions and criticisms except one — that "contests serve no useful function." We won't buy that argument for a moment. Anyone who has ever participated in an operating contest has — or should have — come out more experienced and better qualified. We say this in spite of the fact that in any contest — especially in DX — there are a few knuckleheads who forget all about common courtesy and sportsmanship and give the operation a bad name; but you don't abolish DX contests any more than you abolish ham radio just because there are a few bad actors. No, organized operating such as represented by intelligently conceived and run contests is a positive factor in our training and progress. Our personal ability and our station performance are put to the test. The question is not whether we should have contests; the questions are how many and how extensive they should be.

Please let us know your views.

— ... —

Although not directly related to the above, in "How's DX" this month (as well as last), Jeeve's boss has expounded on some of the principles of what makes skilled radio operators. W9BRD's mill has turned out some hard-hitting comments which merit your careful attention. QST

HERBERT HOOVER — A TRIBUTE

The passing of a great American, Herbert Clark Hoover, and the highlights of his innumerable contributions to society, have been duly recorded by the press. Perhaps less well known is his leadership in guiding the regulatory development of radio communications in its formative days.

When Mr. Hoover was named Secretary of Commerce in 1921, he inherited not only the administration of wireless communications but also an outdated 1912 radio law. He had neither the authority to assign frequencies nor the right to refuse a license! Hampered by its antiquated terms and provisions, he attempted to get Congress to modernize the law: but without success.

Yet radio was growing — especially rapidly with the broadcast boom of the early 1920s, and the opening of the short waves which soon followed. The various activities — broadcasting, amateur, marine, military, etc. — all had to work together somehow, in the national interest. In 1922 he called the first of what became a series of national radio conferences (later better — and more aptly — known as Hoover conferences) of various interests. It was there decided to assign separate channels to each station, particularly in the broadcast field, although the 1912 law neither made nor authorized any specific wavelengths to individual stations. The 1923 conference continued and updated this concept, still on an informal gentleman's-agreement basis. In 1924 an entirely new principle was conceived under Mr. Hoover's direction — the allocation of *bands* of frequencies to various services, within which individual assignments (except for the amateur service) were made to specific stations. This conference set the pattern still observed today in frequency management, including a special federal advisory body on government radio problems which was the forerunner of the Interdepartment Radio Advisory Committee.

In 1926 came the "breakdown of the law." A dissatisfied broadcaster jumped frequency, and the courts found in his favor (as everyone knew they would), holding the Secretary of Commerce without authority to make frequency assignments under the 1912 law. In order to avoid interference and eventual chaos, Mr. Hoover promptly appealed to all radio interests to stand by their informal agreements, in lieu of the inadequate law. Except for some broadcast stations, every other radio service stood fast by its commitments — as great a tribute as could ever be paid to the leadership of and respect for one man.

My friends and fellow-amateurs:

My family and I are most grateful for the many messages of sympathy and expressions of respect for my father which we have received from radio amateurs the world over. We are deeply touched and appreciative.

—Herbert Hoover, Jr., W6ZH.

Strays

SS *Hope*

The hospital ship SS *Hope* is in need of a mature amateur with RTTY experience to maintain its radio equipment. The *Hope* presently is in Africa, at Conakry, Guinea. Those interested are invited to write immediately to Nicholas Craw, Director of Operations and Logistics, Project Hope, 2233 Wisconsin Avenue, N.W., Washington, D.C.

At a recent mobile rally in England we find G3FZL, president of the Radio Society of Great Britain; G6FO, editor of the *Short Wave Magazine;* and VE3CJ, ARRL Canadian Division Director.

OPERATING PRINCIPLES

We repeat ARRL recommendations which, in view of increasing congestion in our limited frequency assignments, urge upon all amateurs a more strict observance of the following operating principles:

a. To make proper choice of bands below 30 Mc. appropriate to the distance to be covered.
b. To achieve equipment flexibility so that an adequate choice of frequency bands and powers may be available.
c. To use minimum bandwidth, consistent with good engineering practice and compatible with the mode of transmission being employed.
d. To expand the use of v.h.f. for local contacts wherever possible, with the ultimate aim of conducting all short-distance communication in this portion of the spectrum.
e. To use the minimum power necessary for each communication.

Listen carefully before transmitting; be brief; use VOX or break-in c.w.; use dummy antenna for tune-ups; give honest signal reports; monitor with gear that directly samples your on-the-air signal.

Observance of these principles, along with common sense and courtesy, will effectively widen our bands.

No Tubes—Four Watts—Six Meters

Portable or Mobile Transistor Transmitter

BY HENRY H. CROSS,* W1OOP

If you've battled the problem of amplitude-modulating a transistor r.f. final, here's some information worth filing away for the next attempt. And if the first paragraph of the article doesn't give you pause, the r.f. end is something to think about, too.

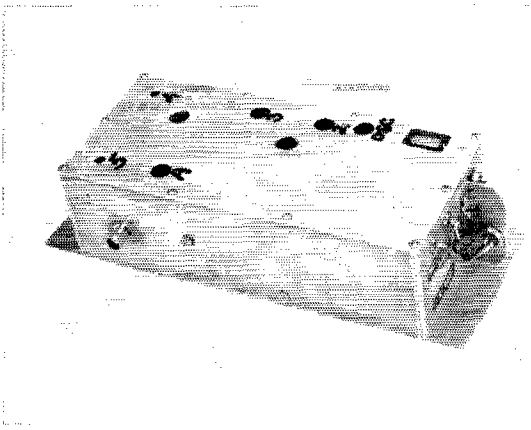
THIS is not intended as a construction article. Although many such transmitters may be in use in a year or two, the present price of the final amplifier transistor — over $60 — seems a bit steep. In any case, the milled-dural chassis that I scrounged up (complete with a few more holes than I needed in it) is not readily available at your jobber's.

There have been some articles published on transistor a.m. transmitters[1, 2, 3] but most of them were intended for CB, and that which works well on 27 Mc. may not on 50. It appears that only part of the a.m. story is written down on paper, and I was obliged to do a bit of experimenting to be sure of getting linear modulation and straightforward tune up. In order to get the usual v.h.f. transistors to modulate, it is essential to vary the voltage on *two* stages, and to arrange things so that the energy fed through the interelement capacitances is small compared with the normal amplified output. The latter requirement implies either some kind of neutralization which will hold as collector voltage varies, or that a transistor with high forward gain is to be used. I didn't have to neutralize.

The transmitter's performance is good. Power input to the final and its modulated driver stage is a total of 7 watts while power output is 4 watts or more, with a 12.6-volt supply. Unlike tube transmitters, this one continues operation (of sorts) down to 8 volts, with readable audio. Operation is normal from 11 to 15 volts, about as much range as is likely in any automobile. Drain on transmit is 1.5 amperes, with nothing being used during standby periods. It could be called "instant heating" except that nothing gets hot. The 12-volt line can be keyed for chirpless break-in c.w.

Modulation

The modulator uses a pair of peanut-sized (TO-37) p.n.p. power transistors in Class B. Because I was unable to find a suitable commercial transformer, I wound up a center-tapped choke or autotransformer (T_2). The design method was to find a choke core (*i.e.*, gapped) with about a $\frac{5}{8}$-inch square center leg (this was the largest core that would fit inside the box) and wind, bifilar, with one No. 24 and one No. 26 Formvar wire, as many turns as would fit in the winding space. The result was a center-tapped coil with good coupling between halves, having somewhat lower d.c. resistance on one side. The side with the big wire was used to carry the current to the final. The number of turns is not known, but the unit was checked out on the bench



The transmitter is built in an aluminum box measuring 8¾ × 2¾ × 2½ inches, not including the extra length of the bottom cover which also serves as a mounting base. Although this case isn't a standard item, it gives an idea of the over-all size of container needed for building the circuit.

to make sure that the low-frequency response was adequate when unbalanced direct current was passing through one side. After testing, epoxy was slopped on and let harden to give the outside of the spool winding a bit of protection. Inductance is about 200 mh. total.

The modulator transistors are diode-biased for good stability with varying temperature. Despite the slight loss of voltage swing from using a modulation choke, it is possible to go beyond 90 per cent on peaks, so there seems to be no point in using larger transistors. The center tap of T_2 is grounded, and the emitters of the r.f. transistors are returned to the outer end of one winding (i.e., the negative lead is modulated). The r.f. transistors' bases are returned to emitter for audio and d.c., so it is really the collector supply voltage that is varied. If the modulator transistors were (silicon) n.p.n. types, T_2 would be hooked in the

* 111 Birds Hill Ave., Needham 92, Mass.

[1] *Fairchild Application Notes No. A-25.*

[2] *PSI Application Bulletin No. 7* (successor to Application Notes No. 1A).

[3] *Electronics World*, February, 1964, p. 28 (other references quoted at end).

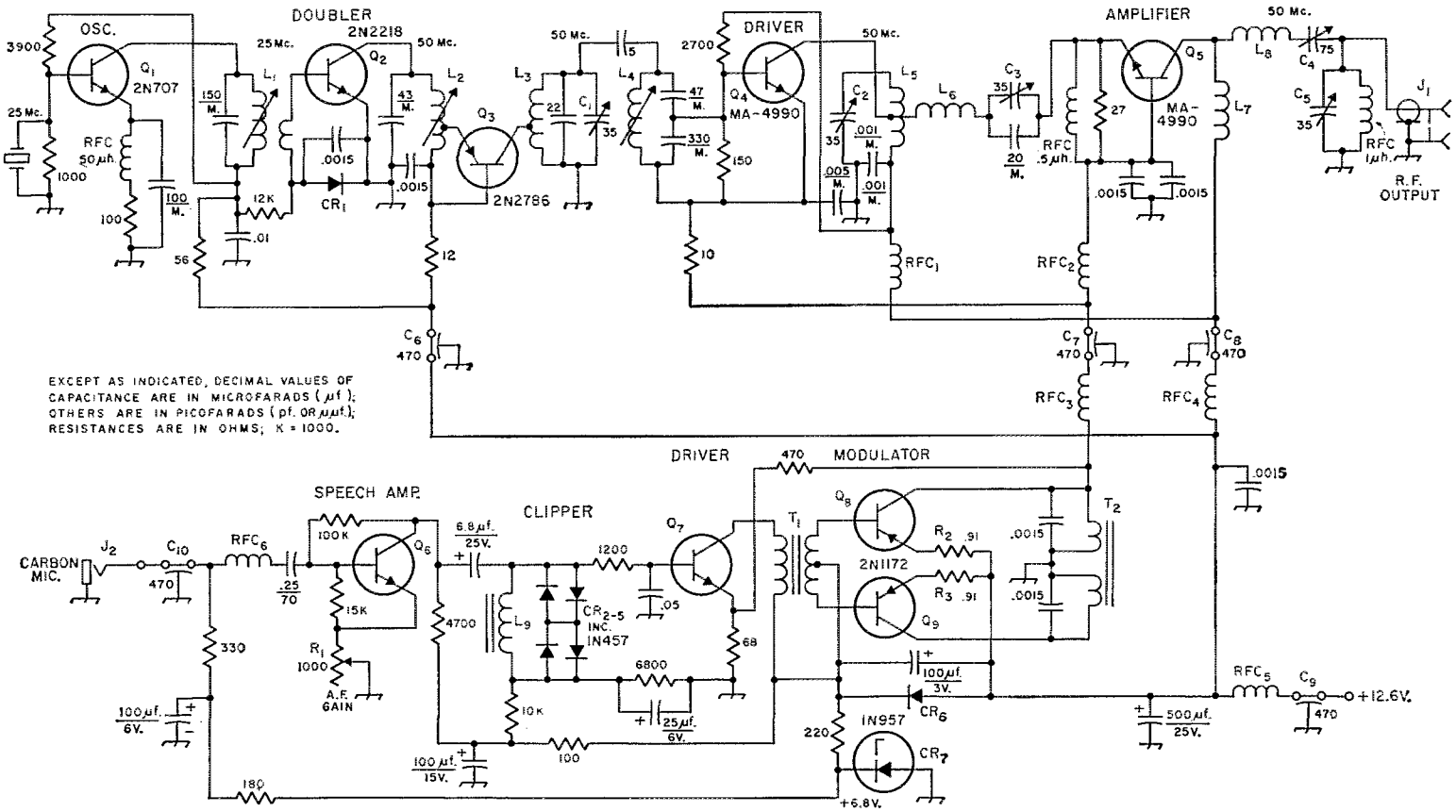
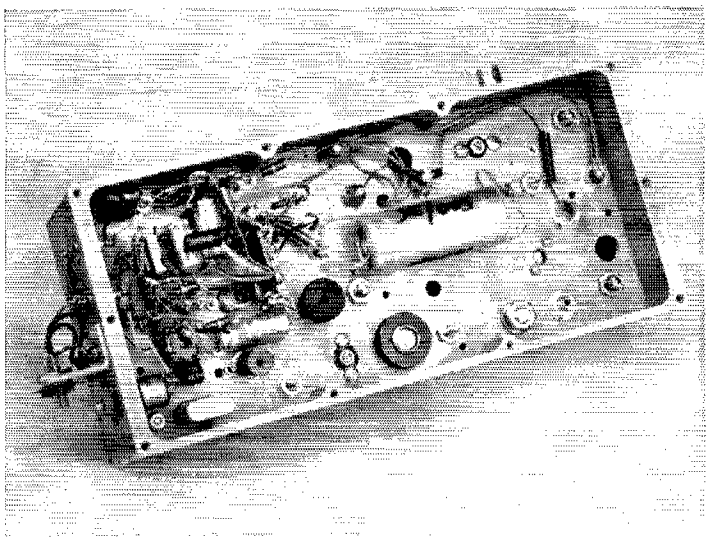


Fig. 1—Circuit diagram of the 50-Mc. transmitter. Unless otherwise specified, capacitors are disk ceramic, except M indicates mica and those with polarity shown are electrolytic. Transistor types shown on diagram are ones used; alternatives are given below.



The audio circuits occupy the left-hand section on this side of the center partition, except for the 25-Mc. crystal in the lower left corner. Heat-dissipating caps are used on the two transistors in the lower center.

C_1, C_2, C_{10}, C_{11}—35-pf. midget air padder.
C_3—75-pf. midget air padder.
C_9—C_{10}, incl.—Feedthrough type, 470 pf. or more.
CR_1—CR_5, incl.—1N251, 1N457, 1N458, 1N625, 1N629, 1N811, 1N903, or similar.
CR_6—1N2326.
CR_7—6.8-volt, ½-watt Zener (1N957 or 1N754).
J_1—Coaxial connector, BNC type.
J_2—Open-circuit jack or microphone connector.
L_1—5 turns No. 22 on ¼-inch diam. slug-tuned form, ⅜ inch long (CTC LS-6, green slug); secondary 1 turn.
L_2—4 turns same as L_1, tapped 1 turn from bottom.
L_3—5 turns No. 22, ⅜-inch diam., ½ inch long, air-wound; tapped 1 turn from ground end.
L_4—4 turns same as L_1.
L_5—4 turns No. 22 on ⅜-inch diam. ceramic form (CTC LS-5 without slug), ½ inch long, tapped 1¾ turns from bottom.
L_6—7 turns No. 22, ¼-inch diam., air-wound.
L_7—8 turns No. 22, ¼-inch diam., ⅜-inch long, air-wound.
L_8—5 turns No. 22 on ¼-inch diam., ceramic form (CTC LS-6 without slug), ¼ inch long.
L_9—5 henrys or more (inductor used is primary of small transistor output transformer).
Q_1—2N707, selected 2N706, or 2N2218.
Q_2—2N1505, 2N2218, or 2N2297.
Q_3—2N2786, 2N2786A.
Q_4—2N1709, 2N2631, 2N2781, 2N2876, MA-4990, PT531.
Q_5—2N2876 (two in parallel), 2N2887, 2N3229, MA-4990, 3TE140.
Q_6—2N336, 2N338, 2N541, 2N708, 2N2712, 2N2924, or similar.
Q_7—2N696, 2N697, 2N699, or 2N1613.
Q_8, Q_9—2N1172, 2N1611, or 2N3215.
R_1-1000-ohm linear control.
R_2, R_3-8 ft., 8 in. of No. 30 copper wire wound on resistor (10 ohms or more) as form.
RFC_1-RFC_{10}, inc.—App. 1 μh., lossy. Made by slipping 3 or so Ferrite beads (Ferroxcube 56-590-65B/3B) over connecting lead.
T_1—Audio driver, 100 ohms to 200 ohms c.t. or 200-to-200 c.t. (Argonne AR-504).
T_2—Approx. 200 mh_y center-tapped (see text). Wound on 1½ × 2-inch core, ⅝-inch square cross section.

positive lead and the collector supply voltage modulated in a more usual manner. (If this confused you, look at the circuit diagram and try again.)

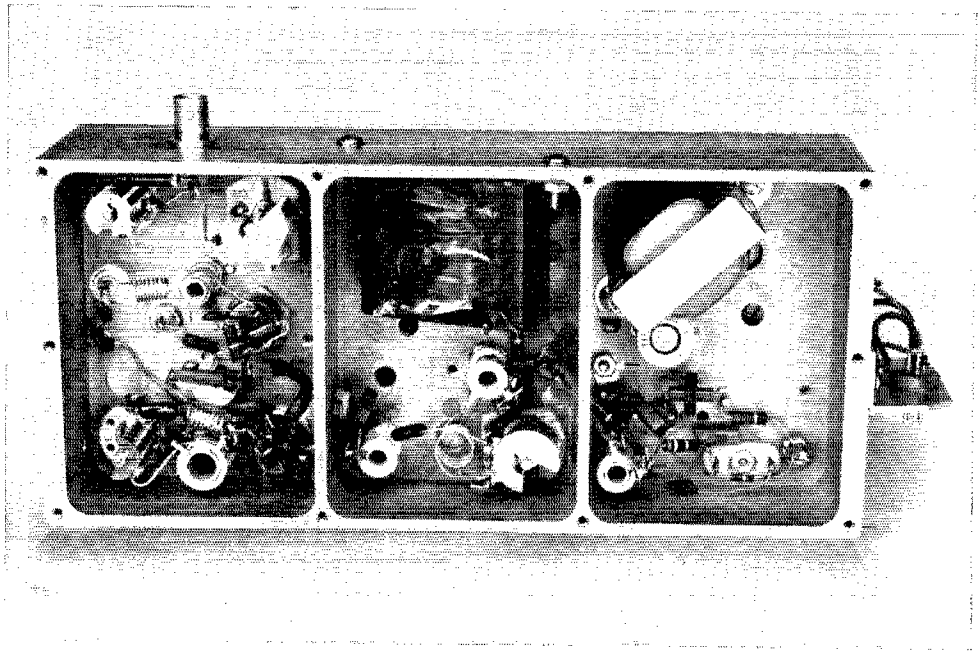
The speech amplifier is designed for a carbon mike. These are two silicon n.p.n. transistors. Four silicon diodes are used in the clipper, type 1N457 (45 cents) or similar. After the clipper, there is some inverse feedback from modulator output back to driver to try to keep the clipping point stable, and to make the modulation percentage less dependent on final drive and loading.

An automobile electrical system may go as high as 15 volts under certain conditions. Audio power transistors which have a choke or transformer in their collector circuits must therefore be able to stand as much as 30 volts between collector and emitter without breaking down. The r.f. power amplifier's instantaneous collector voltage may also swing up to twice supply voltage during the r.f. cycle. If the power amplifier is "plate-modulated" the peak collector voltage can go to four times the battery voltage, in theory, or maybe more under overmodulation conditions or with unusual waveshape. If breakdown is triggered, the transistor may be ruined, so it is desirable to have enough voltage capability in the r.f. power transistors (60-volt BV_{cer}) to make such a disaster unlikely. The clipper also helps.

Many of the transistor types which have been suggested for this service in previously described equipment are not rated for a full 60 volts between collector and emitter (equivalent to 70 or 80 BV_{cbo}) but it is my belief that the transistors actually employed had something more than minimum rated breakdown voltage. This amounts to a gamble, and playing double-or-nothing with sixty-dollar transistors is not my game.

R. F. Circuits

The transmitter starts with a 25-Mc. oscillator.



Mostly r.f. on this side of the center partition. The crystal oscillator is at the right. The central compartment contains the tripler and the driver input circuit. At the left is the driver (bottom) and the final amplifier. Audio components in this view include the modulation autotransformer in the center and the audio driver transformer at the right.

In most cases, a transistor crystal oscillator will be much more stable than one using a tube at the same frequency; this unit is more stable than most 8-Mc. tube oscillators. The 2N707 oscillator drives a 2N2218 doubler to 50 Mc. Any silicon transistor having the required high-frequency gain and voltage rating should do in either oscillator or doubler, but typical 2N697-699 types do not have the gain at 50 Mc. CR_1 is for bias stabilization.

Following the doubler there is one tuned circuit tapped to feed the emitter of the grounded-base 2N2786 driver. This is one of Amperex' stripe-geometry diffused germanium power transistors. It will produce about ½watt output with 12-volt supply on either 50 or 144 Mc., but 16 volts blew the first one we tried it on—roughly, what the ratings told us to expect. It is not suitable for a.m. on a 12-volt supply. The collector of this stage is tapped well down on its tank coil in order to get as much selectivity as possible. The top of the tank circuit is capacitance coupled to a high-impedance point on the tuned circuit feeding the modulated driver. The pair of LC tanks acts to match the 12-ohm collector of the 2N2786 to the 100-ohm input of the first MA-4990, at the same time rejecting 25 and 75 Mc.

The driver has some forward bias, so as to ease the drive requirements. Since the bias varies with modulation, the operation could be called anything you wish, but the net operating angle is about Class B. A lower-power transistor could be used for this stage: the peak output required is about 3 watts. The matching problem is about the same as before, except that the double interstage is coupled up more tightly for better power transfer.

The MA-4990 final amplifier is also modulated, but its quiescent bias is zero; there is an r.f. choke between emitter and base. It is operated grounded-base, not necessarily a more stable connection at this frequency. There is a 27-ohm ½-watt carbon resistor also from base to emitter. This soaks up only a few hundred milliwatts in normal operation, but it eliminated a tendency for the last transistor to oscillate and draw a lot of current when the tuning was just wrong. The final is stable when tuned and loaded properly, and the resistor keeps it that way when it's loaded improperly. That final transistor has over one hundred times the transconductance of an 807, remember. The output circuit is a modified pi network. When used with a narrow-band antenna such as a "Halo," it is adequate for harmonic suppression, as the series-resonant circuit supplies the Q needed.[2]

The modulation characteristic is linear, as shown by the trapezoid pattern of Fig. 2. The linearity is not critically dependent on drive level although, as in the case of a grid-modulated stage, lowered drive can cause overmodulation. The pattern was obtained on a Tektronix 545A scope with "K" plug-in (useful response to 80 Mc.), the horizontal sweep voltage being obtained from one end of the modulation choke.

Fig. 3 shows the output envelope for different degrees of clipping of a 500-cycle signal. There is some filtering of the clipped waveforms, and

on the air the adjacent channel splatter seems reasonably low, with excellent speech quality. What is not shown is that this quality of modulation and linearity is obtained just by tuning for maximum under carrier conditions with a field-strength meter, and the signal still sounds good when things are detuned quite a bit.

Heat and Temperature

The thermal problems in an amplitude-modulation transmitter are minor, mostly because the final-amplifier transistor has a rated dissipation of 20 watts, will put out a maximum of 16 watts, and is running at less than 3 watts average dissipation. Under mistuned conditions, the dissipation will still be well within ratings. Most r.f. transistors are limited as to peak voltage and current, rather than in the power that they can dissipate.

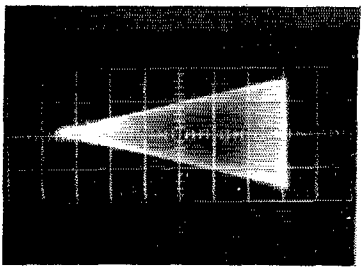
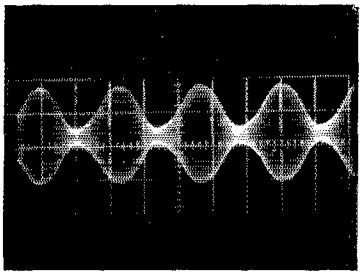
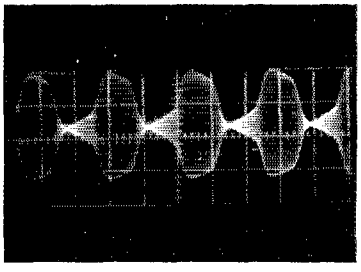


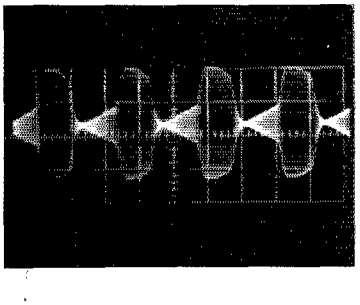
Fig. 2—Trapezoidal pattern shows excellent linearity at maximum modulation, well over 90 per cent.



(A)



(B)

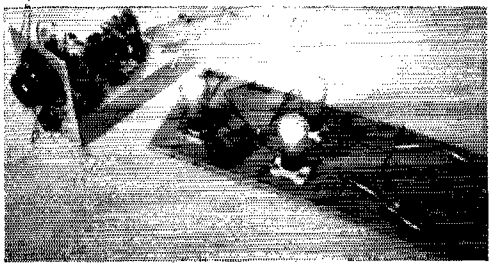


(C)

Fig. 3—(A) Waveform modulation pattern using 500-cycle tone, audio input below clipping level. (B) Input raised 10 db. The clipper is operating at this level. (C) Input raised 20 db. above A. Peak r.f. output is held to the same level as in B.

The 2N1172 germanium power transistors operate Class B, at rather low average dissipation for speech modulation. They can safely operate up to a chassis temperature of about 60 degrees C., mounted as they are with mica washers to the 0.080 aluminum. The 2N2786 has about 22 degrees rise for 0.4-watt dissipation, so it also is safe to above 60 degrees C. It uses a Thermalloy 2205 heat sink mounted to chassis with a Teflon washer. The smaller silicon units use Thermalloy 2210 clamp-on finned sinks which are good for a watt at 70 degrees C. The driver and final are bolted to chassis, and have beryllium-oxide insulators inside that keep the collectors cool and electrically off ground. The only over-all thermal test has been a summer of mobile operation. No problems. QST

Strays



WØKWY (who was 9AMU 'way back then) sends us the picture on the left. It shows a transmitter and receiver built for the early ARRL five-meter tests. The receiver uses two type 237s and a number 38 tube in a super-regenerative circuit. The transmitter uses 201As; two in the r.f. stage and another to modulate. Note the "hedgehog" audio transformer on the transmitter and the 80-to-1 Accuratune dial on the receiver.

At the time of the tests, General Radio cooperated by bringing out a five-meter wavemeter but, writes WØKWY, "they must have been swamped for orders, because by the time mine arrived, the contest was over."

Transistor Keyer/Muter for Collins S Line

Break-In Without Relays

BY H. ROMMEL HILDRETH, M.D.,* KØHZF

In a previous article, the author described a break-in system for Collins S-Line equipment which involved the use of a relay. In this article, he shows a simple method of eliminating the relay.

C.w. has its advocates, as anyone who listens in on the crowded bands can testify. A break-in system adds to the pleasure of working c.w., makes for better operating, and almost any equipment can be adapted to this mode of transmission. Some of the ideas on the conversion of the Collins S-Line that I presented in a previous article[1] may be useful for such adaptation. The principles are basic and may be applied to other manufactured equipment or home-brew rigs. Proper muting of the receiver is a must, and I described the use of a keying/muting relay which has done the job very well. But, not content with stopping at that point, I have eliminated the relay by the use of a single transistor and thus have removed the mechanical disadvantages usually associated with relays.

Keying/Muting

The term keying/muting means exactly what the words imply: When the key is closed the transmitter is functioning and the receiver muted. The reverse takes place instantly when the key is opened, so that the operator hears signals perfectly between dots and dashes. The Collins S-Line lends itself ideally to the use of a transistor as a switching device to replace a relay.

Muting Circuitry

The schematic of Fig. 1 will show the expert at a glance what is to follow. For those who have not worked with transistors, let me go into detail. The Collins 75S series receivers are muted by biasing some of the tubes to cut-off. Part of the biasing circuit is grounded by the stand-by switch. The muting cable that runs to the companion exciter goes to VOX relay contacts which merely do the same grounding. In the break-in system that I described previously, the muting cable runs to a keying/muting relay. One normally-closed circuit of the relay makes the muting ground connection. The moment the relay is energized, the grounding circuit is opened and the receiver is instantly muted.

* 711 Middle Polo Drive, St. Louis 5, Missouri.

[1] Hildreth, "Instantaneous Break-In with the Collins S-Line," *QST*, Dec., 1963.

Transistor Switch

Instead of using the relay, let us connect the muting cable from the receiver to the collector and emitter terminals of a transistor. The center conductor of the cable is negative and must be connected to the collector; the positive terminal (chassis) goes to the emitter. In this situation, with no voltage applied to the base, the transistor presents a high resistance, and the receiver is in the stand-by condition. If a small current is made to flow in the proper direction between the base and emitter, the resistance across the muting cable vanishes, and the receiver is in normal operation. The transistor is therefore acting as an "on" and "off" switch. The voltage for the base current can be supplied by the transmitter, as we shall soon see.

Keying the Transmitter

The center contact of the key jack of the 32S series Collins exciters is negative relative to the chassis. When the key is closed, it grounds this center contact and lowers the bias from the cut-off value to operational level, somewhat like the system of muting in the receiver. The receiver and exciter chassis are at the same electrical potential because they are interconnected by several cables. Now we can use the negative voltage at the key-jack center contact to provide the so-called forward bias to the transistor base-emitter circuit. The base current must be limited by a suitable series resistor. With the receiver and transmitter both turned on, and the receiver switch at standby, the receiver will be operational since the transistor is properly biased to conduct. When the key is closed for transmitting, the exciter bias voltage is dropped to operational level, as mentioned above. Also, at the same moment the key is closed, the key shunts out the bias voltage to the transistor base circuit and the receiver

(Continued on page 176)

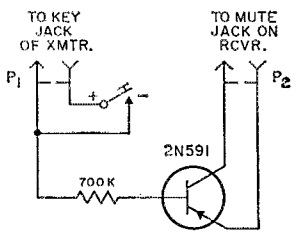


Fig. 1—Circuit diagram of the simple transistor muter and break-in relay substitute. The polarity of the key terminals is shown for the benefit of those using transistor keyers.

A Low-Cost Transistor Mobile Power Supply

375-Watt Unit from Bargain Components

BY JOHN S. RAYDO,* KØLMZ

IF one has the patience to ferret out sources of surplus equipment and comb bargain listings often issued by mail-order houses, he can usually save himself quite a bit of money in any construction project. The mobile supply to be described is a case in point.

The circuit, which is more or less conventional, is shown in Fig. 1. The heart of this supply is a toroid core taken from a 350-cycle 500-watt General Radio M-5 surplus Variac, which was picked up for two dollars.[1] The core was removed from the assembly and the windings stripped off, leaving the plastic bobbin exposed. New windings should be made by the following procedure: The two primary windings are wound first. Each primary is made up of three No. 12 enameled wires in parallel. Parallel the two bundles and wind 8 turns (all six strands simultaneously) over the plastic bobbin, spacing the turns evenly to cover the entire core. Hold the ends down with Scotch glass-cloth high-temperature tape.[2] Select the starting ends of any three strands and find the finishing ends of these same three strands by checking with an ohmmeter. Using pieces of masking tape, identify the ends as the starting and finishing ends of Primary No. 1. Similarly, identify the ends of the remaining three strands as Primary No. 2.

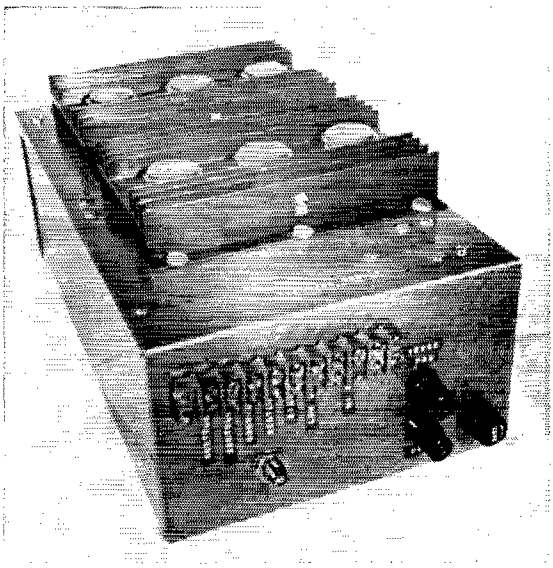
The feedback winding is wound directly over the primaries. It consists of 4 turns of No. 20 hookup wire (approximately 2 feet of wire), spread out evenly around the core, and center-tapped. Wrap the transformer with a single layer of glass tape.

The three secondaries are wound with No. 26 enameled wire. The high-voltage winding (1000 volts) consists of 750 turns, tapped at 620 turns (800 volts), 525 turns (700 volts), and 465 turns (600 volts). Try to complete the entire high-voltage winding in one pass around the core. If it is impossible to do this, tape will have to be used between layers. Cover the finished winding with a layer of tape.

The 300-volt winding consists of 250 turns, tapped at 220 turns (275 volts) and 200 turns (250 volts). Again, complete this winding in one pass around the core, and cover with a layer of tape.

The 100-volt bias winding has 80 turns wound over the core wherever space permits so as to help give the completed transformer a doughnut shape. Two layers of tape should be wound over this final winding. Dip the transformer in shellac and, after it dries, bake for several hours at 275 degrees F. to set the glass tape. (Better do this when the boss is out of the kitchen!)

Hookup wire is suggested for bringing out the taps and ends of the windings. This wire is stronger and more convenient to use than enameled wire. Tape each splice and end to prevent shorts.



The two groups of transistors are mounted with mica insulators on separate heat sinks. The bias adjustment is below the power terminal strip. Leave an empty terminal on either side of the 700-volt terminal to prevent breakdown. (Picture courtesy of WØLQV.)

Testing the Transformer

Preliminary testing of the transformer may be done in haywire fashion by clipping it into the circuit and using only one transistor in each side of the primary circuit. The finishing end of the first primary is connected to the starting end of the second primary to form the center tap. D.c. at 3 to 5 volts (at 1 amp. or more) should be applied to the input with no load on the output. If the circuit is oscillating, an audible tone will be heard. If not, reverse the end connections to the feedback winding. Now short one of the secon-

*c/o Rann Industries, 2801 West 50th Terrace, Shawnee Mission, Kansas.

[1] J.J. Glass Electronics, 1624 South Main St., Los Angeles 15, Calif., and others.

[2] Burstein-Applebee, 1017 Charlotte, Kansas City, Mo.

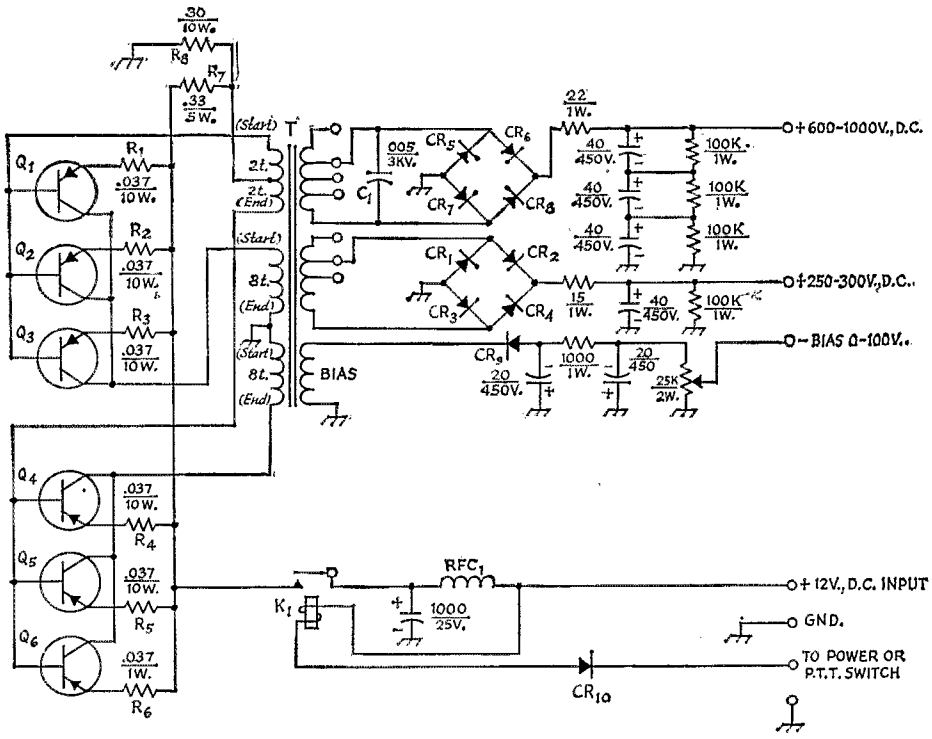


Fig. 1 Circuit of the 375-watt transistor mobile power supply. Resistances are in ohms and capacitances in μf. Capacitors are electrolytic except for C_1 which is disk ceramic.

CR_1-CR_4, incl.—Each consists of two 400-p.i.v. (min.) 500-ma., (min.) diodes in series, each diode shunted by a 470,000 ohm ½-watt resistor, or one 800 p.i.v. (min.) diode (no shunt resistor).

CR_5-CR_8, incl. — Each same as CR_1, but four 400-p.i.v., (min.) or two 800-p.i.v. (min.) diodes in series.

CR_9 — Single 400-p.i.v. (min.) 500-ma. (min.) diode, no shunting resistor

CR_{10} — 50-p.i.v. (min.) 2-amp. (min.) diode

K_1 — 12-volt car-starter relay, or similar.

Q_1-Q_6, incl. — 2N173, 2N278, or equivalent.

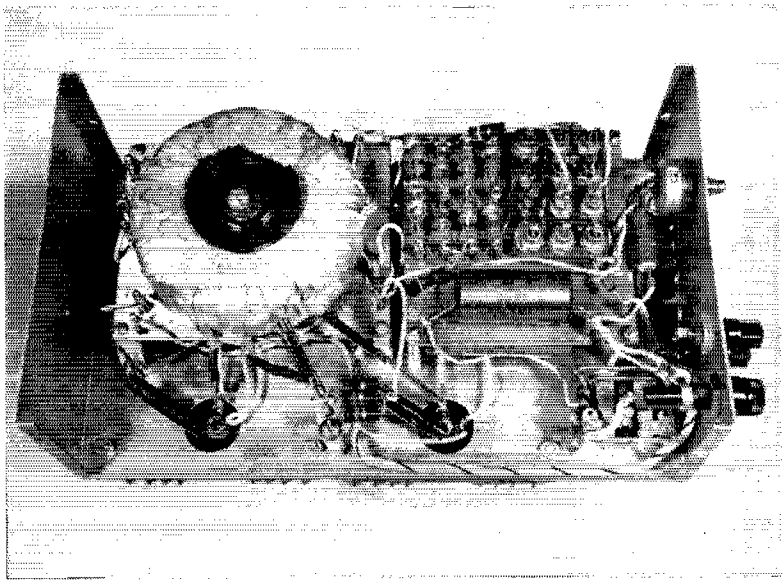
R_1-R_6, incl.—0.037 ohm, 10 watts. See Footnote 3.

R_7 — 0.33 ohm, 5 watts. See Footnote 3.

R_8 — See text.

RFC_1 — 15 turns No. 12, ¾-inch diam., close-wound.

T — See text.



Interior view of the 375-watt supply. The control relay is at the lower right, the rectifier assembly at the upper right, and the transformer at the left. Two of the 0.037-ohm resistors can be seen in the foreground.

daries (use a well-insulated probe to do this). The oscillation should stop, and the input current should drop to a low value.

Now the transformer can be wired into the final circuit. Increase the input voltage to the normal value (12 volts), observing proper polarity. Shorting one of the secondaries should again cause the oscillation to stop. The total primary current should be held below 4 amperes. If the current exceeds this, increase the resistance of R_8.

Construction Notes

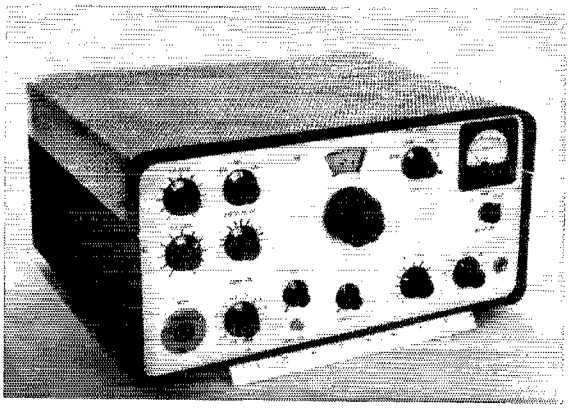
The power supply was built into a 4 × 7 × 12-inch Bud case, but any other case large enough will do. The transistors used were bargain-priced equivalents of the 2N173 and 2N278.[2]

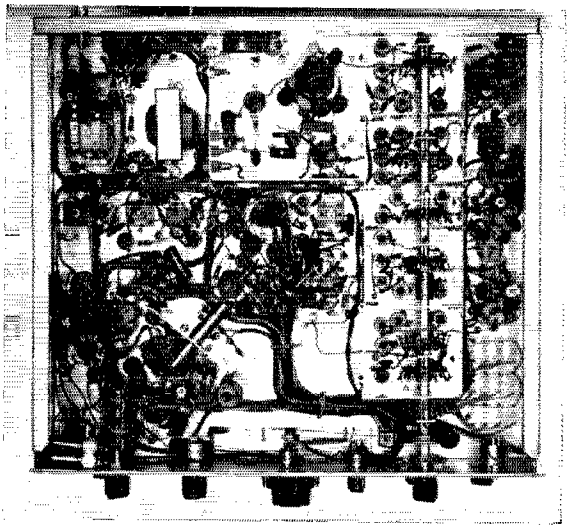
[3] McGee Radio, 1901 McGee, Kansas City, Mo.

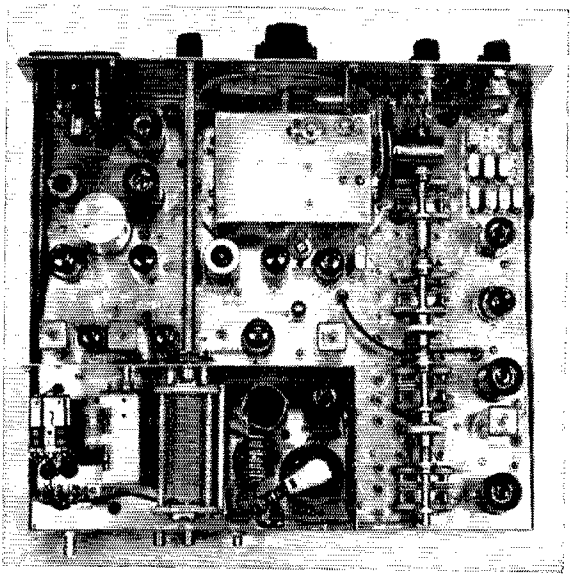
Other 15-ampere 40-watt transistors should be suitable, but make sure that the voltage rating is at least 40, and preferably 60 volts. Mica insulators are placed between the transistors and the heat sinks. The sinks used were Inland brand, BA stock number 12C330.[2] The 0.037-ohm 10-watt emitter resistors[3] assure that the current divides up evenly to each transistor.

The maximum rating of the supply is about 375 watts continuous duty, with a maximum current rating of 500 ma. for either high- or low-voltage winding. This is sufficient to operate most s.s.b. tranceivers, such as the NCX-3, Swan and others. The over-all efficiency of the supply is 92% under full load. With no load on the supply, it will oscillate even on a 1.5-volt flashlight cell. The total cost to me for materials was less than $30.00. QST

Strays







Here's a beautiful piece of homebrew by VE3BJO — a sideband transceiver which he uses both at the home station and mobile. It's got all the fixin's, including having a v.f.o. dial which can be read to ½ kc., upper and lower sideband selection without carrier shift, 60-db. carrier suppression, 125 watts input p.e.p. — and all of this and more too in a package weighing only 14 lbs. and measuring 14 by 12 by 6¾ inches! These photographs show you the excellence of the workmanship.

Incidentally, have you noticed how many sideband transceivers have been homebuilt lately?

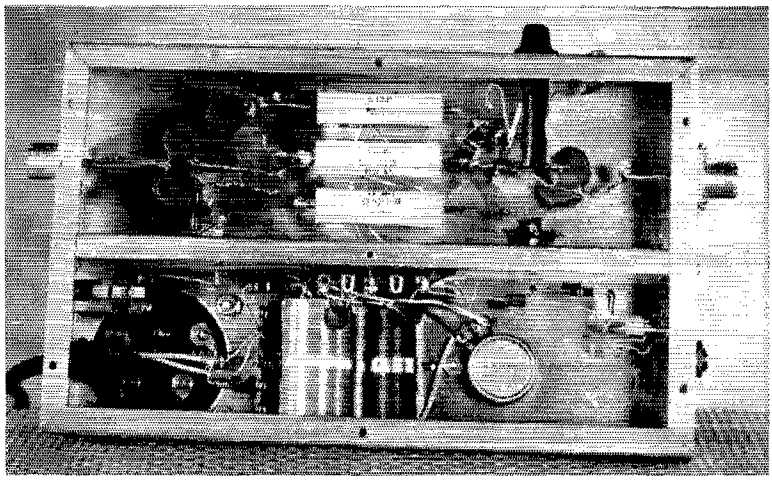
High Power Version of the Keyed Antenna Relay

After nine months of service, including the Sweepstakes and several DX contests, VE3AU reported that his keyed antenna relay [1] finally packed up with the contacts welded together. He regards this as pretty fair service for a device that has been operated 1000 per cent above the manufacturer's specified power capability! However, in anticipation of the ultimate demise of the little reed switch, and also to meet the demand both for greater power-handling capacity and for greater tolerance in mismatching of transmitter to antenna, he has developed a higher-power version. This uses three of the RDG-DTH Hamlin switches. The exciting coils (Coto-Coil S-12-P), are mounted directly on 470-pf. standoff capacitors fastened to the bottom of a 6 × 10 × 2-inch chassis, with the coils wired in series. The chassis is rather wider than necessary, simply to enable the reeds to be slipped in and out without removing the coils.

All the switches close simultaneously or nearly so — any small variations are well within the two or three millisecond tolerance permitted by the grid-block keying technique.[1] Relays K_2 and K_3 are in parallel for the transmitter r.f. and since the impedances in the coupling capacitors are greater than the switch impedances, an equal division of r.f. current is obtained. K_3 only is used to key the grid-block circuit, and the back contact of K_2 only is connected to the receiver relay K_1. In the transmit position (all relays closed) the voltage divider formed by R_1 and by R_2 and R_3 in parallel ensures that the r.f. voltage divides equally across the back contacts of K_1 and K_2. As before, Dow Corning No. 4 silicone grease is applied liberally to the double-contact ends of the switches. Theoretically, therefore, the three relays in this configuration should have double the current-carrying capacity and double the voltage breakdown of the former single relay. In practice this seems to be borne out in tests to date, but only time will tell, of course.

A small power supply provides −50 volts or so to excite the relays. Each relay coil is rated at 12 volts, 30 ma., for normal operation, but in this service the hold-in voltage across each coil

[1] "A Keyed Antenna Relay," *QST*, July, 1964.



The "beefed-up" model of the keyed antenna relay uses three reed switches actuated simultaneously. The switches and r.f. input-output wiring occupy the top section of the chassis in this view. Power supply and keying jacks are in the lower section. The coax socket for the antenna is the one on the right; transmitter connects to the one at the left. Receiver jack is the phono connector at the right top, alongside the fuse holder.

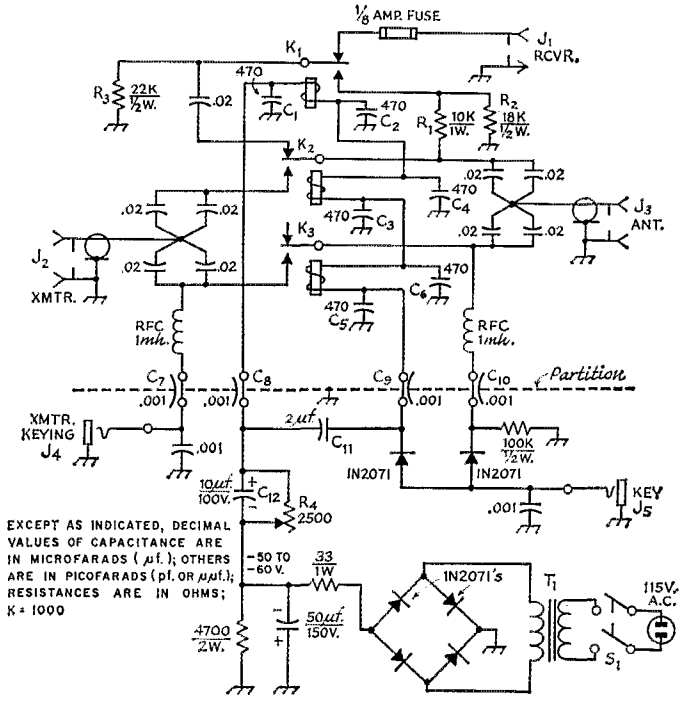


Fig. 1—High-power version of the VE3AU keyed antenna relay. Capacitors with polarity marked are electrolytic; others not specified below are disk ceramic. Any silicon diode having a p.i.v. rating of 400 volts or more may be substituted for the 1N2071s shown.

C_1-C_6, inc.—Standoff type (Allen Bradley SB4A, Centralab ZA-501, or equivalent).
C_7-C_{10}, inc.—Feed-through type (Centralab ZB-102 or equivalent).
C_{11}—Paper.
C_{12}—Electrolytic; see text reference.
J_1—Phono connector.
J_2, J_3—Coax connector, chassis mounting.
J_4, J_5—Open-circuit jack.
K_1-K_3, inc.—Reed switch (Hamlin DRG-DTH) with actuating solenoid (Coto-Coil S-12-P). Available as an assembly (type SP-12/DRG-DTH) from Coto-Coil Co., 65 Pavilion Ave., Providence 5, R. I.
R_1-R_3, inc.—Composition, noninductive.
R_4—Linear-taper control, 2 watts.
S_1—D.p.s.t. toggle.
T_1—Bias transformer, 40 volts, 30 ma. (125-volt, 50-ma. transformer may be used if d.c. output voltage is reduced to required value by an added voltage divider.

can be as low as 6 volts. Satisfactory operation is obtained by adjusting R_4 to yield about 20 to 24 volts across all three coils in series, in the steady-state key-down condition. When the key is pressed, the full supply voltage is momentarily applied to the coils through C_{12}, which ensures fast and positive closing action.

VE3AU admits quite cheerfully that this high-power version of the keyed antenna relay is not yet the ultimate. While the power-handling capacity has been increased four-fold over the single relay, the fact remains that at the kilowatt level the reed switches are still overworked by a factor of three or four above the manufacturer's specification. One could go on adding more switches in series-parallel, but the increased complexity — and cost — makes this approach unattractive. It would be better if a single reed switch were available which would handle a kilowatt comfortably under the usual variations in matched conditions encountered in amateur practice. The design of such a switch does not seem impractical and, if the demand were great enough, some manufacturer would undoubtedly come up with a high-speed switch to fill the bill.

QST

Strays

A cumulative index to *QST* is now available for 25c postpaid. This 64-page booklet covers the years 1950–1962, with provision for updating it easily for the next five years.

Send your order and 25c (no stamps, please) to ARRL, 225 Main St., Newington, Connecticut 06111.

More public service in the medical field — amateurs in Omaha, Nebraska, provide a daily medical advisory network over which Omaha doctors can talk with doctors at the stations of hams in South American countries and exchange medical advice. The net, part of the Intercontinental Traffic Net, meets daily at 14,330 kc., 1300 GMT.

First Maxim Medal Awarded to Reinartz

IT IS OUR SAD DUTY to record the death of another radio pioneer, John L. Reinartz, K6BJ, inventor of the Reinartz Tuner, the standard amateur receiving circuit of the early twenties, and one of the men most responsible for the opening of the vast short-wave territory below 200 meters. The end came on October 5, 1964, after a long illness.

Just three weeks earlier, ARRL President Hoover, Pacific Director Engwicht and several other long-time friends and associates gathered around his hospital bed to present the first Hiram Percy Maxim Gold Medal, established by the ARRL Board of Directors at its meeting in May, and awarded by the Board to John as a result of his short-wave accomplishments beginning in the twenties.

We borrow heavily from a biography which appeared on souvenir programs of a testimonial dinner for K6BJ when he retired from Eimac, February 1, 1960:

John L. Reinartz was born in Krefeld, Rhine Province, Germany, March 6, 1894, the oldest of seven children. In 1904, the family settled in South Manchester, Connecticut, where Reinartz' father was a farmer.

Reinartz first became interested in radio in 1908, while browsing through the magazine racks at a small candy store near school. He read of wireless and its fundamental equipment and practices in *The Electrical Experimenter*. Saving the 10 cents a day he earned working for a blacksmith, he bought the secondary of a one-inch spark coil which he saw advertised. He used iron wire for the core and bell wire for the primary. The electrolytic interruptor for the spark coil was home-made. He made a coherer from a quarter-inch glass tube, filled with nickel filings. Using his own initials, he went on the air as "JL" via the spark transmitter and a 600-foot antenna tacked to the tops of trees.

In 1916, he trained at Camp Upton, **L.I.**, and then taught code to military operators.

By 1921, Reinartz developed his famous tuner. It was given wide publicity and thousands were built. In 1921, Reinartz also published a magazine, distributed free, on "How to Build Receivers and Transmitters at Low Cost." His writings on the tuner and its improvements were published in *QST* in June, 1921, March, 1922 and October, 1922. He was the ARRL assistant division manager for Connecticut in 1923.

A major achievement of Reinartz' early radio work was participation in the first successful two-way trans-Atlantic communication. Three men took part in the attempt — Reinartz, F. H. Schnell, Hartford, Conn., traffic manager for the ARRL and M. Leon Deloy, at 8AB, Nice, France. All used a transmitter circuit developed around a Westinghouse 50-watt tube. Reinartz had developed a single tuner able to sweep from 200 meters down to 28 or 29 meters.

John L. Reinartz, K6BJ

Reinartz had given 8AB the circuit when Deloy came to the States for the 1923 ARRL National Convention at Chicago. The men then made arrangements for trans-Atlantic tests on 100 meters. *Two Hundred Meters and Down* records the event:

The night of November 27, 1923. Both Schnell and Reinartz were on the air. Schnell had secured special permission from the Supervisor of Radio at Boston to use the 100-meter wavelength, and everything was in readiness. At the stroke of 9:30 the strangely-stirring 25-cycle gargle from 8AB came on the air. For an hour he called America, then sent two more messages. At 10:30 he signed off, asking for an acknowledgment. Long calls from 1MO and 1XAM and then . . . there he was, asking Reinartz to stand by, and saying to Schnell, "R R QRK UR SIGS QSA VY ONE FOOT FROM PHONES ON GREBE FB OM HEARTY CONGRATULATIONS THIS IS FINE DAY MIM PSE QSL NR 1 2" . . . American and European amateurs were working for the first time, with strong signals, and to Deloy, after a year's constant and unremitting effort, it was a fine day!

He then called Reinartz, 1XAM, whose transmitting circuit was in use at all three stations, and they also worked with similar ease. A message was sent via 1MO to the renowned General Ferrie, France's grand old man of radio. Further schedules were arranged. Signals were coming through on loudspeakers. A key and buzzer, actuated by the neighbor lad next door, would have been no louder; yet a mighty ocean, four thousand miles of trackless distance, separated these pleasantly-chatting friends, separating innumerable friends to chat in countless days to come.

It was, indeed, a fine day.

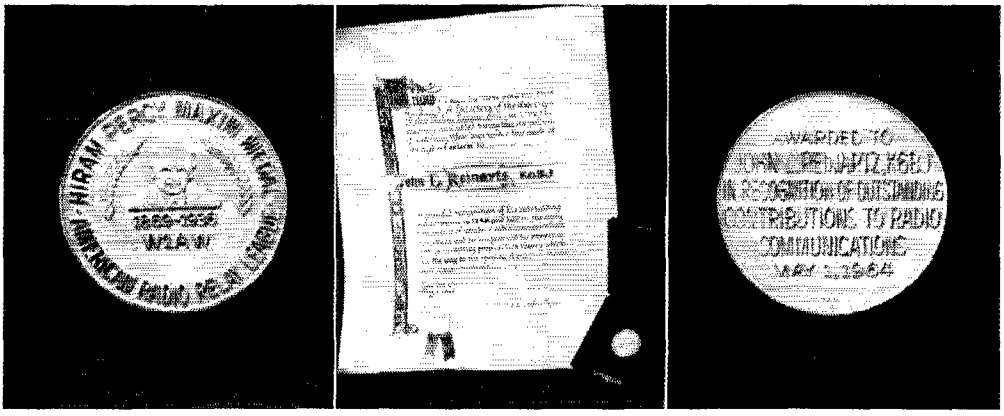
Passing of an Illustrious Pioneer, 1QP/1XAM

Through 1923 and 1924 Reinartz worked on the problem of "skip" in short wave communications. His experiments, published in the April, 1925 issue of *QST*, credited the "Heaviside" layer with bouncing back radio signals. His article, "Reflection of Short Waves" explained the phenomenon whereby a low-power transmitter could send shorter waves to its immediate area, and then, after passing a "dead space," could be received again at longer distances.

Using this "skip distance"theory in his experiments, he was able to communicate across the nation for a daylight record. In 1925, he reached Ed N. Willis, at 6TS Santa Monica, with a 20-meter transmission sent at high noon, rather than during night hours.

moved on to other Navy jobs, including head of the Naval Research Laboratories Radio and Radar Division. Later, on the West Coast, he was in charge of modification of airborne radar equipment used in the Pacific. He served in the Navy until 1946, achieving the rank of captain. In 1946, he rejoined R.C.A.

Reinartz and his wife came to California in 1949 and he joined Eimac as manager of the Amateur Service Department. He held a total of 28 patents; several aided in the development of communications for World War II. His trail-blazing work in radio was recognized in 1958 when he was named a Fellow of the Institute of Radio Engineers. He was also a member of the Explorers Club of New York, the



The testimonial certificate of the ARRL Board of Directors, together with views of the first Maxim medal.

His work attracted the attention of then Lt. Cdr. Richard E. Byrd, who asked him to handle communications for the first attempt to fly over the North Pole. Reinartz aboard the *Bowdoin* achieved the first *daily* communications with civilization from an Arctic expedition. Some of his transmissions were received by Arthur Collins, W9CXX, then a high school boy who cut classes to get back to his rig for the communications.

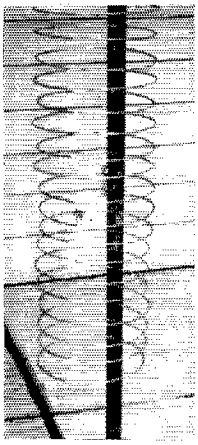
Reinartz was commissioned a lieutenant in the Naval Reserve in 1927. After the Arctic tour of duty he experimented for the Navy and also worked at what is now the University of Connecticut. These latter experiments were on measurement of voltage generated by growing plants. By 1933, Reinartz had joined the Radio Corporation of America. As a Naval reservist, he ran weekly classes, via radio, for the men of the Third Naval District. In 1938, Reinartz was called to active duty in the Navy as a personnel officer, assigned to assemble eligible, experienced, radio personnel for training and research. By Pearl Harbor, he had assembled a list of 720 reserve officers and 3,500 enlisted reserves who were quickly assigned to communications duties. Reinartz

American Polar Society, the American Radio Relay League and was an associate member of the Naval Institute. Reinartz retired in 1960, and since then had lived at Aptos with his devoted wife Gertrude, K6MJH.

ARRL President Hoover, addressing the 1964 National Convention at New York, summed up a tribute to K6BJ:

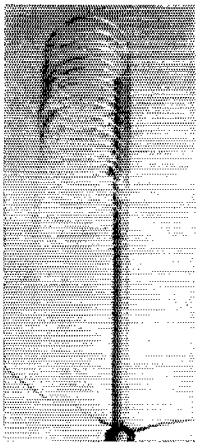
In the immediate scramble for short waves that followed his basic concepts, Reinartz's pioneering work became strangely over-looked. Perhaps the fact that he was an obscure electrician in a New England textile mill, who had over-turned the accepted theories of the scientific authorities of the day, had had something to do with it.

But John Reinartz should not be forgotten. Quiet, modest and unassuming as he may be, he — perhaps more than any other individual — is the father of short-wave radio. When we realize that today, 40 years later, the great bulk of the world's long distance radio communication — broadcast, point-to-point, marine, aviation and all others — still takes place on these same short waves that were first demonstrated by Reinartz, we can justly be proud of his amateur accomplishment.



The completed "Antalo". The driven element is the double ring at the center.

The ANTALO



The "Antalo" aloft on its supporting mast.

Two-Meter Halo with Parasitic Elements

BY ROBERT W. BANTA,* K8PBA

At this time of ever-increasing activity in the v.h.f. region of the spectrum, some serious thought has been devoted toward increasing the useful radiated power from a halo-type antenna. Heretofore, the only way that gain has been realized with antennas of this type has been by stacking driven elements. The antenna shown in the photos consists of a single driven element, and 16 parasitic rings, placed 8 above, and 8 below the driven element on a common mast. The over-all diameter is 10½ inches, and the total height is 33⅜ inches. The driven element is fed with coaxial transmission line, and the system may be easily adjusted for low s.w.r. on the line.

The name "Antalo" is a fusion of the words "antenna" and "halo." Measurements that I have made using Hewlett-Packard signal generator and v.h.f. attenuators and a receiving antenna at a distance of one mile show gains of as much as 10 db. over a reference halo, in the pattern shown in Fig. 1. Maximum gain is along a line drawn from the supporting mast through the gaps in the elements. Several others have duplicated this antenna with highly satisfactory results.

Construction

There are no special hard-to-get items required for the Antalo, and construction is simple. Most of the work will already have been done if you buy ⅛-inch aluminum clothesline that is in a roll 10½ inches in diameter. The rings are merely cut already bent to size for use as the parasitic elements. The only other materials required are a piece of pipe at least 5 feet long and not smaller in diameter than ¾ inch, two pieces of Plexiglas or similar insulating material, and some machine screws.

Two turns, plus about 6 inches, of the aluminum wire are needed for the driven element. A 6–32 spade lug is slid onto the wire approximately to its center. The lug is used as one of the supports for the driven element. The wire is bent into the form shown in Fig. 2. A loop of 5/32 inch inside diameter is bent at each open end of the wire.

An insulating mounting plate for the driven element is made by cutting and drilling a piece of ⅜-inch Plexiglas sheet as shown in Fig. 3. The

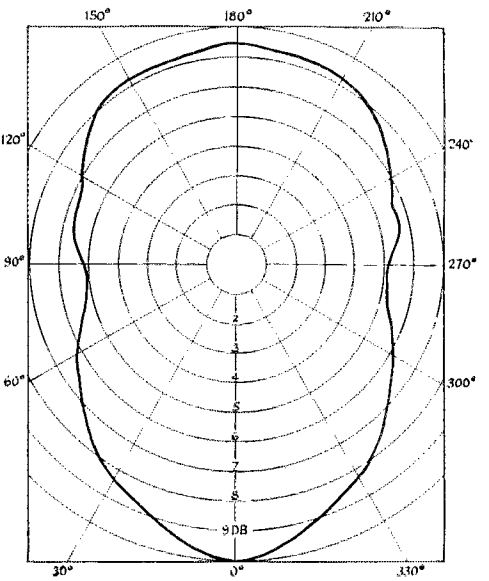


Fig. 1— Field pattern of the Antalo antenna on 145.342 Mc. and at a distance of 1 mile. Gain figures are in reference to a standard halo.

* 853 Oak Court, Ypsilanti, Michigan.

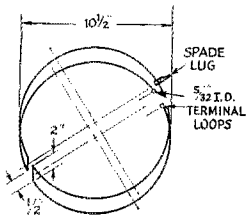


Fig. 2—The driven element is made of ⅛-inch aluminum clothesline, bent to form a double loop with a gap at the front.

element is attached to the insulator with the spade lug at the upper ¼-inch hole, and 8-32 machine screws through the terminal loops of the wire at the bottom pair of holes, as indicated.

A spacer is cut from ½-inch Plexiglas rod to fit between the folded ends of the driven element, as shown in Fig. 4. A similar spacer could also be

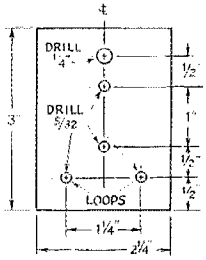


Fig. 3—The insulating mounting for the driven element is made from a piece of ⅜-inch Plexiglas, cut and drilled as indicated.

made from ⅜-inch sheet material if the rod is not available.

For the parasitic elements, 16 rings of the aluminum wire with a 1-inch gap are cut as shown in Fig. 5. A flat spot is hammered in the wire at a point diametrically opposite the gap,

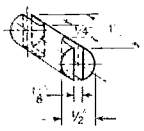


Fig. 4—The spacing insulator for the driven element may be made from a piece of rod or sheet of Plexiglas or other good insulating material.

and drilled as indicated in the detail sketch.

The top end of the pipe mast is drilled and tapped according to Fig. 6. The three larger holes are for mounting the driven element with its Plexiglas insulator. The parasitic elements are attached directly to the mast without insulation. These elements should not be mounted until the driven element has been adjusted.

Adjustment

A 2-meter transmitter of the 2- to 5-watt vari-

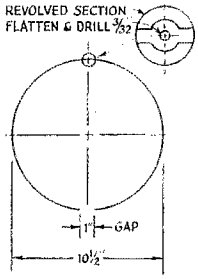


Fig. 5—The parasitic rings are also of ⅛-inch aluminum clothesline, flattened at the center for mounting, as shown in the detail.

ety is desirable as the signal source, and an "in-the-line" type of standing-wave indicator should be inserted in the RG-8/U transmission line to the driven element. Adjust the transmitter frequency to the center of the desired range. The spacing between the open ends of the driven element is then adjusted for minimum reflected power. When this adjustment has been found, "Q Dope" is applied to the Plexiglas spacer to fix the spacing at this point. The parasitic elements should be mounted now, and the gap spacing of each element adjusted for minimum s.w.r., starting with the elements closest to the driven element and working outward from there.

The author wishes to express his thanks to W8DQR, W4ZNV and K8TGH for their assistance, and W8UPB and W11CP for their encouragement.

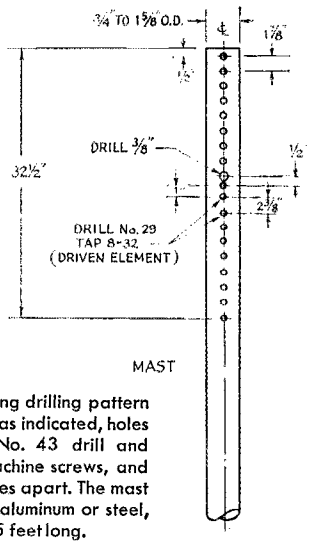


Fig. 6—Sketch showing drilling pattern of the mast. Except as indicated, holes are made with a No. 43 drill and tapped for 4-40 machine screws, and are spaced 1⅞ inches apart. The mast section should be of aluminum or steel, and at least 5 feet long.

Strays

This could become a habit. The Radio Club of Wright Junior College (Chicago, W9DAY) has again carted off first prize for homecoming floats.

—···—

WN2HAQ has no antenna vs. landlord problems —not since he started loading up the curtain rods in his apartment as an antenna for 15 c.w.

An amateur particularly well-known to other amateurs in the Denver, Colorado, area, passed away on September 16. Andy Bahlay, KØOOA, had been FCC Engineer-in-Charge of the 15th district for six years, and he had been a cooperative friend to amateur and commercial operators in the six-state area over which he had jurisdiction.

Which Way?

BY V. JACKSON,* W8BLP

LIKE an old timer viewing a growing young teenager, one wonders what amateur radio is coming to. Is it getting better or worse? Will it end in a series of FCC edicts that strangles amateur radio to death? Reduced to nothing at some future international radio conference? Will it grow bigger and better? These questions deserve some careful consideration.

How many hams do you personally know, who can reasonably explain the operation of every piece of gear in their shack? "But we ain't electrical engineers," is the usual answer, "we're just doing this as a hobby." Maybe so, but I don't know of one true ham who can see a piece of electronic gear anytime, anyplace, without having a terrific urge to take it apart to see how it works. And anyone who tells me that the simpler a piece of gear is, the better he likes it, isn't really a true ham. Knob twisting, dial turning, switch throwing, and meter watching are prime ingredients for a ham operator.

Constructing a piece of electronic gear is the best way to know how it works; modifying existing gear is almost as good. It seems amazing to me that so many factory-made pieces of electronic equipment can be advertised in the ham ads pages of *QST*, completely unmodified. Who wants to drill a hole in the front panel of a six-hundred-dollar receiver? One wonders though, how many hams would attempt even the repair of their receivers, let alone modification?

In years gone by, one of the things to look forward to after getting on the air was to see how far one could communicate with readable signals. Relaying messages was a science in itself. Has amateur radio come to the point where these things are passé? A careful tuning across the seventy-five-meter phone band can raise some thought about this. Rag chewing has taken some definite turns. A fellow talking over his home-made conglomeration of modified surplus gear has a certain air about him that the completely store bought, antenna-to-ground rod, ready-assembled station operator lacks. This isn't necessarily so, but seems more likely in view of experience and knowledge.

Which brings us around to the question of techniques used. A kilowatt is nice but not necessary. Certain frequencies are convenient but not always the best. How many cross-town QSOs are made on seventy-five meters, with at least a hundred watts on each end, while two meters lies vacant? And how much power is actually required for a cross town gab fest?

One of the achievements of amateur radio was the development of what was once considered the useless frequencies above two megacycles. This was not done using equipment assembled in a factory. Nor was it done by hams who were content to "keep things the way they are". The short-wave bands were put to use by ham radio operators who continually tried to improve their technical knowledge, and did.

Today, if improvement is considered expedient in amateur radio, it is difficult to explain the lack of interest in the Extra Class License. Certainly, the possession of an extra class license is not a guarantee of improvement, but it could be considered an indication.

Many hams have suggested that they want to keep amateur radio a hobby and not the exclusive territory of electronic technicians and engineers. This is a good point in view of the highly technical nature that ham radio has assumed. But knowledge of electronics is the only criterion that will allow the ever increasing demands on amateur radio, both from within and without, to be met. We have to continually refer to the basic precepts of amateur radio to determine the degree of knowledge we have to aspire to maintain its existence. Without some technical standards, we would have the basic tool of our hobby, our frequencies, sounding very much like the citizens band and with as many privileges.

The challenges in amateur radio are greater than ever today. Contrary to what some may think, we have barely scratched the surface of the possibilities of our hobby. Project Oscar with its hi's to the world is a case in point. It doesn't take much imagination to see even greater and more ambitious things happening to ham radio in the future. The u.h.f. spectrum lies before us ready to be developed with the same ingenuity that pioneered the lower frequency bands. Space communications, new modes of transmission, improvements in operating skill and greater numbers of operators are things to look forward to. There is no limit in sight if we can maintain a degree of values that commercialization cannot touch.

From the oatmeal-box coils and jumble of wires in years gone by, to the professional looking gear of the present time, hams have always shown their individuality. Let us hope this imagination and ingenuity is not giving way to mass produced stereotypes. The basic spirit and drive of amateur radio is as strong as ever. You and I, as licensed amateur radio operators, should strive to keep it that way. QST

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AUDIO PHASE-SHIFT NETWORK FOR TRANSISTORIZED S.S.B. TRANSMITTERS AND RECEIVERS

Technical Editor, *QST*:

Most commonly-used *M*-derived audio phase-shift networks are designed to be terminated by an infinite impedance. This condition can not be approximated or maintained in ordinary transistor circuits. The networks in question are simplified versions of a more general circuit in which a resistance is present in parallel with the output terminals. Fig. 1 shows one branch of such a network. The well-known network designed by R. B. Dome (W2WAM) uses this configuration. The most obvious solution is to drive an emitter follower with the network output signal. Here the input impedance is fairly high and approximately equal to the product of the emitter resistor and the current gain factor in the common-emitter configuration ($Z_{in} \approx \alpha R_E$). However, as the input impedance of an emitter follower cannot be expected to be rigorously stable, it is necessary to swamp it by a fixed resistor several times lower in value.

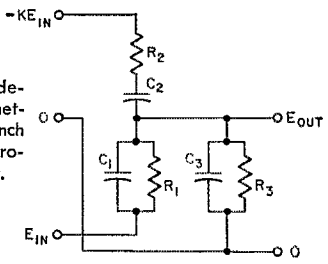


Fig. 1 — Basic M-derived phase-shift network. Only one branch is shown. K is a proportionality factor.

One possibility consists in scaling down the Dome network, which can be done by multiplying the values of all capacitors by a factor N and dividing those of all resistors by the same factor. However, the author preferred to attempt to develop a network without resorting to unnecessary simplifications in the design procedure, thus retaining more freedom in preselecting round values for as many as possible of the network elements. The result is shown in Fig. 2.

Note that the capacitor values are smaller than those obtained by scaling down the Dome network by a factor which would produce the same value of terminating resistors. This makes possible smaller over-all dimensions of the network.

Most of the network elements have standard values or are very close to them, which increases the chance of finding the exact values (1 per cent or better) when selecting them from 10 per cent or 5 per cent components.

It should be emphasized that the value of the fixed output resistors, R_8 and R_6, must be calculated to obtain a total of 3900 ohms with the input impedances of the respective emitter followers in parallel. If the latter is 100K, for example, the fixed resistors must have a value of 4050 ohms. A deviation of about 20K from this value of 100K will not noticeably affect the performance of the system.

In contrast with the Dome network, which has a balanced input, the driving voltages at the input terminals 1, 3 and 2, 4 must be unequal in a 3.83:1 ratio ($K = 3.83$). A similar situation exists also in all open-circuit *M*-derived phase-shift networks. It has never been found to be a serious disadvantage. Here is the price paid for the obvious and more important advantages.

The resistance across the input terminals is not critical but should be low. The value of $R_7 + R_8$ in Fig. 2 may serve as an indication. The ratio of these two resistances, however, must be accurate and should be 3.83 (± 1 per cent or better) to obtain the same ratio of input voltages.

The network should work well between 280 and 2800 c.p.s. As in the case of other networks, the components of the applied audio signal outside this range must be attenuated by appropriate filters if one desires optimum sideband suppression.

To end, an indication which may be useful in some cases: if one does not know the approximate input impedance of the circuit driven by the network, and if R_1-R_2 and R_4-R_5 have the exact ratio, R_3 and R_6 can be made variable and adjusted until the signal ampitude at the respective output terminals 5 and 6 is exactly half that measured at input terminals 2 and 4. Any audio frequency, even outside the range for which the network is designed — e.g., 60 c.p.s. — can be used for this purpose. — *Wilfried van Heddegem, ON4HW, Kortrijkstraat 40, Bevere-Oudenaarde, Belgium.*

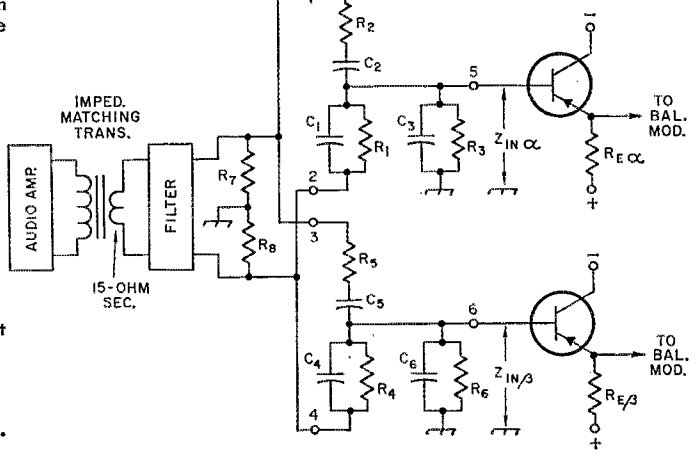
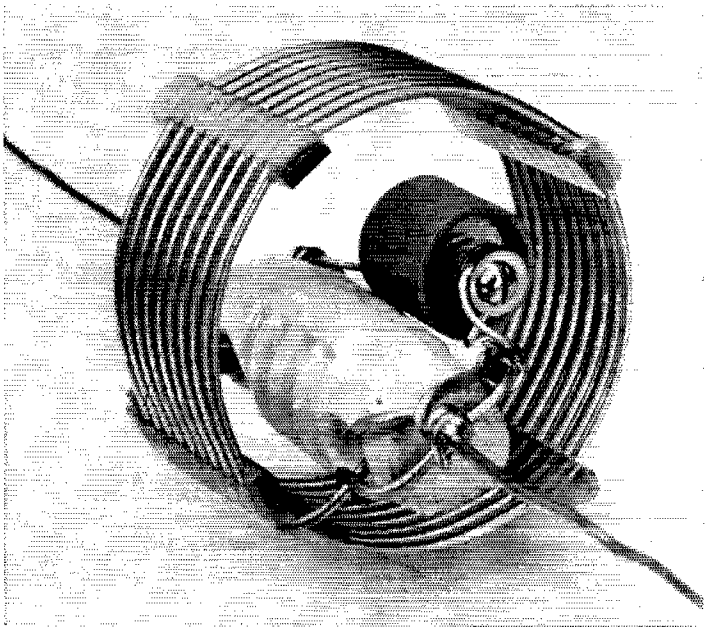


Fig. 2 — The described network, with proposed associated circuits in the case of an s.s.b. exciter.

C_1—0.039 μf.
C_2—0.151 μf.
C_3—0.039 μf.
C_4—0.010 μf.
C_5—0.039 μf.
C_6—0.010 μf.
R_1—3900 ohms.
R_2—5500 ohms.
R_3—3900 ohms (with ZIN_α included).
R_4—3900 ohms.
R_5—5500 ohms.
R_6—3900 ohms (with ZIN_β included).
All above values within 1 per cent or better.
R_7—11.5 ohms.
R_8—3 ohms.
$\frac{R_7}{R_8}$ = 3.83 (within 1 per cent or better).



This shows the construction details of one of the traps. Be sure all twisted-wire connections are soldered to insure good electrical contact.

An Easy to Make, Coax-Fed, Multiband Trap Dipole

BY LEWIS G. McCOY,* W1ICP

We often get requests for information on trap dipoles. Here is a simple design that can be used either horizontally or as an inverted V.

IN a recent article [1] we discussed the pros and cons of coax-fed trap dipoles as multiband antennas. As pointed out, there are several advantages in using such an antenna, probably the most important being the fact that coax line can be run near metal objects, or even be buried in the ground without having any appreciable effect on the antenna system.

There are many types of trap dipoles, some using more than two traps to cover the amateur bands from 80 through 10 meters. In this article we will describe a multiband dipole that will cover the Novice bands with only two traps. However, before describing the construction, let's see exactly what a trap dipole is and how it works.

The Trap Dipole — How It Works

If you are going to use coax feed line, the line should be terminated in an impedance the same as, or at least close to, the characteristic impedance of the coax line. Whenever the antenna impedance differs greatly from that of the coax line, and you want to use coax, you should install a matching device at the antenna so that the coax line "sees" an impedance that is the same as the line impedance.

The reason for doing this is to reduce the standing-wave ratio on the coax line. For example, if the antenna impedance is 200 ohms and the coax line impedance is 50 ohms, the s.w.r. will be 200/50, or 4 to 1. This may be more s.w.r. than we care to have, either because of added losses or difficulties in getting the final amplifier in the transmitter to load properly. Therefore, the object is to have an antenna whose impedance is close to that of the coax.

The impedance at the center of a half-wave horizontal antenna will depend on several factors, including height of the antenna above ground, the type of ground under the antenna, and the effect of nearby objects. Probably, if we could

* Technical Assistant, *QST*.

[1] McCoy, "Antennas and Transmatches," *QST*, Oct., 1964.

take an average, most hams erect their 80-meter half-wave dipoles about 30 feet above the ground. This being the case, the impedance of the antenna will fall somewhere between 40 and 70 ohms, thus either 50- or 75-ohm coaxial cable could be used to feed the antenna and a fairly good match would result. Fig. 1, at A, is an illustration of a half-wave dipole.

Let's assume for a moment that we are using the 80-meter dipole but that we want to tune up the rig on 40 meters. In this case, the dipole would no longer be a single half wave but two half waves fed at their adjacent ends, and the impedance would be somewhere near 4000 ohms, resulting in a mismatch of about 80 to 1! Obviously, we couldn't use our 80-meter half wave dipole as a multiband antenna with the coax feed line.

Back in 1955, *QST* carried an article by W3DZZ[2], describing a "trap" antenna. This article pointed out that it was possible to have a single-wire antenna fed with a single coax line cover the bands 80 through 10 meters and, by making use of traps installed in the antenna, still have a fairly good match to the coax line.

At B, in Fig. 1, is a drawing of a typical system, using 80 meters as the lowest-frequency band. Assuming the antenna at B were being fed with an 80-meter signal, the over-all electrical length would be one-half wavelength and the impedance would be somewhere close to 50 ohms, offering a good match for coax. When the system is fed with a 40-meter signal, the traps act to "divorce" the outer wires from the rest of the antenna, making the system look like a 40-meter half-wave dipole, and again the coax would be fairly well matched. You couldn't do this without traps because the mismatch would be extremely bad on 40 meters, as we pointed out a moment ago.

On the higher bands, 20 through 10 meters, the trap dipole works out to electrical lengths that are close to being odd multiples of half wavelengths. Consequently the center feed point provides an acceptable match for coax line.

It would be unfair if we didn't point out the principal drawback of this type of antenna, particularly for the Novice who operates on 80 meters. As long as the antenna is a multiband job with coax feed, it must be remembered that it will accept harmonics as well as the fundamental. If you are working on 80 meters and have a 40-meter harmonic, there is nothing in the antenna system to prevent the harmonic from being radiated. If we had a single-band dipole such as in Fig. 1 at A for 80 meters, the antenna would be a selective circuit and tend to discourage radiation of a second harmonic. But our multiband antenna won't do this: it will accept the harmonics.

However, it is a simple matter to install a filter in the line to keep harmonics from being radiated. The filter can be a simple device such as the one described in *Understanding Amateur Radio*.[3]

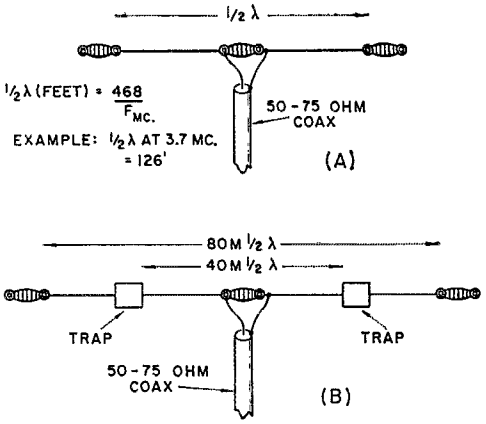


Fig. 1—Shown at A is an example of a coax-fed, half wave dipole. At B is a trap dipole, using either 50- or 75-ohm feed.

Another way to get rid of the harmonic problem is to install a transmatch in the line. A suitable transmatch was described in a recent issue[4] of *QST*.

Making the Trap Dipole

Fig. 2 shows the circuit of the trap dipole. The dimensions given in Fig. 2 will result in an s.w.r. of 2 to 1 or less in the Novice portions of the 80- and 40-meter bands, using either 50- or 75-ohm coaxial cable. We found that on 15 meters the s.w.r. was about 3 to 1 with either type of line. The coils for the two traps are made from Barker & Williamson coil stock, type 3905-1, 2½ inches in diameter, 6 turns per inch. Nine turns are required for each trap. The capacitors used in the traps are Centralab type 850SL-100N. These capacitors will handle 1-kw. input without breaking down.

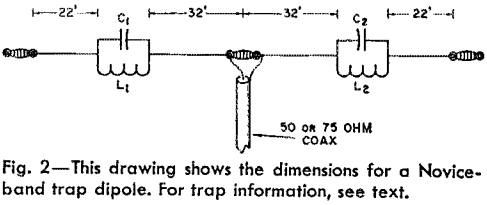


Fig. 2—This drawing shows the dimensions for a Novice-band trap dipole. For trap information, see text.

The photograph of one of the traps will give you a good idea of its construction. Be sure to allow several inches of lead length from the ends of the coil. These ends are fed through the insulator and around into a loop. The antenna wire is also fed through the insulator ends, wrapped back on itself, and then both the ends from the coil and the antenna are soldered together. Use a No. 12 or 14 solid copper wire for the antenna.

Fig. 3 shows the method for connecting the coax cable to the center insulator. Wrapping the coax around the insulator and then clamping the two together will take the strain off the connec-

[2] Buchanan, "The Multimatch Antenna System," *QST*, March, 1955.

[3] *Understanding Amateur Radio*, 1st ed., p. 213.

[4] McCoy, "A Completely Flexible Transmatch for One Watt to 1000," *QST*, June, 1964. Note: On page 40, Fig. 2, both L3 coils should be 32 turns, not 28.

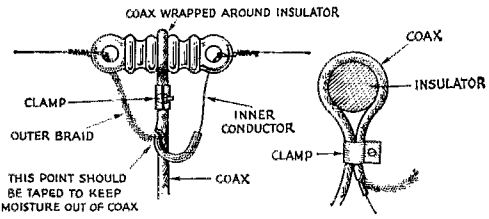


Fig. 3—Method of wrapping the coax feed line around center insulator for additional strength.

tions to the antenna. For power inputs up to 300 watts, either RG-58/U or RG-59/U can be used to feed the antenna. For inputs up to 1 kilowatt, the heavier-duty coax, RG-8/U or RG-11/U, should be used. RG-58/U and RG-8/U are 50-ohm types and the other two are 75 ohms. The Novice should decide before buying his coax which type he'll need because the impedance of the coax used in his installation should be the same as that of his s.w.r. bridges or low-pass filters, if such items are used.

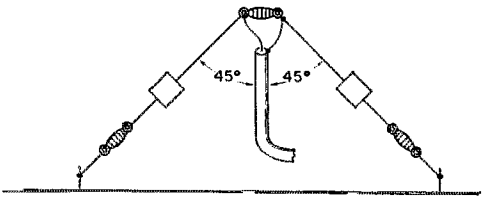


Fig. 4—The trap dipole when used as an inverted V.

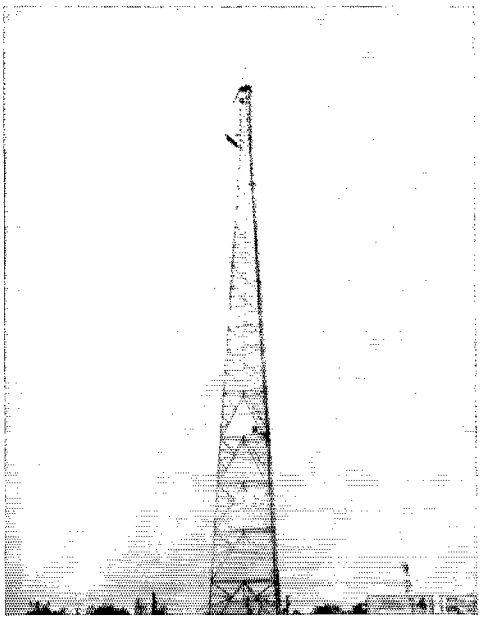
Putting Up the Antenna

There are several possible ways to install the antenna. If you have two support points, the antenna can be stretched out horizontally. If at all possible, get it up at least 30 feet above ground; the higher the better. It may be that you don't have enough room to stretch the antenna out to its full 100-plus feet. If so, you can drop the ends down from the traps, which would mean a straight run of about 65 feet. However, be sure the ends are clear of the ground. We tried the antenna both stretched out full length and with the ends dropped, with no significant difference in signal reports from other stations, either way.

Another way of mounting the antenna is in the form of an inverted V. This type of mounting only requires a single mast or support point. The center insulator is supported on the top of the mast and the ends of the antenna draped down as in Fig. 4. There is no hard and fast rule about the angle of the wires in an inverted V. We show it in the drawing as 90 degrees and we have had good results with such an installation. The best advice would be to try the wires at different angles. You can tie rope or twine to the end insulators and move the ends around to different settings. The antenna *will* radiate and you may be pleasantly surprised with the results.

QST

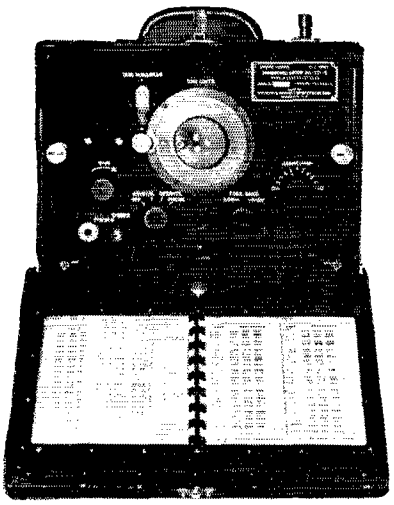
Strays



W5AI'S two full-size, three-element beams—one for twenty meters and the other for forty—are mounted on top of this 280-foot tower in Corpus Christi, Texas. They're so high, in fact, that you can hardly see them.

WA4OKK, Eugene Yoakum, trained his K-9 corps dog "Mucho" to answer commands by radio, through a small receiver strapped to Mucho's harness, and it is believed that this is the only dog ever trained in such a fashion. Mucho answered several commands over the radio, but he would respond only to Gene's voice. Gene, WA4OKK, was going to show off his dog Mucho at the annual hamfest of the Foundation of Amateur Radio Clubs on Saturday, September 27. But on the morning of the hamfest, tragedy struck; Gene was killed while going to the assistance of a fellow officer.

Extending the Range of the BC-221 Frequency Meter



BY ALFRED K. ROBINSON,* W6PM

By making use of the harmonics of the highly stable crystal calibrator of the BC-221 in a heterodyne system, the accuracy obtained at frequencies up to 200 Mc. or higher is essentially that of the BC-221 in its 2-to-4-Mc. range.

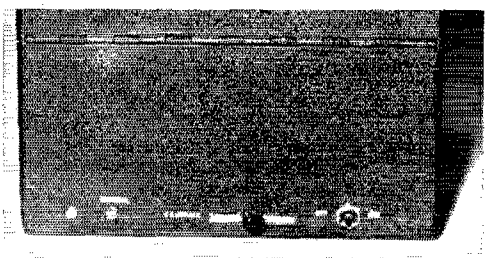
THE improvements that have been made in recent years in radio-receiver and transmitter oscillator stability have not lessened the need for frequency measurements of high accuracy. Particularly in the v.h.f. and u.h.f. ranges, reliable measurement has, in fact, assumed even greater importance.

Amateurs interested in frequency measurement have long relied on the surplus BC-221 frequency meter because of its low cost compared to that of any other instrument of equivalent accuracy. Using the original calibration book, the excellent hermetically-sealed 1-Mc. crystal oscillator, and the standard calibration points, an accuracy of 0.02 per cent or better can be expected over the fundamental range of 2 to 4 Mc. By the use of intermediate calibration points and careful adjustment, this accuracy can be easily increased to 0.01 per cent.

Measurements at frequencies higher than 4 Mc. are made by comparing the unknown frequency with harmonics of the fundamental 2- to 4-Mc. range. Even if the same percentage accuracy is possible at these harmonic frequencies, the absolute accuracy (in terms of cycles or kilocycles) deteriorates in direct proportion to the order of the harmonic used. An error of 0.01 per cent at 2 Mc. is 200 cycles: at 200 Mc., it is a matter of 20 kc. Greater absolute accuracies at the higher frequencies require that the percentage accuracy increase as frequency increases.

A heterodyne system[1] offers a method of accomplishing this objective. In such a system to be described, the unknown high frequency and a highly-stable signal of known frequency are combined in a mixer to generate a beat frequency lying in the 2- to 4-Mc. fundamental range of the BC-221. If fixed marker signals are provided, spaced at intervals of 4 Mc. throughout the desired range, the unknown frequency will always lie within 2 to 4 Mc. of one of these markers. The BC-221 then is used as an interpolator measuring the difference between the unknown frequency and an adjacent marker. Assuming that the marker frequency can be determined with zero error, the absolute accuracy with this system is the absolute accuracy of the BC-221 at its fundamental. The percentage error in measurement of the unknown frequency is then the fundamental percentage *divided* by the order of the harmonic against which the unknown signal is beating.

[1] Riley, "Interpolation Frequency Measurements with the BC-221," *QST*, Jan. 1956.



Controls along the bottom edge of the front panel of the BC-221 are for crystal-frequency trimming, the calibrate-operate switch, and the power switch.

* 1336 East Chapman, Orange, California.

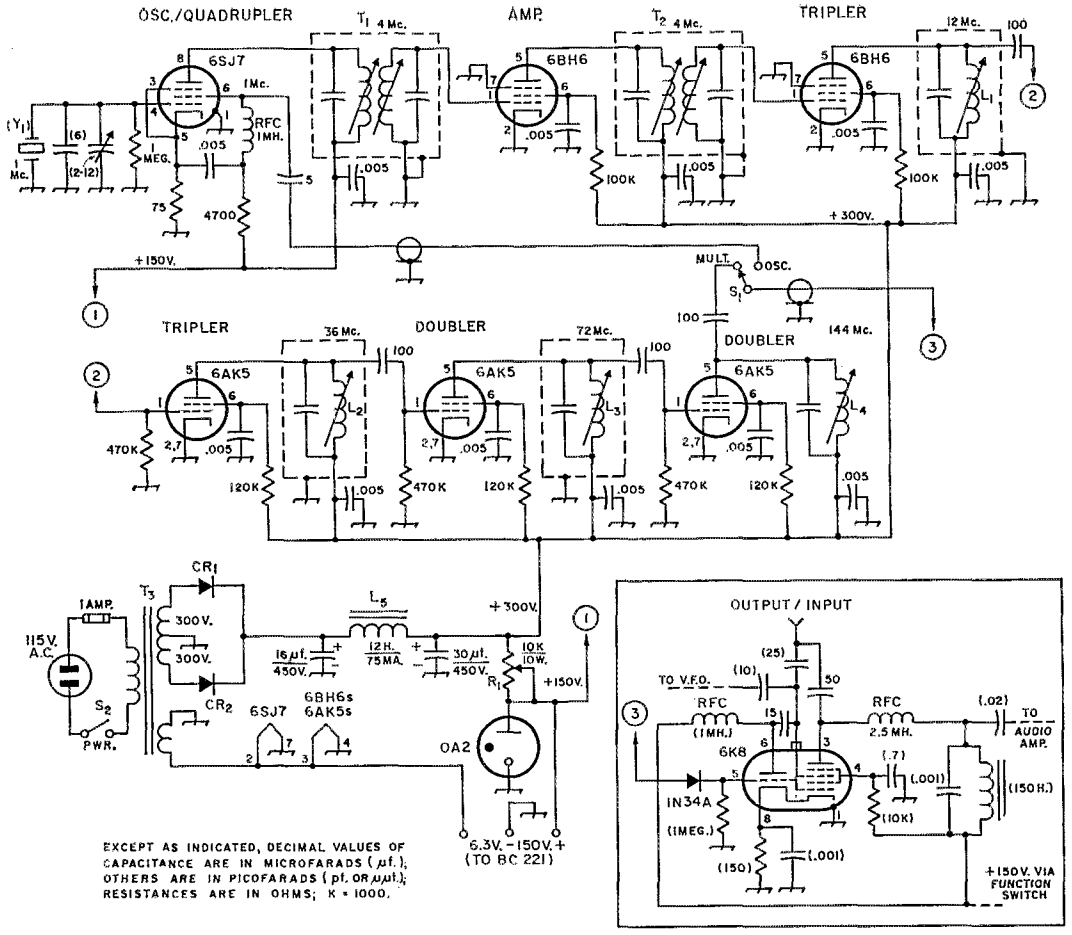


Fig. 1—Circuit of the 1-Mc. crystal oscillator and frequency multipliers which generate markers at 4-Mc. intervals throughout a wide spectrum. Fixed capacitors of decimal value are disk ceramic; others are silver mica or NPO ceramic, except where polarity indicates electrolytic. Fixed resistors are ½-watt composition. Values in parentheses are the original. Inset shows modifications in the original mixer circuit.

CR_1, CR_2—Silicon rectifier, 1000 p.i.v., 100 ma. or more.

L_1-L_4, inc.—Circuits should resonate at the frequencies indicated. Coils may be air-wound, or wound on adjustable iron-core forms, and used with or without shunting capacitance. Capacitors, if used, should be silver mica or NPO ceramic. Approximate inductances required when no shunting capacitors are used are as follows: L_1—12 μh., L_2—1.3 μh., L_3—0.3 μh., L_4—0.1 μh.

L_5—12-hy. 75-ma. filter choke.

R_1—Slider adjustable.

S_1—S.p.d.t. rotary switch.

S_2—S.p.s.t. toggle switch.

Reference Markers

In this modification, the original 1-Mc. crystal oscillator taken from the BC-221 is used as the primary source of reference markers. The required 4-Mc. spacing is obtained by means of the circuit shown in Fig. 1. Frequency is quadrupled to 4 Mc. in the plate output circuit of the oscillator. This signal is fed to a 4-Mc. amplifier which attenuates the 1-Mc. components, and other undesired products generated in the quadrupling process. The filtered 4-Mc. signal is used to overdrive a series of multiplier stages with broad-band tank circuits and oversize coupling capacitors, each stage overdriving its successor. The result is a series of strong marker signals spaced at intervals of 4 Mc. throughout the desired range. By adjusting the crystal frequency so that one of these markers zero beats with WWV, the marker signals can be set with a high degree of accuracy.

The unknown frequency and marker frequencies are combined in a modification of the original BC-221 mixer. As described, the unit is designed to make measurements in the range of 2 to 300 Mc. In some other similar units, the range has been extended to 600 Mc., although the 4-Mc. points become increasingly difficult to identify. S_1 provides a means of feeding the 1-Mc. crystal signal directly to the mixer for calibration purposes.

Power Supply

A small power supply is included. This provides about 300 volts for the multipliers, and regulated 150 volts for the crystal oscillator and the circuits of the BC-221, as well as filament voltage for both. The original 6X5GT tube rectifier shown in the top-view photo was eventually replaced with silicon diodes to reduce heating.

Mixer Modification

The inset in Fig. 1 shows the simple modification of the original mixer circuit. The triode section of the 6K8 is used as an untuned amplifier for the signal from the multiplier chassis. This revision requires the addition of only the diode and the 15-pf. coupling capacitor after removal of the crystal and its trimming capacitors. The diode serves to accentuate the harmonics.

The hexode section of the tube is unchanged except for the insertion of a 2.5-mh. r. f. choke in the plate circuit to provide an r.f. load, and the addition of a 50-pf. r.f. coupling capacitor between the plate and the output jack.

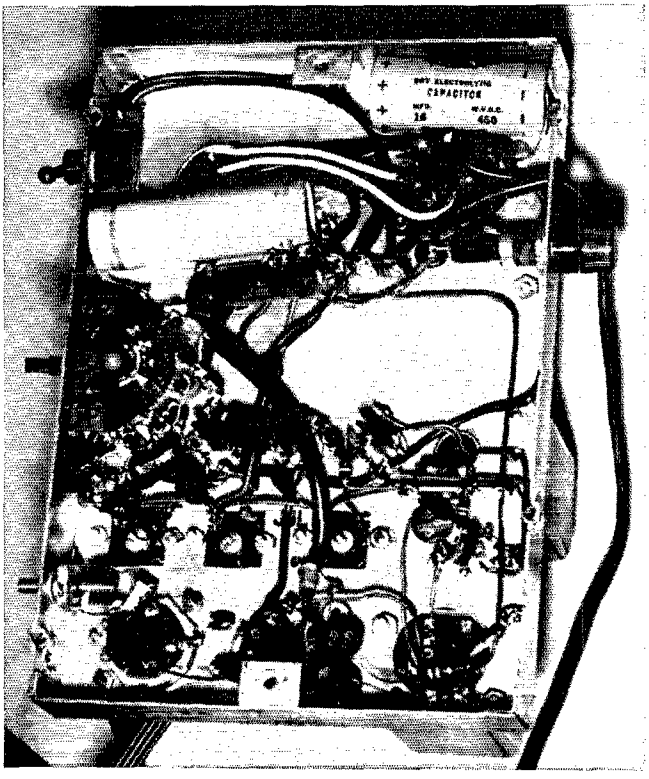
Construction

The components indicated in the main diagram of Fig. 1 are mounted on a chassis whose dimensions are proportioned to fit the bottom part of the BC-221 cabinet. Sufficient space for the chassis is provided by drilling out the rivets and removing the headphone compartment.

The essential details of the layout are visible in the photographs. The 1-Mc. crystal, its socket and associated trimming capacitors are removed from the BC-221 proper and remounted on the new chassis. It will be noticed that power-supply components and the crystal oscillator are at opposite ends of the chassis to reduce heat transfer and hum pickup. Holes in each side of the case provide ventilation.

Making Measurements

Practice with a few signals of known frequency and an accurately-calibrated receiver to identify the 4-Mc. markers will soon show the utility and limitations of the system. To set up for a signal output at some desired frequency, a simple procedure should be followed. To create a signal at a desired frequency, the nearest crystal marker removed at least 2 Mc. from the desired frequency should be used as the reference. If the desired frequency is 157.71 Mc., the 160-Mc. marker should be used. (The 156-Mc. marker is closer, but is less than 2 Mc. away from 157.71 Mc., and therefore the beat will fall outside the 2-4-Mc. range of the BC-221.) The difference between 160 and 157.71 is 2.29 Mc., which (in my case) corresponds to a dial reading of 879.3. The nearest calibration point shown in the calibration books is 795.1 to which the dial should be set. With the 1-Mc. calibrator signal injected, the frequency-meter correction knob is adjusted for zero beat. Then, shifting the mixer drive to the multiplier chain and setting the meter dial



Bottom view of the oscillator-multiplier chassis. The crystal-oscillator trimmer is in the lower left-hand corner. The crystal-oscillator screen r.f. choke is close to the 6SJ7 socket under the bottom-plate bracket at bottom center. L_4 is immediately below S_1 at left center. The three controls at the left extend through holes cut near the bottom of the front side of the BC-221 cabinet.

The crystal-oscillator and frequency-multiplier unit for the BC-221. In the row to the right, from top to bottom, are the 1-Mc. crystal, 6SJ7 and T_1. Three of the four multiplier coils are in the shielding cans in the next row, with the 6BH6 4-Mc. amplifier tube at the bottom. The fourth multiplier coil (L_4) is mounted through a hole in the chasss, largely hidden by the shielding can at the top. (See bottom view.) The four multiplier tubes and T_2 are in the third row. Power-supply components occupy the remainder of the chassis. The coax line feeds signals from S_1 to the mixer in the BC-221. The multiconductor ribbon makes the power connections.

to 879.3 will produce a signal at the desired frequency.

For quick reference for this and other much-used frequencies, notations similar to the following are made:

Frequency — 157.710
Meter Frequency — 2290
Meter dial setting — 879.3
Nearest check point — 795.1

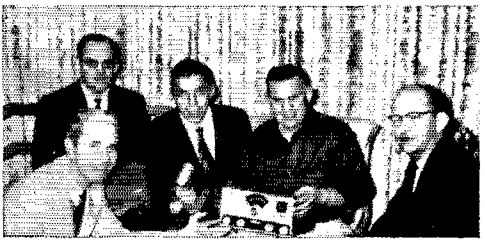
In measuring the frequency of an externally-generated signal, it is assumed that other means are available for checking the frequency to an accuracy sufficient for determining the marker frequency that will serve as the reference. The signal is then fed into the BC-221 and, with headphones plugged into the meter, the meter is tuned for a zero beat with the beat signal that results when the incoming signal is mixed with the marker. If the nearest marker (removed a minimum of 2 Mc. from the unknown frequency) is above the unknown frequency, as in the example given above, the BC-221 frequency reading should be subtracted from the marker frequency to obtain the value of the unknown frequency. If the marker signal is below the unknown frequency, the meter frequency reading should be added to the marker frequency. This condition would exist if the unknown frequency were, for example, 158.7 Mc. In this case, the unknown frequency is less than 2 Mc. from 160 Mc., but more than 2 Mc. from 156 Mc., so the latter would be the reference.

In measuring externally-generated signals, care should be taken to attenuate the signal to a point that will assure that the mixer is not being overdriven. Too strong a signal may result in spurious responses from extraneous mixing with other harmonics of the BC-221, crystal harmonics, or with strong local broadcast or other signals.

If stronger marker signals are desired at the lower frequencies, they can be obtained by using a switch with more positions at S_1, and coupling through a 10-pf. capacitor to the plate of each multiplier tube.

QST

Strays

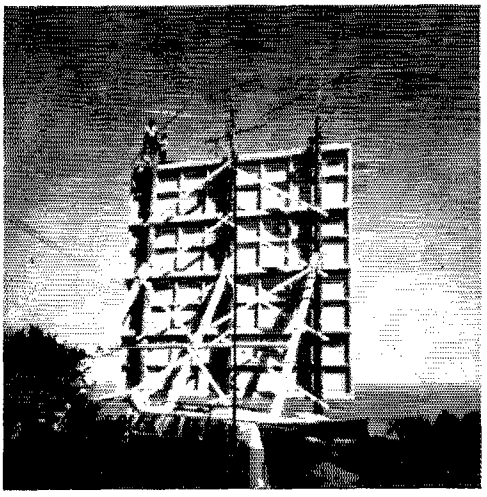


Donation of an s.s.b. transceiver was the climax of a joint effort of the Griffin and Atlanta, Ga., radio clubs. WA4JSU, WA4AYO and W4HEG promoted contributions from as far away as KZ5, K4MDR built the rig, and members of both clubs helped organize. Pictured, in the usual order, are K4MDR, WA4OQH, WA4JSU, WA4KWW, and W4HEG.

September V.H.F. Party Summary

371 Field and Home Stations Join the Fun

COMPILED BY ELLEN WHITE,* W1YYM



W6GD/6, the UHF Radio Society, operated on Black Mountain about 2500' high, located just south of Palo Alto. The sign board held 6 and 2-meter Yagis plus 2 club members! (The 432 Mc. colinear is in the foreground.) A fine 5-band score for SCV, 6136 points.

QST report of a contest is, in a sense, a "historical" record of what took place at a particular time. The time was September 12-13, the event the September V.H.F. QSO Party with reports in from 282 single and 89 multioperator stations in 55 ARRL sections. With a shift to cool weather, conditions apparently nose-dived throughout the country dropping reported participation but doing little to diminish the particular brand of enthusiasm that characterizes the v.h.f. contester.

Several charts accompanying the report are new this time and can help point out the reason for particular scores within a particular area. Whenever multipliers can be added on different bands, it's obvious that versatility makes the difference. A check on the big single and multioperator scores in each division clearly points this out. There's another aspect of operating that is fun to many, concentrating on one band and seeing just how little you can *miss!* Look at the call-area leaders on each band and you will note many calls of stations that did not win section awards but did experience the thrill of getting the most sections on a particular band, within their own particular geographic area.

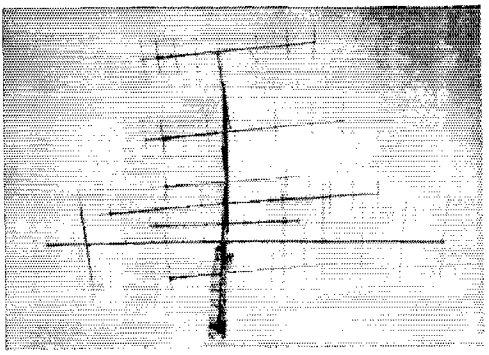
To all certificate winners our sincere congratulations for a great effort, in spite of poor conditions. All awards are scheduled for December 15th mailing.

* Assistant Communications Mgr., ARRL.

SOAPBOX

"There was a very noticeable change in 2-meter operating techniques. Almost without exception, operators were announcing the segments they were tuning. It sure helped." — *K3OBU*. . . . "I had a lot of fun putting Sussex County back on the map." — *K3CNH*. . . . "An awful lot of sections were missed because of lack of c.w. activity on 6." — *W4TYH/3*. . . . "Two was better than in the June Party. Hope to have 432 and perhaps 220 ready to go for January." — *K8KEQ/3*. . . . "Even though many were complaining about the low level of activity on two I certainly heard many more stations than I worked." — *K3VJH*. . . . "I was really shocked when I worked West Virginia and Western Pennsylvania on six." — *K2UOP/3*. . . "I'm proud of my minute score because the weekend was spent primarily in working on my new basement shack. The fun I did derive was heightened by the fact that I recently passed my General Class exam." — *WA3AJD*. . . . "The only thing that popped during the 24 hours was a fuse." — *W2CXV/2*. . . . 'Glad to see the 'big guns' beginning to use c.w., it sure makes sections and contacts much easier to obtain." — *K3HKK/3*. . . . "Conditions were bad in Indiana." — *K9ZUH*. . . . "On the day *after* the contest we had the first opening in two months. Florida and VP7 were S9 on six." — *WA4NUJ*. . . . "Conditions generally far below average as was activity. Nothing unusually good at all." — *W8SH*. . . . "This was a real exercise in reading signals in the noise level." — *K8ZQE*. . . . "My last minute antenna plans failed and I had to settle for 20' instead of 46'." — *KL7FAP/8*. . . . "I think working Vermont for the first contact on 2 is a swell way to start a contest, hi!" — *W2IP*. . . . "Conditions were bad on 2 but the enthusiasm was there just the same." — *WA2OOL*. . . . "This is the last time I do any serious contesting, alone that is. I got three hours sleep and a nice cold." — *WN2LUU*. . . . "During the week before the contest I was able to work N. C. stations every night. Then the cold weather set in and the band closed up like a pretzel." — *K2LNS*. . . . "The 6220 Club was unable to operate from our usual location because of forest fires in the area. We wound up at a campsite in Stockholm, N. J. and spent a lot of time evaluating several spots for *next* June at this new location." — *W2PEZ/2*. . . . "The only touch of 'Murphy' was a blown 2E26 but fortunately I had a spare." — *K1PKQ/1*. . . . "Heard on 6, but missed, Me. R. I. Md. Del. and Va." — *K1RTS*. . . . "A last minute venture on Dennis Hill in Western Connecticut, little planning but pleased that our group worked 12 sections on 6 and 8 on 2." — *W1BGD/1*. . . . "Good ground wave was evident throughout Saturday and at times on Sunday with 2's holding steady and VE's popping in." — *K1FPR*. . . . "My first solo contest in 17 straight. My usual partner W1YQH had laryngitis." — *W1ALE*. . . . "I drove 400 miles to Vermont and hiked 6 miles to make these 5 contacts in 4 sections on 6. Even so, I possibly had the miles/watt record with an output of 70 milliwatts! QTH was Pico Peak, a 4000' elevation near Rutland." — *W1HDQ/1*. . . . "Single-operator mountain-topping sure pays off but it's a lot of work." — *K7GWE/7*. . . . "My first v.h.f. affair and although equipment was poor and 50 Mc. conditions terrible I still had a ball. Next time I hope to operate from 50 through 1296 Mc., maybe atop Mt. Diablo here in East Bay or Mt. Tamalpais in San Francisco." — *WA6VAT*. . . . "I received an outstanding signal from W5SFW in N. Texas on 6 via 2-way sideband." — *K7ICW*. . . . "Biggest thrill was being the first station in California to work K7AUO/7 on Paulina Peak near Bend, Oregon. Even though this was only 350 miles and not comparable in distance to my regular contacts into L. A. on 144 Mc. (400 miles), it was over a far poorer path and my first Oregon QSO, and my third state on 2 meters." — *W6GDO*. . . . "Watch out for me in the January v.h.f. SS, I'll knock 'em dead." — *WA6VPL*. . . . "Had more stations participated, power would have made some difference. With

the exception of two contacts at the 200 mile point, my score could have been duplicated by anyone in this area running 10 watts,into a reasonably good beam." — *W4CPX*. . . . "As you can readily see, c.w. contacts made the difference in several multipliers especially on 144 and 220 Mcs." — *W4VCC*. . . . "Had to QRT early, the beam was damaged by tropical storm Dora and the linear got hot." *K4WYS*. . . . "I operated from the top of 9700' Cheyenne mountain. Was just up there on Sunday. I operate every Sunday and Monday 50 weeks a year from this permanent station from the transmitter site of KKTV, KKFM where I work." — *W0HLS/0*. . . . "I had to settle for less than one half of last years' score — everyone was at a convention!" — *WB6CGM*. . . . "Biggest thrill: working 10 contacts on 2 with 400 milliwatts into a 6-meter ground plane in the period of 2 hours." — *W6GZK*. . . . "My first contest since the big one in '61. Six meter conditions poor and 2 left a lot to be desired. I just listened after I blew 2 strings of diodes when a filter capacitor shorted. Might be ready for June with a pair of 4CX250's for 2." — *WA6JMQ*. . . . "Used c.w. for added multipliers." — *W5WAX/5*.



K2LNS, top NNJ single-operator score, comments on poor conditions in spite of over 20,000 points. Herb says he's glad he had this large array!

SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc.; B, 144 Mc.; C, 220 Mc.; D, 420 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk denotes a Novice Award Winner.

ATLANTIC DIVISION

Delaware

K3UCX 4862-221-22-AB
K3AZH 4408-146-29-ABD
K3UHU 3120-240-13-A
W3CGV 2002- 62-26-ABCD
K3OBU 1515-101-15-AB
W3HC 768- 64-12-B
WA3BAO 330- 30-11-B
K3CNH 174- 29- 6-A

Eastern Pennsylvania

K3IPM 14,868-386-36-ABCD
K3LOM 10,008-417-24-AB
K3IUV 3700- 71-37-ABCD
K3PGB 2448-204-12-A
K3HNP 1800-150-12-A
W3KGI 1776-111-16-AB
K3HHS 1568-112-14-B
K3QGY 1480-148-10-A
W3ETB 1392-116-12-A
K3QMK 1207- 71-17-AB
W3CIL 945- 36-21-ABC
WA3ABC 810- 90- 9-A
K3EGE 333- 37- 9-B
K3PWM 324- 54- 6-A
K3LWY 288- 72- 4-AB
W3BYF 225-15 -15-B
WN3AAD 200- 40- 5-B
K3YQN 164- 41- 4-A
WN3AYR 162- 27- 6-B
K3MTK/3 (WA2ICW, K3s DUW LWR) 7803-289-27-AB
WA2PTA/3 (8 oprs.) 6272-224-28-AB
W3ARW (W3s ARW PMG, K3SQO) 4805-140-31-ABCD
W3MWV/3 (5 oprs.) 2919-139-21-AB
K3YFD (5 oprs.) 2703-159-17-AB
WA3AOF (WA3s AAN AIL AOF) 2561-197-13-A
K3YGH (4 oprs.) 2448-102-24-AB
K3IZU/3 (4 oprs.) 1736-117-14-AC
K3WMI (W3JMP, K3WMI) 520- 65- 8-A

Maryland-D. C.

W3NG 3264-197-16-ABC
W3LCC 2430-100-18-ABCD
W4TYH/3 2100-150-14-A
K3OJH/3 1452-121-12-A
K8KEQ/3 1410- 94-15-AB
K3VJH 1380-115-12-AB
K3VRS 960- 96-10-AB
W3TFA 728- 98- 7-ABC
K3ZSX 616- 88- 7-A
WA3AER 456- 76- 6-A
W3HB 324- 54- 6-B
K3ZMQ 320- 40- 8-A
W3TYJ 245- 49- 5-AB
WA3AFL 234- 39- 6-A
K3TPD/3* 180- 60- 3-A
K2UOP/3 176- 44- 4-A
K3RKB 132- 33- 4-A
W3MNE 81- 27- 3-B
K3KXR 75- 25- 3-A
W3DHQ 54- 18- 3-B
WA3AJD 48- 16- 3-AB
WN3AJR 11- 11- 1-B
K3HFV (5 oprs.) 6838-252-26-ABCD
W3PGA/3 (W3JEH, K3PHH) 1600-100-16-AB

Southern New Jersey

W2EIF 7548-200-34-ABC
WA2VBN 2010-134-15-AB
W2ZUL 1836-102-18-AB
WA2HSP 1032- 86-12-B

Western New York

K2YCO 1584-132-12-AB
K2ISP 1364-124-11-AB
WA2JGG 594- 66- 9-AB
WA2KND 385- 77- 5-AB
W2EFO 380- 76- 5-A
WA2RBF 212- 53- 4-A
K2LGJ 203- 29- 7-B
K2RFO 152- 38- 4-A
WB2HAI 96- 32- 3-AB
WB2CMR 54- 18- 3-AB
K2BBJ 34- 17- 2-B
WA2WEB/2 (5 oprs.) 22,876-526-43-ABCD
W1UDT/2 (W1s ADZ UDT) 3100-155-20-AB
W2OW (8 oprs.) 1526-109-14-AB
W2CXV/2 (6 oprs.) 212- 53- 4-AB

Western Pennsylvania

K3QIO/3 784-112- 7-A
W3DJM 265- 53- 5-A
K3ZGI 116- 29- 4-AB

Call-Area Leaders

(Highest number of sections/band)

Note: Braces group tied stations.

50 Mc.	*144 Mc.*	*220 Mc.*	*432 Mc.*
K1OOR/1*	K1OOR/1* W1MEH/1*	K1OOR/1*	K1OOR/1*
W9ECV/2	K2LNS	WA2FSQ*	W2YPM
K3HFV*	K3HHS	K3IUV	K3IUV
K4WVH	W4VCC	W4VCC	W4VCC
W5WAX/5	W5PZ	——	——
W6GD/6*	W6GD/6*	WB6GUG/6*	W6GD/6* K6OKC/6*
K7DTH*	K7AUO/7	K7AUO/7 K7ICW K7QXF/7* W7TYR K7VTM/7*	——
WA8FSE/8* K8WWW/8* WA8BCA/8*	WA8FSE/8*	W8CVQ	——
WA9LIV/9* WA9IMR/9 K9QCB K9QXS/9*	WA9LIV/9* WA9IML* K9QX/9*	K9QCB	WA9DPL
WØZBL KØITF	WØZBL WØIEX	WØEVZ	WØEVZ WØWYZ
VE2NI*	VE2NI*	——	VE2NI* VE2BMQ

* Multioperator station.

The W5KDT/5 crew operated 6 and 2 atop 10,115' Mt. Withington in New Mexico. Left to right are WA5CES, K5WYY, W5KDT and K5YRQ.

K3HKK/3 (4 oprs.)
4590-168-27-ABCD
K3JRO/3 (5 oprs.)
2580-129-20-AB
K3FGL/3 (K3s FCK FGL)
210- 42- 5-AB

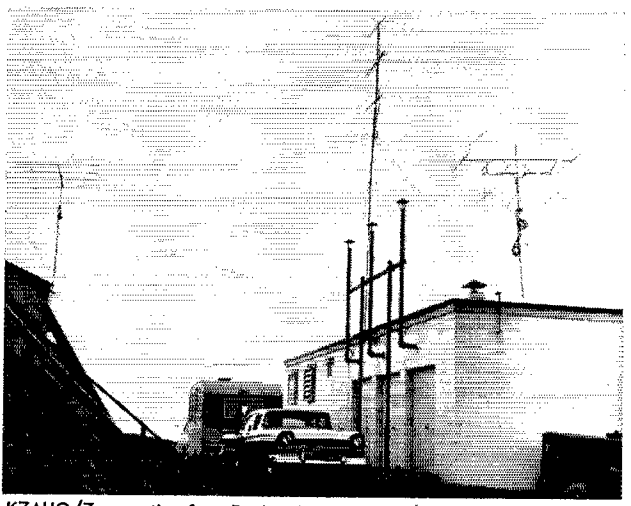
CENTRAL DIVISION

Illinois

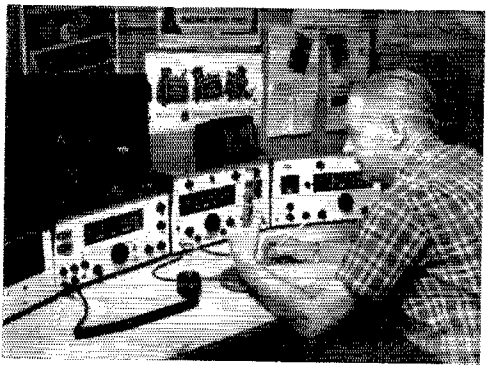
WA9ILR 798-114- 7-AB
KL7EBB/9
656- 82- 8-AB
WA9FIH 440-110- 4-A
WA9BSF 295- 59- 5-A
WA9DPL 282- 45- 6-ABD
W9RSV 270- 54- 5-AB
W9EET 162- 27- 6-AB
W9CEK 135- 45- 3-A
K9IVB 50- 25- 2-A
WN9KQD 44- 22- 2-B
WN9MED 22- 11- 2-B
K9YZG 12- 12- 1-A
WA9LIV/9 (8 oprs.)
2596-236-11-AB
WA9IML (WA9IML, W9ZND)
1017-113- 9-AB

Indiana

K9QCB 1683-151-11-ABC
K9JTZ 102- 34- 3-A
W9JPX[2] 94- 47- 2-A
K9QXS/9 (5 oprs.)
3223-293-11-AB
K9ZUH (K9s MAF ZUH)
204- 68- 3-A
WA9AKU (WA9s AKU ASZ K9DHE)
158- 79- 2-A



K7AUO/7 operating from Paulina Peak at 8000' in central Oregon. One of the highlights was contact with the California Bay Area on 2, the first in recent years.



In their first endeavor for a September Party, the WA2WEB/2 gang, the East Coast VHF Society, turned out with 5 operators. That's W2QCR at the helm of the 50 and 1296 Mc. station. In spite of a nifty 23-K total the boys feel no complacency, rather a major lesson learned — keys for all bands next time around!

Wisconsin

WA9IMR/9
329- 47- 7-AB
WA9FPH 148- 37- 4-A
W9TQ 51- 17- 3-B

DAKOTA DIVISION

South Dakota

KØCER 40- 10- 4-B
KØFKJ 40- 10- 4-AB

Minnesota

KØDTA 152- 38- 4-AB

DELTA DIVISION

Tennessee

WA4INB 245- 49- 5-AB
WA4NUJ 213- 71- 3-A
WA4UKM 110- 22- 5-AB
W4RJC/4 (4 oprs.)
2544-212-12-AB
K4EJQ/4 (K4EJQ, W4YAV WA4CBX)
1000-100-10-AB

GREAT LAKES DIVISION

Kentucky

WA4ERT 258- 43- 6-A
WA4SKP 141- 47- 3-A
WA4QVQ 1- 1- 1-A

Michigan

W8CVQ 558- 61- 9-ABC
W8SH[3] 532- 76- 7-AB
K8VEX 514- 72- 7-AB
K8ZQE 360- 72- 5-B
WA8DXW 49- 49- 1-A
WA8DOF 14- 7- 2-A
K8IXF 14- 14- 1-B
K8TIW (4 oprs.)
712- 89- 8-AB
WN8KOS (WA8KBJ, WN8s KOS NSX)
600-100- 6-B

Ohio

WA8CJP 540- 90- 6-AB
K8KTX 385- 77- 5-A
WA8CXV 165- 55- 3-AB
WA8KRE 66- 22- 3-A
KL7FAP/8 56- 28- 2-AB
W9ONK/8 44- 22- 2-A
K8RXD 36- 9- 4-B
WA8LAX 4- 4- 1-A
WA8LEO 4- 4- 1-A
W8CCI (5 oprs.)
6213-327-19-AB
WA8BCA/8 (10 oprs.)
4290-330-13-A

[1] K3YGC, opr. [2]WA9CYG, opr. [3]K8UDJ, opr. [4]K6KOP, opr. [5]VE3DPZ, opr.

HUDSON DIVISION

Eastern New York

WA2HFI/2
7453-250-29-ABC
WA2BAH/2
5096-193-26-ABC
K2RLW 1235- 95-13-A
W2YPM 1095- 68-15-BD
W2HJO 540- 45-12-B
WA6DUI/2
520- 52-10-B
K2GSF 492- 41-12-B
W2IP 360- 36-10-B
W2HZZ 304- 38- 8-B
WB2KIJ 300- 50- 6-A
WA2TIF 252- 28- 9-B
WB2HZY 238- 34- 7-A
K2ARO 216- 27- 8-B
WB2FXB 6- 3- 2-B
K2YRZ/2 (6 oprs.)
10,179-377-27-AB
W9EOI/2 (5 oprs.)
4836-184-26-ABC
WB2EYG (4 oprs.)
600- 75- 8-A

N. Y. C.-L. I.

K2AAA 7476-267-28-AB
WB2MRK
6489-309-21-AB
W9ECV/2
6447-307-21-A
WA2OOL 3204-178-18-AB
WA2LRO 2800-200-14-A
WA2QCF 2793-147-19-AB
WB2AXS 1845-123-15-AB
WN2LUU*
1160-145- 8-B
WA2DRK 994- 71-14-B
WA2YXK 970- 97-10-AB
W2KXG 666- 74- 9-B
WA2GCL 423- 47- 9-A
WN2MEO 384- 48- 8-B
K2DUX 344- 43- 8-B
W2DBQ 341- 31-11-B
W2DGZ 324- 54- 6-B
WN2NHU 200- 50- 4-B
WA2OUT 84- 21- 4-A
W2ZSD 20- 5- 4-B
WB2MRM
12- 6- 2-A
WA2YHS (WB2IQM, WA2s YDB YHS)
5481-261-21-AB
W2GMT (W2GMT, WB2-JDZ, WA2UFA)
2448-144-17-B
WA2PNF (WA2s K1K PNF)
1068- 89-12-AB
WB2DZZ (WB2s CJW DZZ)
936-117- 8-A

Northern New Jersey

K2LNS 20,020-427-44-ABCD
WB2KLH
9976-344-29-AB
WA2SAB 4884-218-22-ABD
WA2KZV 1920-160-12-B
WA2WIL 1885-145-13-AB
WA2VER 1632- 96-17-AB
WB2GMR
1008- 84-12-B
WN2LEB*
1000-125- 8-B
WN2LOO 945-135- 7-B
WB2LDE 603- 67- 9-B
WB2CCX 600- 60-10-AB
WN2LVW/2
336- 18- 7-B
WB2ERM 164- 41- 4-A
WN2KQD 104- 26- 4-B

(Continued on page 164)

Division Leaders

Single Operator		Multioperator
K3IPM	*Atlantic*	WA2WEB/2
K9QCB	*Central*	K9QXS/9
KØDTA	*Dakota*	—
WA4INB	*Delta*	W4RJC/4
W8CVQ	*Great Lakes*	W8CCI
K2LNS	*Hudson*	W2LST
WØZBL	*Midwest*	WØBFE/Ø
W1RJA	*New England*	K1OOR/1
K7GWE/7	*Northwestern*	K7DTH
K6QEZ/6	*Pacific*	W6GD/6
W4VCC	*Roanoke*	WA8FSE/8
WØEVZ	*Rocky Mountain*	WØAJY/Ø
K4WHW/4	*Southeastern*	WA4PZO/4
W6GZK	*Southwestern*	WB6CDF/6
W5WAX/5	*West Gulf*	K5VOZ/5
VE3EWZ	*Canadian*	VE3FJS/3

One desirable by-product of the heterodyning process inherent in most s.s.b. exciters is the preservation of the stability of the frequency-controlling oscillator in the transmitter output. Heterodyning is thus particularly useful in v.h.f. transmitter design, where the order of frequency multiplication is otherwise high, with the result that even quite good v.f.o. control may not guarantee satisfactory stability at the operating frequency. In this 100-watt 144-Mc. transmitter the output of a fairly simple v.f.o. is heterodyned to the 2-meter range, resulting in stability comparable to that usually obtained on much lower frequencies.

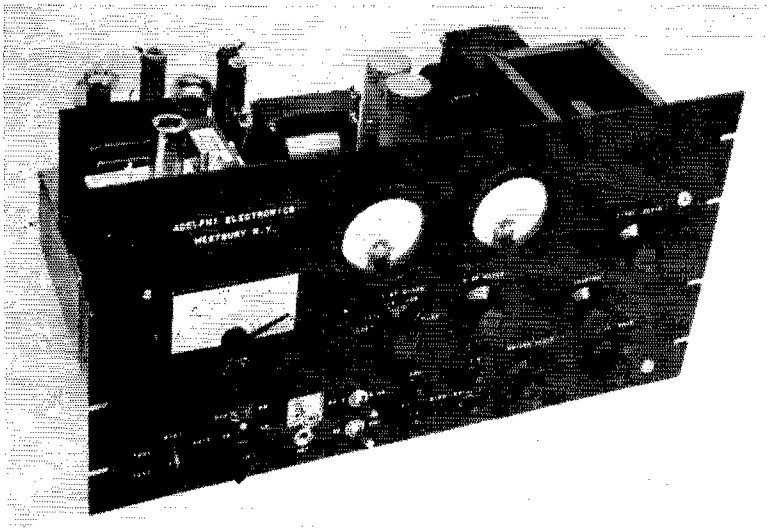


Fig. 1—Panel view of the 144-Mc. transmitter. The v.f.o., left, provides coverage of the entire 2-meter band.

A Heterodyne-Type Transmitter for 144 Mc.

High Stability with Full V.F.O. Control

BY ROBERT M. FORSTER* W2DVG

Not too much has been published on transmitters for s.s.b. work on 144 Mc. The outfit here described is a complete 100-watt r.f. unit with v.f.o. control, which becomes a sideband transmitter when a 9-Mc. s.s.b. source is substituted for its built-in crystal oscillator. As described it may be used for c.w., or the final stage can be modulated. Some of its features are:

1) V.f.o. control over the entire 2-meter band, without frequency multipliers and their inherent magnification of oscillator instability.

2) Final input power of 140 watts s.s.b. (from an 800-volt regulated supply) or 100 watts a.m. or c.w.

3) Automatic drive limitation.

How should a complex piece of ham gear be described? Should emphasis be placed on design principles and problems encountered in applying them, or should the end product be described in full detail, to facilitate exact copying? The writer leans toward the first approach. Unavoidable compromises, experience gained in construction and critical analysis of results obtained all preclude attainment of complete satisfaction on the part of the original builder. Furthermore, it is the natural compulsion of the true ham to modify and adapt. His ingenuity and imagination will nearly always produce a simpler and perhaps more effective device than the one described.

Because of the cost and complexity of this

* C/o Adelphi Electronics, Jericho Turnpike, Westbury, L. I., N. Y.

unit, it is unlikely that many "Chinese copies" will be made, so the following will be mainly an explanation of design objectives and ideas, leaving the reader to make any practical use of them that may appeal to him.

The General Plan

The basic idea is conveyed in Fig. 2, reading from right to left. The final amplifier, V_9, is a 5894, running Class AB_1 for s.s.b., or Class C for c.w. or a.m. It is driven by a 6360 Class-A amplifier, V_8. The preceding stage, V_7, is also a 6360, a push-pull mixer with its output on 144 Mc. Its push-pull input is on 22 to 26 Mc., and its screen is modulated by a 122-Mc. voltage from two 6U8s, V_5 and V_6. The grids of V_7 are driven from the output of a pair of 6BA7s, V_3 and V_4. The control grids of these are excited in parallel on 13 to 17 Mc. from the v.f.o. and buffer, V_{1A} and V_2. The No. 3 grids of the 6BA7s are driven in push-pull by a 9-Mc. signal. This is supplied by the crystal oscillator, V_{1B}, or by an external single-sideband source.

There are three power supplies. The high voltage is either 600 unregulated, for a.m. or c.w., or 800 regulated, for s.s.b. The others are a conventional 300-volt supply and a voltage-regulated bias supply.

The V.F.O.

The original 2-meter rig at W2DVG was crystal controlled. In due course, a v.f.o. in the 4-Mc. region was added. Though this was of ordinarily good design for that frequency, drifting only a matter of 100 cycles or so, the instability at 144 Mc. was intolerable. Marked improvement of the v.f.o. did not look promising, so at this point the heterodyning approach was indicated. Redesigning of the complete transmitter for s.s.b., as well as c.w. and a.m., thus became a logical step.

It is difficult to obtain uniform output from an oscillator when its tuning range is a high percentage of its operating frequency. Furthermore, use of a low frequency compounds the problem of unwanted products appearing in the output of a mixer. For reasons no better than intuition, it was concluded that the v.f.o. mid-frequency should be no lower than three times the tuning range. Charts of harmonic frequencies were prepared in the manner suggested by Isaacs,[1] resulting in the selection of 13 to 17 Mc. for the v.f.o. frequency range.

The vogue today in v.f.o. design is the series-tuned tank. This does not work too well with a wide tuning range, so a parallel-tuned circuit was used. This can be made to be stable by use of as much C as practical and a high-Q coil. Stabilization of the d.c. voltage is important, as are adequate mechanical and thermal stability.

The v.f.o. chassis is a plate with an L-shaped partition on its underside. It is made of heavy brass, bonded by solder. The partition is principally for heat baffling and stiffening. By placing the tube socket on one side of the partition, and the tuned-circuit components on the other, much of the heat not carried aloft by convection is distributed over a wide area, and metal temperature tends to stabilize by reason of good radiation.

The tuning capacitor, C_5 in Fig. 3, is a sturdy variable of sufficient size to spread the band over about 170 degrees of rotation. The padder C_4 and the setting of the slug in L_1 allow the range of the v.f.o. to be centered on the dial. C_1 also contributes to a limited extent to the degree of bandspread. The combination of C_2, C_3 and C_6, taken from ARRL's *Single Sideband for the Radio Amateur*, provides for temperature compensation. With the tube heater running constantly it may be that this refinement could have been omitted. The fixed padder, C_1, is essential, as its purpose is to compensate for expansion of L_1. It is mounted tightly against that coil, to pick up its heat.

The purist may prefer to operate the 6C4 buffer, V_2, as a cathode follower, at some sacrifice in output voltage. The buffer is incorporated

[1] Isaacs, "Filter-Type Sidebander," Nov., 1962, *QST*, p. 19.

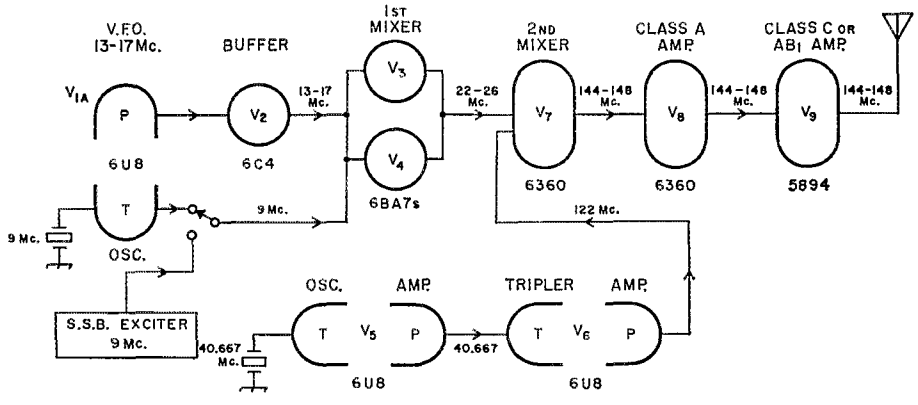


Fig. 2—Block diagram of the heterodyne-type 144-Mc. transmitter, showing tube types, stage functions and operating frequencies. The s.s.b. exciter indicated at the lower left is an external unit not described herewith.

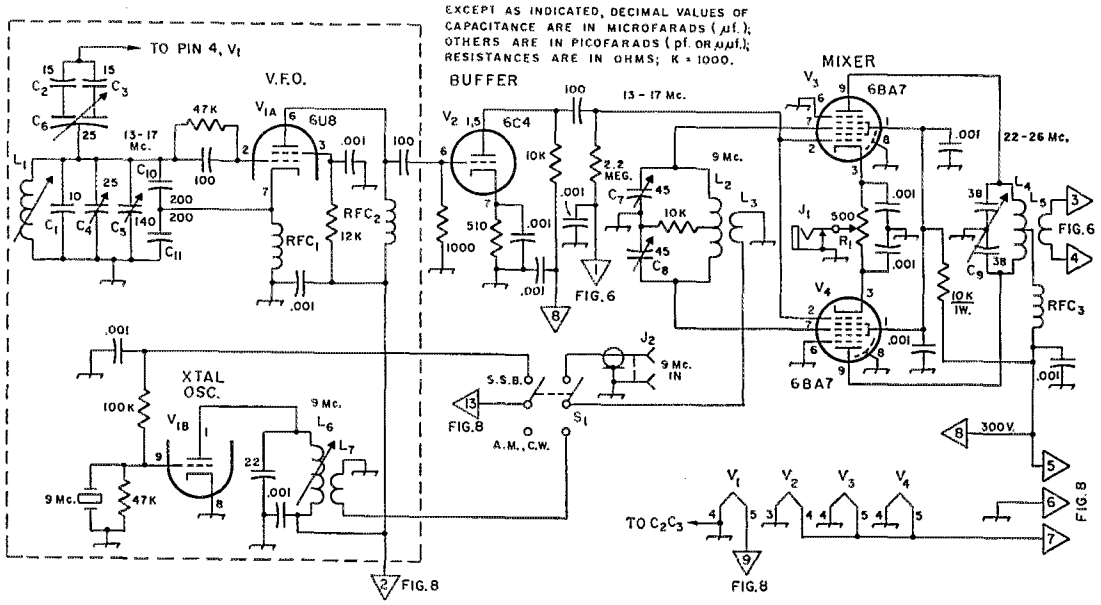


Fig. 3—Schematic diagram and parts information for the low-frequency portion of the transmitter. Capacitors are ceramic unless otherwise indicated.

C_1—10-pf. neg. coef. (Centralab TCN-10).
C_2—15-pf. neg. coef. (Centralab TCN-15).
C_3—15-pf. zero coef. (Centralab TCZ-15).
C_4—25-pf. zero-coef. trimmer (Centralab 823-DZ).
C_5—140-pf. variable (Hammarlund RMC-140S).
C_6—25-pf. differential trimmer (Johnson 148-302).
C_7, C_8—45-pf. dual ceramic trimmer (Erie 519-33R).
C_9—38-pf. butterfly variable (Hammarlund BFC-38).
C_{10}, C_{11}—200 pf. zero coef. (Centralab TCZ-200).
J_1—Closed-circuit jack.
J_2—Coaxial chassis fitting.
L_1—6 turns No. 24, ⅜ inch long, on ½-inch iron-slug form (North Hills 1300C).
L_2—106 turns No. 30 enam., closewound on ⅜-inch form, center-tapped.
L_3—2 turns No. 26 enam. wound over center of L_2.
L_4—40 turns No. 30 enam., closewound on ⅜-inch form, center-tapped.
L_5—2 turns No. 26 enam., wound over center of L_4.
L_6—43 turns No. 24 enam., closewound on ½-inch iron-slug form. 10.8 to 17 uh. (North Hills 1300J).
L_7—2 turns No. 26 enam. wound over cold end of L_6.
R_1—500-ohm control.
RFC_1—55-μh r.f. choke (Miller RFC-14).
RFC_2—5-mh. ferrite-core r.f. choke (Miller 6304).
RFC_3—100-μh. r.f. choke (Miller 4632).
S_1—D.p.d.t. toggle.

principally because of the varying drive-limiting bias on the 6BA7 mixers (see below).

The v.f.o. dial is calibrated only at 500-kc. points, the receiver being depended upon for precise readings of frequency, and at in-between points.

The Mixers

Major problems were expected from these stages, especially in the form of unwanted beats within the pass band. Such fears were unfounded, but a broadbanding problem developed. Overcoupling was tried but satisfactory output could not be obtained over a 4-Mc. range, so C_9, Fig. 3, and C_{13}, Fig. 6, had to be made variable. The associated grid tanks are "pulled along" electrically as these plate tanks are tuned.

Mechanical work had been completed and the shaft ends were in awkward places for front-panel control, hence the Rube Goldberg devices visible in Fig. 4. One is a right-angle drive from the bottom layer of an ancient junk-box, and the other is a drum and dial-cord gadget. There is little point in detailing these items, as the need for them could be engineered out in a rebuilding operation.

The second mixer stage was originally a 12AU7, but its output was too low to drive the 6360 amplifier to sufficient output for operation of the final in Class C. The 6360 mixer took care of this. Trouble was encountered with the 122-Mc. modulation of the 6360 screen, until the d.c voltage for the screen was taken from a regulated source.

The 122-Mc. Stages

Two 6U8s are used in the injection stages, in order to get adequate 122-Mc. voltage with good stability. A 6U8 triode, V_{5A}, is a crystal oscillator on 40.667 Mc., running at low input and driving its tetrode, V_{5B}, as a straight-through amplifier. The triode of V_6 triples to 122 Mc. and drives its tetrode as an amplifier. There may be better ways to do this, as even with these two dual tubes the 122-Mc. voltage level is marginal.

There is quite a "yoop" in the output signal when power is turned on, and if the crystal oscillator tank is not tuned carefully there is a ten-

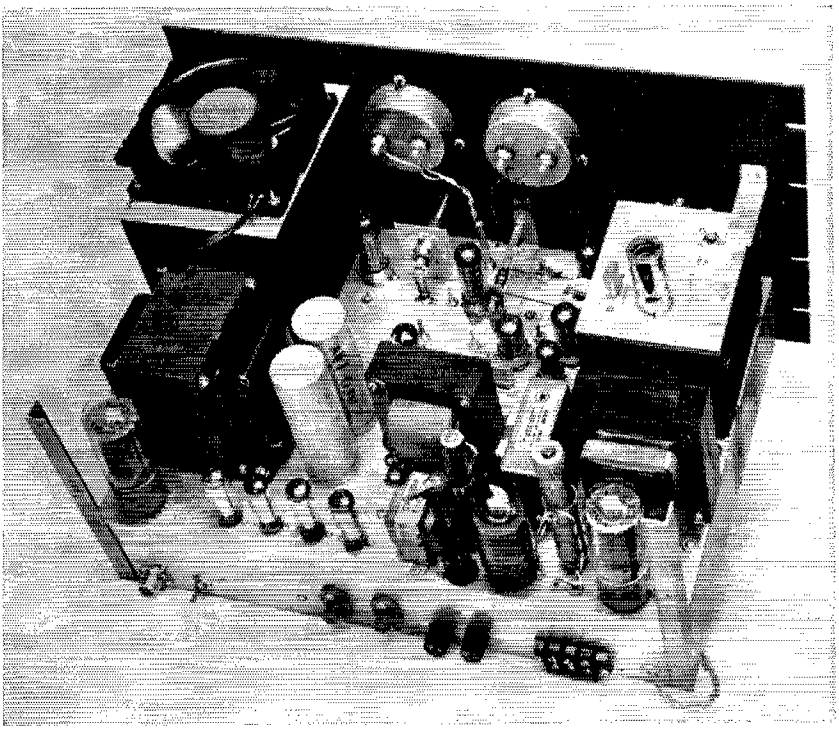


Fig. 4—Rear view of the transmitter. Power supplies occupy a separate chassis bolted to the back of the r.f. assembly. Large compartment at the upper left contains the shielded final amplifier. Note the cooling fan in place in this view. The v.f.o. and 9-Mc. crystal oscillator are in the upper right portion of the picture.

dency for the crystal frequency to jump.[2] Fortunately this chain runs steadily, so the stages can be adjusted for stable operation and they remain so.

The Final Amplifier

The 5894 is an excellent tube for this frequency and power level. At 800 volts, regulated, the plate current swings from 35 to 175 ma. without driving the grids positive. In Class C (600 volts at 160 ma., with 80 volts grid bias and 8 ma. grid current) the plates show no color in continuous operation. Conversion from Class AB_1 to Class C is accomplished by adjusting the bias potentiometer and increasing the drive by reducing the resistance in the cathode circuit of the 6360 amplifier.

The 5894 socket is a recessed type having built-in bypassing on all pins except the control grids. If the more conventional type of socket and external bypasses are used, it would be well to mount the socket above the chassis in the manner recommended in many *QST* articles, and in the *Handbook*. Button-mica bypasses should be

[2] Instability in overtone oscillator circuits may result from insufficient Q in the plate circuit, with a resultant tendency for oscillation to take place at the crystal fundamental frequency, rather than the desired overtone frequency. The usual cure is to use some capacitance in parallel with the plate coil, L_{22} in Fig. 6. Between 10 and 20 pf. should be sufficient in this application. Reduce the inductance of L_{22} proportionately. — *Editor.*

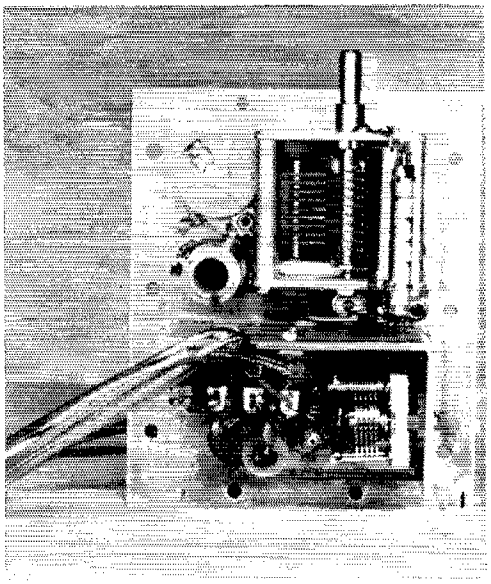


Fig. 5—V.f.o. and crystal oscillator portion of the transmitter. The large variable capacitor is C_5, driven by the vernier dial when the unit is in place. At the left of the L-shaped baffle plate is the differential capacitor, C_6. The v.f.o. coil, L_1, and the padder capacitor, C_4, are in the upper left portion of the picture.

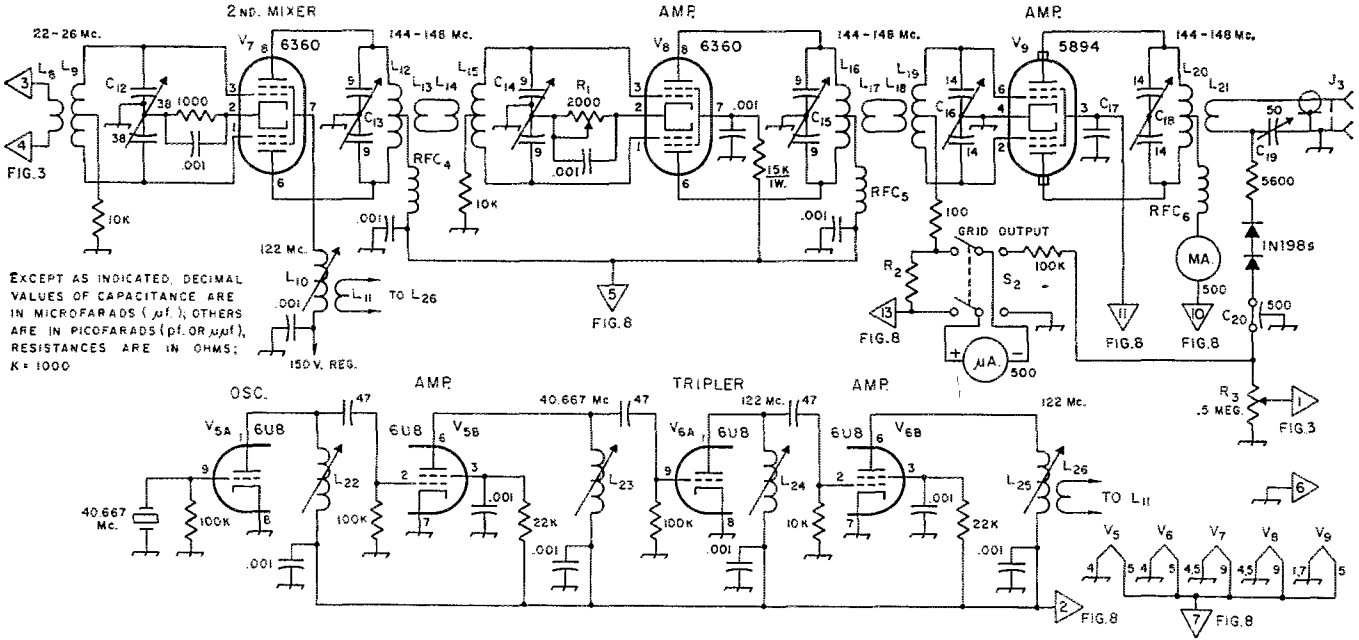


Fig. 6—Schematic diagram of the second mixer, amplifiers and oscillator-multiplier stages.

C_{12}—38-pf. butterfly variable (Hammarlund BFC-38).

C_{13}, C_{14}, C_{15}—9-pf. per section miniature butterfly (Johnson 160-208).

C_{16}, C_{18}—14-pf. per section butterfly (Hammarlund BFC-12).

C_{17}—Screen bypass built into socket. Use button-mica, 500 to 1000 pf. with plain socket.

C_{19}—50-pf. miniature variable (Hammarlund MAPC-50).

C_{20}—500-pf. feed-through capacitor.

L_8—2 turns No. 26 enam. wound over center of L_9.

L_9—40 turns No. 30 enam., closewound on ⅜-inch diam. form, center-tapped.

L_{10}, L_{24}—4 turns No. 26 enam., ¼ inch long on ¼-inch iron-slug form (North Hills 1000 series).

L_{11}—1 turn No. 26 enam., over cold end of L_{10}.

L_{12}, L_{13}, L_{16}, L_{19}—4 turns No. 20, ⅜-inch diam., ¾ inch long center-tapped.

L_{13}, L_{14}, L_{17}, L_{18}—One-turn link No. 26 enam. at center of L_{12}, L_{15}, L_{16}, L_{19}, respectively.

L_{20}—Plate line made from 2 pieces silver strip, ½ by 1/16 inch, 10⅛ inches long. See Fig. 9.

L_{21}—U-shaped loop, No. 14 enam., 4½ inches total length. Loop portion 1¾ inches wide and ¾ inch high, ⅜ inch from L_{20}.

L_{22}, L_{23}—10 turns No. 32 enam., ¼ inch long, on ¼-inch iron-slug form (North Hills 1000 series).

L_{25}—2 turns No. 18, ¼ inch long, on ½-inch iron-slug form.

L_{26}—1 turn No. 26 enam., at cold end of L_{25}.

R_1—2,000—ohm control.

R_2—Shunt to make 500-μa. meter read 15 ma. full scale. (13 ohms for meter used.)

R_3—0.5-meg. control.

RFC_4, RFC_5, RFC_6—144-Mc. r.f. choke.

S_2—D.p.d.t. toggle.

used, rather than disk ceramics, if external capacitors are needed.

The tank inductance was made of ½ by 1/16-inch sterling silver stock, obtainable at hobby shops catering to the jewelry hobbyist. The closed loop comprising L_{2B} was made and checked for tuning range before the shield was put in place around the amplifier. After installing the shield it was found that the plate circuit tuned too high in frequency, so a makeshift padder capacitor, not shown in Fig. 6, was added across the tank circuit. The way that this was done may be of interest to others faced with this predicament.

A bar of the stock used for the plate lines was cut to a length so that it would lie across the line. It was then supported by quartz plates removed from discarded 7-Mc. crystals. The bar so insulated is then moved along the line until the desired effect on the resonant frequency of the tuned circuit is achieved. This will be with C_{1B} just hitting 148 Mc. at minimum setting, if full-band coverage is wanted. The quartz and bar are then cemented in that position with epoxy glue. Polystyrene and ceramic tile were tried as insulators, but were not satisfactory. Possibly Teflon would do. The crystal idea was derived from seeing quartz used for insulation in capacity standards.

Since any capacitance beyond that needed to cover the desired frequency range will have some adverse effect on the plate efficiency, it would be best to prune the plate line to cover the intended frequency range with the lowest usable C. Overall losses in the amplifier are quite high in any case, so a cooling fan is incorporated as seen in the top view. Air flow is from the top down, and out through the socket holes, and through holes drilled along the bottom edges of the shield walls.

With 100 watts input the final stage delivers about 55 watts to its 52-ohm load. The writer feels that v.h.f. plate efficiencies, like the report of Mark Twain's death, are sometimes exaggerated, though 55 percent does seem a bit low. Investigation of possible sources of loss showed the chassis to be heating in strange places, apparently due to r.f. current.[3] However, the difference between the realized 55 watts and the maximum potential of 70 is of no real consequence for communications purposes.

Power Supplies

The low-voltage and bias supplies are conventional. The bias transformer primary is not cut off by the power switch on the panel. Thus its 6.3-volt winding, connected to the v.f.o. tube, maintains that tube's heater current constantly. To reduce the load on this transformer during non-operating periods, the high-voltage secondary is opened by the power switch, S_{3B}, in its *off* position.

The high-voltage supply has a novel method for obtaining voltage regulation. This system has been in use at W2DVG since 1946 on a Class B modulator (using rectified audio instead of r.f. to furnish the control). The source of the idea has been lost.

With a secondary voltage of 1500, center-tapped, a full-wave rectifier and choke input, the d.c. voltage out of the filter is 600 at 160 ma. The regulation is satisfactory for Class C operation. To obtain higher voltage for sideband or

[3] Mounting a tetrode tube socket above the chassis, and bypassing to the top surface, may help to correct the chassis-current situation. It is likely to make operation more stable, particularly when a socket not having built-in bypassing is used. — *Editor*

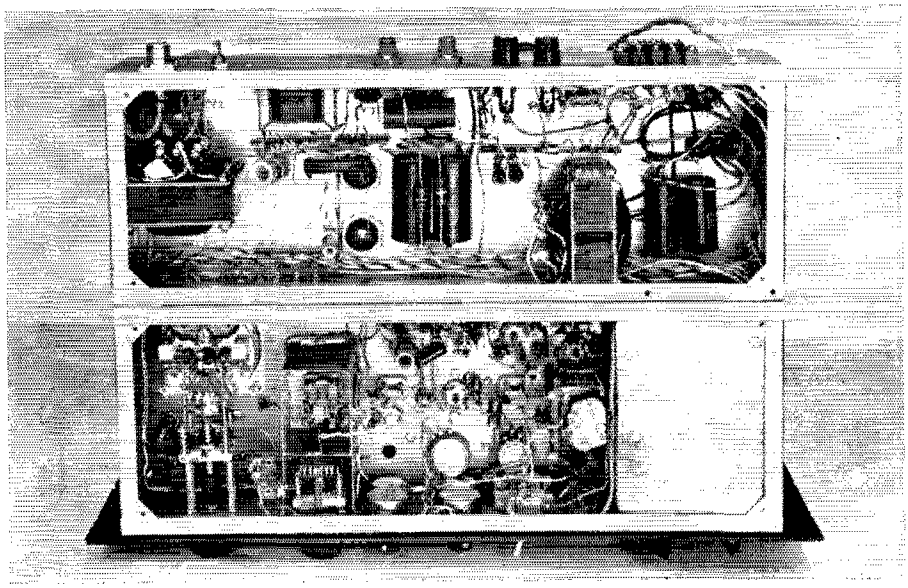


Fig. 7—Bottom view of the transmitter. Shielded compartment at the lower right is the v.f.o. Mixer and amplifier components follow to the left, just back of the panel. Upper chassis contains the power supply equipment.

c.w., a filter capacitor is switched into the input of the filter, and the supply then delivers 800 volts under full load. Without regulation the voltage soars to nearly 1000 with the load reduced to 40 ma. This will not do for s.s.b. operation, where constant voltage is a necessity.

The 6L6 shunt regulator of Fig. 8 does the job admirably. With the 6L6 screen voltage fixed at 255 and the control grid at ground potential, the 5000-ohm slider resistor is adjusted until the current through the tube is about 140 ma. (the difference between the idling and peak indicated currents drawn by the 5894). The control grid of the 6L6 is returned to ground through a control which permits setting the level of a varying bias for the tube. This bias is obtained by rectifying some of the r.f. power on the 52-ohm output line of the final. The r.f. output voltage varies directly with the plate current, so that as more current is drawn, more bias is generated. This increased bias reduces the load imposed on the power supply by the regulator current.

At maximum r.f. output the 6L6 is virtually cut off. Any difference between the plate-current grid-bias curve of the 6L6 on the one hand and the plate-current r.f.-voltage output of the 5894 on the other is ironed out by the power supply's output filter capacitor. The net result is that the static and dynamic stability of the voltage source is entirely satisfactory. The 6L6, while seemingly badly overworked, is standing up well.

There is a small amount of r.f. energy on the 52-ohm line, even with the carrier generator off. This may be due to contact potential, but whatever the cause, the energy biases the 6L6. To bring its grid back to ground potential, a little d.c. bias is fed in. The 20-ohm resistor, R_9, in series with the sometime input capacitor was placed there out of compassion for the switch, S_{5A}.

Another 5000-ohm slider resistor and associated switch apply reduced plate voltages to all stages except the final, for tuneup purposes. The switch across the aforementioned combination applies full voltage to the stages. This was incorporated simply to provide full drive for the final during the initial testing and debugging stages.

The supplies are mounted on a separate chassis bolted to the rear edge of the r.f. chassis. The

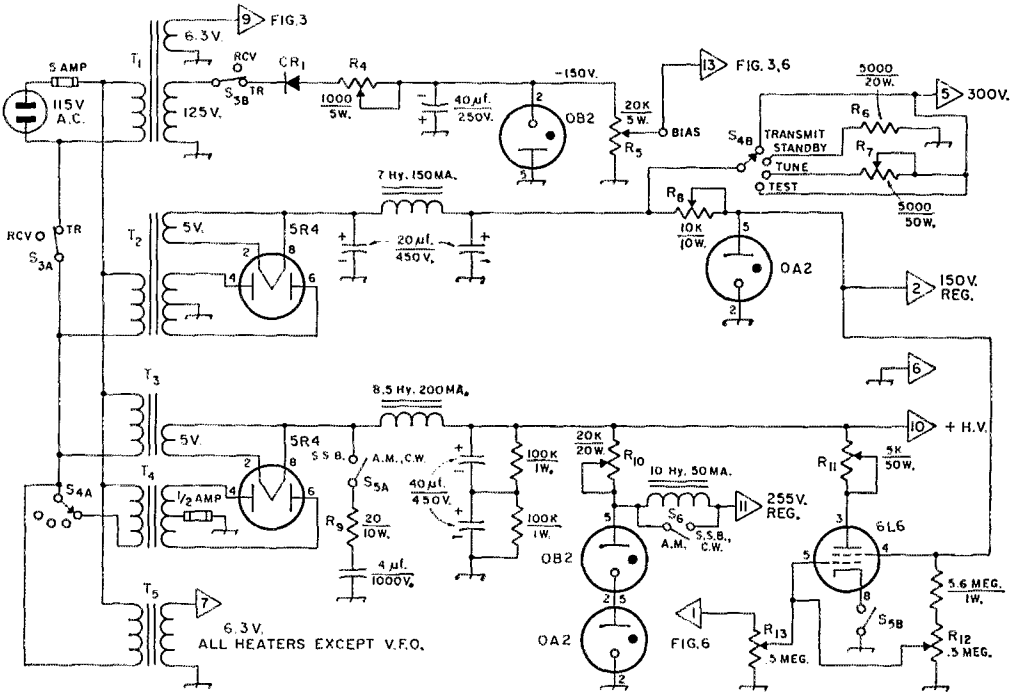


Fig. 8—Power supply circuits. Capacitors marked with polarity are electrolytic.

CR_1—Silicon rectifier 400-v. P.I.V., 125 ma.
R_4—1000-ohm 5-watt slider-type.
R_5—20,000-ohm 5-watt slider-type.
R_6—5000 ohms 20 watts.
R_7—5000-ohm 50-watt slider-type.
R_8—10,000-ohm 10-watt slider-type.
R_9—20 ohms 10 watts.
R_{10}—20,000-ohm 20-watt slider-type.
R_{11}—5000-ohm 50-watt slider-type.
R_{12}, R_{13}—0.5-megohm control.
S_3—D.p.d.t. toggle.
S_4—4-position 2-section wafer switch.
S_5—D.p.s.t. toggle.
S_6—S.p.s.t. toggle.
T_1—6.3 v., 0.6 amp.; 125 v., 15 ma. (Stancor PS-8415).
T_2—5 v., 3 amp.; 750 v., c.t., 180 ma.; 6.3 v. not used (Stancor P-6008).
T_3—5 v., 3 amp. (Stancor P-3026).
T_4—1330 v. c.t., 250 ma. (Stancor PC-8034).
T_5—6.3 v., 6 amp. (Stancor P-3064).

resultant partition not only acts as a shield but also stiffens the entire base. Leads from one section to the other are by way of feed-through capacitors, or are concentrated in a copper box built into one end of the r.f. section. This box (covered in the bottom view) contains the power switches that are mounted on the front panel.

Automatic Drive Limiter

This system is designed to put a limit on the r.f. voltage reaching the grids of the linear amplifiers, so that they will not be overdriven. It was with this in mind that 6BA7s were selected for the first mixer. These tubes have variable-mu grids, and can be used for automatic gain control purposes.

Some of the rectified r.f. voltage used to bias the 6L6 regulator is also fed back to the control grids of the 6BA7s. No attempt was made to control the time factor of this feedback loop, but the values of R and C in the circuit were fortuitous, and the limiting is effective.

The R.F. - Generated Bias Source

The bias voltage required for the 6L6 is about 35. With 55 watts power output, the r.f. voltage across the 52-ohm line is in excess of 50, so there is ample bias available. In fact, with a mismatched load there may be far too much r.f. voltage. In an early stage of testing, diodes were being popped like corn in a hot pan, due to the use of a 75-watt lamp as a load. With the line properly terminated, two diodes in series should prove adequate.

Some After-Thoughts

One is inclined to say that this is quite a sophisticated piece of gear to have been designed and built by a ham not on a "postman's holiday" from an electronics laboratory. Actually advice was obtained from many sources, and the end result is the implementation by one individual of the ideas and suggestions of many.

Second-guessing is a wholesome practice, so the author will engage in a little. From an operating standpoint, the transmitter has too many controls. The keying system is hotter than the proverbial 2-dollar pistol. R.f. currents in the chassis are a source of irritation. The chain producing the 122-Mc. injection could be improved. Silver, or even silver-plated, plate lines may be a pure luxury. Perhaps the sideband exciter on 9 Mc. could have been built in, by some judicious jamming, making the transmitter complete in one package.

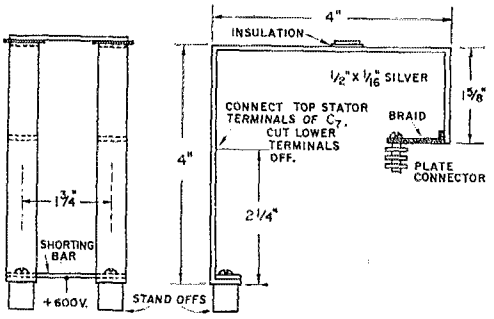


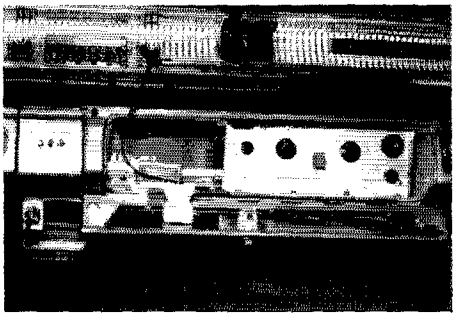
Fig. 9—Details of the final amplifier plate circuit. The tuning capacitor, not shown, is mounted inside the plate circuit loop, with its upper stator terminals soldered to the vertical portion at the point indicated. A ¼-inch rod soldered to the rear of the rotor shaft is brought out to the left of the side view, for knob control. The rotor is ungrounded, and the capacitor is mounted on an insulating support.

But the transmitter does work, both stably and well. With a sideband exciter of conventional crystal-filter design, the rig is quite versatile, yet completely "home-brew."

Thanks are due Dr. Hugh Neely, WB2BPK, who listened patiently to many tales of woe during the construction and testing of this transmitter. He also photographed the v.f.o. assembly, and painstakingly read and corrected the author's manuscript.

Comments from readers are solicited, and will be greatly appreciated. QST

Strays



Now you see it—now you don't. Mel Chan, K6PUB, says that the only way to install a mobile rig is in the glove compartment (so the YL doesn't have to sit a foot away). His (rig—not the YL) runs six to eight watts to a 2E26 final and the whole thing fits snugly into his glove compartment. There's room in there for the microphone and cord, too.

Some Fine Points in Message Handling

Part 3: This Business of Network Operation

BY GEORGE HART,* W1NJM

Want to feel nine feet tall? Get in a traffic net. Not just *any* traffic net, but one which is really on the ball, in which traffic gets handled *right*, the *first* time. When you get through, you'll say to yourself: "By gosh, this is why we are here!"

THERE are nets and nets, but basically a net is a group of amateurs working on a spot frequency for a specific purpose, controlled by a station designated as "net control station" (NCS). There are all kinds of nets — emergency nets, traffic nets, open and closed nets, directed and free nets, social and ragchew nets — you name it, somewhere on the amateur bands you can find it.

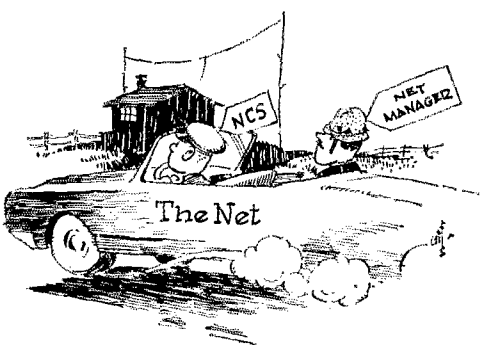
The kind of net we are talking about here is a *directed* net in which members do not transmit (or are not supposed to) unless directed to do so by the NCS, and in which formal record traffic is handled. Most traffic nowadays is handled in nets. In fact, about the only traffic not handled in nets is the long-haul variety between two stations who have set up a point-to-point schedule and who bang away at it night after night. We call this kind of business "iron man" traffic handling — although some of them are YLs.

Traffic Nets and Emergency Nets

Up until quite recently, there was a big difference between traffic and emergency nets. With the amalgamation of our two principal public service facilities, AREC and NTS, into the Amateur Radio Public Service Corps, however, the differences are gradually breaking down. A traffic net usually meets frequently, three times a week or more, to handle routine, normal-times, unimportant message traffic. Emergency nets usually meet once per week or less, or sometimes only in an emergency, to provide or prepare for disaster communications. For many years, these two types of public service nets went their respective ways without paying much attention to each other. Since about 1950, however, the realization is slowly dawning that nets that handle routine traffic only and close up or stay on and cause QRM during an emergency are doing only half the job of which they are capable, and the less important half at that; and that so-called emergency nets which are not experienced in handling record messages during an emergency have neglected, through lack of practice, the most important part of their function.

As a case in point, let us quote from a letter received from a critical observer of an emergency net in operation in a recent emergency: "I have seldom heard such a burlesque of traffic handling. The NCS was usually a 'nice guy' who never prescribed any order, never scolded anybody, and who never even acknowledged the existence of a practice called 'formal traffic.' I listened perhaps six to ten hours on those circuits and have not yet heard a message. It was all 'talk.'" While this net was floundering around, apparently the traffic net covering the same area was handling with efficiency and dispatch the "health and welfare" traffic which wasn't important enough for the emergency net.

Moral: In order to do a complete job, every traffic net must be capable of operating in an emergency situation; every emergency net must be capable of handling record traffic efficiently and in standard form. In other words, every traffic net must be an emergency net and every emergency net must be a traffic net.



The Net Manager

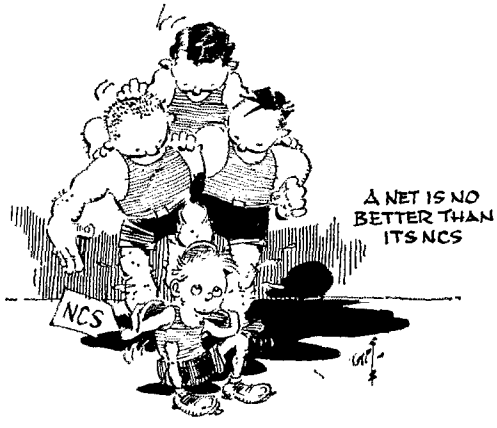
Most nets have some kind of administrative organization. The net manager is the head administrator of the net, and also the one who selects net controls and liaison stations. He is an individual, not a station. He is the "boss," selected by election or appointment depending on the mechanism set up. Some nets have complete slates of officers, making them more akin to clubs than to nets. In any case, *some* one has to appoint net controls, set the operating procedure, conduct the correspondence, settle disputes and in general represent the net; this someone, in most nets, is called the net manager.

* National Emergency Coordinator, ARRL.

The Net Controls

The net control station selected for each session of the net should have the best available combination of the following qualities: central location, good signal, familiarity with net procedure and coverage by various net members, net "know-how," mental alacrity and reliability to be on the net promptly at the appointed time to take charge. Some nets have the same net control every night; most have different net controls for the various nights or days of the week.

There can be no net without an NCS. Morever, a net is only as good as its NCS, so this function is of the greatest importance to any specific net



session. Just as the net manager is the boss administratively, the NCS is the boss operationally for the net session of which he is in control. Any member who speaks out of turn because he thinks the NCS is doing a poor job is strictly out of order. No NCS is perfect, but if he wants help he'll ask for it, and nothing wrong with this.

The NCS is charged with the clearing of traffic within the net, with the dispatching of internet traffic, and with maintaining order within the net. His authority extends only to the operation of the net on the air during that particular session, and is in no way concerned with the interior administration of the station, nor with its operation. *Within its scope, however, the authority of the NCS is absolute, its decisions are final and its instructions are strictly complied with, without comment.*[1]

Net Members

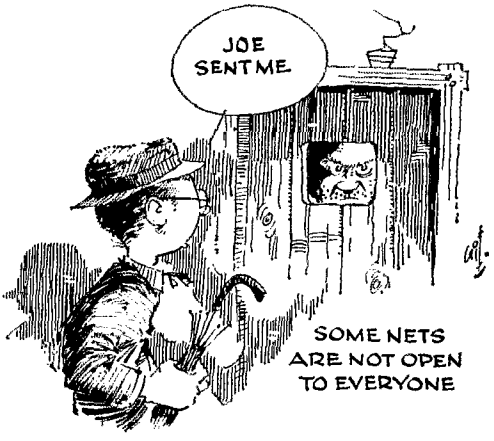
We said above that a net is no better than its NCS. It is also no better than its members, regardless of how good the NCS is. Traffic (and emergency) nets are usually open to anyone who wishes to participate, but there are limits. Any station reporting in is expected to know the net's procedure and to be able to participate without disrupting the net's business, either knowingly or unwittingly. There is no substitute for actual participation, but there is a certain amount of skull work that can be done beforehand, such as *listening* to observe procedure, to determine whether or not your participation would be welcomed, and to pick the propitious time to make your presence known. It all depends on what kind of net it is and why you want to participate. Some traffic and emergency nets have regular roll calls; it would be decidedly improper and perhaps would be resented if you were to call the NCS in the middle of such a proceeding. Wait until it is over, and until the NCS invites "any other" station (QNI on c.w., instead of QNA) to report in. If he does not do so, chances are the net is a closed operation and your presence would not be welcomed.

There is much that a net participant can do to enhance efficiency, but the *best* way is to *remain silent, but available*, unless or until you are called upon by the NCS to transmit. Any transmission without invitation in a directed net is bad procedure, no matter what its purpose or extent.

Phone Traffic Nets

In any net operation, the first order of business is what we term the "call up." This is simply an announcement by the NCS that the net is being called to order. On phone, he would start out something like this: "Calling the Podunk Net (repeat two or three times — all stations should be on frequency and waiting, so long calls are just so much unnecessary QRM), this is W9NCS. All stations zero beat this frequency. This is a directed net. Stations will now report into the net (or answer in prearranged order)."

Many phone traffic nets like to give with a long spiel at the beginning, grandly announcing



to the world the name of the net, its purpose in a few hundred well-chosen words, its frequency (by authority of FCC), operating time and days, requesting all non-participating stations to move off the frequency or refrain from transmitting, and on and on. This is usually followed by a carrier-on pause for the express purpose of allowing net stations to zero beat. Then the roll call begins and each participant exchanges a few pleasantries with the NCS. The name of the operator, especially, is bandied about as a matter of the greatest importance.

[1] Sound familiar? It should, it's almost a direct quote from *Operating An Amateur Radio Station.*

DATE TIME	STATION CALLED	CALLED BY	HIS FREQ. OR DIAL	HIS SIGNALS RST	MY SIGNALS RST	FREQ. MC.	EMISSION TYPE	POWER INPUT WATTS	TIME OF ENDING QSO	OTHER DATA NAME	QSLs S	QSLs R
10-16-64										Illinois		
0000	PDN	X				3515	A-1	500		~~Rockford~~ Net-NCS		
0001	X	W9NET							0020	Para +Rt +tru		
0001	X	W9TFC							0015	ESL		
0002	X	WA9AJF							0015	Elmhurst		
0002	X	W9AKV							0032	Chgo +ESL 3 Spfld 2 tru		
0003	X	K9AUD							0015	Chillicothe		
0003	X	K9EZP							0023	Kankakee 7 tru		
0006	X	W9HAS							0015	Champaign + Chgo		
0008	X	K9UOV							0027	Chgo – tru		
0010	X	K9YOE							0015	Chgo		
0021	X	K9ZSE							0022	Rockford		

We have never seen a net control station log this neat, but this illustrates how a log of the Illinois CW Net might look. The notes in the "Other Data" column are the type made by the NCS in clearing the traffic. "Tru" means traffic destined for points outside Illinois, in this case cleared by K9UOV.

Understand, we are not opposed to pleasantries or fraternalism. On the contrary, at the proper time they are an essential to *esprit de corps* in any net operation. But in a traffic net, we feel that the first order of business should be to get the traffic cleared, and anything that delays this is superfluous and should be dispensed with. After that, if desired, the net can be opened to pleasantries and rag chewing.

Traffic on phone nets is listed by the station when it reports in, such as "W9NCS from W9NET, reporting into the net from Rockford, two for Springfield, over." The NCS answers "Roger, W9NET from W9NCS, stand by," and is ready for the next station. Occasionally, we hear a station mentioning he has an "informal" for someone. "Informal" traffic is not traffic, it's just gab, and has no place in a directed net. Save it for later. Also, we sometimes hear the phrase "pieces of traffic"; we assume this means formal messages, so why not just *call* them messages?

When the NCS gets two stations in the net which have traffic for each other, he may direct them to start clearing it. How he does this depends mainly on what band the net is on, what mode is being used, how crowded the band is, and how much traffic has been reported in, and is therefore a matter of the NCS's judgment. On 75-meter evening nets, it usually isn't possible to shift the stations clearing traffic to another frequency, so the traffic must be passed on the net frequency. A sequence would go something like this:

"W9NET from W9NCS, give W9TFC your traffic for Peoria, over."

"Roger. W9TFC from W9NET, over."

"W9NET from W9TFC, go ahead."

"Roger. Message number. . . . . (etc.)"

Note, in the above, the absence of a lot of back-and-forth about "How copy?" and "I copy you loud and clear." If copy is difficult to the extent that it should affect transmission of the message, the receiving operator should say so ("Copy is difficult, send your message in parts, over") before transmission commences. Otherwise, everybody assumes conditions are normal and transmission can be made at normal writing speed.

If off-frequency transmission is feasible, this should be used by all means; it speeds up the traffic immeasurably. It also takes less acknowledgement time:

"W9NET and W9TFC from W9NCS, go down ten, clear traffic for Peoria, over." Both stations roger, and away they go, and NCS can continue the net. When they return, traffic cleared, they simply wait for a favorable opportunity to indicate that they are again on frequency, which they do merely by stating their call letters. NCS acknowledges. This is not a violation of our previous axiom of never transmitting unless invited to do so; it is a standard part of efficient net operation.

"Down ten" does not mean you slide your v.f.o. down ten kc. and start hollering. You listen first. If the frequency is occupied, you go down twelve or thirteen, or down seven or eight, or find a clear spot. The station designated to receive the traffic finds the best spot and calls first.

Maybe there *is* no clear spot and you can't clear the traffic. For a couple of good traffic men, this is rare, because they'll squeeze in somewhere; but if you don't clear the traffic, tell the NCS so when you return, otherwise he'll assume everything is hunky-dory.

Nets have differing procedures, but a good rule of thumb is to excuse all stations after fifteen minutes if there is no further use for them in the net. If this rule is followed, no rule-abiding net member has to sit on his hands for long periods of time because the NCS forgot him. At the end of 15 minutes, net control says: "The following stations are excused from the net," and lists them, signing his own call at the end of the transmission. FCC requires identification on the part of the designated stations at this point, so NCS can stand by while they do so — all at the same time.

Thereafter, the NCS excuses stations as soon as they are clear. If any stations excused want to stick around for a ragchew after the net, fine; but let's get the formal part of it cleared up first.

C.W. Traffic Nets

There really is little difference between phone nets and c.w. nets except that on c.w. it is helpful to use abbreviations and symbols. A c.w. net call up might go like this: CQ PDN CQ PDN CQ PDN DE W9NCS W9NCS QNZ QND QNI (or QNA) K. Translated, this would mean: "Calling all members of the Podunk Net, this is net control W9NCS. Zero beat this station. The net is directed. Stations now report into the net (or in prearranged order), go ahead." If this has a familiar ring, it's because this is almost exactly what W9NCS said when he called up the Podunk Phone Net. In fact, there is no reason anywhere why the procedure on phone and c.w. should differ in intent. The mode is incidental to the job being done.

If QNA (answering in prearranged order) is the procedure, NCS then goes about calling the roll, station by station, or uses whatever other procedure for getting stations in the net that has previously been decided upon. On c.w., a roll call or other type of QNA is not always necessary. It is easier to pick out one of several c.w. signals than it is one of several phone signals on the same frequency. However, in large c.w. nets it is often necessary to have some sort of QNA to avoid complete pandemonium when the NCS stands by after the call up.

On c.w., QNY procedure (i.e., sending stations off frequency to clear traffic) is almost always possible and is used more frequently than not. The customary procedure is for the NCS to call each station involved in turn, getting some sort of acknowledgement from each (usually just a dit), then instructing them: "D5 Spfld" (move down five kc. and clear traffic for Springfield). The receiving station always calls first on the QNY frequency; if D5 is being clobbered, he finds a niche nearby that is comparatively clear. A certain amount of hunting is the lot of the transmitting station; if he parks down five and waits for the receiving station to call, he might wait a long time, because the receiving station might be down seven or eight.

Identification and Logging

FCC regulations make only scant mention of nets in the section on identification (97.87) and none at all in the section on logging. Therefore, the regulations applying to identification and logging of individual QSOs must be fitted to networks. This, if followed to the book, tends to slow down network operation and make it inefficient. Nevertheless, if we don't follow the regs we are taking a chance of being cited, as individuals but in batches, and making a bad name for traffic handlers. So let's take a look at the minimum requirements.

It is authorized for the NCS to use the net call in the call up, but he must log each station as it reports in and exchange complete identification with it. In each case, this can be considered the beginning of the contact with that station. When that station is excused, leaves the net or the net ends, the time must be entered as the ending time of the contact, and identification must be exchanged. The NCS's log must show the call of each station in the net, the time it reported in and the time contact with it terminated.

Net members' logs must show the NCS as of the time the net member reported into the net, and the time contact terminated — that is, the member was excused from the net or the net ended. In addition, they must show the call of each station with which direct contact was made during the net, including beginning and ending times. For every such contact, complete identification has to be exchanged both at the beginning and ending and every ten minutes (or as soon thereafter as possible) if the contact lasts longer than that. The "as soon thereafter as possible" is subject to interpretation, but in network operation we assume it means you don't have to break for identification in the middle of a message.

* * * *

There are a great many more fine points of network operation that we have not been able to cover. These will be covered in more detail in ARRL literature now under preparation. Meanwhile, we are always glad to answer questions on this and allied subjects. Right now, it is time to get on to some of the other aspects of our public service operations. QST

The Publishers of *QST* announce an increase in the annual subscription rates, which effective January 1, 1965, will be $6 domestically in the U.S. and possessions; $6.50 in Canada; $7 elsewhere. This applies to schools, libraries, laboratories and similar institutions.

Effective with the January 1965 issue, the radio-store retail price of *QST* will be 60 cents per copy in the U.S. and Canada.

Membership dues are not affected.

Strays

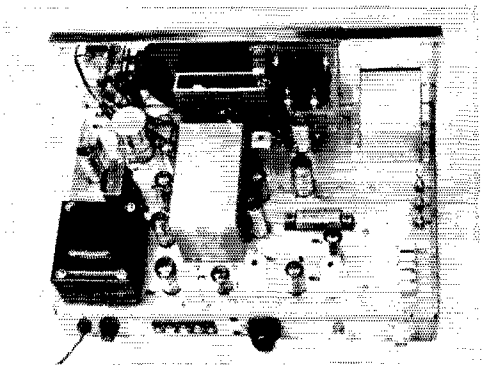
The International Amateur Radio Club, with headquarters at the ITU building in Geneva, has a special offer for new members joining before December 31. In addition to membership certificate and lapel pin, the $5 yearly dues will bring copies of two editions of *4U1ITU Calling*, each edition full of international ham features, personalities news, activities and "ham-tech-aid." Those who wish the publications only can get the 1963 reprint at 50 cents and the 1964 edition at $1. Address the club at Geneva 20, Switzerland.

• Recent Equipment —

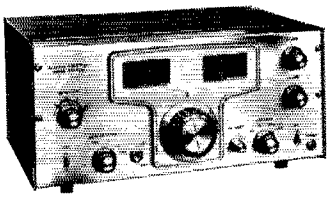
Lafayette HA-350 Receiver

THE HA-350, an import from Japan, appears to be the first serious attempt to crash the amateur receiver market with Japanese-manufactured gear. In the HA-350 the JA's have done an attention-getting job. Here is a five-band (3.5 through 29.7 Mc.) amateur-band receiver featuring double conversion, tunable i.f. for identical bandspread on all bands, 455-kc. mechanical filter, crystal-controlled front ends from 7 Mc. up, crystal-controlled b.f.o. for selectable sideband reception, 100-kc. crystal calibrator, and the usual "fixings" such as an S meter, automatic noise limiter, and a.g.c. that works on c.w. and s.s.b. as well as a.m. All this in a package measuring 15 inches wide, 7¾ inches high, and less than 12 inches deep. The tuning range is 600 kilocycles, giving full 10-meter coverage (28 to 29.7 Mc.) in three steps, along with good bandspread on the lower-frequency bands.

The receiver has some interesting circuit features which, while not exactly innovations, are more representative of home-built than commercial designs. For example, the tunable i.f. covers the 3.5-4-Mc. band directly; the set is basically an 80-meter receiver to which crystal-controlled front ends have been added for covering the higher frequencies. The general scheme is given in the block diagram, Fig. 1. V_3 converts 80-meter signals to 455 kc., V_4 being the variable oscillator that provides the beating frequency. V_1 is a straight r.f. amplifier, used as such on all bands, and on 3.5 Mc. V_{2A} likewise is an r.f. amplifier. These two stages have gang-tuned grid



Rear view of the HA-350 out of its cabinet. The box in the center houses the variable oscillator and 3.5-Mc. mixer tuned circuits. The oscillator and mixter tubes are alongside. The preselector tuning capacitors are in the shield box against the panel at the right. The mechanical filter is the horizontal object on the chassis to the right of the oscillator-mixer box. Crystals for the h.f. oscillators for various bands are in the right corner in the foreground.



circuits, but a 3.5-4-Mc. bandpass circuit is used for coupling V_{2A} to V_3. On 80, therefore, there is only one frequency conversion.

For 7-Mc. reception the h.f. crystal oscillator, V_{2B}, is switched on, having been inoperative on 3.5 Mc. This is the only change made in shifting V_{2A} from straight r.f. amplification to frequency conversion. On this and the higher bands V_1 is the only r.f. stage, V_2 serving as an oscillator-mixer for these bands. Only two sets of coils are used, as the tuning capacitor has enough range to cover a 2-to-1 frequency ratio. One set of coils is used for 3.5-7 Mc. and the other takes care of 14-29.7 Mc. — reminiscent of some of the homemade converters that have been described in *QST*. The r.f. tuning has to be separately adjusted on each band, an operating feature that has crept into more than one domestically-manufactured receiver in recent years (there once was a day when a single tuning control was the only acceptable method, but times do change!). One result of using a 2-to-1 range in the front-end tuning is that the gain tends to be leveled off on each coil set, since the band that falls at the high-C end of the scale (the lower-frequency band) generally gets amplified less than the one at the low-C end. This helps to overcome, comparatively, the general reduction in amplification that occurs as one goes higher in frequency.

Although there are actually only two front-end tuning ranges, there is a separate position for each band on the band switch because it is necessary to switch the converter crystals. There is a little doubling-up on crystals, five of them being made to provide seven bandspread segments. The crystal for 7-Mc. reception, for example, is on 11 Mc., which conveniently offers WWV reception on 15 Mc. as an "image"; thus there is a special WWV position on the bandswitch. The crystal for 21-Mc. reception (24.5 Mc.) likewise is used for "image" reception of the 28.5-29-Mc. segment of the 10-meter band. As a result of this and the position of the v.f.o. in the spectrum, the tuning is in one direction for one set of bands — 80 and 10 meters — and in the opposite direction for the rest. This, too, is a feature that is not unknown in current commercial receivers.

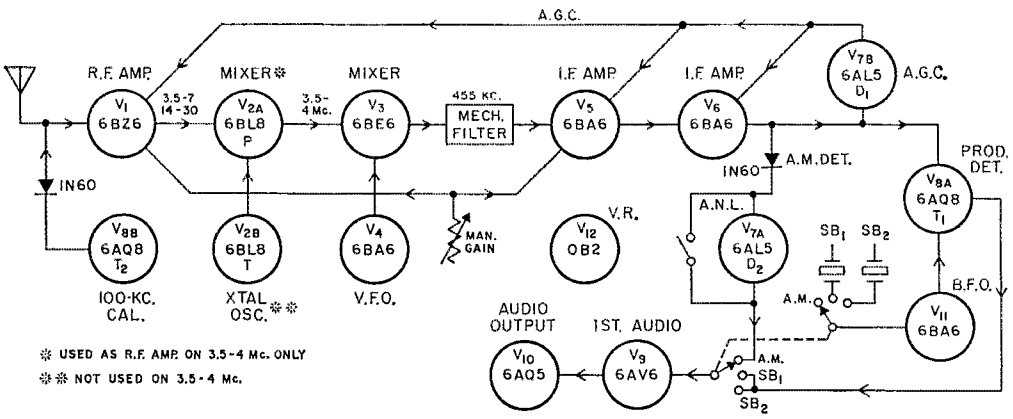


Fig. 1—Block diagram of the Lafayette HA-300 receiver.

Other Features

The i.f. amplifier after the mechanical filter follows standard practice, with transformer coupling. The a.m. detector is a semiconductor diode; the audio output goes through the well-known series-type noise limiter (which can be switched out) using one section of a 6AL5. For c.w. and s.s.b. reception the detector is one triode section of a 6AQ8 with the b.f.o. voltage introduced across its cathode resistor. Upper or lower sideband reception is selectable by a switch which cuts in one or the other of two crystals placed at the edges of the mechanical-filter passband. C.w. can of course be received on either of these.

The remaining section, V_{7B}, of the 6AL5 is used as an automatic gain control rectifier. A.g.c. voltage is applied to the r.f. amplifier and the two i.f. stages, as shown in Fig. 1. On c.w.-s.s.b. the release time of this circuit is quite long, with the result that the audio output is held quite constant as you tune across a band. One consequence is that the receiver blocks up when the station transmitter goes on, and is reluctant to come back within a reasonable time when sending stops. However, there is an octal "auxiliary" socket on the back to which the a.g.c. lead is brought out, so it would be no great problem to circumvent the a.g.c. by shorting it out while transmitting. The same socket has a lead to the antenna terminal so it, too, can be grounded while transmitting. It also has a pair of leads, paralleling the send-receive switch, for relay- or switch-operated standby. In the "receive" position the send-receive switch disconnects the screen voltage to V_{2A}, the plate and screen voltage to V_3, and the plate and screen voltage to V_5; the remaining tubes stay in operation.

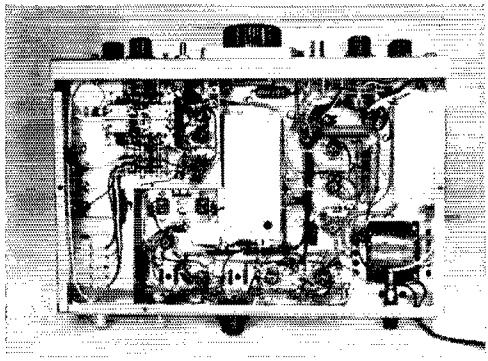
The audio system uses a voltage-amplifier stage followed by a 6AQ5 for power output. The input is switched, along with the b.f.o. crystals, to the proper detector for a.m. or c.w.-s.s.b. reception.

The 100-kc. calibrator is crystal controlled (the crystal is sold as an accessory), using a triode in the well-known Pierce circuit. It is connected to the antenna lead through a crystal diode for building up the harmonic output.

The power supply uses a full-wave transformer at rather low voltage (140 volts r.m.s. each side of the center tap) rectified by a pair of semiconductor diodes. These are bypassed to prevent damage by transient "spikes". The filter has three 40-μf. capacitors with resistors between, and is quite effective since the hum in headphones is lower than average for commercial receivers. A voltage regulator tube holds the plate voltage on the various oscillator tubes (except the 100-kc. oscillator) at 105 volts. The regulated voltage is also applied to the screen of the last i.f. stage, which incorporates a bridge circuit for the S meter.

Some General Observations

The tuning uses pinch drive from the tuning knob to the calibrated dial, followed by gears from the dial to the tuning capacitor. The action is light, but there was a slight amount of backlash



The shielding along the right-hand side of the chassis near the panel covers the v.f.o. circuit. The preselector coils are in a shield compartment between the bottom of the v.f.o.-mixer box (center) and the band switch at the upper left. The i.f. section is at bottom center in this view.

in the one we tried out. We understand that this receiver was one of a few flown over for initial inspection, so it is not known whether this is characteristic of the mechanism or not. On more certain ground, the tuning rate varies from 100 kc. per knob rotation at one end of the scale to about 150 kc. at the other; many operators would find this a little fast for easy tuning. There is one feature of the dial mechanism that may be confusing — at least, it proved so to the writer: The dial rotates in the opposite direction to that in which the knob is being turned. It would be hard to find an instance of this "oppositeness" in American equipment, and it takes a little getting used to.

Having a tunable i.f. that covers 80 meters can be disconcerting if there is any feed-through. Measurement of the i.f. rejection showed it to be about 50 db. with the receiver tuned to 7 Mc., and approximately 60 db. on all the higher bands. This is adequate under ordinary conditions. However, if you're using the traditional "hunk of wire" for a receiving antenna and are looking over a band — such as 21 or 28 Mc. — which is usually dead in the evening in this part of the sun-spot cycle, you'll hear weak amateur signals that may inspire you to fire up the transmitter — until you catch on. With a tuned antenna system this should not be a problem, and even with the hunk of wire it isn't one when the band you're listening on is actually open.

The receiver has plenty of gain — so much so that with a speaker or headphones of ordinary sensitivity the audio volume is hard to control; your eardrums are likely to be rattled with the audio control barely opened. Some like it that way, and those that don't will have little trouble in finding ways — a resistive voltage divider in the audio input circuit, for example — to knock it down. The manual r.f. gain control also has a rather limited range; signals are still coming through at good strength with the control all the way off. Since the a.g.c. takes over when the r.f. signal level gets high, this may not be too much of a disadvantage provided the audio gain can be controlled more smoothly.

With crystal control everywhere but in the tunable i.f., and the latter operating at a relatively low frequency, the stability can hardly help but be good. It sounds that way, both electrically and mechanically.

Like any equipment that has several oscillators and conversions, this receiver has birdies. Some of these are quite prominent when you tune across a band without the antenna connected. In most cases, though, they go down into the mud when the antenna is on and the front end is properly tuned. With one or two exceptions they should not be particularly bothersome.

The mechanical filter is rated at a bandwidth of 2 kc. at 6 db. down and 6 kc. at 60 db. down. We did not attempt to measure this, but in c.w. reception the other side of zero beat is practically nonexistent, which is a good indication of skirt selectivity. The selectivity is strictly s.s.b.; offset tuning is necessary for good a.m. reception, and the phone bandwidth may be too wide to satisfy c.w. men who are used to sharper i.f.'s. Adding audio selectivity would seem to be the only answer to this last, since there is no provision in the receiver for anything other than the 2-kc. bandwidth.

The construction is quite solid, with rather more attention paid to shielding than one ordinarily expects in receivers of this price class. The v.f.o./mixer circuits are completely boxed in, for example, with the power leads brought out through feed-through bypasses. The b.f.o. circuit is likewise separately shielded. There is also a good deal of shielding around the front-end circuits, the tuning capacitor being completely boxed.

The panel layout is simple, with ample room between controls. The tuning knob is the most prominent one, as it should be, and is large enough for a good grip. The hardware you have to remove to get the chassis out of the case is all machine screws; the Japanese do not seem to go for sheet-metal screws the way domestic manufacturers do.

— *G.G.*

Lafayette HA-350 Receiver

Height: 7 ¾ inches.
Width: 15 inches.
Depth: 12 inches including controls and terminals.
Weight: App. 19 lb.
Power Requirements: 115 volts a.c., 50/60 cycles.
Price Class: $190.
Distributor: Lafayette Radio Electronics Corp., 111 Jericho Turnpike, Syosset, L. I., New York.

Strays

Adman Bill Shakespeare wrote slogans long ago. It was only recently ARRL Advertising Manager W1VG came up with products to fit them:

"O, understand my drift" — The Windsor Crystal Co.

"When we have shuffled off this mortal coil" — Hamlet Inductances

"Screw your courage to the sticking place" — Macbeth Small Tools

"I have them at my fingers' ends" — Twelfth Night Dials

"Let me tell the world!" — Henry IV Transmitter Co.

"These blessed candles of the night" — Merchant of Venice Pilot Lights

"Out, damned spot! Out, I say!" — Macbeth Contact Cleaner

(Adapted from "After Hours," August 23, 1963 Printers' Ink.)

The Old Old Timers Club

Forty Years Apiece in Amateur Wireless

The story of the founding of Old Old Timers Club is largely the story of three men — Hubert Ingalls, W1NQ; Vermilya, W1ZE; and Roland B. Bourne, W1ANA. It is particularly the story of W1NQ, a veteran of the early days of amateur wireless, who, while convalescing from an almost certainly fatal illness, wanted to "get a few of the old boys off the shelf." The following, quoted from Mr. Ingall's autobiography, briefly describes the events leading up to OOTC's start.

THE thirties found me working for Rockland County, New York, as Chief of the County Police Radio System. In 1939 I spent many months in Summit Park Sanatorium with a bad case of tuberculosis in both lungs. The usual treatment for TB is collapse of the infected lung with pneumo or rib removal; because I had the devil disease in both lungs, the doctors told me to just lie like a bag of salt. In the spring of 1940, I decided to come up here to the Granite State to cash in my chips. It was that kind of situation.

"Miraculous as it seems, after two years up in this healthful country, living mostly out of doors among the tall pines, I rapidly gained my strength back. When World War II broke out, I was busily trying to set up an outstanding amateur station, something I had always had in the back of my mind. By this means, I intended to locate some of my long-lost buddies, friends, and acquaintances of years gone by. It occurred to me to start a forty-year club, which I figured would get the old boys off the shelf and back into circulation.

"During the fall of 1947, I put the proposition up to Irving Vermilya, W1ZE, and Roland Bourne, W1ANA. Between the three of us, we whipped up a constitution. Irving became president, Roland v.p., and I took the job of secretary-treasurer (office boy) myself.

"The original thirteen members of OOTC were W1NQ, W1ZE, W1ANA, W1SS, W1TK, W1FZU, W2DH, W2FG, W2RBH, W3CC, W2ENX, W2OUS, and W4TY.[1] The reason I picked these thirteen to be the nucleus of the club was that I knew each one personally to have had at least forty years experience as an amateur wireless operator. No doubt there were many more who were eligible at the time, but I just didn't have their names or know how to reach them."

Thus was founded the Old Old Timers Club.

—•••—

The purpose of the OOTC is fivefold: "to band together in one fraternal organization, without special benefits to any, the pioneers . . . in wireless communication; to encourage communication between members, and to establish nets and round-tables for members using all modes of wireless communications; to at all times encourage good operating practice, render all possible help to fellow members, welcome all modes of operation, and, above all, to establish a fraternal atmosphere among all wireless amateurs regardless of class or origin; to provide a forum from which early wireless and related personal narrative can be delivered, and to provide . . . a depository for such in its journal; and to remain above and apart from all political activity and bickering, either government or otherwise."

OOTC Publications

Spark Gap Times is the bimonthly journal devoted to articles of general interest and particularly of historical significance. Free to members.

OOTC publishes the *Blue Book of Amateur Wireless*, which contains members' biographies and pictures and is constantly kept up to date.

Also from the OOTC library are reproductions of the 1913 Government *Call Book* and supplements; and the 1909, 1910, and 1911 Electro Importing Company and Modern Electrics *Call Book*.

Qualifying for Membership

Any amateur who (now) holds a valid amateur license, and who held a two-way contact with some other wireless station, whether amateur, commercial or naval, at least forty years prior to his or her application for membership, is eligible. Applicants need not have been continuously active during the intervening years.

Applications must include, in writing, the date of his or her two-way contact, the calls of stations involved, and the location of the applicant's station. If the contact occurred prior to 1913, proof of the contact must accompany the application. If it was during or after 1913, applicant must have had a license and give the call and date of the license. Life membership in the Old Old Timers Club is paid in full by sending fifteen dollars to the secretary with the application. (W2EG is currently OOTC secretary and treasurer.)

The Old Old Timers Club operates under a non-profit charter granted by the State of Rhode Island. It is not associated with any other organization either directly or indirectly. Because of its unique place in amateur wireless, it is in no way competitive with any other organization; but it is ready to cooperate with others in any way compatible with its aims and creed. OOTC is an international organization which welcomes members from any part of the world whose desires are to better the understanding between amateurs of all nations. All qualified amateurs are invited to seek membership.

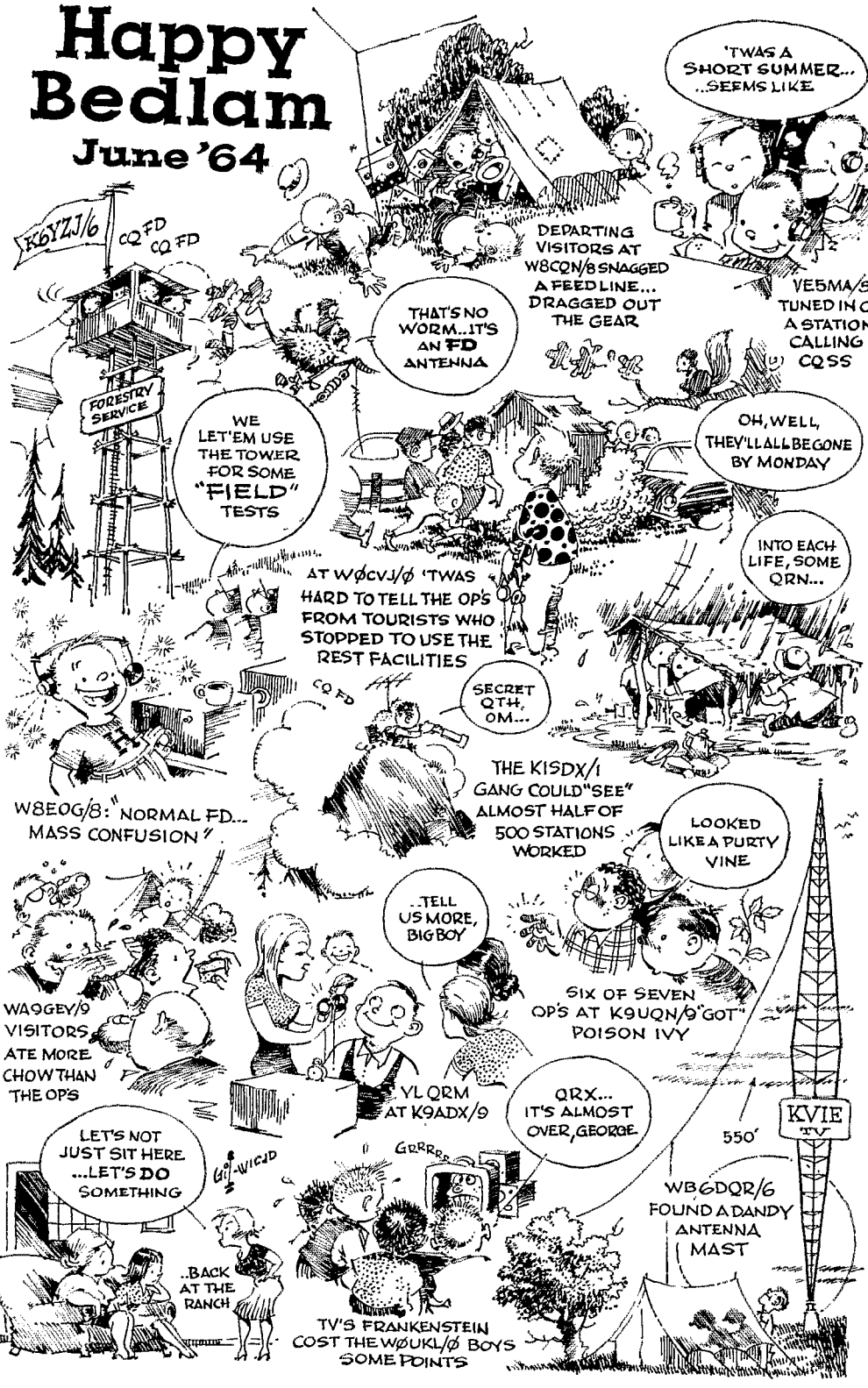
QST

This article was prepared by OOTC President Earl Cline, W4PPZ, who became a Silent Key soon afterward. Inquiries concerning OOTC may go to Secretary and Treasurer Earl Williams, W2EG, 507 Wayside Road, Neptune, New Jersey.

[1] Four of these veteran keys have since been silenced: W1ZE, W1FZU, W2OUS and W2ENX.

Happy Bedlam

June '64



1964 Field Day Results

Near-Record Turnout in All Classes

COMPILED BY ELLEN WHITE,* W1YYM

THE fourth weekend in June of 1964 (the 27th and 28th) was a very special period for W/VE amateurs. By the thousands they took to fields and mountain tops to demonstrate once again their ability to set up and maintain stations under field conditions. Reports are in and indicate a near record event, a total of 14,757 participants maintaining 3454 stations which accounted for 1510 Field Day score listings.

Weather in general proved fine, trouble as usual revolved around generators, bugs and other assorted wild life. One of the strangest tales reported recalls the June '64 Field Day cartoon cover. K7QIJ/7 reported setting up at a site where the Army was preparing ground for the girl scouts in '65. Explosives were stored in a concrete building not 500 feet from the antennas. The fellas reported a quick move to a site about a mile and a half away with a curfew on pre-Field Day operations!

Although the FD tabulations are grouped in order of number of transmitters operated simultaneously, a glance at the Class A Call-Area Leader listing can point up how well you did *within* your class on a geographic basis.

The soapbox to follow relates the happy and sad sides of the Field Day, as well as clues to what to prepare for in FD '65. *QRV?*

SOAPBOX

"We totalled more chigger bites than QSOs." — *K5JCC/5*. . . . "Old Murphy made up for lost time this year. Our troubles began when we ran over the generator with a car. After we straightened out the frame we discovered our starter rope was missing and then broke two extension cords and a piece of the 80-meter coax starting the generator." — *W8CQN/8*. . . . "At 2 Saturday morning we took the home beam down and by 6:30 a.m. we had everything ready to go. By the start of the test we were too tired to operate." — *WA5BNG/5*. . . . "We had flies, goats, mosquitoes, strangers, intermittent receivers, no-load antennas, burned out VOX relays, few QSOs, a full moon and a good time." — *K6LDA/6*. . . . "We resorted to the hand key after someone stepped on the bug." — *VE3HVC/3*. . . . "Our non-ham friends visiting the site ate more of the chow than we did." — *WA9GEY/9*. . . . "We lost an hour and a half due to a member bringing a TV set up so we could watch 'Frankenstein *vs.* Wolfman.' " — *KØUKL/Ø*. . . . "The use of a transceiver and the short skip on 20 Sunday A.M. boosted our score in '64." — *W2FFU/2*. . . . "The Forestry Service was glad to open up the lookout tower for our U. S. MARS group for some field and radio-wave propagation testing." — *K6YZJ/6*. . . . "A chance contact on 6 with K2FP disclosed that he was ex-W3VF and a charter member of the Beacon RA of 30 years ago." — *W3ATR/3*. . . . "I actually think we could have done as well without the linear; next year we'll try it that way." — *W4MN/4*. . . . "Hope our FD message was relayed more accurately than our request for 2 quarts of naptha for cooking. We received 2 quarts of SAE 30 instead, resulting in cold beans and uncooked hamburgers." — *WB2BAW/2*. . . . "The kids ate more than the operators and mosquitoes put together." — *W8TFZ/8*. . . . "We were located about 200 feet from the railroad and the trains sure kept busy FD weekend!" — *K5ALU/5*. . . . "Murphy struck one station and proceeded to disable it piece by piece. After 24 hours had passed not one piece of the original station was left working." — *KØQWM/Ø*. . . . "Our score would have been higher if some of the fellows had not put in so much time in the chow line." — *K8LUC/8*. . . . "Murphy's presence was obvious before we even started for the site. There were metal filings in the guts of the generator. We borrowed another generator on a trailer but the trailer had no lights, tags or hitch." — *WA2TPV/2*. . . . "Our v.h.f. rigs which worked A-OK at home refused to work at our FD site but then they worked A-OK when we brought them home again!" — *WA2MYS/2*. . . . "Next year the inverted Vees are going to be higher so they can't be tripped over and broken at 3:30 A.M." — *WAØARA/Ø*. . . . "Heard someone calling CQ SS." — *VE5MA/5*. . . . "We couldn't see to tune with all the bugs in the dial going for the light." — *WN8KOQ/8*. . . . "Putting high power on 40 is like poking a bee hive." — *K9AVO/9*. . . . "We lost our 6- and 2-meter rigs accidently due to the wind which dumped

* Asst. Communications Mgr., ARRL

HELPERS: "Hello Test"—A racoon gets into the act with WN2HHN for the State Line RC, K2LSA/2, 3A. W7RXS and 'cat's whisker' type friend at the 10-meter position of W7DK/7, the RC of Tacoma in 10A.

them in a 300-foot deep quarry." — *WA2REM/2.* . . . "The boys were quietly putting up a 6 ground plane when they discovered they were in the middle of a poison ivy patch." — *K2IPN/2.* . . . "Mosquitoes gummed up the works in the transmitter." — *W8DC/8.* . . . "After FD the dipoles were lowered from the trees by shooting the supporting ropes with a shotgun." — *WA8DVX/8.* . . . "Just as one of the club members mentioned that we were having a relatively accident-free FD, the 40-meter antenna blew clear down." — *K8OQM/3.* . . . "Unlike the previous KCARC FD's, s.s.b. completely replaced a.m. this year and we probably shall never use a.m. on FD again." — *W8HZZ/8.* . . . "After our 50 foot mast was already up, our FD chairman decided it was in the wrong place. Putting it back up, it bent in the middle which cost us two hours and 5 feet." — *W6CUS/6.* . . . "The generator coughed and sputtered, then conked out. After taking the gas line and fuel pump apart, we soon realized that the gas tank shut-off valve had vibrated shut." — *W1AQE/1.* . . . "We were plagued with millions of fish flies which swarm up from the Detroit river once a year and that happened to be FD night where we operated right at river's edge." — *K8NOW/8.* . . . "About one third of our QSOs were on VHF." — *WA8FSE/8.* . . . "Fortunately we found out that one of the generators had been wired for 220 before much damage had been done." — *W2GSA/2.* . . . "On Sunday afternoon the local volunteer Fire Department insisted the site was theirs for a picnic and our 75 phone position was located on 2nd base!" — *W2HW/2.* . . . "We were surprised that 80 c.w. was hot for the full 24-hour period." — *VE3VM/3.* . . . "We operated in a park located near a residential area without any complaints of TVI. The neighbors expressed great interest in our operation." — *W8HLD/8.* . . . "Our only Novice operator stayed on 2 and made 225 points." — *K4DPZ/4.* . . . "Our 22nd consecutive year without rain. Can anyone better this record?" — *W2JBQ/2.* . . . "Wish more guys would use Operating Aid #6." — *K1LOM/1.* . . . "Operated in a pasture and didn't mind it too much when the cows rubbed my antenna poles down before the contest, but a few minutes after the start one wrapped its foot around my coax and pulled the rig right out of the tent. I lost one hour replacing coax connectors, straightening bent gear and replacing broken tubes." — *W3PWK/0.* . . . "Many c.w. stations did not observe FCC regulations regarding the use of the fraction bar to indicate portable operation." — *WB6JQP/6.* . . . "You'll notice a lag in activity from 0927 to 1310 GMT. I fell asleep at the key." — *WN4SGD/4.* . . . "The 550-foot KVIE chanel 6 TV tower made an excellent antenna mast." — *WB6DQR/6.* . . . "My '63 Pontiac used 20 gallons of gas during the 24 hour Class-C stint and we drove just ¼ of a mile. The mileage is 100 gallons per mile." — *K9VPL/6.* . . . "I operated from Ham's Station in Amador County, California." — *WA6NVQ/6.* . . . "Never saw so many New Hampshire stations in one place at one time." — *K3SFP.* . . . "Away at Chicago but home in time for one 160-meter FD QSO." — *W1BB/1.*

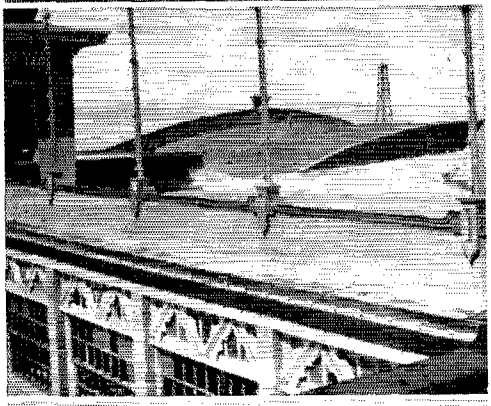
SCORES

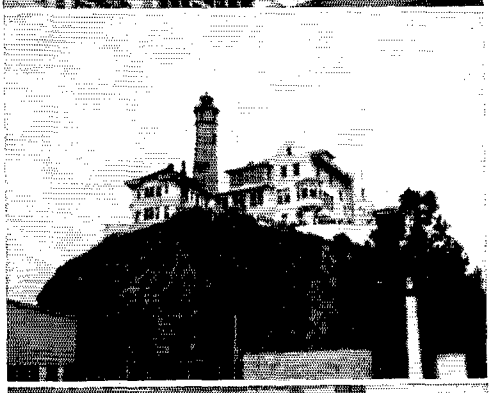
Class A stations are clubs and groups in the field with more than 2 operators. Scores are tabulated according to the number of transmitters operated simultaneously at each station. The figures and letters following each call indicate the number of valid contacts, the power inputs used, the number of participants at each station and the final score. The "power classification" used in computing the score is indicated by the letters A, B or C after the number of QSOs shown. A indicates power up to and including 30 watts (multiplier of 3); B indicates power over 30, up to and including 150 watts (multiplier of 2); C indicates over 150 watts (multiplier of 1).

One Transmitter

W5KPI/5	Lost Pines ARC	1236-	A-	4-11,349
W3FRY/3	Frankford RC, Jr. Opr. Division	1219-	A-	4-10,971
W5DDL/5	Lafayette ARC	662-	A-	8-6093
W7OTV/7	Tualatin Valley ARC	700-	AB-	13-6045
W8NCP/8	Tusco RC	644-	A-	7-6021
K5JCC/5	(nonclub group)	651-	A-	3-5859
W2EUP/2	RA of Erie County	640-	ABC-	8-5544
W1OP/1	Providence R Assn.	615-	A-	16-5535
W9CCN/9	Southern Wisconsin DX Club	867-	AB-	9-5343
W8CQN/8	(nonclub group)	541-	A-	4-4869
K9BZO/9	Chiburban Radio Mobileers	526-	A-	5-4734
W6VZT/6	Santa Clara County RACES Group	523-	A-	6-4707
W2FT/2	Plainview ARC	536-	AB-	12-4551
W2WS/2	RA of Greater Syracuse, Group #1	480-	A-	6-4320
KØRSA/Ø	Forx ARC	462-	A-	10-4293
WØDCW/Ø	Suburban RC	476-	A-	10-4284
K5HAA/5	Jefferson ARC	697-	B-	8-4272
W7LRA/7	Utah ARC	593-	AB-	19-4032
W9GCB/Ø	Delta County ARC	395-	A-	12-3780
K8HLR/8	Cooley H. S. Sharp-shooters Group	408-	AC-	8-3732
W4UC/4	Pensacola ARC	571-	B-	12-3576
W7MY/7	Murphy's Rebels	568-	B-	14-3558
WA8FPX/8	County Wide ARC	548-	B-	11-3450
WØDEP/Ø	(nonclub group)	356-	A-	3-3429
K5TSR/5	Beau May RC	569-	B-	4-3414
KØKAQ/Ø	Mae West Ham Club	568-	B-	4-3408
W9NGI/9	Society R Oprs.	536-	B-	30-3306
VE1JV/1	Pictou County ARC	349-	A-	11-3276

W4IE/4	Sarasota AR Assn.	443-	AB-11-	3192
W6VPU/6	Vista ARC	531-	B- 5-	3186
W1FWH/1	Newington AR League	494-	AB-12-	3159
WØNWX/Ø	Newton AR Assn.	328-	A-17-	3177
W5HTK/5	Enid ARC	471-	B-10-	3051
K6HV/6	Palisades ARC	501-	B- -	3006
W6BLY/6	Whittier Radio 50 Club	450-	AB-11-	2988
W9ZB/9	General Electric ARC	314-	A- 4-	2961
WA5CNQ/5	(nonclub group)	326-	A- 6-	2934
W8AL/8	Cantle ARC, Ad Ops	322-	A-10-	2898
W9ZWY/Ø	Sioux Falls ARC	322-	A-11-	2898
VE1RR/1	Albert County ARC	296-	A- 8-	2889
W4MVB/4	Beaches AR Soc	449-	B-15-	2844
W1CB/1	Burlington AR Assn	298-	A-20-	2817
WA5BNG/5	(nonclub group)	459-	B- 4-	2754
K9BPO/9	(nonclub group)	436-	B- 3-	2616
WØIUL/Ø	(nonclub group)	410-	B- 4-	2610
W1BV/1	Candlewood AR Assn	294-	AB- -	2607
W8RY1/8	Kalamazoo ARC	287-	A- 9-	2583
WØOM/Ø	Dubuque ARC	405-	B- 5-	2580
K9ADX/9	Wauwatosa ARC	400-	B- 6-	2550
W8IN8/8	Muskingum ARC	396-	B-16-	2538
KØZXE/Ø	Arrowhead RA	276-	A- 6-	2484
K7AYF/7	Shy-Wy RC	373-	AB-15-	2457
K6LDA/6	Crescent Bay Emergency Net	310-	AB-14-	2445
W9AA/9	Hamfesters RC	406-	B- 4-	2436
W8ZAU/8	(nonclub group)	405-	B- 4-	2430
K8LEK/8	Columbus Grove Key Clickers' ARC	404-	B- 5-	2424
K2ISP/2	Pebble Beachers	370-	AB- 5-	2385
K4MCL/4	Sowega ARC	395-	A- 4-	2370
WA4GJJ/4	Hillsboro AR Soc	368-	B-10-	2358
W6UUS/6	Astronautics RC	261-	A-15-	2349
K4JLA/4	Spartanburg ARC	363-	B-10-	2328
VE2BCB/2	(nonclub group)	371-	B- 5-	2316
WA6BAI/6	Tulare County ARC	331-	AB-18-	2301
W7TQC/7	Anaconda ARC	362-	AB-14-	2283
WA2IOG/2	(nonclub group)	300-	AB- 3-	2253
K8EPV/8	Brass Pounders ARC	250-	A-12-	2250
K2BWK/2	Squaw Island ARC	306-	AB-10-	2238
K4YYN/4	(nonclub group)	356-	B- 3-	2226
W3NNL/3	(nonclub group)	221-	A- 4-	2214
K8SUL/8	Edison Employees AR Soc	287-	AB- 6-	2205
K9USN/9	Navy MARS Ill., Forest Park Task Group	331-	AB-14-	2193
K8UIE/8	Chippewa ARC	218-	A-12-	2187
K3SZM/3	Dover, Del., 6 & 2 ARC	215-	A-10-	2169
W2FFU/2	Oswego County AR Assn	319-	AB-15-	2088
W7ED/7	Gallatin ARC	206-	A-10-	2079
K8UTT/8	Ford AR League	346-	B-12-	2076
KØOYM/Ø	Mid-Missouri ARC	290-	AB-11-	2073
W5CVB/5	(nonclub group)	295-	AB- 9-	2070
WØRFU/Ø	Bandhoppers RC	320-	B- 6-	2070
KH6DQ/KH6	Honolulu Mobile ARC	318-	B-16-	2058
WØDDN/Ø	Tri-State ARC	682-	C-17-	2046
W9BKC/9	Arrow RC	328-	AB- 9-	2001
W3ABT/3	Univ. Of Pa. ARC	311-	AB- 9-	1968
K4UYT/4	Hampton Roads RC	655-	C-20-	1965
VE3LK/3	(nonclub group)	300-	B- 3-	1950
KØMMA/Ø	Sugar Creek RC	323-	B- -	1938
W9HHX/9	Milwaukee School of Engineering ARC	321-	B- 5-	1926
W7SU/7	Hill MARS Communicators Club	268-	AB-10-	1866
WØFFN/Ø	(nonclub group)	288-	B- 4-	1884
WA2MSO/2	Hamburg ARC	289-	B-15-	1884
K6EDE/6	Lassen ARC	309-	B- 5-	1854
K6YZJ/6	(nonclub group)	302-	AB- 5-	1845
W2ZJ/2	Elmira AR Assn	293-	AB- 5-	1797
VE3FLW/3	(nonclub group)	297-	B- 3-	1782
K7KUK/7	(nonclub group)	173-	A- 5-	1781
W8ZZ/8	Detroit AR Assn	172-	A- -	1773
W5AQR/5	Ville Platte RA	295-	B- 5-	1770
WØHSC/Ø	N. D. State Univ. AR Soc	278-	B-11-	1758
W2QZR/2	Bishop Timon H. S. RC	288-	B- 4-	1728
W5QJR/5	Richardson ARC	542-	AC-10-	1707
W2BX/2	Cumberland RC	258-	B- 9-	1698
W7VSS/7	Ogden ARC	221-	AB- 6-	1695
W2AMK/1	Westchester AR Assn	187-	A- -	1683
K9JFA/9	(nonclub group)	187-	AB- 5-	1683
K4JIY/4	Aiken ARC	251-	B-10-	1656
W4ZDK/4	Delta ARC	276-	B-11-	1656
K7TPN/7	Rodeo City RC	249-	B- 9-	1644
K8CRJ/8	(nonclub group)	272-	B- 3-	1632
VE7UI/7	North and West Vancouver ARC	271-	B-15-	1626
WA5HTW/5	(nonclub group)	266-	B- 3-	1596
K8DXF/8	Mason County RC	240-	B- 6-	1590
K2YCQ/2	(nonclub group)	262-	B- 3-	1572
VE2CRS/2	Saguenay RC	259-	B-12-	1554
KØUKI/Ø	WWWL RC	254-	B- 4-	1524
W7LIQ/7	Bonner County ARC	246-	B-11-	1476
WA9GEY/9	(nonclub group)	144-	A- 3-	1431
W2TIO/2	Brantling Hill RC	236-	B- 9-	1416
VE6QE/6	Central Alberta R League	220-	B- 6-	1410
W4WSB/4	Ancient City ARC	232-	B- 3-	1392
W4PL/4	Chattanooga Old Timers Club	200-	B- 6-	1350





UNUSUAL FD SITES (top to bottom): the 2A location of the Gulf Coast ARC (WA4MEQ/4) with 265 QSOs; an antenna installation by the 1A Utah ARC (W7LRA/7) on top of a deserted dance hall in Scoltair, Utah; the W6CUB/6 boys journeyed to (and returned from) Alcatraz Island for a 5A stint and 5898 points; W9VNE monitors c.w. activity for W9AB/9 (Michiana ARC) with the empty bleachers of Notre Dame stadium for a backdrop.

Class-A Call-Area Leaders

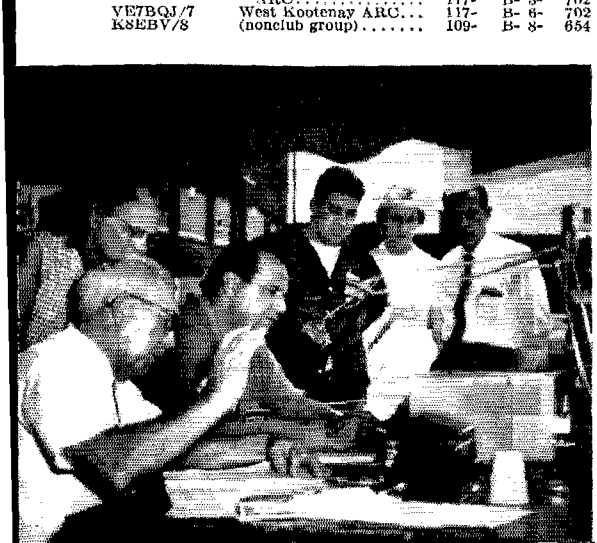
1A	2A	3A	4A	5A	6A	7A	8A	9A	10A	11A
*W1OP/1	*W1TX/1	W1DNE/1	W1KV1/1	W1AQE/1	W1AQE/1	W1MV/1	W1CKA/1	—	—	*W2MM/2
W2EUP/2	W2AZV/2	K2GQ/2	*W2OYH/2	K2MQW/2	*K2AA/2	*W2GSA/2	—	—	*W2WE/2	W3RCN/3
W3FRY/3	W3ATR/3	K3NBU/3	W3PFT/3	*W3BTN/3	W3CTC/3	W3OM/3	W3GV/3	—	—	VE3WE/3
W4UC/4	K4AF/4	W4AM/4	W4THM/4	W4SKH/4	—	WA4MBD/4	—	K4DPZ/4	K4DTV/4	
*W5KPI/5	WA5AUP/5	W5KHB/5	W5DPA/5	W5HZZ/5	—	W5SC/5	WA5GRO/5	W5MS/5	—	12A
W6VZT/6	W6TJ/6	W6MSO/6	W6HS/6	W6ZL/6	W6ZE/6	W6WWJ/6	W6ULI/6	*W6FA/6	W6AB/6	*VE3OW/3
W7OTV/7	K7FDB/7	W7CO/7	W7AW/7	W7VE/7	K7UGE/7	—	—	W7KYC/7	W7DK/7	
W8NCF/8	W8CEA/8	W8VV/8	W8FY/8	W8FGL/8	W8ACW/8	W8KAI/8	W8HLD/8	—	—	13A
W9CCN/9	K9FRI/9	W9BFO/9	W9OFR/9	W9LM/9	W9SW/9	W9SWQ/9	*W9FQ/9	—	—	*WA6ODP/6
KØRSA/Ø	WØVQ/Ø	WØDK/Ø	WØDUN/Ø	WØERG/Ø	WØWYV/Ø	—	—	—	—	16A
VE1JV/1	VE1FO/1	*VE2NE/2	VE3CBC/3	VE3KCD/3	VE3BSQ/3	VE3JJ/3	VE3MRC/3	—	VE3NAR3	*W4PLB/4

* Over-all class leader.

W4VX/4	(nonclub group)	225-	B- 4-	1350	
VE3RC/3	Ottawa ARC	199-	B-12-	1344	
K1UOR/1	(nonclub group)	222-	B- 3-	1332	
KØYCO/Ø	Coon Valley ARC	220-	B-12-	1320	
WØFLO/Ø	Pine Ridge ARC	192-	B- 7-	1302	
KØIWJ/Ø	Spencer AR Klub	192-	B-10-	1302	
W3V1/3	Huntingdon County ARC	216-	B- 9-	1296	
W5MCO/5	(nonclub group)	201-	B- 3-	1296	
K4CE/4	Everglades ARC	207-	AB-16-	1293	
W9LIT/9	Tri-State AR Soc.	215-	B-25-	1290	
K8QIK/8	Lancaster & Fairfield County ARC	116-	A-12-	1269	
W6MXO/6	Aeronautical RC	180-	B- 3-	1230	
W2QH/2	Greene ARC	151-	AB- 7-	1227	
W5ETG/5	San Antonio VHF Club	136-	A- 6-	1224	
K2DNN/2	Chemung Co. AREC	108-	A-19-	1215	
WA4RDA/4	Pinellas County 4-H ARC	187-	B- 9-	1212	
K8BSV/8	Buckeye Shortwave R Assn., Group #1	102-	C-12-	1206	
W9VAR/9	(nonclub group)	399-	C- 4-	1197	
K4BDT/4	Manatee ARC	157-	AB-24-	1179	
WB2FGA/2	(nonclub group)	128-	A- 3-	1152	
WA2NKR/2	(nonclub group)	190-	B- 4-	1140	
W8ODJ/8	Buckeye Shortwave R Assn., Group #2	185-	B-10-	1110	
VE3SCB/3	Camp Borden ARC	152-	B- 4-	1062	
VE4UM/4	Univ. of Manitoba AR Soc.	150-	B-11-	1050	
WØRCH/Ø	Pioneer RC	282-	AC-17-	1036	
W8BDG/8	(nonclub group)	114-	A- 4-	1026	
W5JEF/5	Tarrant County 6-Meter Emergency Net	94-	A- 6-	1017	
WAØASV/Ø	Albert Lea Spiderweb A.R. Assn.	143-	B- -	1008	
W9RCH/9	(nonclub group)	319-	C- 4-	1002	
WAØDIL/Ø	North Suburban Wireless Assn.	121-	AB- 6-	891	
W6KIL/6	Dunsmuir ARC	165-	B- 6-	990	
K6YCX/6	Pomona AR Transmitting Soc.	153-	AB- 3-	984	
WB6BQR/6	(nonclub group)	159-	B- 3-	954	
K5MLD/5	6 Meter Club of Dallas	157-	B- 7-	942	
W8ZOF/8	Dayhams	255-	ABC- 3-	942	
W9KZM/9	The Hamsters	150-	AB- 5-	942	
WA8DXD/8	Cooley H. S. Beginners	88-	AB- 4-	939	
WA3ADR/3	William Tennent ARC	115-	AB- 4-	903	
WA8NBT/8	Heights Area RC	150-	B-10-	900	
W8SSK/6	(nonclub group)	148-	B- 4-	888	
K7PUV/7	Southern Oregon ARC	122-	B- 4-	882	
WØTWU/Ø	McPherson ARC	96-	A- -	864	
WØHAC/Ø	Marion Mavricks	286-	C- -	858	
KH6ECT/KH6	RC of Kauai	127-	B-14-	852	
W5KVI/5	Mineral Wells ARC	115-	AB- 6-	846	
K7ELW/7	Laurel RC	110-	B- 6-	840	
KØAZV/Ø	Kirkwood High ARC	140-	B-12-	840	
K2SKO/2	Bristol Center Hill-Toppers	128-	AB- 3-	834	
K9CQA/9	Hoosier Hills Ham Club	274-	C-12-	822	
VE3HVC/3	Humber Valley ARC	91-	A- 9-	819	
K9DWG/9	QQQ ARC	134-	B- 5-	804	
VE7UT/7	Kamloops ARC	109-	B- 6-	804	
K4CSH/4	Kentuckiana RC	74-	A-17-	801	
W8PO/8	Intercity RC	131-	B-10-	786	
W6JTB/6	Antioch DX Soc.	80-	A- 4-	720	
WØDVL/Ø	(nonclub group)	118-	B- 3-	708	
VE4GY/4	Garden City Collegiate ARC	117-	B- 3-	702	
VE7BQJ/7	West Kootenay ARC	117-	B- 6-	702	
K8EBV/8	(nonclub group)	109-	B- 8-	654	
WA0CAE/Ø	(nonclub group)	108-	B- 4-	648	
K3EYK/3	Adams County AR Soc.	92-	B- 6-	642	
WA6CDY/6	Duarte AR Assn.	105-	B- 4-	630	
WA2PXB/2	Mt. St. Michael RC	209-	A- 6-	627	
KØEVC/Ø	Storm Lake ARC	43-	A- 6-	612	
WA9HHA/9	(nonclub group)	101-	B- 3-	606	
W9BSO/9	Mother of Good Counsel Scout Units #61 ARC	100-	B-16-	600	
WA4KRK/4	Chesapeake ARC	99-	B-10-	594	
KH6RS/KH6	Maui ARC	172-	B-12-	591	
WA9ERS/8	CTS ARC	54-	A- 3-	576	
KØGPF/9	(nonclub group)	108-	B- 3-	540	
W9SXY/Ø	ARC of Central Missouri	77-	AB- -	465	
WB6HKK/6	(nonclub group)	67-	B- 4-	402	
KØTCS/Ø	Smoky Valley RC	66-	B- 5-	396	
WA2ICV/2	Port Washington Brotherhood of RA, Unit #2	17-	A- 3-	378	
KL7WAF/KL7	Wildwood ARC	121-	BC- 4-	372	
VE2BLA/2	(nonclub group)	98-	A- 5-	369	
WA9CJP/9	Q-Mults ARC	35-	B- 5-	360	
K9YZQ/9	Explorer Post No. 27	167-	B- 4-	334	
K7WPD/7	Sammamish Totems AR Soc.	55-	B- 3-	330	
W9SA/9	North Shore ARC	40-	B- 3-	330	
W9AVX/9	(nonclub group)	35-	A- 9-	315	
WA2YAJ/2	Pearl River H. S. RC	128-	B-10-	256	
W8JGC/8	Hickory Corners Engineering Soc.	80-	B- 3-	160	
K7PUO/7	(nonclub group)	14-	A- 3-	126	
VE5WB/5	Wood River ARC	20-	B- 4-	120	
WA9FVN/9	(nonclub group)	17-	AB- 3-	102	
WA2OBG/2	(nonclub group)	11-	A- 6-	99	
WA3ANQ/3	(nonclub group)	14-	B- 3-	78	
W3YC/3	Northeast H. S. R. Transmitting Soc.	7-	A- 3-	63	

Two Transmitters Operated Simultaneously

W1TX/1	Connecticut Wireless Assn.	1385-	A-18-12,690	
W3ATR/3	Beacon RA	1050-	A-13- 9675	
W8CEA/8	Miami Valley AR Contest Soc.	1252-	AB-18- 9258	
WØVQ/Ø	Wilcox Electric ARC	1330-	AB-12- 8751	
K9FRI/9	(nonclub group)	969-	A- - 8721	
WA5AUF/5	(nonclub group)	971-	AB- 5- 6969	
K3HUO/3	South Community YMCA RC	737-	A- 7- 6858	
W9ANA/Ø	Univ. of Denver ARC	841-	AB- 7- 6417	
WØIFTB/Ø	Emporia ARC	1036-	BC- 7- 6012	
W6TJ/6	Riverside County AR Assn.	799-	AB-15- 5616	
W3OK/3	Delaware-Lehigh ARC	861-	AB-16- 5529	
W8NP/8	Massillon ARC	582-	A- 6- 5481	
W8COE/8	Kanawha RC	1063-	ABC-50- 5364	
W9UDU/9	Racine Megacycle Club	874-	B-20- 5334	
W8LIT/8	ARC of the Ohio State Univ.	840-	AB-10- 5271	
VE1FO/1	Halifax ARC	850-	B-10- 5250	
K4AF/4	(nonclub group)	846-	B- 7- 5226	
KØBHM/Ø	(nonclub group)	856-	B- 4- 5136	
W5PDO/5	Los Alamos ARC	751-	AB-13- 4869	
WØBRI/Ø	(nonclub group)	781-	B- 8- 4836	
W4CN/4	AR Transmitting Soc.	784-	B- - 4704	
K8SYD/5	Bayshore ARC	1151-	ABC-17- 4683	
W1TA/1	Nashua Mike and Key Club	1466-	C-10- 4518	
W4ORF/5	(nonclub group)	652-	AB- 5- 4521	



The Apricot Net operated W8CTZ/8 3A in downtown Cleveland with tremendous pre- and post- FD publicity giving a wonderful boost to public relations. Some particularly cogent operating tips offered their members prior to the stint: Thou shalt not come expecting to operate unless thou hast thy amateur operator's license on thy person. Thou shalt not use the terms fixed portable, slant nor thine own call sign in lieu of W8CTZ portable Cleveland. Honor thy adversary and deal with him courteously. Thou shalt not waggle thy tongue excessively.

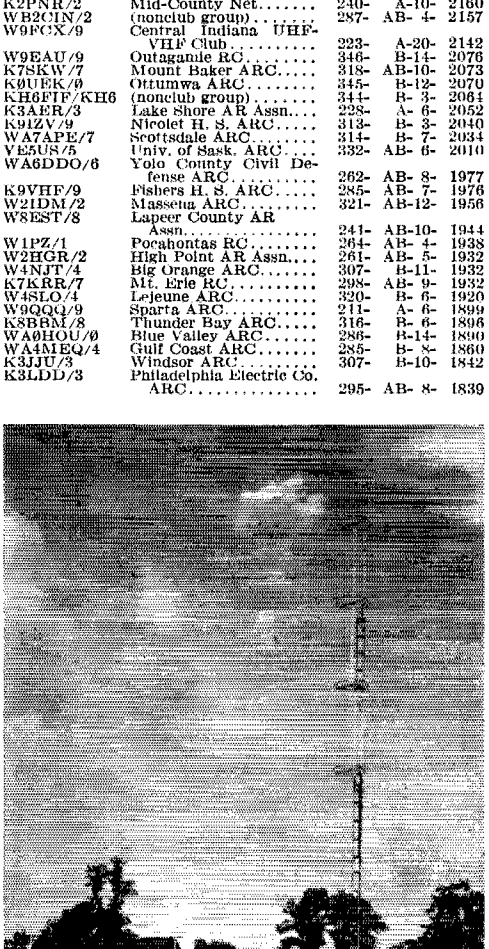
QST for

K7FDB/7	(nonclub group)	750-	B- 4-	4500
K9MMH/9	Steve's Swingin' Seven	606-	AB- 7-	4494
WØBFE/Ø	Jayhawk AR Soc	1276-	BC-30-	4491
W1SEA/1	Open Air Operators' Club	719-	B- 6-	4464
W5NS/5	Bartlesville ARC	602-	AB-20-	4332
W6KA/6	Pasadena RC	456-	A-14-	4329
W5YM/5	ARC of the Univ. of Arkansas	700-	B-10-	4290
W8KSL/8	Edison RA Assn	553-	AB- -	4140
K7EFA/7	Yellowstone RC	686-	B-40-	4116
W9EXE/9	ITTRI ARC	447-	A-14-	4023
W3GR/3	Friendship ARC	429-	A-30-	3915
VE2UN/2	ARC of McGill Univ.	604-	AB-10-	3861
W5MPI/5	Red Cross/AREC Group	651-	BC-18-	3855
W3PSH/3	Keystone ARC	379-	A- 6-	3836
K8LDS/8	(nonclub group)	619-	AB- -	3830
KØBUU/Ø	(nonclub group)	622-	B- 5-	3732
K9LAL/9	Love 'em and Leave 'em AR Soc.	430-	AB-13-	3716
W4WRG/4	(nonclub group)	584-	B- 7-	3654
K7CBP/7	Klamath Basin AR Assn.	570-	B-19-	3570
W8RXM/8	Dayton AR Assn.	531-	AB-20-	3570
K4GLL/4	Accomac Northampton AREC	545-	AB- 8-	3519
W4VPW/4	(nonclub group)	494-	AB- 5-	3510
W6TO/6	Fresno ARC	574-	AB-30-	3495
W2AZV/2	Wantagh RC	358-	A-25-	3447
K2SSB/2	(nonclub group)	520-	AB- 6-	3369
K1SHY/1	(nonclub group)	514-	AB- 4-	3358
W4JZC/4	(nonclub group)	698-	BC- 9-	3354
K7WAT/7	Ft. Lewis ARC	526-	AB-12-	3348
WØBXO/Ø	Radio Research Club	532-	B-15-	3342
W4MN/4	Palmetto ARC	1091-	C-12-	3273
W9CPO/9	(nonclub group)	544-	AB- 7-	3264
K4VHC/4	(nonclub group)	346-	A- 3-	3249
VE3ESS/3	Georgian Bay Rock Lifters	454-	AB- 3-	3231
K9RHH/9	Menomonee Falls RAC	461-	AB-12-	3216
VE3RAM/3	Ottawa Valley Mobile RC	521-	AB-15-	3216
VE2BAW/2	Sir George Wills Univ. ARC	394-	AB-15-	3159
W5CUQ/5	Pittsburg County ARC	500-	B-14-	3150
W1HEB/1	Middlesex ARC	424-	AB-10-	3147
WØEBE/Ø	Southwest Missouri ARC	496-	B-30-	3125
W8EQ/8	Lima Area ARC	504-	AB-20-	3120
W2SUS/2	South Amboy AR Assn.	472-	AB-10-	3084
WØCVJ/Ø	Tube and Shutter Club	488-	B-10-	3078
VE2CO/2	Lakeshore Field Day Group	312-	A- 5-	3060
W1USS/1	Pittsfield RC	484-	B-10-	3054
K3ICK/VO1	Harmon ARC	506-	B-14-	3036
K9WIE/9	Waupaca ARC	490-	B-13-	3030
WA2SJC/2	Central Nassau ARC	486-	AB- 9-	3024
W1NRG/1	Meriden ARC	477-	AB-15-	3012
WA2RUD/1	Soc. for Prevention of Cruelty to RA	476-	B- 3-	3006
W9REG/9	Tippecanoe AR Assn.	361-	AB- -	2979
K9UN1/9	Valley VHF Club	300-	A-20-	2925
WØCET/Ø	Kaw Valley RC	613-	BC- -	2913
K4HYB/4	Charles E. Newton ARC	485-	B- 6-	2910
K9UOV/9	(nonclub group)	322-	A- 8-	2898
W4HBB/4	ARC of Savannah	940-	C-30-	2895
W8TFZ/8	Aviation RC of No. American Aviation	410-	AB-19-	2892
K5ALU/5	Crawford County AREC	447-	B- 3-	2832
K8IEK/8	Port Huron AR Organization	445-	B-12-	2820
K4GRD/4	Florida AR Transmitting Soc.	443-	AB- 5-	2817
K9LGU/9	Point RA	438-	AB-13-	2814
W1BFB/1	Southern R.I. DX and Propagation Soc.	457-	AB- 5-	2796
KØEJS/Ø	Galva ARC	436-	B-15-	2790
VE1IM/1	Annapolis Valley ARC	464-	B-15-	2784
K3LOW/3	Berwick AR Klub	283-	A- 5-	2772
W8HOE/8	A.V.C. RC	334-	AB-18-	2709
K4ZJT/4	Roane County ARC	360-	AB-10-	3147
W5ABD/5	Westside ARC	440-	B- 9-	2640
K3VWT/3	(nonclub group)	423-	B- 4-	2628
WB6IJW/6	Nevada County ARC	546-	AB- 7-	2624
WA9BWH/9	Notre Dame H. S. RC	291-	A-15-	2619
W4WUW/4	(nonclub group)	555-ABC-	-	2604
K4ZXZ/4	Tidwater ARC	432-	B-23-	2592
K5YAA/VO1	Argentia ARC	783-	BC- 9-	2586
W2LZ/2	Walton R Assn	278-	A- 7-	2507
KL7DPX/Ø	(nonclub group)	384-	AB- 6-	2463
VE2ADX/2	South Shore ARC	367-	AB- 9-	2448
VE7AAM/7	Penticton Civil Defence ARC	380-	B-16-	2430
WA5IWD/5	North Arkansas AR Soc.	393-	AB- 9-	2418
K8EEH/8	Henry Ford Community College ARC	403-	B- 9-	2418
W8KTZ/8	St. Joseph H. S. RC	401-	B- 8-	2406
W9YT/9	Badger AR Soc.	376-	B-12-	2406
K7SHY/7	Mike and Key RC	400-	A-18-	2400
W9GFD/9	Prairie ARC	367-	AB-25-	2400
WØGHZ/Ø	Des Moines Technical H. S. ARC	398-	B-15-	2388
W2JUG/2	Burlington AR Soc.	279-	AB- 5-	2382
K9SWL/9	Rush County RC	369-	AB-10-	2364
K8MIT/8	Niles ARC	365-	B-14-	2340
WA9AZU/9	(nonclub group)	385-	B- 4-	2310
W8ATH/8	(nonclub group)	309-	AB- 6-	2274
W1CWA/1	Bloomfield ARC	321-	AB- -	2259
W2KXO/2	Wanaque Civil Defense	313-	AB- 7-	2256
W1EWO/1	Knox County ARC	374-	AB-10-	2244
KØQWM/Ø	Story County ARC	236-	AB- 6-	2235
WA8JVV/8	CRES AREC	308-	AB- 9-	2217
W8TKP/8	Hilltop ARC	363-	AB-17-	2208
W2HTD/2	(nonclub group)	286-	AB- 4-	2187
K3WA8/3	Aberdeen RC	361-	B- -	2166

CLUB AGGREGATE MOBILE SCORES

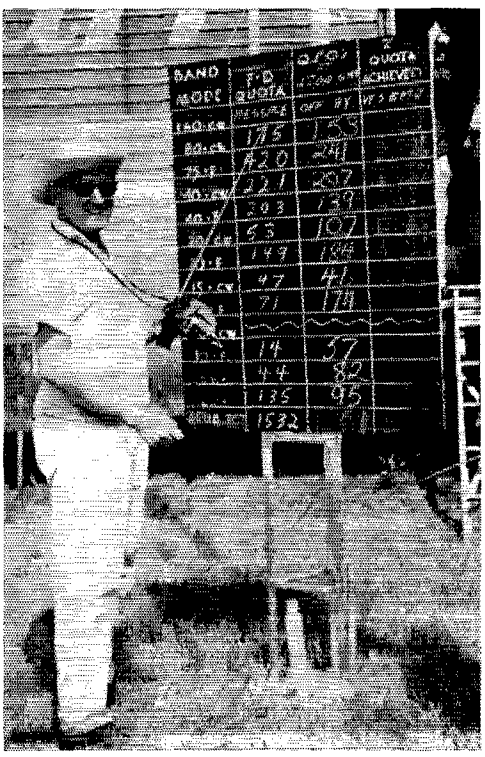
Phil-Mont Mobile Radio Club (Pa.)	80,280
Radio Amateur Mobile Society (Calif.)	36,554
Mobile Amateur Radio Club of South Bend (Ind.)	2102
Hayward Radio Club (Calif.)	2097
Argonne Radio Club (Ill.)	1962
Chiburban Radio Mobileers (Ill.)	1770
Amateur Radio Assn. of Bremerton (Wash.)	1017
South East Amateur Radio Club (Ohio)	932
Red River Amateur Radio Club (Texas)	747
Rodeo City Amateur Radio Club (Wash.)	603
Copper County Amateur Radio Assn. (Mich.)	40

W9YCR/9	Quad City ARC	361-	B-10-	2166
WØDBD/Ø	Iowa City ARC	721-	C-15-	2163
K2PNR/2	Mid-County Net	240-	A-10-	2160
WB2CIN/2	(nonclub group)	287-	AB- 4-	2157
W9PCX/9	Central Indiana UHF-VHF Club	223-	A-20-	2142
W9EAU/9	Outagamie RC	346-	B-14-	2076
K7SKW/7	Mount Baker ARC	318-	AB-10-	2073
KØUEK/Ø	Ottumwa ARC	345-	B-12-	2070
KH6FIF/KH6	(nonclub group)	344-	B- 3-	2064
K3AER/3	Lake Shore AR Assn.	228-	A- 6-	2052
K9IZV/9	Nicolet H. S. ARC	313-	B- 3-	2040
WA7APE/7	Scottsdale ARC	314-	B- 7-	2034
VE5US/5	Univ. of Sask. ARC	332-	AB- 6-	2010
WA6DDO/6	Yolo County Civil Defense ARC	262-	AB- 8-	1977
K9VHF/9	Fishers H. S. ARC	285-	AB- 7-	1976
W2IDM/2	Massena ARC	321-	AB-12-	1956
W8EST/8	Lapeer County AR Assn.	241-	AB-10-	1944
W1PZ/1	Pocahontas RC	264-	AB- 4-	1938
W2HGR/2	High Point AR Assn.	261-	AB- 5-	1932
W4NJT/4	Big Orange ARC	307-	B-11-	1932
K7KRR/7	Mt. Erie RC	298-	AB- 9-	1932
W4SLO/4	Lejeune ARC	320-	B- 6-	1920
W9QQQ/9	Sparta ARC	211-	A- 6-	1899
K8BBM/8	Thunder Bay ARC	316-	B- 6-	1896
WAØHOU/Ø	Blue Valley ARC	286-	B-14-	1890
WA4MEQ/4	Gulf Coast ARC	285-	B- 8-	1860
K3JJU/3	Windsor ARC	307-	B-10-	1842
K3LDD/3	Philadelphia Electric Co. ARC	295-	AB- 8-	1839



The AVC RC W8HOE/8 operated 2A with 4 stacked halos on 6 meters.

WB2ENJ/2	Trenton Wireless Assn..	281-	B- 3-	1836
WA0ENP/0	(nonclub group).....	310-	AB- 3-	1836
W9CYX/9	6n2 AR Soc.....	305-	B-10-	1830
K4DKJ/4	Heart of Georgia RC....	303-	B- 7-	1818
WA6UCM/6	Kilocycles RC.....	256-	AB-14-	1791
VE1YT/1	Shearwater ARC.....	272-	B- 5-	1782
W1EDH/1	Middlesex AR Soc.....	291-	B- 9-	1746
K1JFI/1	Roger Williams V.H.F. Soc.....	236-	AB- 6-	1737
W0ILO/0	Red River RA.....	521-	BC- 7-	1722
VO1CU/1	Soc. of Nfld. RA.....	270-	B-10-	1710
W9HRM/9	Milwaukee RAC.....	276-	B- 8-	1656
K4YTZ/4	Rock Hill ARC.....	523-	A-10-	1614
W8RB/8	Buckeye Ragchewers Club.....	253-	AB-14-	1614
W8RCC/8	Babcock & Wilcox Co. ARC.....	400-	ABC-16-	1608
WA2VSG/2	Shore Area ARC.....	153-	A- 8-	1602
WA3AOE/3	Pottsgrove RC.....	215-	AB- 5-	1602
W5NW/5	Permian Basin ARC....	534-	C-12-	1602
W0CNK/0	OMARC RC.....	267-	B- 5-	1602
VE1AHU/1	Upper St. John River Valley ARC.....	271-	BC-10-	1584
K2HJY/2	Medford Wireless Assn..	208-	AB-10-	1581
K0TLQ/0	Lawrence ARC.....	260-	AB-14-	1569
WA4RMV/4	Virginia Highlands ARC	256-	AB-10-	1551
W1DDD/1	Blackstone Valley ARC.	243-	B-12-	1548
W8VPV/8	Cuyahoga Falls RC....	257-	B-15-	1542
W9ETQ/9	St. Mary of the Lake Seminary.....	208-	AB- 6-	1542
WA5ESJ/5	Burbank ARC.....	767-	B- 8-	1534
W3OI/3	Lehigh Valley ARC....	510-	C- -	1530
WA0BBP/0	Hamsters V.H.F. Club..	155-	A- 7-	1530
WA9DKV/9	Zion-Benton H. S. ARC.	168-	A- 6-	1512
K7CTI/7	(nonclub group).....	175-	AB- 3-	1509
WA0HME/0	McConnell ARC.....	246-	AB- 4-	1497
WA9CJN/9	Kishwaukee RC.....	416-	BC-20-	1494
W9USA/9	MARS, Ill.....	249-	B- 3-	1494
K8LUC/8	Evendale AR Soc.....	195-	AB-10-	1491
K7ENE/7	(nonclub group).....	223-	B- 3-	1488
WA9CBP/9	Badger V.H.F. Club....	218-	B- 5-	1458
W0VQN/0	Tri-City RAC.....	350-	BC- 8-	1458
W0CUO/0	Grand Island AR Soc...	242-	B- 9-	1452
K2KHB/2	Brighton H. S. ARC....	201-	AB- 6-	1449
VE3SAR/3	ARC of Sarnia.....	216-	AB-16-	1449
VE6BJ/6	(nonclub group).....	241-	B-13-	1446
W0MKJ/0	Jefferson County RC...	210-	AB- 3-	1437
W8MVE/8	V.H.F. Bucaneers.....	214-	B-14-	1434
WA0DSE/0	Harrisonville AR Klub.	214-	B- 8-	1434
K3SGD/3	Baltimore Area AR Emergency Corps....	213-	B- 5-	1428
VE1CR/1	Sydney ARC.....	228-	B- 6-	1368
K2PFC/2	Canisteo Valley ARC...	211-	AB- 4-	1362
K9IXS/9	Elkhart H. S. RC.....	218-	AB-10-	1341



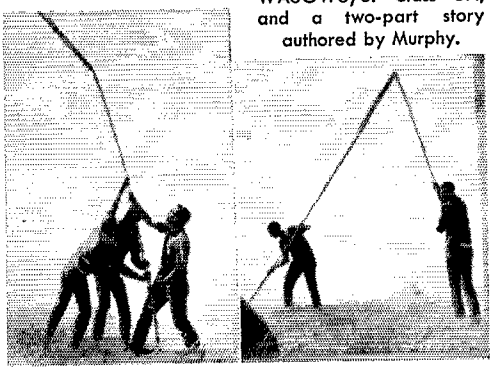
VE3EWU keeps up with FD statistics for the Scarborough ARC, VE3WE/3, ensuring a winning effort in 11A with 1635 two-ways.

W8DOG/8	Forest City ARC.....	196-	B- 9-	1338
K9ONA/9	6 Meter Club of Chicago	164-	AB-15-	1335
WA2TPV/2	6-Up ARC.....	177-	AB- 5-	1293
K8DYB/8	Northern Panhandle ARC.....	214-	B- 8-	1284
K2EC/2	Eastern Suffolk RC....	213-	B-15-	1278
WA7AAL/7	Cochise RAC.....	105-	B- 8-	1255
WA9IVH/9	Destruction Unlimited RC.....	181-	B- 4-	1236
W3NAV/3	Coke Center RC.....	203-	B- 6-	1218
WN2KDD/2	(nonclub group).....	145-	AB- 5-	1200
WA2MYS/2	North Jersey DX Chasing, Marching and AR Benevolent Assn.....	175-	AB- 4-	1200
K5FHU/5	Holloman AFB MARS Club.....	375-	C-10-	1200
K4CK/4	Winter Haven AR Assn..	198-	B-13-	1188
W0OSC/0	H-PA-K AREC.....	173-	B-12-	1188
K3CPC/3	Latrobe ARC.....	196-	B-11-	1176
K6GBP/6	Sierra Foothills ARC...	172-	AB-14-	1170
WA0ARA/0	Steele County ARC....	160-	AB- 8-	1170
K4MMB/4	Capitol AR Soc.....	384-	C- 5-	1152
K7LYY/7	Flathead Valley ARC...	127-	A- 8-	1143
K7UFT/7	Valley Council of H. S. RCs.....	161-	AB-11-	1131
VE2CSR/2	Sherbrooke ARC.....	185-	B- 5-	1110
WB2NUW/2	Teaneck Police Athletic League RC.....	369-	A-13-	1107
W1GIF/1	Thumb & Elbow Club...	257-	AC- 4-	1098
K7RJM/7	Polk County ARC.....	157-	AB- 5-	1086
W6WMO/6	(nonclub group).....	174-	B- 5-	1044
W0CIW/0	Fullerton RC.....	175-	B-10-	1050
W0YVY/0	(nonclub group).....	150-	B- 4-	1050
W9AZ/9	Kaukakee Area R Soc..	171-	B- 5-	1026
K3CEZ/3	Greenbelt AR Assn....	169-	B-11-	1014
K9ZEV/9	Miami County RC.....	148-	AB-12-	975
VE4DF/4	Flin Flon ARC.....	146-	B- 7-	966
W8BAA/8	Chippewa ARC.....	135-	B-39-	960
K8GIV/8	(nonclub group).....	222-	BC- 7-	936
W8BWK/6	Delta ARC.....	104-	AB- 4-	915
VE7ASC/7	Chilliwack ARC.....	125-	B-10-	912
K9YMF/9	North Township ARC..	100-	A-10-	900
W8QLS/8	Delaware County AR Assn.....	113-	AB- 6-	897
K9QKG/9	Flambeau AR Technical Soc.....	148-	B- 4-	888
K1FNU/1	Cromwell AR Soc.....	130-	AB- 6-	882
VE5MA/5	Moose Jaw ARC.....	122-	B- 5-	882
W8GQN/8	Straits Area RC.....	144-	B-10-	864
WA6RLM/6	(nonclub group).....	109-	AB- 5-	813
W9VMW/9	Cass County Radio Club	109-	B- 6-	804
WA0BHY/0	Pony Express ARC.....	134-	B- 7-	804
K9PJX/9	South Milwaukee ARC.	132-	B- 7-	792
VE7ARM/7	Richmond ARC.....	123-	AB- 6-	759
K2YEW/1	Adler/Westrex Communications Club....	122-	B- 4-	732
W8PM/8	Lakewood RC.....	104-	AB- 9-	709
K0JOQ/0	Crete ARC.....	64-	AB- 4-	708
WA6HMP/6	Madera ARC.....	86-	AB- 5-	693
W7TCK/7	Capitol City RC.....	231-	B- 8-	693
WA5IPE/5	Wheat Straw RC.....	97-	AB- 4-	690
K8WZS/8	(nonclub group).....	114-	B- 4-	684
W5SU/5	Magic Valley R.....	220-	BC- 8-	678
W0PMW/0	Boothill ARC.....	112-	B-10-	672
W0CBL/0	North East Missouri ARC.....	293-	B- 8-	636
VE7ANK/7	Cowichan Valley RC...	76-	AB-10-	621
W4DW/4	Wake County AR Assn..	102-	B- 6-	612
W4WVO/4	Suncoast V.H.F. Club..	68-	A-12-	612
W7SWS/7	Magic Valley RAC.....	77-	B- 6-	612
WA4TFZ/4	Albemarle ARC.....	100-	B-14-	600
WB6BML/6	Mt. Shasta ARC.....	94-	B- 4-	564
W2WCR/2	Amateur V.H.F. Institute of NY.....	208-	B- 6-	561
W4GBQ/4	Talladega ARC.....	93-	B- 4-	558
K0JMO/0	Macon County ARC...	263-	B- 7-	526
WA0GYQ/0	(nonclub group).....	84-	B- 4-	504
WA5GHK/5	(nonclub group).....	52-	A- 5-	468
VE6NC/6	Northern Alberta Radio Club.....	56-	B- 5-	336
WN8KOQ/8	(nonclub group).....	46-	B- 3-	276
K6FB/6	HP ARC.....	43-	B- 4-	258
K8VII/8	(nonclub group).....	105-	B- 3-	210

Three Transmitters Operated Simultaneously

VE2NE/2	Contest Operators Assn..	1645-	A- 7-15,000	
W0DK/0	Boulder and N.B.S. ARCs.....	1333-	A-20-12,240	
W5KHB/5	Old Natchez ARC.....	1325-	A-14-12,150	
K2GQ/2	Irvington RAC.....	1061-	A-18- 9774	
W6MSO/6	Inglewood ARC.....	1048-	A-22- 9567	
VE7ARV/7	Vancouver ARC.....	920-	A-25- 8541	
K3NBU/3	West Oak Lane RC....	1077-	AB-12- 8499	
K2BR/2	Southern Counties AR Assn.....	904-	A-25- 8271	
W8VV/8	Kent RC.....	1284-	AB-35- 8133	
W0DKU/0	Wichita Tee-Ni-Chat...	1154-	AB-25- 7974	
W8WC/8	Ohio Valley AR Assn..	1098-	AB-10- 7887	
W2TND/2	Hiram's Grove RC....	830-	A-10- 7731	
K5TM8/5	AR Operators of Lubbock.....	1205-	AB-22- 7680	
K2TRN/2	Lockport AR Assn.....	964-	AB-25- 7647	
W5GZG/5	Dallas Ten Meter Net..	1249-	B-10- 7644	
W8MRM/8	Motor City RC.....	1254-	AB-20- 7605	
W4AM/4	Frye ARC.....	1228-	B-40- 7518	
K8EMY/8	South East ARC.....	971-	AB-20- 7158	
W4KC/4	Fort Myers ARC.....	1165-	B-20- 7140	
VE3ODX/3	Ontario DX Assn.....	903-	AB-12- 7089	
W4ABK/4	Kentucklana RC.....	1139-	B-17- 6984	
K2ZSS/2	Seven-Eleven ARC.....	804-	AB-11- 6975	
W7CO/7	Western Washington DX Assn.....	1066-	ABC-18- 6858	
K6PVN/6	Rio Hondo RC.....	836-	AB-20- 6732	
W4BCV/4	Louisville's Active R Operators.....	1094-	B- 8- 6714	
W1DNE/1	Nobscot Mountain Wireless Assn.....	942-	AB- 9- 6489	

The Los Altos Emergency Communications Net, WA6GWS/6. Class 3A, and a two-part story authored by Murphy.



W8TO/8	Columbus AR Assn.....	878-	AB-79-	6429
K5YJG/5	Suburban West ARC...	1042-	B-17-	6402
W8CJN/8	Kettering ARC.....	835-	AB- -	6399
W5FC/5	Dallas ARC.....	1036-	B- -	6366
W4TRC/4	Kingsport ARC.....	991-	AB-30-	6216
K6KMB/6	South Bay Wireless Soc..	830-	AB- 9-	6150
K5IRO/5	Oklahoma Central VHF Club.....	936-	AB-12-	6130
K5WAT/5	Texas Tech. ARC.....	1004-	B-12-	6114
W6JBT/6	Citrus Belt ARC.....	781-	AB-25-	6054
W3ISE/3	Soc. for the Preservation of Key Clicks, Splatter and TVI.....	851-	A- 8-	6039
W5US/5	Red River ARC.....	1003-	B-16-	6018
K8WNJ/8	Muskegon Area AR Council.....	913-	AB- -	6015
WØRC/Ø	Wichita ARC.....	976-	B-15-	6006
VE7BAR/7	Burnaby ARC.....	632-	A-42-	5913
W1ECV/1	Southington AR Assn...	967-	B- -	5802
W8VM/8	Westpark Radiops.....	930-	B-20-	5730
W9BFO/9	South Eastern Illinois Ham Soc.....	1174-	BC-15-	5712
K3MTK/3	Germantown RC. General Group.....	731-	AB-35-	5676
W1AQ/1	Associated RA of Southern New England....	862-	AB-17-	5558
W2MO/2	Livingston ARC.....	815-	AB-22-	5544
WA2PNU/2	Larkfield ARC.....	653-	AB-20-	5508
W7YN/7	Nevada AR Assn.....	867-	B-12-	5352
K9TPN/9	Belleville AR Foundation.....	653-	AB- 7-	5328
W7TDK/7	(nonclub group).....	854-	B- 9-	5274
W2HO/2	Owls of New York.....	735-	AB- 8-	5154
W2OR/2	Pompton Valley RC....	752-	AB-25-	5142
W2DAA/2	Orleans County ARC...	784-	AB-18-	5139
K5UFR/5	Pasadena ARC.....	853-	B-12-	5118
W8OFG/8	Sister Lakes Monster Hunting and Field Day Soc.....	806-	AB- 9-	4977
W8MJL/9	Vermilion County AR Soc.....	828-	B-27-	4968
VE2ARC/2	Montreal ARC.....	793-	B-16-	4932
W2OFQ/2	Rome RC.....	674-	AB-27-	4902
WA4GPA/4	Kennehoochee ARC....	813-	B- 8-	4878
K3DKD/3	Friendly AR Transmitting Soc.....	752-	AB- 5-	4863
K6GJ/6	Foothills AR Soc.....	531-	AB-15-	4824
W5FU/5	Tulsa ARC.....	794-	B- -	4764
K2YNT/2	Metuchen YMCA RC....	673-	AB-10-	4764
K9EOY/9	Ozaukee RC.....	765-	B-28-	4740
W8CWO/8	Jefferson County AREC	749-	AB-20-	4701
WA2NGI/2	Gloucester County ARC	494-	AB-19-	4659
W9EXS/9	Norway ARC.....	914-	BC-15-	4653
W3KOI/3	Delaware 6 Meter Net..	667-	AB-19-	4629
W4NYK/4	Blue Ridge R Soc.....	743-	B-15-	4608
KØATS/Ø	Air Capitol AR Assn....	745-	AB-15-	4596
W5SJZ/5	General Dynamics/Ft. Worth ARC.....	719-	B- 5-	4464
W4KAT/4	Nashville ARC.....	682-	AB-15-	4437
W4ZA/4	Richmond ARC.....	710-	B-12-	4410
K4HUF/4	(nonclub group).....	733-	B- 8-	4398
VE3DRT/3	Skywide ARC.....	607-	AB-25-	4398
K3QBD/3	First State ARC.....	663-	AB-10-	4350
W9INL/9	Bloomington ARC.....	639-	AB-15-	4326
WA5EPP/5	Springhill ARC.....	690-	B- 8-	4290
W8CZM/8	Parma RC.....	709-	B-40-	4254
WA9CWL/9	Fall Creek ARC.....	617-	AB-16-	4239
W3ILO/2	Levittown ARC.....	630-	AB-12-	4224
W8AM/8	Coffee Dunkers of Detroit.....	585-	AB-10-	4215
W4NVU/4	Dade RC.....	676-	B-24-	4206
K4PIA/4	Anderson ARC.....	601-	AB- 8-	4125
K5SKF/5	Gulf Area YL AR Klub.	653-	AB-12-	4110
WA4QCN/4	North Florida AR Soc...	669-	B-16-	4104
W7NTO/7	Lewis County ARC.....	451-	A-14-	4059
W4NGS/4	Columbus ARC.....	648-	B-25-	4050
W8DSO/8	(nonclub group).....	611-	AB-25-	4044
W9YH/9	Twin City ARC.....	758-	ABC- -	4005
W3SL/3	Delaware ARC.....	637-	B- 9-	3978
K4KAZ/4	Atlanta Soc. of Teenage R Operators.....	543-	AB-10-	3942
KZ5AX/KZ5	U. S. Air Force Southern Command MARS Club.....	625-	B-11-	3900
W1LAS/1	Waterbury ARC.....	577-	AB- 8-	3894
K9AVO/9	Western Electric ARC..	720-	BC-17-	3891
VE1LC/1	Loyalist City ARC.....	566-	AB-15-	3867
VE3LON/3	London ARC.....	465-	AB- -	3867
W8SH/8	Michigan State University ARC.....	425-	A- 6-	3825
K4SZF/4	(nonclub group).....	606-	B- 4-	3786
W8CTZ/8	Apricot Net.....	441-	AB-29-	3780
WB2BCY/2	Washington AR Soc.....	566-	AB-12-	3732
WA6GWS/6	Los Altos Emergency Communications Net.	538-	AB-11-	3714
K1BCI/1	CQ RC.....	580-	AB-16-	3692
VE6NQ/6	Calgary AR Assn.....	590-	B-18-	3690
K2AFE/2	North Country RC.....	589-	B- 7-	3684
K9TSM/9	Goshen ARC.....	505-	AB-20-	3560
WA9IHI/9	6 and 2 Ham Club.....	564-	B-27-	3534
W9AXD/9	Rockford AR Assn.....	554-	AB-10-	3474
W2DP/2	Telephone ARC of Manhattan.....	578-	B-15-	3468
W4KEK/4	Peninsula ARC.....	462-	AB-20-	3463
K9VHB/9	Ottawa RC.....	574-	B-10-	3444
K9OLE/9	Martinsville ARC.....	572-	B- 9-	3432
W3WPW/3	Chesapeake ARC.....	564-	AB-17-	3105
W1JNS/1	Marlboro AR Assn.....	500-	AB-15-	3377
VE3UOT/3	Hart House ARC, Univ. of Toronto.....	347-	A- 5-	3366
K5VOZ/5	Lawton Ft. Sill ARC...	524-	B-10-	3330
W6MIX/6	El Dorado County ARC.	370-	A- 7-	3330
WA6TNY/6	Santa Clara County Communications Soc..	412-	AB- 9-	3327
W9VT/9	Tri-Town RAC.....	540-	AB-25-	3306
W6LS/6	LERC ARC.....	341-	A-18-	3294
K1CRN/1	(nonclub group).....	544-	B- 3-	3264
K5WPH/5	Sun City ARC.....	540-	B- 8-	3240
W9EAC/9	Eau Claire ARC.....	933-	BC-22-	3230
KH6WO/KH6	Honolulu ARC.....	503-	AB-30-	3198
K8DYZ/8	Davison Area ARC.....	492-	AB-12-	3183
KØAXU/Ø	Northwest St. Louis ARC.....	525-	B-12-	3150
WA4IXA/4	Knox Presbyterian RC..	520-	B- 9-	3120
W6TYB/6	(nonclub group).....	407-	AB- 5-	3120
W9DUK/9	Delaware AR Assn.....	412-	AB-15-	3096
K2RRY/2	Jersey City RC.....	353-	AB-10-	3030
W6PB/6	Wheels-N-Whips Mobile RC.....	311-	A- 7-	3024
WA2LHM/2	Band-Dit-Dahs.....	473-	B- 6-	2988
K9UXZ/9	National Trail ARC....	481-	AB- -	2985
K9AOM/9	Allison ARC.....	473-	AB- -	2985
W6AF/6	Oroville AR Soc.....	496-	B- 6-	2976
WA9DYH/9	Bureau County ARC....	496-	B-12-	2976
K7QIJ/7	Lewis and Clark ARC..	465-	B- 9-	2940
W2KGV/2	Harmonic Hill R League	442-	AB-21-	2940
K9YHB/9	Lawndale Boys' Club AR Assn.....	439-	AB- -	2940
WA8BBB/8	Derby Wireless Assn....	485-	B- 7-	2910
W3AVK/3	West Branch AR Assn.'	445-	AB- 8-	2901
VE3GBN/3	Grey Bruce AR Assn....	456-	B-12-	2886
W5JBV/5.	Port Lavaca ARC.....	519-	BC- 8-	2880
W5PGI/5	Ardmore ARC.....	432-	B-16-	2742
W9COP/9	MARS Station, 128th ACW Sqdn.....	473-	B- 3-	2838
W6JTP/6	Tamalpais ARC.....	410-	AB-30-	2838
K9GLV/9	Shelby County ARC....	378-	AB- 9-	2826
W9GWF/9	Eastern Illinois Hamateurs.....	470-	B-10-	2820
WØCRG/Ø	Upper Iowa RA Assn....	452-	B-14-	2802
W7DP/7	Walla Walla Valley RAC	449-	AB-16-	2802
WA5CKF/5	Irving ARC.....	414-	AB-15-	2751
WA4DOG/4	Horse Shoe Bend ARC..	550-	ABC-14-	2727
KØOVV/Ø	Beatrice H. S. Fuseblowers Assn.....	425-	B- 3-	2700
W3ZWJ/3	Bedford County AR Soc.	393-	AB-12-	2697
K8DTU/8	Greater Pontiac VHF ARC.....	445-	B-15-	2670
K6YAL/6	Cal Poly AR Assn.....	414-	ABC-17-	2667
W3EXW/3	Etna RC.....	294-	A-15-	2646
WØBRN/Ø	Three River ARC.....	428-	B-12-	2658
K7RJL/7	Sherwood High School ARC.....	265-	A- 3-	2610
K8LZJ/7	Central Michigan VHF Club.....	376-	AB-15-	2604
KØRZH/Ø	Wecomo ARC.....	405-	AB- 8-	2544
K4PYA/4	Pioneer ARC.....	397-	B- 4-	2532
WA2REM/2	Garret Mountain AR Group.....	304-	AB- 6-	2532

No FD report is complete without a classic generator shot. This year we show WØZFJ handling power for WØDK/Ø, the Boulder and N.B.S. ARC, 12,000 points in 3A.

WØEÆH/Ø	Johnson County RAC...	312-	AB-20-	2520
VE7FY/7	Royal City AR Assn....	357-	AB-10-	2451
W3BMD/3	Indiana County ARC...	400-	AB-14-	2436
WA8LQI/8	Holmes County ARC...	373-	AB-23	2436
W38JI/3	Hazleton ARC.....	360-	AB- -	2433
K2ODP/2	Woodbridge RC.....	328-	AB-12-	2433
K8WNI/8	Oregon City RC.....	327-	AB-12-	2409
W6FBK/6	Humboldt ARC.....	375-	B- 6-	2400
W5ES8/5	El Paso ARC.....	397-	B-10-	2382
W6IJK/6	Sacramento Aerojet RAC.....	389-	B-18-	2334
W3CSL/3	Monessen ARC.....	387-	B-10-	2322
K9REE/9	Explorer ARC.....	376-	B- 4-	2256
K9UQN/9	(nonclub group).....	370-	AB- 7-	2256
WA8IZX/8	Port Clinton Area RC..	280-	AB- 5-	2256
VE6SSB/6	Calgary Assn. of Sideband Amateurs.....	349-	B- 7-	2244
W7RGL/7	AR Communication Service.....	372-	B- 5-	2232
WA6YNN/6	American RC of El Cajon	308-	AB-10-	2223
K9TQQ/9	Fulton County RC	313-	AB-15-	2214
W3PNL/3	Explorer Post 401 of Souderton.....	354-	AB- 7-	2208
W3VV/3	McKean County ARC..	365-	B-16-	2190
W7PXL/7	Valley RC.....	336-	B-10-	2178
K2IYO/2	Salem County RC.....	335-	B-10-	2160
KØAJW/Ø	Minot AR Assn.....	359-	B- 9-	2154
K9REN/9	Mobileers.....	333-	B-10-	2148
W2AE/2	RA of Greater Syracuse	355-	B-25-	2130
W9KA/9	Chicago R Traffic Assn.	263-	AB- 6-	2127
W3QV1/3	Allband ARC.....	307-	AB-10-	2109
K5SLD/5	Arlington RC.....	436-	ABC-25-	2082
VE3ATM/3	Radio Advancement Soc.	346-	B- 8-	2076
W9DIP/9	Clinton County VHF RAC.....	318-	B-16-	2064
K2TAZ/2	Northern Nassau ARC..	303-	AB- 4-	2061
K4NXD/4	Jefferson County Emergency Communications Team.....	264-	AB- 6-	2016
VE7IP/7	East Kootenay ARC....	320-	B-10-	2010
WA2ZRD/2	Fingertip Operators ARC.....	218-	A- 5-	1962
KØAYO/Ø	Pilot Knob ARC.....	297-	B-25-	1932
W5DSC/5	Victoria ARC.....	291-	B- 6-	1896
W2QYV/2	Niagara RC.....	475-	ABC-20-	1890
W3RVC/3	Allegheny Kiski AR Assn.....	383-	ABC-12-	1872
VE4BB/4	Winnipeg AR Assn.....	425-	AC-13-	1860
K2YBN/2	Rancocas Valley AR Assn.....	265-	AB-10-	1857
W9MRZ/9	Ninth Area RC.....	276-	AB- -	1851
KØSOQ/Ø	Hastings ARC.....	292-	B-20-	1842
K9IYP/9	Platt County RA.....	296-	AB-16-	1836
KZ5AA/KZ5	MARS R Station USARSO.....	425-	BC-10-	1806
K6CUK/6	El segundo Civil Defense Group.....	244-	AB- 8-	1764
WØBLK/Ø	Black Hills ARC.....	318-	B-14-	1740
W4ABZ/4	Ringgold H. S. ARC....	264-	B- 8-	1734
W8GET/8	Lorain County AR Assn.	264-	AB-10-	1719
WA9IGF/9	Tipton County ARC....	334-	ABC-11-	1713
K9EAM/9	Green Bay Mike and Key Club.....	445-	ABC-10-	1692
WØNNL/Ø	Stromsburg ARC.....	280-	B- 4-	1680
W4YSG/4	Tuscaloosa ARC.....	279-	B-14-	1674
K5TQC/5	Fayetteville H. S. ARC.	279-	B- 3-	1674
K4AUK/4	(nonclub group).....	278-	B- 3-	1668
VE3YNA/3	York North ARC.....	447-	BC-14-	1668
WA2TXQ/2	Port Washington Brotherhood of RA.....	167-	A- 4-	1638
WAØFXD/Ø	Saint Charles H. S. ARC	231-	AB- 6-	1623
WA4BSE/4	Springville ARC.....	252-	B- 5-	1602
W5MTN/5	AR Caravan Club of New Mexico.....	235-	AB-10-	1599
WA4TNL/4	Coral Reef ARC.....	266-	B-11-	1596
W3ZRQ/3	SCM's Stump Jumpers, E. Pa.....	264-	ABC- -	1566
WA8CKN/8	(nonclub group).....	173-	AB- 5-	1557
W4VTA/4	Confederate Signal Corps.....	259-	AB-10-	1554
WA6DZL/6	(nonclub group).....	198-	AB- 3-	1527
K9ONH/9	Seymour ARC.....	253-	B-10-	1518
W4BFB/4	Mecklenburg AR Soc....	247-	B- -	1482
VE3AHU/3	Kingston and Royal Canadian School of Signals RCs.....	206-	AB-10-	1482
WB2FZI/2	Westchester Teenage ARC.....	245-	B- 9-	1470
K8SME/8	(nonclub group).....	240-	B- -	1440
K9GSC/9	(nonclub group).....	225-	B- 9-	1422
K2IPN/2	Carteret Civil Defense Organization.....	192-	AB-10-	1410
W4MOE/4	Buncombe County ARC	234-	B-18-	1404
WA5FMC/5	North Little Rock ARC.	233-	B-15-	1398
W8CPQ/8	Marion VHF Hi-Banders	290-	BC-20-	1365
K1SAK/1	Foster Ham RC.....	192-	AC- 5-	1359
W1BRF/1	Quinebaug Valley RC...	170-	AB-10-	1353
K2PWK/2	Princeton YMCA RC...	185-	AC-12-	1353
W4FND/4	Central Virginia ARC...	225-	B-12-	1350
WØREA/Ø	Saint Paul Mobile RC..	198-	AB-10-	1350
K7CCH/7	Coos County RC.....	188-	AB- 7-	1296
WA2DNR/2	Colonie Central H. S. RC	175-	AB- 8-	1272
W3GGN/3	Somerset County ARC..	211-	B- 7-	1266
W6NPH/6	(nonclub group).....	133-	AB- 5-	1263
K8DEV/8	Clinton County RA....	195-	AB-10-	1248
WA9HDI/9	Random RC.....	208-	B- 7-	1248
K6EPE/6	Albany Hi-Hi-CQ'ers RC.....	180-	AB- 4-	1239
VE3BNK/3	Roblin RC.....	161-	AB-12-	1215
VE6WR/6	(nonclub group).....	175-	B- 8-	1200
W1VSR/1	(nonclub group).....	179-	AB- 3-	1161
VE3SRS/3	Sudbury District ARC..	111-	AB- 6-	1143
W4PAY/4	Northern Virginia RC...	277-	BC-18-	1140
W2BMW/2	Tu-Boro RC.....	161-	B-10-	1116
W7TD/7	Apple City RC.....	220-	BC-12-	1110
K2TRS/2	Chenango Valley Central School ARC.....	152-	AB- 8-	1062
W2RHM/2	Black River Valley RC...	235-	ABC- 9-	1059
W8FT/8	Findlay RC.....	176-	A- 4-	1056
K3HDO/3	District Heights RC....	148-	AB- 9-	1023
W8PIF/9	M and M RC.....	168-	B-10-	1008
W6JFP/6	Lompoc ARC.....	187-	ABC- 7-	1005
K4JMC/4	Gadsden ARC.....	167-	B-10-	1002
KL7GI/KL7	Juneau ARC.....	205-	BC-10-	966
VE2MO/2	Assn. RA de la Mauricie.	137-	B-10-	912
K8ZAA/8	Grand Ledge H. S. Ham Club.....	150-	B- 5-	900
W4LEN/4	Triangle ARC.....	138-	AB- 8-	897
WA2WGN/2	(nonclub group).....	395-	AB- 3-	843
W7RHX/7	North East Washington Sevens.....	139-	B-10-	834
VE6CU/6	(nonclub group).....	129-	B- 4-	774
WA5FLV/5	(nonclub group).....	128-	B- 7-	768
W6FLQ/6	(nonclub group).....	357-	B- 6-	714
K2OFN/2	Genesee Valley ARC....	106-	AB- 6-	590
KØZFK/Ø	Jefferson Barracks ARC.	86-	AB-10-	579
K2LSA/2	State Line RC of N. Y. and N. J.....	187-	A- 9-	561
WØBXR/Ø	Davenport RAC.....	357-	BC-10-	545
W2TC/2	(nonclub group).....	71-	AB- 7-	516
K2CD/2	Telephone Employees AR Assn.....	75-	AB-10-	507
W3ZGD/3	Hilltop Transmitting Assn.....	145-	AB- 9-	499
K9LSW/9	Immanuel RC.....	159-	C-13-	477
W4AKH/4	Ft. Pierce RC.....	82-	AB- 8-	476
W2DIW/2	North Fork RC.....	70-	AB- 5-	447
VE4JW/4	Beausejour RC.....	48-	B- 8-	438
W1KMV/1	So. County Emergency Net.....	65-	AB- 5-	435
W3GHX/3	Dit-Happy Dash-Hounds.....	312-	BC- 7-	386
KØEDP/Ø	Electron Club of Denver	123-	C- 9-	369
K3GZX/3	Warwick R Emergency Communications Klub	40-	AB- 3-	91

Four Transmitters Operated Simultaneously

W2OYH/2	Morris RC.....	1807-	A-34-	16,488
W9OFR/9	Joliet AR Soc.....	1289-	A-20-	11,844
W8EY/8	Van Wert ARC.....	1311-	A-35-	11,799
K9AVE/9	Illinois Valley R Assn....	1756-	AB-13-	11,665
W8VVL/8	Queen City Emergency Net.....	1335-	AB-41-	8889
W7AW/7	West Seattle ARC.....	946-	A- -	8514
KØWOT/8	(nonclub group).....	921-	A-12-	8289
W7GO/7	Arizona ARC.....	1299-	B-25-	7946
W6HS/6	Cresscenta Valley RC...	1119-	AB-27-	7938
K6FDU/6	Mather AFB MARS Club.....	1016-	AB-11-	7917
WØDUN/Ø	(nonclub group).....	1276-	B-16-	7806
W8KGG/8	Huron Valley AR Assn..	1237-	AB-35-	7710
W3PFT/3	Reading RC.....	1235-	B-40-	7560
K3SSC/3	Delmont RC.....	1195-	AB-14-	7422
W5DPA/5	Houston ARC.....	1176-	B-25-	7224
W2GLQ/2	Nutley AR Soc.....	719-	AB-15-	7117
K6CST/6	Point Mugu ARC.....	1056-	AB-12-	6987
WB2BTQ/2	Long Island Tri-Banders ARC.....	774-	A-40-	6966
K7OUS/7	Clackamas AR Soc.....	1058-	AB-30-	6843
W4THM/4	Bristol ARC.....	1088-	AB- 4-	6834
W9AB/9	Michiana ARC.....	983-	AB-57-	6762
W4BFM/4	Decatur ARC.....	1084-	B-25-	6678
W6QTX/6	Palo Alto ARC.....	995-	AB-20-	6522
W8MF/8	Calhoun ARC.....	1022-	AB-21-	6480
W1WHF/1	Hamden AR Assn.....	1005-	AB-26-	6477
VE3CBC/3	C B C ARC.....	913-	AB-25-	6459
K6FAV/6	McClellan AR Soc.....	934-	AB-40-	6336
WØGWK/Ø	(nonclub group).....	993-	AB- 9-	6024
K6CXI/6	Alexander Hamilton H. S. RC.....	643-	A-15-	6012
W9CSF/9	Michigan City ARC....	832-	AB-24-	5970
K1MUJ/1	Eastern Conn. AR Assn.	902-	AB-18-	5832
W4JJ/4	Panama City ARC.....	932-	B-17-	5742
W8KEG/8	Tri-State AR Assn.....	897-	AB-15-	5733
W8MAA/8	Central Michigan ARC.	947-	B-20-	5682
KØAXC/Ø	North East Missouri ARC.....	940-	B-12-	5640

From the looks of that terrain it couldn't have been much fun driving ground stakes for the Tri-State ARC of Minn. WØDDN/Ø operating in 1A. Who forgot the tools?

W2NPT/2	Fair Lawn ARC	663-	AB-11-	5466
W8BAP/8	Scioto Valley ARC	592-	AB-30-	5391
W8DC/8	Grand Rapids AR Assn.	1016-	BC- -	5343
W9JP/9	Indianapolis RC	852-	B-21-	5304
W8VP/8	Guernsey County ARC	787-	AB-20-	5130
W2CGJ/2	Ridgewood ARC	769-	AB-14-	5112
K4FEC/4	Brookley AFB ARC	724-	AB-13-	5082
W6MIGJ/6	Helix ARC	827-	B-15-	5052
W5DB/5	Midland ARC	815-	B-15-	5040
K8SCH/8	Oh-Ky-In VHF AR Soc.	730-	AB-20-	4857
WØMG/Ø	North East Iowa RA Assn.	695-	AB- -	4677
WAØFYA/Ø	Zero Beaters RC	774-	B- -	4644
WØCTV/Ø	Raytown H. S. ARC	744-	AB- 7-	4617
WØGWX/Ø	Lee's Summit RC	716-	B- -	4296
VE3HB/3	Oakville ARC	477-	A-14-	4293
W2US/2	Suffolk County RC	707-	B-30-	4242
WØCKF/Ø	Minneapolis RC	650-	AB-36-	4191
W5PFC/5	Jackson ARC	661-	AB-10-	4188
W9AWE/9	Western Illinois RC	680-	B-16-	4080
KØLDN/Ø	Blackhawk ARC	678-	B-20-	4068
W3ZEK/3	Harrisburg RAC	596-	B-17-	3726
W4BBB/4	RAC of Knoxville	552-	AB-21-	3635
K4FOW/4	Lanierland ARC	545-	AB- 4-	3537
W5OK/5	Electron Benders ARC	891-	AB-25-	3532
W6LUC/6	Santa Barbara ARC	515-	AB- 8-	3444
WØFHU/Ø	Barber County ARC	573-	B-10-	3438
W7NCW/7	Lower Columbia AR Assn.	506-	AB-18-	3243
W4HFH/4	Alexandria RC	457-	AB-25-	3240
K8TKA/8	20/9 RC	525-	B-12-	3150
WA8DVX/8	Celina ARC	349-	A- 9-	3141
W4VLA/4	Northern Kentucky ARC	515-	B-13-	3090
K8T1W/8	Oshtemo ARC	492-	B-24-	3042
K4GEK/4	Petersburg ARC	496-	B-10-	2976
W8EOG/8	Licking County VHF Club	495-	B-10-	2970
W1SYE/1	Newport County RC	465-	AB-20-	2910
W2TRS/2	Seneca Drums ARC	471-	AB-17-	2862
W3AD/3	Lancaster R Transmitting Soc.	445-	AB-14-	2853
W3RDF/3	Hellertown ARC	449-	AB-20-	2841
W6UJ/6	Taft RAC	455-	AB- 7-	2820
VE5AA/5	Saskatoon ARC	446-	B-20-	2778
K3OQM/3	Ivyridge ARC	462-	B-12-	2772
W3SGJ/3	Beaver Valley AR Assn.	445-	AB-15-	2745
W1AEW/1	Pioneer Valley ARC	406-	AB- 7-	2694
W1ERM/1	Shoreline ARC	310-	AB- 5-	2589
W2SDA/2	Binghamton AR Assn.	402-	B-18-	2562
K2YCL/2	Edison RC	337-	AB-12-	2529
W9KQZ/9	(nonclub group)	388-	AB- 7-	2472
K3CSG/3	Abington ARC	385-	B-12-	2460
WØAMJ/Ø	Minuteman RC	392-	AB-10-	2409
WA6UQX/6	Livermore H. S. ARC	265-	A- 7-	2385
K1OXW/1	Central Connecticut ARC	345-	AB- 9-	2334
K5TYP/5	Keesler ARC	388-	B-20-	2328
K4LTK/4	Hopewell ARC	342-	AB-20-	2283
W7PR/7	Eagle Rock RC	321-	AB- 8-	2283
KØLIR/Ø	St. Louis ARC	295-	AB-10-	2271
WA2YHS/2	Empire AR Soc.	339-	AB- 6-	2268
K31ZU/3	Bucks County ARC	400-	ABC-25-	2160
VE1PF/1	St. Croix Valley ARC	240-	AB- 9-	2121
K4POA/4	Naval Air Station OCEANA, ARC	350-	B- -	2100
W7UZ/7	Tacoma AR Soc.	339-	AB-12-	2034
K3FLT/3	Milton ARC	279-	AB-12-	2025
K8GOY/8	Pickaway County RACES Group	376-	ABC-12-	2013
WØMAO/Ø	Lincoln MARS Club	335-	B-19-	2010
WA4RXP/4	Floridora YLs	393-	ABC- 7-	2004
WN4AJ/8	DESC ARS	309-	AB-35-	2001
W4QBE/4	Mobile ARC	237-	AB-10-	1995
K8SIR/6	Ramona RC	285-	AB-10-	1965
VE7DJ/7	Totem ARC	267-	AB-11-	1911
KØAPK/Ø	Ridge Runners ARC	275-	AB- -	1803
K7VDY/7	Burlington ARC	283-	AB- 6-	1767
W9BXR/9	Montgomery County AREC	266-	AB- -	1767
VE3CCR/3	Cooksville ARC	274-	AB-12-	1761
W2ATT/2	New York RC	275-	AB- 6-	1743
W9CZH/9	Winslow AR Soc.	320-	BC- -	1737
WA2TFH/2	Crossband Communication Club of New York	274-	AB-11-	1665
VE3TCD/3	St. Thomas ARC	218-	AB- 8-	1581
WA9IAK/9	Na Ba Ge RC	263-	B- 8-	1578
K9FHB/9	Greater Beloit ARC	227-	AB-15-	1557
K1NQG/1	Fidelity ARC	231-	AB-14-	1516
W4VO/4	Northwest Georgia ARC	213-	B- 5-	1428
W8CDZ/8	Copper County RA Assn.	220-	B- 7-	1410
W3IFZC/3	MIC ARC	199-	AB- 7-	1371
W9ADZ/9	Chain-O-Lakes ARC	214-	AB-12-	1302
W3HZW/3	Kent County ARC	432-	ABC- 8-	1276
K1PNS/1	Tri-City ARC	212-	B-10-	1272
W4UCJ/4	Thomasville ARC	204-	B- -	1224
W5WE1/5	I-Tappa-Ke	189-	AB-12-	1215
WA8KKB/8	Licking County AR Assn.	171-	AB- -	1092
K1FGT/1	Whaling City Hi-Banders	220-	ABC- -	1089
K3JRO/3	(nonclub group)	152-	AB- 8-	1014
W1LN/1	Danvers AR Assn.	166-	B-10-	996
WØEQJ/Ø	Hecter ARC	122-	AB-11-	975
WØBZN/Ø	Newton ARC	139-	B- 8-	834
WA9EYY/9	Southwest Chicago ARC	82-	A-11-	738
K3KLI/3	Jefferson County AR Assn.	339-	AB-10-	699
W5LQP/5	Port Arthur Texas ARC	312-	AB- 6-	677
WA5DMY/5	Central Arkansas R Emergency Net	212-	AC- 7-	660
WØAXO/Ø	Weld County RC	401-	ABC- 8-	530
W2EB/2	(nonclub group)	158-	BC- 7-	486

Five Transmitters Operated Simultaneously

W3BTN/3	North Penn ARC	1401-	A-35-	12,834

Up at 9500-foot elevation Murphy's Rebels, W7MY/7 had no difficulty in playing it cool in 1A for 3558 points. That's W7BLR on the left with W7QWH.

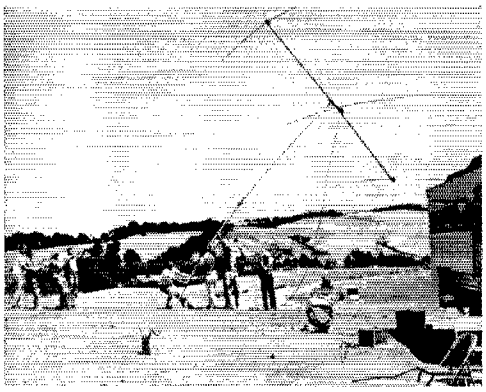
W4SKH/4	Oak Ridge R Operators Club	1420-	AB-24-	11,250
K2MQW/2	Five Towns RC	1391-	AB-32-	9213
W6ZL/6	Newport AR Soc.	1098-	AB-50-	9072
W4CA/4	Roanoke Valley ARC	1399-	AB-32-	8868
K2GE/2	Raritan Bay RA Assn.	1180-	AB-18-	8865
W2YKQ/2	Lake Success RC	1041-	AB-18-	8160
WØERG/Ø	Sioux City AR Assn.	1319-	AB-35-	8100
K6LGR/6	Edgewood AR Soc.	893-	A-18-	8037
W9LM/9	Northwest ARC	898-	AB-19-	7983
W9VZ/9	Wisill VHF Club	1115-	AB-24-	7779
W6IP/6	Douglas Space Systems ARC	950-	AB-28-	7404
W6CX/6	Mt. Diablo ARC	1188-	B- -	7022
W4AY/4	RA Transmitting Soc.	1137-	B-25-	6972
W5HZZ/5	Kay County ARC	1090-	AB-21-	6852
W8FGL/8	Blennerhassett ARC	1085-	B-14-	6660
VE3KCD/3	Kitchener-Waterloo ARC	923-	AB-15-	6162
K3RTE/3	Pop-Bottle Net	899-	AB-25-	6042
W6CUB/6	Alcatraz Island Expedition	958-	B-10-	5898
K6QHQ/6	South Bay AR Soc.	891-	AB-28-	5895
WA2SCZ/2	West Jersey RC	912-	B-28-	5622
W6OT/6	Oakland RC	777-	AB-20-	5490
W6CUS/6	East Bay RC	788-	AB-14-	5178
W6LFJ/6	Sonoma County RA	735-	AB-17-	5103
W9UV1/9	Peoria Area ARC	828-	B-15-	4968
VE3ZM/3	Guelph ARC	558-	AB-10-	4632
W2HCS/2	Albany AR Assn.	635-	AB-10-	4629
W8OHR/8	Detroit Metropolitan RC	821-	ABC-11-	4446
WA9BRE/9	Argonne ARC	651-	AB-17-	4360
W6NWG/6	Palomar RC	989-	BC-20-	4305
K5AFO/5	North Miss Ham Club	687-	AB-12-	4299
K9GXU/9	St. Clair ARC	638-	AB-35-	3939
W8NCM/8	Springfield ARC	946-	ABC-30-	3801
W8ID/8	Seneca RC	594-	AB-15-	3750
W7VE/7	AR Assn. of Bremerton	575-	AB- -	3702
K4DXO/4	Vienna Wireless Soc.	477-	AB-20-	3267
K6QWL/6	North Hills RC	558-	ABC-14-	3156
WA4DHE/4	Franklin AR Organization	504-	AB-12-	3147

The Halifax ARC VE1FO/1, topped the Canadian two-transmitter group with over 5000 points. VE3BDX (left) with VE1AI is shown manning the 6-meter setup in the 40-foot communications trailer.

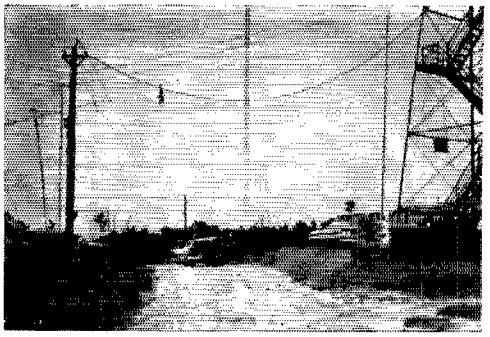
K6AGF/6	Tri County R Assn.	475-	AB-15-	3113
W6EUR/6	Santa Cruz County ARC	465-	AB-10-	3108
K4OXL/4	Limestone ARC	478-	B-11-	3042
W2POL/2	Poughkeepsie ARC	474-	AB-10-	3015
WA9JYL/9	Greenwood ARC	456-	B-17-	2922
K2UHD/2	Rockaway ARC	476-ABC-30-		2754
WB6DFV/6	Poly ARC	413-	AB-12-	2718
W6UCS/6	Monterey Bay RC	344-	AB-16-	2661
W7BB/7	Lake Washington ARC	390-	AB- -	2544
WA5JKP/5	Institute of Electronic Science RC	388-	AB-12-	2523
W4AB/4	Broward ARC	410-ABC-25-		2490
W6YDQ/6	Antelope Valley ARC	321-	AB- 7-	2376
K7NWS/7	Boeing Employees AR Soc.	359-	AB-21-	2346
W1KVI/1	Portland A Wireless Assn.	351-	AB- 7-	2331
W5KA/5	Austin ARC	388-	B-10-	2328
W1GLA/1	Framingham RC	274-	AB-12-	2004
W3QZF/3	Horseshoe RC	336-	B- -	1926
K9WWJ/9	Wells County ARC	306-	B- 8-	1836
K5STG/5	Southmost Texas RA	294-	AB-10-	1773
WA8KXW/8	North H. S. ARC	224-	AB- 9-	1764
K4KOX/4	Ole Virginia Hams ARC	269-	AB- -	1680
W8HH/8	Marietta ARC	469-ABC-	-	1671
W6AK/6	Sacramento ARC	245-	AB-18-	1620
W8HHF/8	Toledo Mobile R Assn.	277-ABC-	8-	1545
KØVOG/Ø	Council Bluffs R Operators Club	396-	BC-15-	1522
W9VHD/9	DeWitt County ARC	247-	B-15-	1482
W5ZDU/5	Explorer Post 382	243-	B- 5-	1458
WØTOB/Ø	Honeywell RC	537-ABC-17-		879
WØKY/Ø	(nonclub group)	133-	AB- 8-	798
WAØDHJ/Ø	O'Brien County AR Assn.	130-	B- 7-	780

Six Transmitters Operated Simultaneously

K2AA/2	South Jersey R Assn.	1720-	AB-40-14,202
K2YCJ/2	Communications Club of New Rochelle	1526-ABC-40-10,671
WØWYV/Ø	Bellevue ARC	1610-	B-20-	9810
W9SW/9	Chicago Suburban R Assn.	1442-	AB-21-	9267
WA2LQO/2	Grumman ARC	1225-	AB-30-	9198
K2AE/2	Schenectady AR Assn.	1493-	AB-42-	9042
W6ZE/6	Orange County ARC	939-	AB-19-	7494
K6QEZ/6	Ampex ARC	1079-	AB-18-	7101
W1AQE/1	Chelmsford ARC	1036-	AB-12-	7017
K7UGE/7	Las Vegas RAC	1167-	B-30-	7002
W8ACW/8	Genesee County RC	1043-	AB-60-	6678
W6PW/6	San Francisco RC	983-	AB-24-	6354
W3CTC/3	Delaware Valley ARC	894-	AB-47-	6306
K8NOW/8	Metropolitan Ragchewers Club	676-	AB-32-	5286
K1WEW/1	Sub Sig ARC	666-	AB-20-	5220
K8TIH/8	Wood County ARC	800-	AB-20-	4926
W6PMI/6	United RAC	783-	B-12-	4788
K1BKE/1	Contoocook Valley RC	864-ABC-14-		4536
VE3BSQ/3	Belleville and District ARC	718-	AB-20-	4521
W6MLK/6	HI Frequency A Mobile Soc.	622-	AB-21-	4278
K6ALI/6	(nonclub group)	671-	AB- 7-	4149
W8FO/8	Toledo RC	553-	AB- -	4137
W3CWC/3	Antietam RC	686-	B- -	4116
KØRKR/1	North Andover ARC	667-	AB-16-	4113
W9FLP/9	West Allis RAC	646-	AB-12-	3909
KØZZK/Ø	Grand Forks Air Force Base	605-	B-10-	3630
WØKQU/Ø	Central Kansas RC	618-ABC-30-		3552
W8TNO/8	Oakland County AR Soc.	570-	AB-40-	3540
K1RKF/1	Nipmuc Emergency R Corps	368-	A-11-	3312
WA9EDW/9	Barrington AR Soc.	563-	AB- -	3465
WA6UUN/6	San Fernando Valley State College RC	495-	AB-11-	3270
W1WKN/1	Old Colony AR Assn.	481-	AB-18-	3051
W3VPJ/3	Susq. Valley ARC	328-	AB-20-	2769
W1KAA/1	Northern Connecticut ARC	431-	AB-10-	2751
W2FVB/2	(nonclub group)	316-	AB-12-	2601



Up she goes! Members of the Palo Alto AR Assn., W6OTX/6, prepare for FD '64. The 4A effort produced 6522 points.



The Massasoit AR Assn. W1MV/1 lead the 7A group at a site festooned with wires. The boys report that the 160-meter vertical half wave in the center wasn't used!

WA2OII/2	Apple Pie Hill RC	325-	AB-10-	2100
K8VXH/8	Genoa RC	293-ABC-	-	1920
K3SBT/3	Metropolitan Erie V.H.F. Soc.	354-	BC-12-	1899
VE1ND/1	Central N. B. ARC	197-	AB-10-	1410
WA8FSE/8	Opequon R Soc.	242-	AB- 8-	1395
W3ZIC/3	Fort Venango Mike and Key Club	243-	BC-12-	999

Seven Transmitters Operated Simultaneously

W2GSA/2	Garden State AR Assn.	2652-	AB-50-22,779
WA4MBD/4	Blue Grass ARC	2434-	AB-21-18,063
W2WW/2	Watchung Valley RC	1338-	AB-35-10,596
W5SC/5	San Antonio RC	1417-	AB-35-	9873
W1MV/1	Massasoit AR Assn.	1164-	AB-25-	9609
VE3JJ/3	West-Side RC	1189-	AB-18-	9021
W6WWJ/6	South County AR Soc.	1271-	AB-38-	8640
W4CUE/4	Birmingham ARC	1343-	AB-27-	8195
W9SWQ/9	Four Lakes ARC	1231-	B-40-	7386
VE3VM/3	Niagara Peninsula ARC	1183-	AB-23-	7377
W4DOC/4	Atlanta RC	1169-	B-21-	7200
W2SEX/2	AR Assn. of the Tonawandas	861-	AB-26-	5685
K6EAG/6	Hayward RC	890-	AB-20-	5631
W6UW/6	Santa Clara County AR Assn.	836-	B-25-	5202
WA8KAI/8	Van Buren ARC	771-	AB-13-	5109
W2RCX/2	Genesee RA	736-	AB-29-	4917
W4SRX/4	Eglin AR Soc.	869-ABC-12-		4638
W3OM/3	Worm Watchers	744-ABC-22-		4266
W1NY/1	Hampden County R Assn.	576-	AB-14-	3912
K2BFB/2	Auburn AR Assn.	432-	A-10-	3888
K6GNZ/6	Anaheim AR Assn.	716-	AB-10-	3442
W1HPM/1	Manchester RC	525-	B-40-	3150
W9CEQ/9	Fox River R League	730-	BC- 7-	3132
K3WRS/3	General ARC	421-	AB-20-	2556

Eight Transmitters Operated Simultaneously

W9FQ/9	Wheaton Community RA	2109-	B-44-12,804
W8HLD/8	Catalpa AR Soc.	2080-	B-26-12,570
W6ULL/6	Fullerton RC	1582-	AB-30-11,091
W9PCS/9	York RC	1419-	AB-24-	9261
VE3MRC/3	Metro ARC	1313-	AB-27-	9225
W3GV/3	R Assn. of Erie	1100-	AB-18-	6780
W9IKN/9	Elgin AR Soc.	975-	AB- -	6141
W1CKA/1	Forestville AR Assn.	838-	AB-25-	5298
WA5GRO/5	Fort Smith Area ARC	945-	B-21-	5670
K6HAI/6	North Shores ARC	884-	AB-15-	5664

Nine Transmitters Operated Simultaneously

W6FA/6	The Corona Gang	975-	AB-12-	8700
K4DPZ/4	Gainesville A Soc.	1027-	AB-23-	6570
W6PMK/6	North Peninsula Electronics Club	802-	AB-19-	5490
W5MS/5	Corpus Christi ARC	618-	AB-15-	3870
W7KYC/7	Portland ARC	478-ABC-35-		1911

Ten Transmitters Operated Simultaneously

W2WE/2	Tri County R Assn.	2551-	A-45-23,184
W7DK/7	RC of Tacoma	2532-	AB-45-18,201
VE3NAR/3	Nortown ARC	1351-	AB-52-11,937
K4DTV/4	Huntsville ARC	1749-	B-40-10,584
W6AB/6	LERA ARC	692-	AB-15-	4272

Eleven Transmitters Operated Simultaneously

W2MM/2	Englewood AR Assn.	1581-	A-32-14,508
W3RCN/3	Rock Creek ARAssn.	1889-	AB-62-12,534
VE3WE/3	Scarborough ARC	1635-	AB-49-12,213

Twelve Transmitters Operated Simultaneously

VE3OW/3	Windsor ARC	2220-AB-100-16,500

Thirteen Transmitters Operated Simultaneously

WA6ODP/6	Livermore AR Klub	1529-	AB-40-11,748

Sixteen Transmitters Operated Simultaneously

W4PLB/4	Orlando ARC	2778-ABC-85-12,615

CLASS B

Grouped in this listing are the scores of portable stations manned by one or two operators. Where two persons participated, the call of the other operator (if known) is given below that of the amateur whose call was used. Figures following the calls indicate number of contacts, power and final score.

One Transmitter

W2JBQ/2 ..... 427- A-6102
W2FBA
WA2APT/2 ..... 441- A-5954
WA2JHE
K5RHZ/5 ..... 903- B-5418
W3DQG/3 ..... 350- A-4725
VE2AGQ/2 ..... 477- A-4293
VE3FUX
W4UWA/3 ..... 274- A-4037
K4LJR/4 ..... 414- A-3951
W4WHK
WA2DPT/2 ..... 294- B-3969
K2BMI
K9IMX/9
WA9GCK 378- B-3502
K1LOM/1
W1MEH 315- A-3096
K8GJM/8
K8PLJ 481-AB-3087
W6ANB/6 ..... 301- A-2934
K7POA
K6CLM/6 ..... 450- B-2850
WA6YBU
K5FRH/5 ..... 442- B-2802
WA5JDO
K5WUE/5 ..... 181- A-2781
W5OLD
K3SQO/3 ..... 204- A-2754
W3PMG
K8RGH/8 ..... 336-AB-2712
WA8CSF
WB2AJE/2 ..... 298- A-2682
WB2CON
K8NGQ/8 ..... 171- A-2646
W8VWY
K5LJF/5 ..... 258- A-2547
W6PFE/6
WA6HUQ 282- A-2538
WA9AUM/9 ..... 389- B-2484
K9UKM
W5QAG/5
WA5IYF 413- B-2478
KØEDK/Ø
KØTRX 176- A-2376
W3EAN/3
W3EBY 329-AB-2157
W5LZG/5 ..... 234- A-2106
W5BPF
WA8KAK/8 ..... 230- A-2070
WA8JBK
K1MZB/1
K1LPC 316- B-2052
W3PWK/Ø 200- A-2025
W5UOZ/5
K5VDI 336- B-2016
VE2BOW/2
VE2BPH 188- A-1917
K4TTA/4
WA4ATM 317- B-1902
K6JEN/6
WA6IFA 305- B-1830
K3FEO/3 ..... 189- A-1719
K3SOM
KØMDX/Ø
KØGWK 272- B-1632
K8OPM/8
WA8FRH 268- B-1608
W2FVD/1
WB2HTL 89- A-1539
WB2GIS/2 ..... 230- B-1530
WA6WHC/6
WA6VKK 170- A-1530
KZ5OB/KZ5
KZ5OA 483- C-1524
W9NYS/9 ..... 253- B-1518
WØHDH
K6AVR/6 ..... 231- B-1386
KØVTT
W7VB/7 ..... 200- B-1350
K7AHO
W4WSF/4 ..... 145- A-1285
W3RWW/3 ..... 212- B-1272
WA9APC/Ø 209- B-1254
WA9A8Q
W1BCV/1 ..... 193- B-1248
W1GKJ
W1ALL/1 ..... 110- A-1215
W1VNX
WA8GRE/8 ..... 199-AB-1206
WA8FZZ
K7SKR/7 ..... 195- B-1170
W7AGE/7 ..... 129- A-1169
K4SXD/4 ..... 169- B-1164
KØFSJ/Ø 101- A-1161
WA4SJA/4 ..... 128- A-1152
WA4SIZ
W9VOO/9 ..... 159- B-1104
K8QPY/8 ..... 94- A-1071
K8VVV
K5TCK/6 ..... 152- B-1062
WA5BBS
K9DMV/8 ..... 176- B-1056
K9FSV
WA9BAI/9 ..... 150- B-1050
WA9CRY

K5ADQ/5 ..... 116- A-1044
W5QVZ
WA8HHU/8 ..... 116- A-1044
WA8HIK
K3WQK/3 ..... 170- B-1020
K3TXX
K7RGO/7 ..... 168- B-1008
K7RAJ
K9WEE/9 ..... 168- B-1008
K9UIJ/9 ..... 112- A-1008
K9UIB
WAØAHL/Ø 167- B-1002
WØPGI
K4CG/4 ..... 166- B- 996
K1OHE/1 ..... 165- B- 990
K7HLR/7 ..... 164- B- 984
K9DCJ/9 ..... 164- B- 984
W5TJT/5 ..... 162- B- 972
W5PIZ
WA2CCE/2 ..... 155- B- 930
WA6KDX/6 ..... 154- B- 924
WA6OFL
K7ETY/7 ..... 153- B- 918
W7JWJ
WB6JQP/6 ..... 151- B- 906
W1BFG/1 ..... 145- B- 870
K1VQG
W1MX/1 ..... 145- B- 870
W6NAT/6 ..... 142- B- 852
K7JMN/6 ..... 126- B- 756
K9DIM/9 ..... 100- B- 750
K9DOL
K7BBO/7 ..... 83- A- 747
K1WXU/9 ..... 95- B- 725
K1SAV
K4RTA/4 ..... 248-AB- 704
WAØAHI/Ø ..... 140- B- 700
WØGWU
K3JQB/3 ..... 116- B- 696
KØGCK/Ø ..... 109- B- 654
K1OOV/1 ..... 48- A- 648
VE3DZJ/3 ..... 105- B- 630
VE3EED
K1YRB/1 ..... 104- B- 624
W9WRK/9 ..... 301- B- 602
WN9KDY
WN9FQN/6 ..... 45-AB- 598
W4YRM/4 ..... 18- A- 581
WB2GLQ/2 ..... 96- B- 576
WA2MJQ
KØETA/Ø ..... 95- B- 750
WA9PHF/4 ..... 169- B- 556
WØZXX
WA9ETL/9 ..... 92- B- 552
WA9ESP
VE3EYI/3 ..... 241- B- 536
VE3FPH
WA8ETX/VE3 ..... 187-AB- 493
WA8ETW
WAØASC/Ø ..... 81- B- 486
K3OMP/3 ..... 11- A- 486
WAØFLL/Ø ..... 11- A- 486
WA9CWO/9 ..... 75- B- 450
WB2ARH/2 ..... 50- A- 450
WB2JOK
K4ZVQ/4 ..... 22- B- 423
W6CRA/6 ..... 70- B- 420
KN7ZUP/7 ..... 27- A- 365
WB2CNU/2 ..... 40- A- 360
WA4IZB/4 ..... 119- C- 357
W9GWA/9 ..... 119- C- 357
K7RQZ/7 ..... 59- B- 354
K7JUC
WA2TAT/2 ..... 36- A- 324
WA2PIA
W3INV/3 ..... 24- A- 324
K9FHP/9 ..... 160- B- 320
WA9KSZ
WA4GPM/4 ..... 52- B- 312
WAØGVJ/Ø 139-AB- 308
WNØIPA
W3IDO/3 ..... 32- B- 288
WB2HTL/2 ..... 21- A- 284
WA9CWR/5 ..... 128- B- 256
W8PZV/4 ..... 121- B- 242
W4QFY/4 ..... 114- B- 228
WA4FNZ/4
K4FQC 111-AB- 227
K7MBA/7 ..... 25- A- 225
W4EVN/4 ..... 37- B- 222
W4GIM
WN5ILJ/5 ..... 34- B- 204
K7YJM/7 ..... 32- B- 192
K6YJO
K9QHO/9 ..... 42- A- 189
WA9EUD
WA2SPT/2 ..... 28- B- 168
WA4EZV/4 ..... 83- B- 166
K3URZ/3 ..... 82- B- 164
K3LLV
WB6CQK/6 ..... 80- B- 160
WA6VYM
W2FSL/12 ..... 24- B- 144
K3RDM/3 ..... 64- B- 128
K3RDL
WN8JSC/8 ..... 18- B- 108

A perfect 1B station, operated by WA9AUM/9 with K9UKM. Credit for this excellent photo goes to the Palladium-Photo Co.

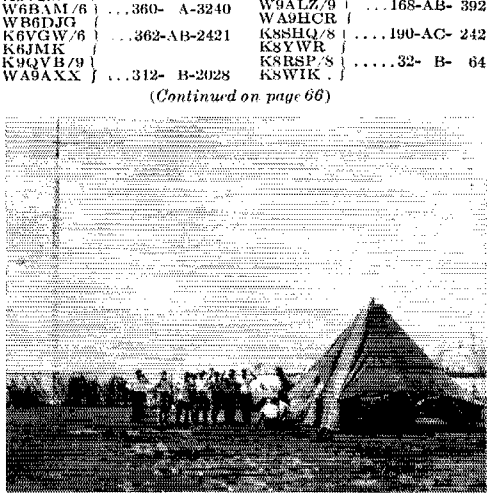
W4IMC/4 ..... 8- A- 108
WA4EGH
WN2LLJ/2 ..... 6- A- 93
WN2ASGD/4 ..... 46- B- 92
WA9DYC/4 ..... 27- C- 81
K9IYK
WN4PYG/4 ..... 40- B- 80
WN4PYH
K1MQX/1 ..... 26- A- 78
K3PBU/3 ..... 12- B- 72
W3MCJ
WP4BPH/KP4 ..... 5- A- 68
WN3APQ/3 ..... 18- A- 54
WB2EDU/2 ..... 3- A- 27
K8JWR/8 ..... 3- A- 14
K8KFP
WA8ETW/VE3 ..... 6-AB- 13
WA2UUQ/2 ..... 6- B- 12
KØUJJ/Ø ..... 6- C- 6

Two Transmitters

K7PBO/7 ..... 514- A-4869
W7VGQ
K1FCR/1 ..... 345- A-4658
K3TYL/3 ..... 504- A-4536
K3MNT
K1SDX/1 ..... 478- A-4527
WA1AAY
W6KEV/6 ..... 321- A-4334
W6M8M
KØEDH/Ø 264- A-3902
KØVIM
W6BAM/6 ..... 360- A-3240
WB6DJG
K6VGW/6 ..... 362-AB-2421
K6JMK
K9QVB/9
WA9AXX 312- B-2028

WA6CBQ/6 ..... 245-AB-1953
WA6PRY
W7ZOD/7 ..... 287- B-1872
W4VRO/4 ..... 239- B-1584
WA4PFA
WB2CJW/2 ..... 232-AB-1512
WB2DZZ
WB6DQR/6 ..... 117- A-1485
WA6UYD
K8TPT/9 ..... 189-AB-1398
K2AKI
K6BXD/6 ..... 132- A-1188
K6BXI
WB6GGE/6 ..... 63- A-1188
WB6BET
WA4PFN/4 ..... 187- B-1122
WA4MIY
WAØDKA/Ø 127-AB- 957
WAØDSH
WA9FBC/9 ..... 126- B- 906
WN9JUM
WA8FIZ/8 ..... 85-AB- 864
W8BHF
WA8FLO/8 ..... 94-AB- 849
WA4IWE/4 ..... 106- B- 636
WA4AAL
WA4CYA/4 ..... 99- B- 594
WA4LBO
K3VNH/3 ..... 58-AB- 402
K3TIE
W9ALZ/9 ..... 168-AB- 392
WA9HCR
K8SHQ/8 ..... 190-AC- 242
K8YWR
K8RSP/8 ..... 32- B- 64
K8WIK

(*Continued on page 66*)



The Wantagh RC (W2AZV/2) operated 2A in an urban location scoring best ever with ideal weather. The boys line up right before zero hour for a soft-drink break. That 40-foot tower was topped by stacked 2- and 6-meter beams and also supported one end.

1965 FIELD DAY

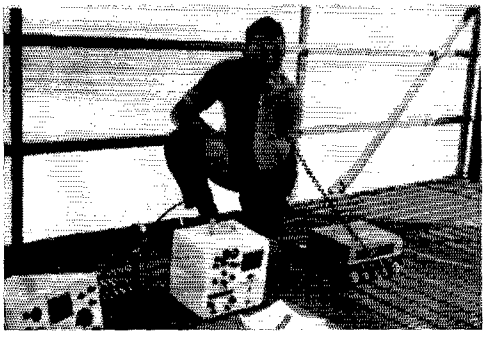
JUNE 26-27

CLASS C

K9VPL/6[4]	532-	B-4788
W2OKO/2	118-	A-4018
W3HFY/3	274-	B-3699
W3JYA/3[1]	115-	A-3348
W6QHP/6	176-	A-3186
WB6DFO/6	167-	A-3051
W3EQV/3	80-	A-2876
W3MHR/3	72-	A-2849
W3YHV/3	72-	A-2822
W3SRU/3	65-	A-2727
K3CEE/3	60-	A-2714
K2GKK/5	251-AB-	2696
WA6DBL/6	135-	A-2619
K3GNM/3	54-	A-2579
WA6THI/6	139-AB-	2534
WA6HGH/6	138-AB-	2520
W3YJM/3	65-	A-2457
W3IWO/3	133-	A-2448
W3RQZ/3[3]	125-	A-2412
W3AJO/3	45-	B-2390
W3LNQ/3	39-	A-2376
W3WUX/3	42-	A-2336
W3DSG/3	37-	A-2322
W6CXD/6	109-	A-2268
WA6ORZ/6	152-AB-	2232
WA2RDC/3	27-	A-2214
W3NIP/3	28-	A-2201
K3HIJ/3	20-	A-2147
K3HIE/3	19-	A-2133
W3CDY/3	15-	A-2124
W3GIF/3	18-	A-2066
W3ZZI/3	14-	A-2039
W3BBB/3	14-	A-2012
K3KDP/3	20-	A-1985
W3QQH/3	9-	A-1971
W3AWH/3	6-	A-1944
W3GOW/3	10-	A-1931
W3ZPP/3	140-	A-1890
VE3BLT/3	114-	A-1877
W2VJZ/2	125-	A-1688
K3GBA/3	15-	A-1661
K3TXE/3	44-	A-1629
K3SPS/3	35-	A-1566
K6VYV/6	55-AB-	1512
WA6IVI/6	30-AB-	1472
K3WPT/3	31-	A-1412
W6TEE/6	91-AB-	1364
K6ZFI/6	41-	A-1350
WB6FZY/6	39-	A-1323
W9GQY/9	125-AB-	1273
K8UZA/4	106-	B-1179
WB6IAW/6	28-	A-1175
W3TKQ/3	50-	A-1152
W6HIR/6	26-	A-1148
K6JNV/6	26-	A-1148
K6TYJ/6	20-	A-1121
K6RRD/6	23-	A-1107
W6EPG/6	19-	A-1107
WA6NVQ/6[1]	55-	A-1081
W7HMA/7	113-	A-1017
K6SEA/6	16-	A-1013
K6SBL/6	16-	A-1013
W3ADV/3	48-	A- 986
K8CGW/8	38-	A- 932
W6GDO/6	53-	A- 882
K3EZJ/3	59-AB-	878
K6ODJ/6	56-	A- 756
K9SFQ/9	36-	A- 738
W6IIF/6	75-	B- 675
W9AYU/9	20-	A- 621
W3DJV/3	19-	A- 594
W9OGZ/9	18-	A- 581
K3WQU/3	17-	A- 581
K1NIJ/1	46-AB-	540
K3KUD/3	15-	A- 540
W3OWK/3	13-	A- 513
W6UGO/6	56-	B- 504
W4YOK/4	109-	C- 491
W5QF/5	81-	B- 486
W3DJW/3	10-	A- 473
K7RZS/7	48-	B- 432
W3APD/3	7-	A- 432
WA6NPC/6	47-	A- 423
K9TBA/9	31-	A- 419
W6UCR/6	46-	A- 414
K9TBZ/9	29-	A- 392
W2RQA/2[1]	28-	A- 378
W3FOG/3	3-	A- 378
K5HBH/8[2]	42-	B- 378
WA5CMC/5	16-	B- 369
K3DCD/3[1]	2-	A- 365
W9FUY/9	27-	A- 364
K6LDE/6	13-	A- 342
WN6KUT/6	25-	A- 338
WA6YZO/6	33-	B- 297
W9AVE/9	22-	A- 297
K9CYU/9	22-	A- 297
WB6AOJ/6	23-	B- 216
K9SBL/9	14-	A- 189
WA6WNA/6	19-	B- 171
K9MNF/9	12-	A- 162
K6ONP/6	21-	A- 158
K9PAW/9	11-	A- 149
K9FJK/9	9-	A- 122
K9SWE/9	9-	A- 122
K3AWC/3	8-	A- 108
W9QXO/9	8-	A- 108
KL7EMA/KL7	8-	A- 108
WA4QLB/3	7-	A- 95
W7VA8/7	10-	B- 90
K6YBS/6	9-	B- 81
W7EGR/7	9-	B- 81
W2RWY/2	19-	B- 57
WB6AOG/6	5-	B- 45
K8CBK/8	9-	C- 10
WB2DJQ/2	2-	A- 27

CLASS D

W4KVK[6] 572, WA6TBY[7] 570, K3GTN[8] 447, W7ECA[9] 380, WB2HJC[10] 374, WA6FLD[10] 353, WB6GFJ/6[12] 264, W3PIE[13] 164, WA8CYR[14] 112, W4TUQ 101, W7OVM[15] 101, K6ZYZ 88, VE6AHJ[1] 38, W6BHG 24, W1BNB 20, W7RBE 7.



The Eglin AR Soc., W4SRX/4, operated 7A on the edge of the beautiful Gulf of Mexico. Former club president K4LXV demonstrates the 2-, 6- and 10-meter rigs.

CLASS E

K0SCM[15] 1057, KØHAL[16] 1027, W2BXK[17] 823, W6EE[18] 649, KØWGE[19] 608, K0SLD/Ø 528, W8FAW 523, K1IFJ/1[20] 493, WB6ENX 400, WA8HIT[9] 372, WA8CFJ 326, WA2TKL 311, W9KLD/7 314, WB2BYJ 310, WB2NKE/2[1] 268, WØIEM 265, W3GNQ 252, K3MYS 230, K5POU/5 202, K3WWP 183, K7ZZH[1] 179, WA4AIH[8] 178, WB6HUM[8] 173, WA9LGQ[21] 168, WA8QYT 167, W5LJT 161, WA5HRD 155, K8GKX 155, WA2WIJ 152, WA6KHK 150, WB2GMU[1] 146, K9RJO 146, K1WKB[1] 143, WA4CUQ 140, VO2HA[22] 131, K3SFP 128, K3VZV 119, W2GVH 116, WB2CCX 107, WB6EFA 106, KH6BTH/9[23] 106, WA4PFQ 105, WA9TTY 103, W2NEP 100, K3ORW 100, W1ORS[24] 99, WA9APT 99, K4RDU 98, W4YSJ 96, WA5CYR[25] 95, K1YST[2] 94, K8BAB 93, WA6SVY 91, K5LQL 90, K5MTP 89, WØNLF 80, K6PXD[26] 79, K3TTM[1] 77, W8RGF 74, W2DUN 70, WB2EGR[1] 70, K4BSS/1 70, WA9-CYG 64, K1FVS 63, W1RFJ 63, K8ANX 63, WAØDGG 61, *VE3FHQ* 61, WA4MXD 58, K8LIO 58, W4YZC/4 57, WN9-LMC[27] 55, K8ZXI 53, W5BW 51, WA6RND 51, K7WPC 50, VE1EK/1 50, VE1AE 47, W1IFM 46, WB2CXP 45, VE2BVD[28] 45, WB2JPR 43, KN3ZYK[29] 42, W8HQN 42, WB2FPF 41, K1DIK 40, KØRUA 40, WB2HHP 37, K4THA 37, WA2ZOW 36, WA8GBZ 36, WA9JYO/8 35, WB2JWA 34, W8VDF 31, W4WBK 30, WA4ODB 29, WA9FIA 27, WB2ODI 26, WA8-HBL 25, VE3DEU 25, WB2HEY 24, WA2HZU 24, W7TUO 24, WA9FIH 24, WB6FFP 23, K9GUH 23, WA4BNO 22, K2AZJ 21, W2NHH 21, WA9IZR 21, WB2KDB 18, W8IBX 17, WA9FTU 17, WN9LOL/9 16, WN8KBK 13, WAØDZI 10, WN2LUT 7, KN3FKU 7, KN3ZRK 7, WN4RIJ 7, K6ICS 7 WN9KWN 7, WA6YWS/6 6, WB6CGZ 4, WR2MNM 3, WN2KXC 2, WN2LWE 2, KH6BZF 2, W1BB 1, W5MVP 1.

[1] 2 oprs. [2] WA2UFL K3OAE oprs. [3] WA1AXU, K1VTY oprs. [4] WA6NKW, K9VPL oprs. [5] 3 oprs. [6] 2 xmttrs. 18 oprs. [7] 3, xmttrs. 10 oprs. [8] 5 xmttrs. 5 oprs.[9] 2 xmttrs. 5 oprs. [10] 10 oprs. [11] WA0s AJV FLD, oprs. [12] WA6 BMD WB6GFJ, oprs. [13] xmttrs. [14] 3 xmttrs. 12 oprs. [15] 2 xmttrs. 4 oprs. [16] W5GUI, KØRAL oprs. [17] 5 xmttrs. 9 oprs. [18] 5 xmttrs. 15 oprs. [19] 3 xmttrs. 3 oprs. [20] K1s HAN IFJ, oprs. [21] 4 oprs. [22] 5 oprs. [23] K9PCG, KH6BTH oprs. [24] 4 xmttrs. 20 oprs. [25] 2 xmttrs. 3 oprs. [26] 2 xmttrs. 2 oprs. [27] WN9s *LMB LMC*, oprs. [28] *VE2s BHM BVD*, oprs. [29] KN3s ZUU ZYK, oprs.

Hq. thanks the following amateurs for submitting their logs for checking purposes: K1ZGH WB2KYV K2YNL W3KOW W3HOT W4EWL W4HOS W6SD/6 W7SEI K7UNI W8FWQ W8HA WA8LKI VE3BJI VE3DGW.

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

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8. Known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities. None.
9. Not Applicable.
10. Not Applicable.

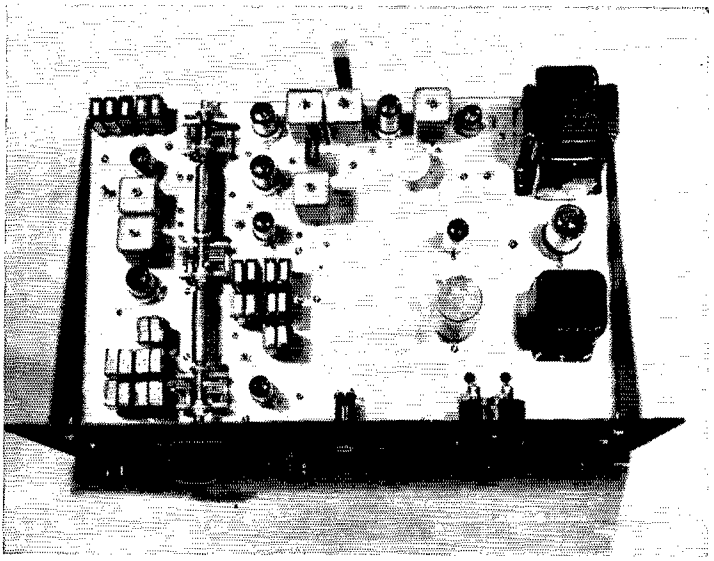
I certify that the statements made by me above are correct and complete: JOHN HUNTOON, *Editor*

FEEDBACK

In the h.f.o. circuit of the second-converter circuit described by W2MUH in the November issue, the tap on L_1 should be placed at 5 turns from the ground end.

—•••—

The operator of the schooner *Bluenose II* should have been listed as VEØMY in *QST* for August 1964, Station Activities, Canadian Division, Maritime section.



Components are assembled on an 11 × 17 × 3-inch chassis fitted with an 8¾-inch rack panel, as described in the text. The shaft couplers in the capacitor gang are homemade; standard couplers and shaft extensions may be substituted.

Crystal V.F.O. with Full-Band Coverage

Simplified Unit for the 3500-4000-Kc. Range

BY FRANK W. NOBLE,* W3QLV

As time goes by, more and more amateurs are becoming convinced that the only really satisfactory answer to the problem of v.f.o. stability is the crystal frequency synthesizer. The unit described here is not prohibitively complicated. It covers the entire 80-meter band, and may be used with conventional frequency multipliers to cover higher frequency bands.

THE virtues of the heterodyne-type v.f.o. have been extolled in several previous articles [1, 2, 3, 4]. These include a high order of frequency stability, and the need for relatively few crystals to cover a desired frequency range. To be sure, the problem of avoiding spurious emissions with such systems is a serious one, but not insurmountable with reasonable precautions. The subject has been discussed previously [3, 4] and will not be labored here.

In an earlier article,[2] the author described a 20-crystal v.f.o. which provided continuous coverage over the lower 100-kc. segment of the 80-meter band. Later, the thought occurred that it should be possible to cover the entire 80-meter band by the addition of 5 crystals, a third oscillator, and a second mixer. When used with the conventional frequency multiplier already at hand in most existing transmitters, the arrangement would then provide crystal stability over all amateur bands through 10 meters. A plot of frequency combinations showed none that would be likely to produce spurious signals difficult to suppress, so the circuit was redesigned with the extended range in view. The results are presented herewith.

Circuit

Referring to the circuit diagram of Fig. 1, it will be observed that a "units" oscillator (V_1), using 10 crystals at 1-kc. intervals, and a "tens" oscillator (V_2), using 10 crystals at 10-kc. intervals, are fed to the first mixer (V_3). The bandpass filter including L_3 and L_4 in the output circuit of the mixer is adjusted to select the sum beat of the two input frequencies. The mixer circuit is of the double-balanced type,[5] whose output contains neither the fundamental nor any odd harmonic of either of the two input signals (except the small amount that may be fed through to the output via the grid-plate capacitance of the triodes). The mixer behaves best at low levels and with low-impedance drive, hence the use of link coupling to the two driving sources.

The output signal from the first mixer is amplified in V_{4A}, the pentode section of a 6AN8A, and then fed to the second mixer (V_5), where it is combined with the signal from a

*10004 Belhaven Road, Bethesda, Maryland 20034.

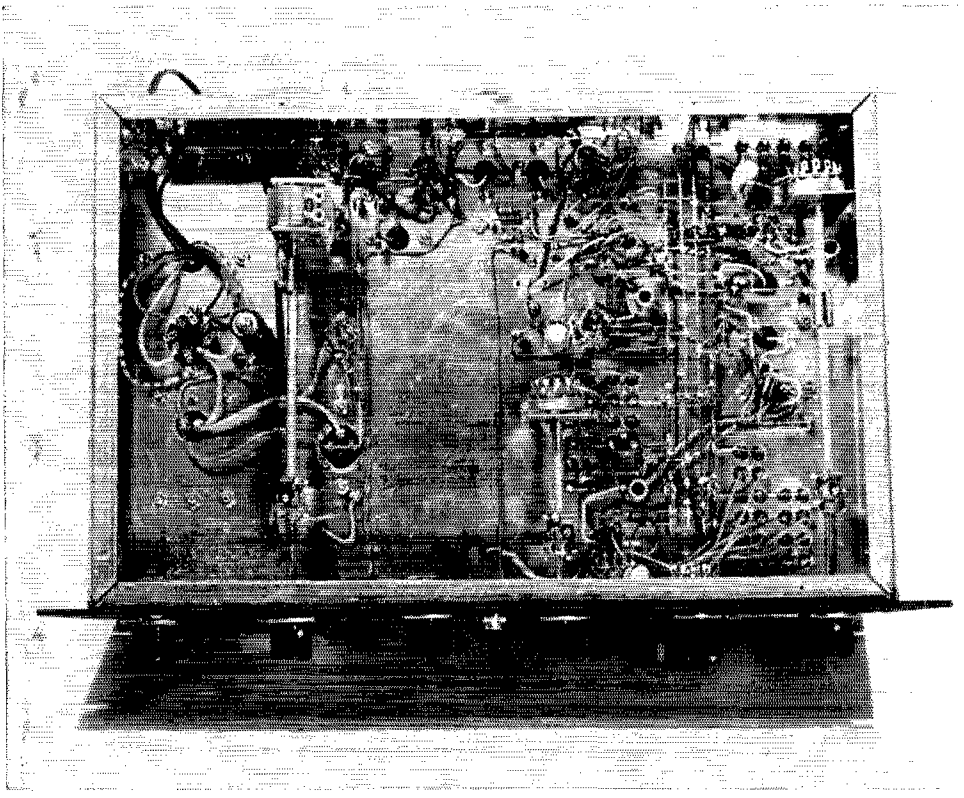
[1] Shall, "*VXO* — A Variable Crystal Oscillator," *QST*, Jan., 1958.

[2] Harvey, "The Ultimate Exciter," *QST*, Oct., 1962.

[3] Noble, "A Crystal V.F.O.," *QST*, May, 1963.

[4] Briggs & Morrison, "A Simplified Frequency Synthesizer," *QST*, January, 1964.

[5] McAleer, "Mixer Circuit Has Clean Output," *Electronic Industries*, Oct., 1960.



Bottom view of the crystal v.f.o. unit. Of the four No. 14 busses at the right, two carry ground connections. The other two carry the plus 150- and 250-volt lines. The shielding is completed by the addition of a bottom chassis cover.

"hundreds" oscillator (V_6). This mixer is similar to the first mixer except that its output filter including L_{11} and L_{12} is tuned to the difference beat. Thus the frequency fed to the final amplifier (V_7) is:

f (units) + f (tens) − f (hundreds).

With the crystal frequencies listed in Table I, the range of 3500 to 4000 kc. may be covered in steps of 1 kc. Coverage between adjacent 1-kc. points is accomplished by "rubbering" the crystals of all three oscillators simultaneously by the 3-gang capacitor C_1. Since the final output frequency is determined by adding the units and tens frequencies and subtracting the hundreds frequency, it follows that maximum "rubbering" will take place if the hundreds oscillator is "rubbered" in a direction opposite to the other two oscillators. This is done by ganging the capacitors with the rotors of C_{1C} offset 180 degrees in respect to the rotors of C_{1A} and C_{1AB}, so that the capacitance of C_{1C} increases with clockwise rotation of the dial as the capacitances of C_{1A} and C_{1B} decrease, and vice versa. The frequency variation obtainable in this manner is more than adequate to span the interval between adjacent 1-kc. points.

The 6CL6 output amplifier is operated Class A. It delivers an average output of about 50 volts peak. This should be sufficient to drive any reasonable tetrode or pentode amplifier or multiplier. C_2 has sufficient range to compensate for the reactance of at least 20 feet of RG-62/U cable. The author prefers the output coupling arrangement shown to low-impedance coupling because high output voltage can be

C_1—Three 50-pf. midget variable capacitors ganged as described in the text, with the rotors of C_{1C} displaced 180 degrees in respect to the rotors of C_{1A} and C_{1B}. (Individual units are Hammarlund MC-50-S, or similar).
C_2—Broadcast replacement-type variable.
J_1, J_2—Closed-circuit headphone jack.
J_3—Chassis-mounting coaxial receptacle.
L_1, L_5, L_9, L_{13}—Slug-tuned coil, 3.1–6.8 μh. (Miller 4405, or similar).
L_3, L_4, L_8—Slug-tuned coil, 1.5-3.2 μh. (Miller 4404, or similar).
L_{11}, L_{12}—Slug-tuned coil, 30–69 μh. (Miller 4408, or similar).
L_2, L_6, L_7, L_{10}—1 turn No. 22 solid hookup wire spaced ⅛ inch from ground end of associated coil.
RFC_1—Shielded 10-mh. r.f. choke (Miller 856, or similar).
S_1, S_2, S_3—Single-pole 12-position rotary switch (Mallory 32112J with stops adjusted for 10, 10 and 5 positions, respectively).
S_4—S.p.s.t. rotary (Arrow-Hart 81815, or similar).
Y_1, Y_2, Y_3—See Table I.
Y_4—3500-kc. or other marker crystal.

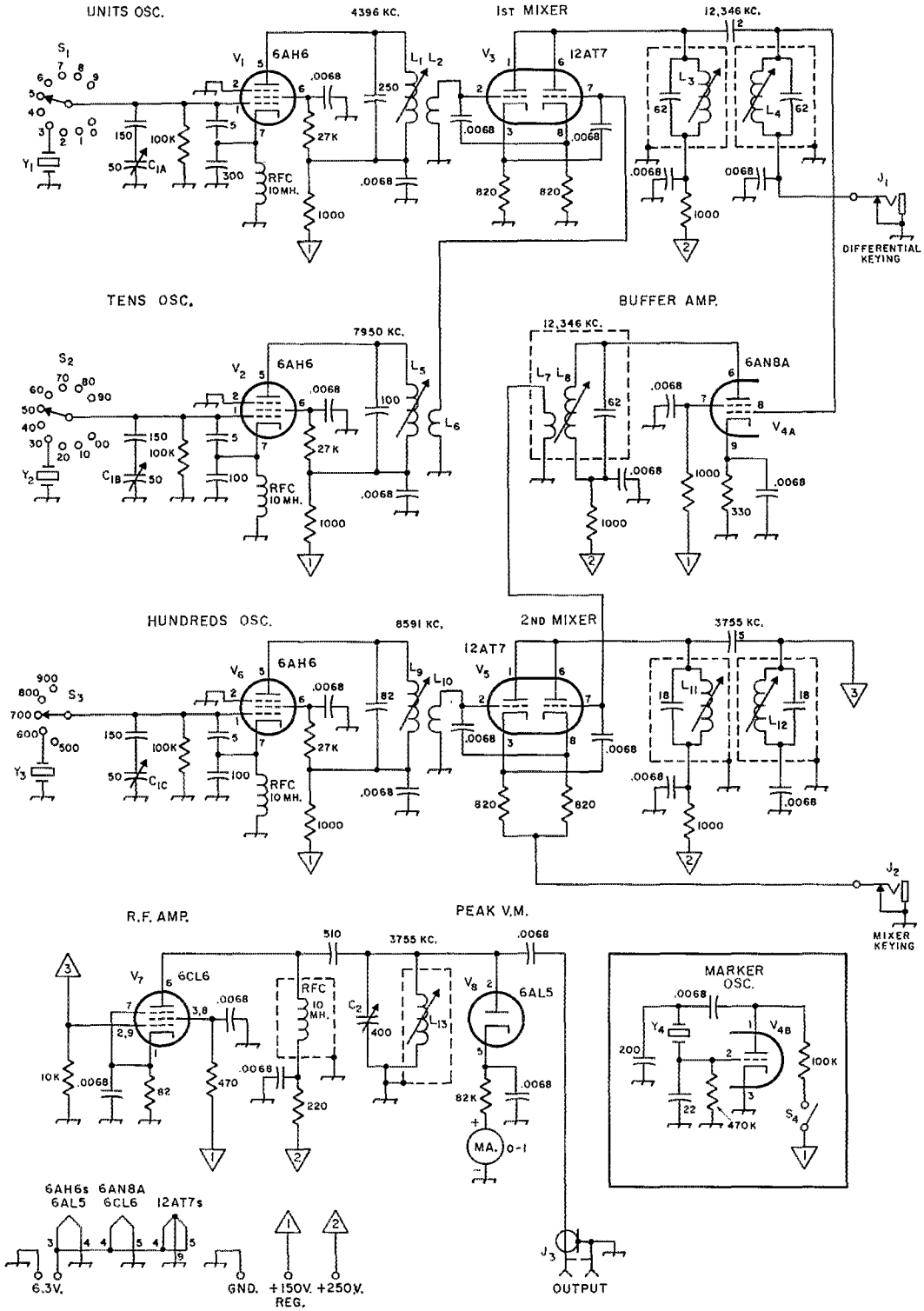
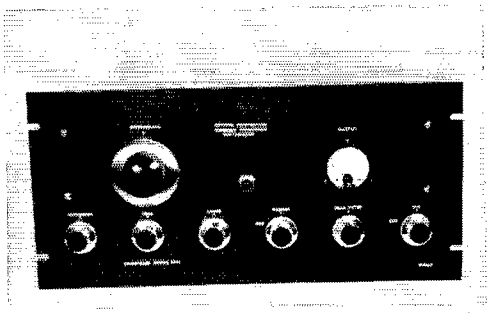


Fig. 1—Circuit of the crystal v.f.o. Decimal values of compacitants are in μf.; others are in pf. Resistances are in ohms (K= 1,000) Fixed capacitors of decimal value are disk ceramic; others are silver mica. Resistors are ½-watt composition. Inset at lower right shows the circuit of a marker oscillator which makes use of the triode section of the 6AN8A whose pentode section, V_{4B}, is used in the buffer amplifier above.



Panel view of the crystal v.f.o. unit. Frequency is set to the nearest kilocycle by adjustment of the three switch knobs (National HRS-3) to the left. Exact frequency is then obtained by adjustment of the large interpolation dial. The output-amplifier stage is tuned to resonance by the knob directly below the output meter. The knobs to either side of this control are for the marker-oscillator power switch and the power-supply switch.

obtained without the need for a step-up transformer at the terminal end of the output cable. The latter can be quite a nuisance if it requires frequent retuning to cover the desired frequency range.

The 6AL5 r.f. voltmeter circuit is not strictly necessary, although it will be found very convenient for tune-up purposes.

The triode section of the 6AN8A (V_{4B}) is used in a marker oscillator, the circuit of which is shown in the inset of Fig. 1.

The two keying jacks, J_1 and J_2, provide a choice of keying systems. Keying of the mixer at J_2 will provide chirpless keying with no key-up signal in the band. However, it is necessary to operate all subsequent amplifier stages Class A or B to avoid the generation of clicks in the amplifiers. If Class C operation is desired, it is preferable to use a differential keying system so that the keying of the final amplifier stage may be shaped. J_1 is provided for such a system.

Crystal Frequencies

The crystal frequencies required are shown in Table I. The switch dial position for each crystal is also shown. The National HRS-3 dials employed have markings of 0 to 10 over 300 degrees to match the Mallory switches used. This arrangement makes it very easy to read output frequency directly in terms of kilocycles above 3000 kc. by simply adding the dial readings. Thus, if the hundreds dial is set at 7, the tens dial at 5, and the units dial at 3, the output frequency should be 3753 kc. The crystals used by the author are surplus FT-243 units etched to the desired frequencies.

Construction

The layout of components on the chassis is shown in the top-view photo. On the left-hand side, C_{1B} is close to the panel, with the tens crystals on the left and tens oscillator tube on the right. The adjusting screw of L_5 may be seen just above the tube, and slightly to the left. C_{1A} is at the center of the gang with the units crystals and tube to the right, and the first mixer tube and its shielded output coils to the left. The adjusting screw of L_1 may be seen to the left of the oscillator tube. C_{1C} is at the top with the hundreds crystals and tube to the left. The adjusting screw of L_9 is below and to the left of the tube.

The second mixer tube and its shielded output coils are to the right of C_{1C}, with the 6AN8A buffer, L_8, and the marker crystal below. To the right of the second mixer is the 6CL6 output amplifier and the 6AL5 voltmeter tube, with L_{13} in between. The amplifier plate r.f. choke is the shielded unit below.

Power-supply components occupy the right-hand edge of the chassis. This is a standard 90-ma. supply delivering 250 volts from a single pi-section filter. The power transformer is a 520-volt r.m.s. center-tapped job. (Stancor PC-8404) and the rectifier is a 5Y3GT. Regulated 150 volts is obtained from this supply through a dropping resistor and 0A2 regulator tube.

The bottom-view photo shows that although the tens crystal switch is mounted on the panel, the other two crystal switches are mounted on brackets close to the crystal groupings to avoid excessively-long connecting leads. The output-amplifier tuning capacitor C_2 is also mounted on a bracket close to the terminals of the output coil above chassis.

Table I
Crystal Frequencies

	Position	*Crystal f_{kc}*
S_3	500	8791
	600	8691
	700	8591
	800	8491
	900	8391
S_2	00	7900
	10	7910
	20	7920
	30	7930
	40	7940
	50	7950
	60	7960
	70	7970
	80	7980
	90	7990
S_1	0	4391
	1	4392
	2	4393
	3	4394
	4	4395
	5	4396
	6	4397
	7	4398
	8	4399
	9	4400

Adjustment

Adjustment is fairly simple. A general-coverage receiver with an S meter is a convenience, although an indicating wavemeter or g.d.o. may also be used. Connect about a yard of coax line to the receiver, with about an inch of the inner

(*Continued on page 180*)

Hints and Kinks For the Experimenter

HOMEMADE QSL CARDS

THE man who QSLs infrequently or changes his address often, or who wants special cards for contests, portable or mobile operation, can have some fun making his own QSL cards by using custom-made rubber stamps. Most large cities have rubber-stamp dealers; the names of dealers who specialize in this area can usually be found in the classified section of *QST*.

Usually, it's a good idea to use two stamps, one of which has the call in large letters, and another with slightly smaller type for the contact information heads. Actually, I use three stamps for my QSL cards. One has my call in large letters; I also use this stamp on station records and to identify station property. The second stamp contains my name and address. The third is the QSL body which contains such things as band, mode, time, and equipment. This is the largest and most expensive of the three, but it is never outdated and can be used forever.

Routine cards can be made using regular government post cards. However, a little experimentation with colored cards and ink can produce a handsome personalized card.

— *Alex. F. Burr, K3NKX*

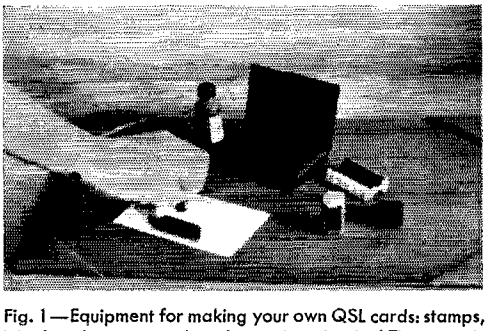


Fig. 1—Equipment for making your own QSL cards: stamps, inked pad, paper stock and some imagination! Ths stamp is freshly inked and then applied with one firm motion to produce a neat, clear impression.

RUBBER EQUIPMENT FEET

OFTEN it is necessary to put feet on equipment to keep the unit from scratching desk tops, etc. Most commercially available rubber or plastic feet do not prevent slipping on slanted surfaces and almost all of them require the drilling of holes for mounting.

Rubber matting, normally used for covering floors and stairs, can easily be cut with scissors into squares, strips or any desired shape. Attached to the equipment bottom with rubber cement, the treads prevent slippage and, at the same time, protect other surfaces from scratches.

— *Bill Johnston, WA6MCU/5*

COMMUNICATOR SCREWDRIVER

MANY owners of early Gonset Communicators have found it difficult to locate a screwdriver convenient to use on the transmitter controls. I have found that a 3AG fuse holder stem will fit over the shafts and provide the necessary leverage to turn the shafts with ease.

— *Robert Coviello, K1WNK*

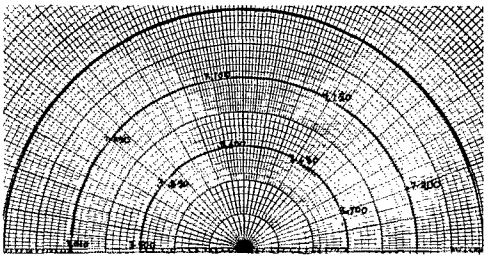


Fig. 2—Polar graph paper makes dial calibration easy.

EASY DIAL CALIBRATION

THOSE wishing to calibrate dials might be interested, as I was, in using polar graph paper. Push the dial shaft through the polar paper and then mark calibration numbers and points on the appropriate circles. In my opinion, the result is a much better-looking dial than that made by hand on a blank piece of paper.

Polar graph paper can be found in most college book stores, or a package of 20 for about 20 cents can be obtained from the National Bank Book Co., Holyoke, Mass.

— *Brian H. Alsop, WA2KSD*

STRENGTHENING THE "LIGHTWEIGHT" QUAD

FOR the benefit of those living in high-wind areas, the lightweight quad structure described in our article in the June 1964 issue can be strengthened materially, without adding noticeably to the weight, by making the vertical spreaders entirely of aluminum conduit. Two pieces of conduit will be required for each vertical spreader, since a standard length is 10 feet. Couplers for joining conduit sections are available at electrical shops. Suitable insulators must be provided, of course, at the points where the quad loops are attached.

As pointed out by WØAIW,[1] the horizontal spreaders should be broken into insulated sections, but these spreaders may also be strengthened by minimizing the lengths of the dowel sections, and increasing the lengths of the conduit sections to compensate.

— *WA4FRY and K4AVU*

[1] Bergren, "The Multielement Quad," *QST*, May, 1963.

(*Continued on page 182*)

YL news and views

CONDUCTED BY JEAN PEACOR,* K1IJV

"How pleasant it is, at the end of the day,
No follies to have to repent:
But reflect on the past, and be able to say,
That my time has been properly spent."
— *June Taylor*

WHERE do you find the time to get on the air? How often you hear such words from those who just don't understand. Present day trends tend toward trying to find ways in which the increase of our leisure time can be better spent. The ideas of many YLs in amateur radio could greatly add to any such leisure time reports. Looking behind the scenes at the goings on in a typical YL's radio shack would disprove a few current theories.

YLs in amateur radio are a prime example of the truth that the busier a person is, the more you seem capable of undertaking. A basic ingredient for this is enthusiasm, and lady hams appear to have this in abundance. Just how does she find time to be on the air so much? When television rigs become commonplace, you will see!

Shown gathered at the Walla Walla, Wash. club station, W7DP, in September are many of the Minow Net members. (l. to r.) Back row: K7MRX, K7VHN, K7RBC, K7RBE, K7RAM. Front Row: W7IXR, W7FDE, K7PVG, K7KSF, K7MSF, W7WMS. Vicki Raymond, K7VSG, their newest and youngest member (a high-school freshman) was busy in a ball game at the time of the picture.

Can you concentrate on more than one thing at a time? Ask the YLs of the ham bands. Depending upon the location of each YL's radio shack, it's unbelievable what these gals accomplish while enjoying the pleasurable company of wonderful radio friends the world over. All that's essential is a little preparation of the radio shack with the necessary tools of the day, depending upon the job to be done. Then, as you check into an interesting net or *QSO*, menial household tasks cease to be chores. Some fine new creations have also been completed through this same process.

Snow in California? It sometimes happens! That compact car includes mobile gear and yet everyone fits, even 6-ft., 4-in. Van, WA6HUW, OM of Ruth, WA6RCR, who's not new to these YL pages. (see QST, April, 1964)

It would be interesting to know just how many rooms have been painted or papered, windows made gleaming, floors waxed, rigs polished, laundering completed and the like through this fashion. You've heard YLs appologize for being a second slow in turning the switch because they were leaping from work on a braided rug on the floor to the operating position. That's but one of countless projects undertaken behind the YL ham scenes.

Then there are those fortunate enough to have kitchen rigs! Not only are their meals always on time, but their reports of the many favorite holiday recipes which are concocted effortlessly as they converse with all parts of the world provide a rather unique drooling corner.

In this busy holiday season, some fine gift making ideas can be gleaned in listening to the gals. Sweaters, socks and mittens are being assembled up and down many a ham band. As these YL hams reflect upon the past, it's with a touch of pride that they feel their time has indeed been properly spent.

* YL Editor, *QST*. Please send all news notes to K1IJV's home address: 139 Cooley St., Springfield, Mass.

Q R D

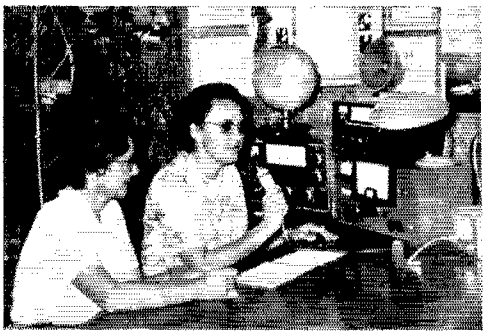
DX fans the world over would relish the opportunity to some day actually meet those radio amatures whose contacts have pleased them so much. Such a lifelong dream was fulfilled this past summer for Ruth Jank, K5OPT, and her OM, W5EJT, when they spent a month visiting Europe and many of the hams they have talked with via the DX bands.

Ruth had the privilege of talking with the YLs on a German YL Net on 80 meters from the QTH of Ursula, DL3LS, and her OM, Heinz, DL1RA, in Remscheid, Germany. She thoroughly enjoyed conversing with many German YLs in their native tongue and had but one regret—these contacts would not count for YLCC!

Following their visit with Ursula, they travelled to Hof where they were guests of Mac, DL5AO, and his family. Mac was once stationed in San Antonio, Texas, where he and Ruth's OM had become good friends through their avid DX interests.

Mac's family continued the trip with them to Bern, Switzerland. Added pleasure and increased knowledge of what it is like to be a DX station resulted from this part of the trip when they met Anne, HB9YL, and Fred, HB9TT, also vacationing in Bern. Anne's interest in amateur radio was sparked by her OM, Fred, about six years ago when she became the first licensed YL in Switzerland. It was no easy task, as the first YL, to convince the examiners of her qualifications. It was necessary that she copy code at 10 words per minute, know the DX calls of the world, Q signals, and how to build a transmitter and receiver. Anne is now an active c.w. operator but unfortunately, for U. S. A. stations, since she and Fred live across the Alps, U.S. contacts are rare.

LX3MZ was a special call used during the WAEDC in August. DJ9SB and her OM DJ4SB, DJ9GU and DL9QY operated the station. Perhaps you QSOd Renata, DJ9SB, shown here at her home station.



Ursula, DL3LS, and Ruth, K5OPT, checking into a German YL Net on 80 meters.

No ham's tour of Geneva is complete without visiting the International Amateur Radio Club station of 4U1ITU. Here Micek, OK1WI, V. President of the club, hosted Jane and her OM. Since Micek speaks five languages, there was no problem conversing.

Now back home in Texas, Ruth and her OM have some fine vacation memories. Their lifelong dream of such a trip came true and was made that much nicer because of radio amateurs throughout the world.

We Get Letters

CQ Teenagers—

"This letter asks the question that so many wonder about. Where are the YLs? Also, is it possible there are any under 16? I have worked many YLs and I think only one has been under 30 and yet she was still an XYL. Since real honest to goodness YLs are rare, how about prompting the XYLs' daughters to get into amateur radio. Please? 88s to the YLs,

Chuck Stigberg, WA4QIT"

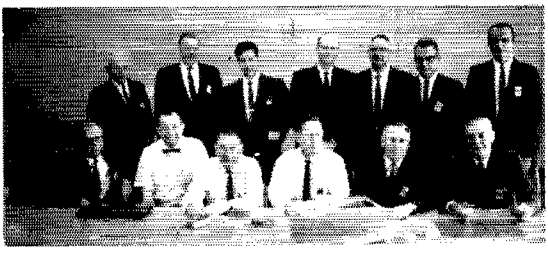
(Editor's Note) Chuck's is but one of many letters received asking for this information. Response from YLs will be most welcome!

YL Club News

Change in address: YLAP logs yet to be mailed should go to Martha Edwards, W6QYL, 2855 West Avenue M-8, Lancaster, California.

Officers for the new year for the Portland Roses were installed at their regular monthly meeting in October as follows: Pres., Beverly Welker, W7HPT; V. Pres. and Treas., Cecil Thomas, K7VCF; Secy., Edith Bennett, K7PEE; Pub. Chairman, Beth Taylor, W7NJS. QST

Strays



The Project Oscar crew invited League officials, enroute to the Pacific Division Convention, to stop in the Bay area for a briefing on progress of the Oscar III translator satellite, and an examination of the "hardware". L. to r., seated, ARRL General Manager W1LVQ; W6UF; W6MVH; W6VKP; Oscar chairman W6KAS; ARRL president W6ZH. Standing, Dr. Donald MacQuivey, visitor from Stanford Research Institute; ARRL General Counsel W3PS; W6HEK; Oscar president W6SAI; W6HB; W6LUQ; K6GSJ.

I.A.R.U. News

QSL BUREAUS OF THE WORLD

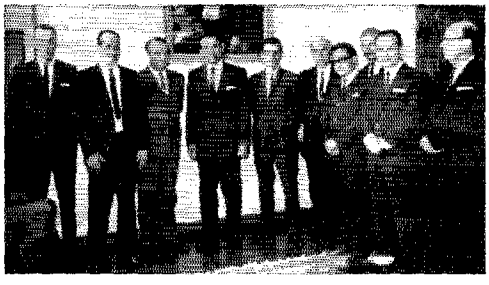
For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: *e.g.*, cards for VP8s go to RSGB in Great Britain. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL. See "How's DX?" for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most *QST*s, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

Aden: **Amateur Radio Club, RAF Khormaksar,** B. F. P.O. 69, London, England
Algeria: G. Deville, **7X2RW,** 21 Blvd. Victor Hugo, Alger
Angola: L. A. R. A., P.O. Box 481, Luanda
Antarctica: KC4AA cards go to the Office of Antarctic Programs, National Science Foundation, Washington 25, D. C. KC4US cards go to KINAP, COMCBLANT, USN, CBC, Davisville, E. Greenwich, R. I.
Argentina: R.C.A., Carlos Calvo 1424, Buenos Aires
Australia: **WIA, Box 2611W, GPO, Melbourne C.1,** Victoria
Austria: Oe. V.S.V., Box 999, Vienna 1/9
Azores: via Portugal
Bahama Islands: D. R. Thompson, VP7NS, Box 48, Nassau
Bahrein: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali
Barbados: Highgate Signal Station, Highgate, St. Michael
Belgium: U.B.A., Postbox 634, Brussels 1
Bermuda: R.S.B., P.O. Box 275, Hamilton
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: D. E. Yong, VP3YG, Box 325, Georgetown
British Honduras: VP1RL, P.O. Box 463, Belize
Bulgaria: Box 830, Sofia
Burma: B.A.R.T.S., P.O. Box 800, Rangoon
Burundi: via Congo (9Q5) QSL Bureau
Canton Island: Phil Preece, KB6CB, Postmaster, Canton Island, USPO **06 50,000,** Phoenix Group, via Honolulu, Hawaii
Cape Verde Island: Radio Club de Cabo Verde, CR4AA, Praia, **Sao Tiago**
Caroline Islands: Father Jack Walsh, Xavier High School, Truk
Cayman Island: via Jamaica
Ceylon: 4S7WP, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 13630, Santiago
Colombia: L.C.R.A., P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) U.C.A.R. QSL Bureau, B.P. 1459, Leopoldville 1
Cook Island: ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: Radio Club of Costa Rica, Box 2412, San Jose
Cuba: **ANRAC QSL Bureau, P.O. Box 6996, Havana**
Cyprus: C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: C.A.V., Box 69, Prague 1
Denmark: E.D.R. QSL Bureau, OZ6HS, Ingstrup
Dominican Republic: R.C.D., P.O. Box 1157, Santo Domingo
Ecuador: Guayaquil Radio Club, P.O. Box 5757, Guayaquil
El Salvador: YS1O, Apartado 329, San Salvador
Ethiopia: Telecommunications Amateur Radio Club, P.O. Box 1047, Addis Ababa or via APO 843, N.Y., N.Y.
Faeroes Islands: via Denmark.
Fiji Islands: P.O. Box 184, Suva
Finland: S.R.A.L., Box 306, Helsinki
Formosa: (BV1 only) Taiwan American Radio Club, USARSCAT, Box 8, APO 63, San Francisco, Calif.
France: R.E.F., Boite Postale 26, Versailles (S & O)
France: (F7 only) F7 QSL Bureau, MARS, Headquarters U.S. European Command, APO 128, New York, N. Y.
Germany: (DL2 only): G. D. Griffiths, DL2OX, 212 Hohenzoller Str., Moenchen-Gladbach
Germany: **(DL4 & DL5 only) MARS Radio Station, Hqtrs. 12th Signal Group, APO 46, New York, N. Y.**
Germany: (Other than above) D.A.R.C., Box 99, Munich 27
Ghana: 9G1CW, Hans Suess, P.O. Box 3773, **Accra**
Gibraltar: RAF Amateur Radio Club, New Camp, RAF
Gilbert and Ellice I.: Charles W. Adams, VR1A, % P. and T. Dept., Betio, Tarawa
Great Britain (and British Empire): R.S.G.B. QSL Bureau, G2MI, Bromley, Kent
Greece: George Zarafis, P.O. Box 564, Athens
Greece (SV0s only): Signal Officer, Hqtrs. JUSMAGG, APO 223, New York, N. Y.
Greenland (OX calls only): via Denmark
Greenland (KG1 calls only): All KG1F s to MARS Director, 2004 Comm. Sqdn., APO 121, N. Y., N. Y. All other KG1's to MARS Director, 1983 Comm. Sqdn., APO 23, N. Y., N. Y.
Guam: M.A.R.C., Box 445, Agana, **USPO 96910**
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, Navy 115, FPO, New York, N. Y.
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haiti, Box 943, Port-au-Prince
Honduras: Jacobo Zelaya Jr., HR1JZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541
Hungary: H.S.R.L., P.O. Box 214, Budapest 5
Iceland: Islenzkir Radio Amatorar, Box 1058, Reykjavik
India: A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1
Iran: **Amateur Radio Soc. of Iran, Armish/MAAG** APO 205, New York, N. Y.
Ireland: I.R.T.S. QSL Bureau, 24 Wicklow St., Dublin 2
Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.I., Viale Vittorio Veneto 12, Milano 401
Jamaica: Alec A. Hugh, 6Y5AII, 38 Brentford Road, Kingston 5
Japan (JA only): J.A.R.L., Box 377, Tokyo
Japan (KA only): F.E.A.R.L. -M-, APO 925, San Francisco, Calif. 96525
Johnston Island: QSL Bureau, APO 105, San Francisco, Cal.
Kenya: RSEA QSL Bureau, Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Officer, U. S. Forces in Korea, APO 301, San Francisco, Calif.
Kuwait: Alhaf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: Varoujan Calinian, OD5CS, P.O. Box 4818, Beirut
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber, Esch/Alz.
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): P.O. Box 587, Tananarive
Malawi: **7Q7RM, P.O. Box 472, Blantyre**
Malaya: QSL Manager, M.A.R.T.S., Box **777,** Kuala Lumpur

Malta: R. F. Galea, ZB1E, "Casa Galea," Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 444, Navy 824, FPO, San Francisco, Calif.
Mauritius: Paul Caboche, VQ8AD, Box 467, Port Louis
Mexico: L.M.R.E., P.O. Box 907, Mexico 1, D.F.
Midway Island: Midway Navy 3080, Box 23, KM6CE, Naval Security Group Activity, FPO, San Francisco, Calif.
Monaco: Pierre Anderhalt, 3A2CN, 19 rue Grimaldi
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: A.A.E.M., P.O. Box 2060, Casablanca
Mozambique: CR7LU, P.O. Box 161, Beira
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles (Aruba), VERONA, P.O. Box 392, San Nicolas, Aruba, Netherlands Antilles
Netherlands Antilles: (Curacao), P.O. Box 383, Willemstad, Curacao, Netherlands Antilles
New Zealand: N.Z.A.R.T., P.O. Box 189, Wellington
Nicaragua: **C.R.E.N. QSL Bureau, Box 925,** Managua
Nigeria: Dr. M. Dransfield, 5N2JKO, Agricultural Research Station, Samaru, Zaria, Federation of Nigeria
Northern Ireland: via Great Britain
Northern Rhodesia: **See Zambia**
Norway: N.R.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1
Nyasaland: **See Malawi**
Okinawa: O.A.R.C., APO 331, % Postmaster, San Francisco, Calif.
East Pakistan: Mohd, AP5CP, Tiger Amateur Radio Club, Dacca Signals, Dacca 6
West Pakistan: Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore
Panama, Republic of: L.P.R.A., P.O. Box 1622, Panama City
Paraguay: R.C.P., Casilla de Correo 512, Asuncion
Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
Peru: R.C.P., Box 538, Lima
Philippine Islands: P.A.R.A. QSL Bureau, 1546 Requesens, Santa Cruz, Manila
Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 1
Portugal: R.E.P. Rua de D. Pedro V., 7-4°, Lisbon
Rodriguez Island: via Mauritius
Roumania: Central Radio Club, P.O. Box 95, Bucharest
Rwanda: via Congo (9Q5) QSL Bureau
Samoa (American): Clark Browne, KS6AX, Comm. officer, Government of American Samoa, Pago Pago
Saudi Arabia: HZ1AB, **7244th ABRON-COMM.,** APO 616, New York, N. Y.
Scotland: via Great Britain
Senegal: Ch. Tenot, 6W8BF, P.O. Box 971, Dakar, or via REF (France)
Sierra Leone: **Radio Society of Sierra Leone, P.O. Box 907, Freetown**
Singapore: QSL Manager, P.O. Box 777
Somali Republic: Box 397, Mogadiscio
South Africa: S.A.R.L., P.O. Box 3037, Cape Town
Southern Rhodesia: R.S.S.R., Box 2377, Salisbury
Spain: U.R.E., P.O. Box 220, Madrid
St. Vincent: QSL Bureau, P.O. Box 142, St. Vincent, West Indies
Surinam: QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo
Sweden: Sveriges Sandare Amatorer, Enskede 7
Switzerland: U.S.K.A., Buron/ LU
Syria: P.O. Box 35, Damascus
Tanganyika: P.O. Box 2387, Dar es Salaam
Trinidad and Tobago: P.O. Box 756, Port of Spain, Trinidad
Uganda: R.S.E.A. QSL Bureau, P.O. Box 3433, Kampala
Uruguay: R.C.U., P.O. Box 37, Montevideo
U.S.S.R.: Central Radio Club, Box 88, Moscow
Vatican: HV1CN, Domenico Petti, Radio Station, Vatican City
Venezuela: R.C.V., P.O. Box 2285, Caracas
Virgin Islands: Richard C. Spenceley, KV4AA, 16 Commandant Gade, Charlotte Amalie, St. Thomas
Wales: via Great Britain
Yugoslavia: S.R.J., P.O. Box 48, Belgrade
Zambia: **Radio Society of Zambia, P.O. Box 332, Kitwe**
Zanzibar: via Tanganyika QST

A devoted group of Swiss hams spent much of their free time and holidays this past summer operating this neat station sponsored by the Radio-Amateurs of Switzerland and located at the Swiss National Exposition. A great many foreign amateurs signed the guest register and many non-ham visitors from all over the world had their first view of an amateur station in action.



The signing of the recent reciprocal operating agreement between the United States and Costa Rica was one of the landmarks in U. S. amateur radio history and those present at the ceremony were obviously pleased with their accomplishment. Pictured at the signing in Costa Rica are:
Leslie Boss—TI2QKX—ex W4QKX
Lic. Francisco Urbina—Minister of the Interior—Republic of Costa Rica
Lic. Daniel Oduber—Minister of Foreign Affairs—Republic of Costa Rica
Hon. Raymond Telles—U.S. Ambassador to Costa Rica
Sydney Sasso—TI2SS—Secretary of the Radio Club de Costa Rica—TI2SM
Lic. Rolando Angulo—TI2RAZ—President—RCCR
Hon. Philip Raines—Deputy Chief Mission—U.S. Embassy
Humberto V. Perez, TI2HP—ex-President—RCCR
Luis H. Andrez—Chief of Radio Department—Govt. of Costa Rica

MEMBERSHIP CHANGES OF ADDRESS

Four week's notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of *QST* without interruption.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

HOW ABOUT AN ARPSC FORUM?

At the National Convention in New York City last August we had some pretty good public service meetings. One in particular brought quite a few questions, and had the meeting not been cut off because of lack of time, there probably would have been many others. One young fellow collared us afterward (when we were on our way to make another meeting) and fired several questions at us in machine-gun fashion. We remember giving him hurried answers, but there just was no time to go into as much detail as necessary to give him full and complete answers. We made a mental note to send him further details by mail.

But mental notes (in some mentalities, at least) fade quickly. A couple of weeks later, then, we were delighted to receive a letter from this same young amateur (WA2VKU) complimenting us on the conduct of the meeting, proposing a monthly "ARPSC Forum" as a part of this column, and giving us a few questions to start off with.

The idea kind of tickles our fancy. We reserve the right to withhold from print those questions which are already specifically answered in recent articles (we'll answer them by mail, of course), but some questions are basic enough and the answers informative enough to be of interest and value to our entire ARPSC operating organization. We may even invent some questions ourselves that we think need answers.

So here goes on WA2VKU's questions:

(1) In what form is "emergency power" the most valuable? This depends on the emergency situation, but the best rule to follow is, the more the better. Having a mobile you can fall back on (with its built-in emergency power) can be a great asset. Having a gasoline generator in or associated with your shack is desirable, but not usually practical for the average amateur. The ability to run low-powered equipment from batteries is easily arrived at by designing and installing plugs and jacks for your regular station equipment so that it can be run from a transistor pack or dynamotor which in turn gets its power from automobile storage batteries, nearly always available.

(2) What other specific things should be done in getting ready for an emergency? Too many even to mention fully, but here are a few: (a) Be ready for emergency lighting, so you won't have to use your emergency power for it — gasoline or kerosene lamps, flashlights, even candles; (b) have a supply of fresh water on hand; (c) have a stock of non-perishable food on hand; (d) have as complete a selection of tools, instruments and replacement parts as possible for trouble shooting in case of equipment failures; (e) most important of all, be fully trained in the kind of operating you will be faced with under emergency conditions.

(3) What steps can be taken to speed up the long bureaucratic process of RACES application? At local level, you must find the answer to this question yourself (if there is one), because circumstances vary greatly. Some state RO's have provided local RO's with forms to be filled out so that applications can meet federal government requirements through standarization. Your regional OCD office can supply you with information to assist in preparing applications. We still have a few copies of W2BGO's "Radio Officer's Guide" which is most helpful in getting RACES started and keeping it going locally.

(4) How much interface should there be between AREC and RACES? There should be more than interface, there should be overlapping to the extent of identity. RACES is a part of the AREC's job. AREC is the principal implementing force of RACES. See "With the AREC" columns in Oct. '62 and June '63 *QST*s for further discussion of this subject.

(5) To what extent can the traditional amateur "ingenuity" be depended upon in an emergency situation? Well, one argument is that we have gotten along pretty well so far, and in the past most of our emergency operation has depended mainly on just this. The opposite argument is that as well as we have done in the past, we could have done infinitely better with adequate

*National Emergency Coordinator.

W2DLP spent many hours from this position handling emergency traffic between a doctor in New York and Colombia. Thanks to his efforts, the patient recovered and was sent to New York for further treatment (see "Diary of the AREC" for details). (Newark News Photo.)

preparation and organization. Some net operation even today — operation of which the perpetrators are inordinately proud — is pitiful compared to what could be done with proper training.

(6) On the hypothesis that the amateur service is itself an emergency backup service, to what extent should its facilities and operations be further backed up within itself? As much as possible. A backup service which is nullified by one failure, whether this be of equipment or personnel, is at best an indifferent backup. Equipments should have replacements available for parts that fail, or replacement equipment. Emergency power should have alternative emergency power. Personnel should be several deep in each position, both for backup and relief purposes. Such "system redundancy" (a military term, we are told) is not always possible. Where it is, it should be kept in readiness — and this means *utilized* in training.

We haven't succeeded in dealing with all of WA2VKU's questions, but we'll continue answering them next month. Meanwhile, if you have further fodder for the answer machine, let's have it. Questions should be specific, concise, answerable without too much filling in, unique, and should have national significance if not national scope. We reserve the right to paraphrase, condense or otherwise edit. — *W1NJM.*

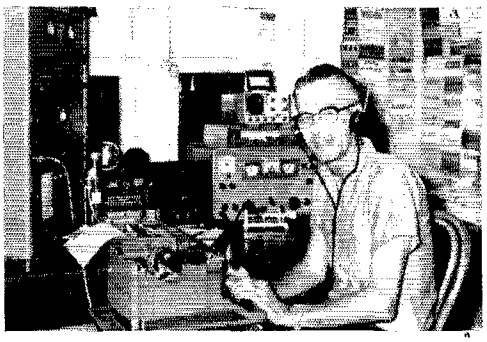
National Traffic System

In Part 1 of our series on "Some Fine Points in Message Handling" we stated that RTTY is an ideal way to handle record traffic but omitted any detailed discussion of its specialized procedures because of our view that there was not yet sufficient RTTY-traffic activity. A few enthusiasts around the country took exception to this.

We regret any choice of language that might have led to misinterpretation of intent, but the paragraph in question had one good effect — it prompted submission from the field of some RTTY procedural recommendations which should soon find their way into *QST* print.

As far as NTS is concerned, however, let us make it plain that RTTY is just another *modus operandi*, like phone (both a.m. and s.s.b.) and c.w. The system uses the mode best suited to the need, within availabilities. So far, at region, area and TCC levels the need has been filled by c.w. nets and stations, and generally speaking an excellent job is being done. In NTS we are trying to set up a *practical* public service, and this is the primary consideration. We have made a number of changes in the past, but never for the sake just of making a change or pleasing some one or some group. Any change has to be made for the sake of *improving our efficiency*. At one time attempts were made to set up a region net session on phone, but it didn't work out. At present one of the region nets is investigating the possibility of establishing a session using s.s.b. RTTY has been under consideration for use in TCC for some time but efforts so far have not borne fruit. There are a great many NTS phone nets operating at section level, conducting liaison with region through the section c.w. net or direct to the region net using phone net members who are versatile enough to perform this function.

NTS is a traffic system. There is only one NTS, in which all interested traffic amateurs using all modes work together according to a standardized plan completely described in a publication designated CD-24. When it comes to mode, we'll do the job by whatever mode it can be done best. In order to change any mode now being used for a particular job, two requirements have to be met: (1) the change has to be an *improvement*, and (2) the necessary liaison with the rest of the system must be maintained. While there are some practical difficulties, particularly with the second point, there is no doubt that appropriate use of RTTY by traffic men in NTS can strengthen the over-all system — W1NJM.



Here's Bill Watson, K7JHA, RN7 manager, ready for business. Bill is one of our better NTS managers, appointed in June, 1962. Besides being RN7 manager, he holds BPL, A-1 Op, ORS, CP-35 and an Amateur Extra Class license.

September reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
EAN	30	1625	1.082	54.2	98.3
CAN	30	1203	.873	40.1	100
PAN	30	1438	.848	47.9	97.8
1RN	54	533	.457	9.89	86.2
2RN	59	1087	1.420	18.4	99.3
3RN	60	457	.355	7.62	93.9
4RN	58	718	.466	12.4	97.3
RN5	60	1048	.467	17.5	96.5
RN6	60	991	.622	16.5	97.5
RN7	30	453	.364	15.1	91.0 [1]
8RN	59	407	.280	6.90	77.5
9RN	29	546	.652	18.8	95.7[1]
TEN	60	614	.554	10.2	77.3
ECN	29	161	.252	5.54	81.6[1]
Sections[2]	1430	8576			
TCC Eastern[3]	120	599			
TCC Central[3]	90	1004			
TCC Pacific[3]	120	953			
Totals	2078	22,413	2RN	9.56	CAN
Record	*1829*	*21,234*	*1.183*	*15.4*	*100*

[1] Region Net representation based on one session or less per day.

[2] Section nets reporting (52): VSBN VSN VN (Va.); OQN (Ont.-Que.); NJN NJ6&2 NJPN 16N (N. J.); BUN (Utah); Nev. Net; OZK (Ark.); WFPN (Fla.); AENB AENH AENM AENO AENP (noon) AENP (eve.) AENR AENT (Ala.); OSN (Ore.); OSSBN (Ohio); SCEN (S. C.); EPA PTTN PFN (Pa.); MDDS MDD (Md.-Del.-D. C.); TN ETPN TPN TSSBN (Tenn.); NCN (early) NCN (late) CCEN THEN NCSSBN (N. C.); SCN (Calif.); CN (Conn.); GBN (Ont.); VT-NH CW (Vt.-N. H.); WSBN (Wis.); NTTN (Tex.); MSPN (noon) MSN MJN (Minn.); SGN (Maine); NLI NLS VHF NYCLIPN (N. Y. C.-L. I.).

[3] TCC functions reported, not counted as net sessions.

We broke all but one record this month. It looks as if things are starting to pick up after the summer lull. An early speculation on NTS performance in the SET indicates nothing less than an excellent showing.

K1WJD summarized condx this month in this fashion: "Worst month of the year; September combines the QRN and high noise level of summer with the long skip and deep fade outs of winter." WB6JUH sez PAN is on the up swing but representation could be a wee bit better. After a 19 month period, 2RN has only missed one session. K3MVO is already talking about long skip; it scuttled one of the 3RN sessions. K5IBZ praised his alternate liaison stations for doing an excellent job. WB6BBO has awarded RN6 certificates to WA6VPN, W6YKS and W7SHY. K7JHA sez traffic is up and the Mont. and Idaho representation are increasing. W9QLW awarded a 9RN certificate to K9W1E. WØLGG sez TEN has finally got a Manitoba rep. and the students have left but the farmers are back on the air. ECN is showing a slow but sure improvement sez VE3BZB.

One of our YL Region NTS managers is Louise Moreau, WB6BBO (egad, what a call on c.w.!). Lou is well known on both coasts not only for her traffic handling ability but for her collection of antique telegraph keys. In addition, Lou holds ORS, RM, CP-30 and A-1 Op.

Transcontinental Corps — W3EML sez there has been some shifting of skeds with some new stations added to the roster and things are going well. W4ZJY awarded a TCC certificate to KØFPC and special thanks to WØOHJ. As in the Eastern Area, there is a shifting of skeds, etc. but there are plenty of stations on the waiting list.

September reports:

Area	*Functions*	% *Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	120	80.8	1786	599
Central	90	91.1	1522	1004
Pacific	120	78.3	1906	953
Totals	330	80.3	5214	2556

The TCC roster: Eastern Area (W3EML, Dir.) — *W1s* BGD EMG NJM, K1NEF, *W2s* GVH ZVW, K2UAT, *WA2s* BLV KQG WLN, *W3s* EML NEM, *K3s* FHR MVO, W4DLA, K4VDL, WA4PDS, *W8s* CHT ELW, K8NJW, W9PTZ/2. Central Area (W4ZJY, Dir.) — W4ZJY, W5PPE, *W0s* CXY DYG HAS JOZ VAY ZYK, *WA9s* AUM BWY, K9DHN, *WØs* BDR OHJ, KØFPC.

Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
HBN	30	455	493
North American SSB	26	449	409
7290	44	1043	559
Interstate SSB	30	983	486
Northeast Area Barnyard	26	666	11
20 Meter SSB	22	756	2769

Hurricane Dora

The Hurricane Dora operation began with an SEC bulletin from W4IYT and W4MLE, SECs of East and West Florida, setting Condition One at 0230Z Sept. 8. Condition Two became effective automatically when the Weather Bureau put up hurricane warnings at 1700Z Sept. 8. An SEC bulleting alerted Net C at 2330Z and Net D at 0300Z Sept. 9. All Key Cities were alerted also at 0300Z. Almost immediately there was a burst of message handling for Red Cross which was moving people into the threatened areas and most back-up areas as well. Net C had been handling preliminary c.d. traffic even during Condition One as preparations were made for the storm's arrival. K4DAD, EC for the Key Cities of Tallahassee and Pensacola did an excellent job even though he had been appointed only a short time before the emergency.

Neither Net C nor D was loaded with much traffic in terms of their capacities and Net C had less problems than in Hurricane Cleo with stations calling to report that they were standing by in case needed.

Condition Three was established at 1200Z Sept. 10, with the simultaneous alerting of Net B to be covered by the Key Cities of Pensacola, Tallahassee, Tampa, and Miami to receive incoming welfare traffic (our temporary precedence P2) to be cross-tiled to other nets through the Key City intercom system. Even though some of this traffic was subsequently put on Net C for delivery because of the light traffic load, there was no problem. Net B took the QRM and confusion off of Net C, leaving it to operate as a Florida circuit, as it had in Cleo.

Nevertheless, Net B had a bad go of it. When the net shifted to its 40-meter frequency at 1400Z, conditions were very bad and there was little traffic. WA4FJF, NCS, closed the net to reopen at 2300Z on the 75-meter frequency, but traffic picked up again and the net was reopened about 1800Z.

Under the standing procedure in the Florida AREC plan, the Key City of Jacksonville was relieved entirely of Key City duties because it was, itself, in a disaster area. Telephone lines were going out and W4WHK, on emergency power, checked into Net D every two hours to pick up traffic and clear his own. Other stations on emergency power remained continuously on Net C, especially WA4TEG at state civil defense headquarters and Duval County EC, W4GUJ. Several mobiles were active during the storm, reporting fallen trees, damaged power lines and similar road hazards.

At the request of the W. Fla. SEC, W1AW bulletined a request that P2 traffic to Florida be routed via NTS rather than directly into the emergency nets which were handling outgoing traffic and statewide communications. At 0620Z, Net B manager K4NMZ advised that he was closing net for lack of traffic and that the net would reopen at 1100Z Sept. 11. A joint SEC bulletin reduced the alert from Condition Three to Two at 0700Z. Traffic continued to be light and Condition Four was finally set at 1400Z.

TCRN and WARN were activated by W3CVE and served primarily as a weather information service. Stations checked into the nets with the latest hurricane information, wind velocity and rainfall. The net remained active until emergency conditions ceased in Florida.

Those stations known to have participated are: *W4s* ATA FNE IEI IYT LUV MLE OHP OVE PIM RHZ TFL TRS TUB WRT, *K4s* COO KDN KMO SJH VFY, *WA4s* ECY HDH IJH IMC LBM LCH PDS RSQ.

Diary of the AREC

On Aug. 4 and 5, the vessel *Jon Peer*, VEØMU/MM, was caught in a storm some 200 miles off the North Carolina coast. WA4ECY was contacted on 20-meters and requested to obtain weather information and the best course to take to reach land and avoid the main part of the storm. WA4ECY contacted the New Orleans Coast Guard station and was advised that the best course for the vessel to follow would be West or Northwesterly. VEØMU reported that he was on a 30-foot craft with his wife and family and if they didn't reach land within the next 12 hours they would need assistance. This information was also relayed to the Coast Guard. By this time, WA4FMC/4 had contacted the Coast Guard station in Washington, D. C., which initiated action and in short order WA4ECY was in communications with several stations on the east coast. Stations in New York notified the Coast Guard there. K1UGX/4 in Norfolk, Va. notified naval authorities. W1BCR contacted VP9BN, a friend of VEØMU who was able to provide information as to the description of the boat and the equipment aboard. All this information was relayed to the Coast Guard. The Navy and Coast Guard attempted to obtain the bearing of the vessel with a radio direction finder but was unable to do so because of poor conditions. The *Jon Peer* was finally located by a naval vessel, aided by aircraft, and assisted to safe waters. All hands aboard were safe. — *WA4ECY.*

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On Aug. 10, the Baltimore Area AREC was activated at 1400Z for a post-hurricane simulated emergency test. By 1435Z, five members of the corps were on Chesapeake Bay in two boats. Five others stood by on frequency at their homes for relays from the boats. On the return trip to the marina, one boat lost a sheer pin and was stranded in the bay for about half an hour. Help was summoned by the disabled boat and then towed in for repairs which seemed impossible in the rough water. All activities were secured by 1700Z. Those stations taking part were: *K3s* FEQ MDL RKU SGD VBD VGX WIT WTV. — *K3SGD, EC Baltimore Area, Md.*

This has been the worst year for hurricanes in Florida since 1960 when Donna caught the boys completely unprepared. This year, however, the Florida group was in excellent shape and the operation shows it. We'll report on the operation of Cleo here, Dora elsewhere in this column and Hilda will be the subject of a separate write-up in a future issue.

Cleo was the first full-scale activation of the Florida AREC plan for a real emergency. Compared to Donna, Cleo produced only a small communications emergency. Virtually all commercial telephone, telegraph, newswires and broadcast network lines remained in operation during Cleo with the result that ARPSC had little to do.

Florida was on the alert for a total of 69 hours from 0200Z Aug. 26 to 2300Z Aug. 29. Nets B, C and D (Florida emergency nets) were alerted during the operation, each to serve a particular purpose. At no time did any net run at more than an estimated ten per cent of its traffic-handling capacity and they had two nets still unalerted in reserve. The entire Florida system probably never exceeded three per cent of its capacity.

Nets C and D were alerted by a SEC bulletin. Net C served as a c.d. circuit to aid in preliminary arrangements ahead of the storm. It also served as back-up circuit for Red Cross. Red Cross Hq in Atlanta kept a station on this net throughout the alert.

Although much damage was done, the operation was as simple as a prepared test. The only problem some of the nets had was that of stations on the outside checking in and saying they were available if needed. Those stations known to have participated are: *W4s* OVE TPW OGX WPD FNE WHK TRS LUV SHJ MLE RHK MTD SRM WPD PLE URX SRP, *K4s* KDN NMZ TMN PMO NTD NMC ANJ RNR RNS POA TFX, *WA4s* COX LBM BAW CJN JIM DED DNY NZG TBM KJF. — *W4IYT, W4MLE, SECs East and West Fla.*

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On Sept. 9 at 2125Z W2DLP heard HI4XAB calling CQ New York with traffic. W2DLP called and finally contacted him and was advised that HK2VN was on frequency with emergency traffic for a doctor in New York City. An American patient in a hospital in Santa Marta, Colombia was suffering from a bleeding ulcer and the doctors were unable to find a proper treatment to relieve the condition. W2DLP called the doctor who had treated this patient before and advised him of the condition and requested his help. For the next few hours medical information was relayed from W2DLP to HI4XAB to HK2VN. The New York doctor was kept up to date on the patient's condition and prescribed treatment. The patient's condition improved until it was safe to move him and plans were made to have him flown to New York for hospitalization and further treatment. — *W2DLP.*

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Late in September, a television station in Lima, Ohio was caught without proper communications during a remote telecast. W8DDG, K8CEP, WA8BJT and WA8CPB provided communications to aid the allignment of the microwave dishes and between the remote location and the station.

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Corrections and Addenda

On page 47, July 1964 *QST*, ZL4GA was incorrectly listed as ZL3GA.

On page 85, August 1964 *QST*, WA8GEX was listed as WA8GEY.

During the Alaskan earthquake, July 1964 *QST*, KL7ETO, K1ITU, K2KTK, *W6s* FZX OA, K6LL, W7DPK, K7OMO and K9QBJ are reported as having participated.

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Thirty-seven SEC reports were received for August, representing 17,579 AREC members. This is the same number of reports received for last year and is the all-time high for August. Membership, however, dropped a little less than 1,000 members. Those sections heard from are: E. Mass., Colo., Minn., Wash., N. C., B. C., Nev., Ind., Ala., Alta., Ohio, Maine, Okla., Va., Ark., N. Y. C.-L. I., S. Dak., N. N. J., Tenn., Mich., Ont., W. Pa., Utah, R. I., E. Fla., Ariz., Mo., S. Tex., Ga., Iowa, Del., N. Mex., E. Bay, Miss., Nebr., W. Fla., Sask. We're behind last year's record in SEC reports. How about some of you SEC's who haven't reported this year making a visible effort.

RACES News

On Aug. 5 the Jefferson County, Texas, RACES net was alerted because of turbulent weather conditions which developed into a violent electrical storm with rains and wind gusts as high as 109 m.p.h. Several mobile units were sent to the Sabine Pass area to maintain communications after telephone lines were knocked out. Weather information was correlated by the Weather Bureau and c.d. headquarters. Those stations known to have participated are: *W5s* HWA HYV MOO PJX RVF TFW ZAT, *WA5s* DBA DUG EBJ GVA HGH IPG. Mobile units: W5APX, *K5s* MJS SAC. — *W5MOO.*

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On Sept. 20, a forest fire was out of control in Napa County, California. The Red Cross had been swamped with incoming inquiry messages and with telephone lines out, except for emergency communications, RACES aid was requested. W6NOP activated the RACES group and instructed mobile units to go to Red Cross headquarters in St. Helena and the local fair grounds. Operations lasted for some eight hours with quite a bit of welfare traffic being handled both into and from the disaster area. Stations known to have participated are: *W6s* WLW PFO, K6ZZP, *WA6s* OGB YST SMK UHO IST BNR and WN6IOG. — *WA6OGB in the Silverado Amateur Radio Society News.*

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On Oct. 3, at 1400Z, North Carolina RACES activated because of severe flooding in the western part of the state. Area F Net was activated by W4GOQ and W4FUI and remained directed until the following morning. The 2 meter net was also activated to supplement the 6 meter net's activity. W4DXG was net control for the 6 meter net, operating from Black Mountain. Mobile units were dispatched to various locations to report on flood damage and relay any requests for aid from those areas. Transylvania County was completely isolated as well as parts of Macon and Jackson Counties. Those stations known to have participated in the nets are: *W4s* HHE RAD ACA VTW, *K4s* KLK UNA LJH HCU, *WA4s* CFL TKR BVW COS AVI KWC. — *W4FUI.*

California — The Los Angeles v.h.f. annual Christmas dinner will be held at the Fortune Room, 15500 Western Ave., Gardena, California on December 5, 1964, at 8 P.M. Tickets and information available from K6JJN, 7832 Jellico Ave., Northridge, California, or K6HIT, 17204 Eastwood Ave., Torrance, California.

New Mexico — The Albuquerque Amateur Radio Club will hold its annual Christmas Party December 11, 1964, at 2000 MST at the Holiday Inn, Albuquerque, New Mexico. Speaker for the evening will be Dr. E. R. Harrington, well known writer and lecturer. Meal tickets are $3.50 a person and may be obtained from Francis Fletcher, W5TLE, 3209 Maderia Drive, N.E., Albuquerque, New Mexico. Wives and friends are invited.

New York — The Federation of L. I. Radio Clubs, Inc., will hold their Hamfest December 4, 1964, at the Rockville Centre Recreational Bldg., at 8:00 P.M.

Pennsylvania — The Delaware Valley Amateur Radio Club will be holding their 10th Annual Dinner Dance on Saturday evening, November 28, 1964, at the Towne House in Media, Pennsylvania.

To the ARRL's new Newington, Connecticut address has been added the "Zip" number 06111. Use it when you write League Headquarters. The Zip code number should be placed two spaces to the right of the state.

Correspondence From Members-

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

WHAT *CAN* WE SAY?

¶ I should like to vehemently protest your September editorial comments regarding over-the-air political discussion. Already, so many amateurs confine their QSOs to the name-QTH-report-rig format that I am frequently embarrassed when asked by a newcomer, "What do amateurs talk about?" Is it demanding too much to expect that a man's interests range beyond his final amplifier tube and the local weather conditions?

As awe-inspiring as the amateur's technical contribution has been, a still more wonderful facet of our hobby is the human contact it affords. That voice from the revr. isn't just a mechanical signal reporter (although it often sounds that way); it is another human being with individual tastes, ideas, beliefs, and political outlooks. I would urge all fellow hams to make the little extra effort and get to know the other fellow. If he is politically minded (and who isn't in an election year) so much the better! — *W7AYC.*

¶ I am considerably provoked by *QST*'s attitude concerning our candidates for president. In the September issue of *QST* you sanctimoniously, in your editorial, disclaim partisanship and then proceeded to laud Senator Goldwater. I too would like to see a ham in the White House, but not just because he is a ham. In the October issue John Troster's thinly worded and veiled parable was completely tasteless. I find such actions by the ARRL and *QST* personally and generally distasteful.

I am sorry that these articles were printed at a time when such letters as this cannot be published prior to the election so that my feelings and the feelings of countless other hams can be voiced by *QST* in the letters section.

If *QST* had openly taken an editorial stand, I would then respect this position although I would not approve of it. By your sanctimoniousness you have ruined your approach and you do not voice the amateur radio code! — *W6QCI*

¶ If it is true that radio amateurs "avoid on-the-air discussions of political campaigns and controversies" by tradition, as stated in your September editorial, it must also be tradition that amateurs shall have sterile minds. — *WB6FDV*

¶ The League, and its organ, *QST*, claims to be nonpartisan and non-political. This long standing claim is no longer valid, I fear, owing to the publication of material by and about B. Goldwater in recent months. This person is obviously a political personality who can only benefit from appearances on your pages. I do not approve of this compromise of long standing League principles.

Therefore cancel my subscription and membership. — *WB2AVI*

(EDITOR'S NOTE: *QST* will continue to report noteworthy activities in the field of amateur radio by prominent persons who are amateurs. Senator Goldwater accepted an invitation to deliver the National Convention banquet speech more than a year ago. The fact that he subsequently became a presidential candidate should not — and did not — deter us from reporting his participation and his speech.)

REASON TRIUMPHS

¶ About two months ago I asked for and you sent me literature on various tower laws that were upheld by the Supreme Court and various other courts.

As I told you, I had a problem with the residents and with the local authorities in regard to my tower. After you sent me the requested documents I gave them to my father, who is an attorney. On September 10, 1964 he appeared before the Variance Committee and asked them to grant a building permit without the need for a variance. He stated that this would be an easy way out for them due to the fact that if notices were sent to local residents there would not be enough room to hold them all. He also mentioned that so-called responsible residents, such as a doctor and a stockbroker, threatened to burn the house down and put a .22 bullet through the window. The Variance Committee said they would consider this matter but, in the meantime, I should continue using my tower "in good health."

On October 1st, I received a copy of a letter from Paul Belden, attorney for the Variance Committee, advising that it was permissible for me to erect a tower without the need for a variance because of the *Wright v Vogt* 7 *N.J.* (1951) decision that we cited. — *WB2KLH.*

HAM PIONEERS

¶ It was with great regret that I read today in the local paper of the passing of John L. Reinartz. I have his autograph on the A.R.R.L. convention program held at Hotel Bancroft, Worcester, Mass. in 1925. He gave a talk at that convention. I also was initiated into the original R.O.W.H. at that same convention. That was something to remember with all the characters QRM-QRN etc.

I made a "Reinartz" tuner of his design copied from an original that he made for 1ZE-1HAA, the late Irving Vermilya. I also have an American Flag of silk about 3½ in. × 6 in. autographed by him, John L. Reinartz, Etah, Greenland, when he was radio op. on the *Bowdoin*, Cdr. McMillin's schooner, on a trip to the north pole areas. I wonder if any other O.T. have one of these flags? — *W1AVY.*

KOREAN LICENSING

¶ Perhaps the following information on amateur operation by U.S. military personnel in Korea will be of help to someone about to make the trip over here. The policy is laid down by United States Forces Korea Policy Directive 9-8. Briefly, a statement from the amateur operator's commanding officer and a photostat of the FCC Conditional

Class or higher license is required for operator authorization. To obtain station authorization an amateur must hold or apply for operator authorization, as well as include a statement from the installation commander on which the station is to be located. Power is limited to 100 watts antenna power, and bands are 100 kc. out of each of the h.f. bands. Third-party traffic is expressly prohibited. Communication with any communist country is prohibited. Two copies of the station log are required to be forwarded monthly, showing all operation for the month. C.w., a.m., d.s.b. and s.s.b. are the only types of emissions authorized. Calls with an HL9 prefix are assigned to all U.S. military amateur stations. Hope this information will prove helpful to some amateurs trying to decide whether or not to ship their rig to Korea. — *K3BUZ*

NEW OPERATING AWARD?

I heartily subscribe to your plea for recognition of good operators as reflected in your "Operator of the Month". Deserved praise merits recognition of which too often there is little. Similarly, there is need for equal recognition for the "Lid of the Month."

There certainly is far too much of the kind of operating which deserves the raspberry instead of the orchid! I suggest you initiate a similar award to call attention to those who should mend their ways. — *W2PTM*

KNOW THE RULES?

Heard a fellow identify his station DE K2XXX/foc on forty the other night. He said foc stood for some kinda club; must be "foolish operators club" because DE K2XXX/foc is an illegal procedure for identifying an amateur radio station. — *W4YNG*

TEEN-COLUMNS

In reading other magazines they always have a column that fits a certain personality. For instance, in your own magazine you have columns for the DXer, the YLs, VHF, Novice, etc. Why not start a teen ham column. Maybe this thought has been neglected. Why not have a DXCC club exclusively for teen-age hams. Of course, possibilities are unending. You would be surprised on the number of hams under 20 years old. Come on, fellows! Let's see your views! — *WA0FQF*

HAM IMAGE

I feel obligated to comment upon the article by Marcus A. Felt, W2GYQ, concerning the amateur's status as ambassador at large. I hold his opinions to be of great importance as I have written similar articles for our local chamber of commerce publication.

Mr. Felt's article was superb, both in style and in the idea which he presented. All too often, I feel, the pursuit of DX is viewed as purely an end in itself with scarce recognition given to the opportunities this facet of our hobby presents. Our image as a nation is displayed on the ham bands in full view of our neighbors abroad. If we appear rude or disrespectful of others, our image is portrayed in like manner.

Even though DX contacts are sometimes quite brief, one always has an excellent opportunity to add a personal message to his QSL card. This will allow the DX station to know you better and may even net you a rare QSL. — *WA0FPQ*

AD OR SUBTRACT

May I register my keen disappointment with your acceptance of Galaxy Electronics' ad, page 121, October *QST*. I have seen pictures like this before, but not in my ham journal.

I enjoy *QST*. Though I work the lower bands, I believe that I have read everything that Ed Tilton has written since I became a League member. I appreciate the excellent construction articles of W6TC, and once in a while I chuckle with John Troster.

But, OM, in the whole journal, there is nothing that I read more avidly than the ads. I like to see what is coming into the market, shop for new gear, see that latest hot-shot answer to the QRM and on and on. But, let's leave the cheesecake to those who need that sort of thing to sell their mags. Please, may this not be the first of a series of similar material.

If Galaxy cannot sell their equipment on its own merits, then do not join hands with them in using persuaders to pull the wool over our eyes. — *K8UKH*

PUBLIC SERVICE OR CONTESTS ? ? ? ?

I think some amateurs should make up their minds which comes first. Recently I was talking to a friend of mine who was diligently trying to pass traffic to California. Upon getting an answer, after calling "CQ California", he asked the W6 if he would handle some traffic. The W6 immediately said he wouldn't take it because he was in a contest. Personally I think that's a pretty poor excuse.

In the first place, my friend was calling CQ California (which should have given some hint as to traffic) and in the second place how would he know if the traffic was extremely important or maybe even an emergency, which it wasn't.

Anyway, there are so many contests a year you can't even keep track of them all, so what's 5 min. out for traffic. Personally, I can't handle enough. I think this is something a few amateurs should think about. I have nothing against contests, in fact I love 'em, but I think traffic should be first. — *W1Q1.11*

LEAGUE DECAL

The decal which was enclosed in acknowledging the renewal of my membership is beautiful.

This emblem is too nice to allow it to go unrecognized.

Whoever thought it up and whoever designed it are to be congratulated. — *W3RSB*

TECH C.W. BANDS

I am all for the incentive licensing program. But in addition to this I think that more of the 2- and 6-meter bands should be restricted to c.w. (A1) or A2.

Many Technician Class licensees are Techs. because we couldn't quite reach 13 w.p.m.

As a Tech., trying to get a code contact is quite difficult.

I include A2 operation because many transceivers are not equipped for c.w. (sending or receiving).

Here are my suggestions:

Allow the use of A1 or A2 only on 50.1 to 51.0 Mc. I am sure the rest of 6 meters can handle the other modes of transmission.

Extend the Technician and Novice 2-meter band to 144 Mc., and allow only A1 or A2, 144 to 145 Mc.

What do you think of this? — *WB2HVF*

The QSO Specialists

BY JOHN G. TROSTER,* W6ISQ

I TELL YA, MARGE, there's nothin' like a rainy Sunday afternoon for a little old-fashioned ragchewing. Good old 14 megs . . . with all that old ham spirit . . .

"Hmmmm . . . see what's on sideband here. Maybe a CQ would bring a greeting outa the ether — haw! Zero into this nice open spot near the edge . . . 'CQCQCQCQCQ from W6ISQ'."

"W6ISQ W6ISQ . . ."

"Listen to that, Marge! Got a fella on the first call. Guess the old rig still is plugging along. Or maybe it's just superior operating technique — haw! Pick the right spots for my CQs . . ."

"Listen ISQ. Get off this frequency, ya knucklehead. Why don't ya tune before ya start blabbering. This is a net frequency and clods like you are lousing up important traffic. Ya wanna play ragchew games, go someplace else — or go jump on the lousy DXers. But stay outa this end of the band that's for important messages! Beat it, ya lid."

"Ohhh, oooh my, sorry old man. Didn't hear anyone at all here. Sure don't want to bother your important patch work . . ."

"I'd better slide down a bit. Get away from the VIPs . . . Very Important Patchers. Haw. Sounds like some ragchewers down around here — but no CQs. So . . . call one in this open spot. 'CQCQCQCQCQ W6ISQ.'"

"QRX a minute, George. Some crum-bum California kw. came on there with a lousy CQ just as you was finishin'. No foolin', George, between those lousy patchers up the band and the jerks callin' CQ, ya can't have a decent ragchew no more. Now, for that W6 who just messed up this frequency . . . listen, buddy, go bellow someplace else. Stay outa this part of the band that's reserved for good decent ragchewers. Why don't ya CQ up about 200 kc. . . . make it up 300 . . . ya lid."

"Well, sorry, old man . . . and George. Just looking for a ragchew myself. Guess this is a special kind of ragchew ya got going here . . .

"Well Marge, at least the rig is getting out! Tune on down. Listen . . . not a single signal here within 8 kc. I'll zero right in the middle of this blank and — 'CQCQCQCQ W6ISQ'."

"W6ISQ . . . come on, chum, why not give that QRP mobile fella a chance? Ya tryin' to show off your mighty kw. and rotary or somethin'? Go plow into that batch of patchers or the crazy DXers. But stop clobbering these poor little mobile fellas. Beat it — ya lid."

"Well, I'd be glad to QSO a mobile — if I could hear him. Or anybody — even you. Oh well, move on down.

"Now look, Marge . . . it's wide open here. Not a sound. 'CQCQCQCQ W6ISQ'."

"Get off the frequency. QSY. Get off. QSY — you're on Gus's frequency. QSY off rare DX. Get off, ya bum!"

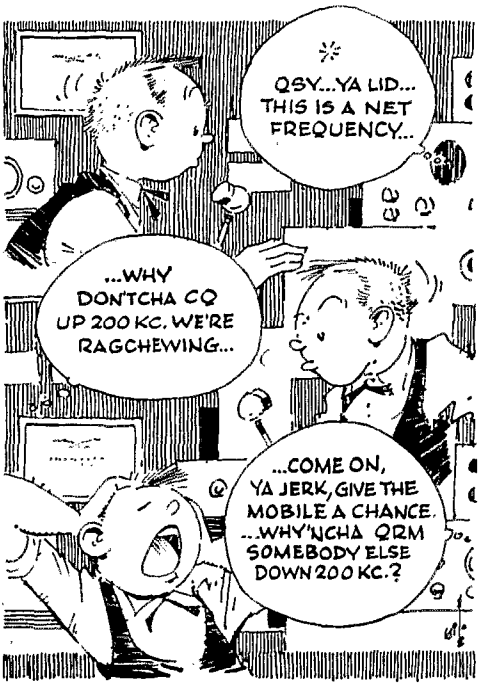
"QRZ W6ISQ? Sorry OM, don't hear Gus or anybody else on this frequency."

"Well, ya fink, don't ya know Gus is supposed to be on this frequency sometime this week? How's anybody gonna hear him if you louse things up? Go wheeze on them yawning, ho-hum ragchewers or busybody patchers. But stay away from the DX frequencies here . . . ratfink."

"Gee, if I could hear Gus, I'd call him too. Couldn't work him, but I'd call . . . haw!

"Phooey, I'm going way down. Get away from these fellas. Now look, Marge, not a peep here — right? See what happens . . . 'CQCQCQCQ W6ISQ.'"

"W6ISQ ya majerkimo. Get outa the a.m. band



with that sloppy side splatter. Nothin' but real honest a.m. radio allowed here. Keep that bird-talkin' glop off this end or I'll hetrodyne ya silly."

"Sorry OM. Just looking for a ragchew. Almost any mode would be OK at this point . . . even a.m."

"Well, ya s.s.b. you're not allowed around here with that bird talk. Go back to where ya

*45 Laurel Ave., Atherton, Calif.

come from and splash with them idiot DXers and patchers. Better yet . . . go *down* 50 kc. and call your CQ there . . . ya lid."

"OK, so I'll go down 50 kc. 'CQCQCQCQCQ' . . . *don't sign your call!* My gosh — outside the band. How about that, fella? I'd have more QQ cards than the mailman could carry."

"Nothing around here but foreign phone . . . not even c.w. Ohhhh, here's some c.w. — way down here. Well, limber up the old bug . . . guess my keyer's too fast for the boys — haw! Zero into this wide-open spot and . . . 'CQCQCQCQCQ W6ISQ.'"

"Bibble-te-bibble-te-dah-dah-dit-dit-te-di . . ."

"What's that . . . rare DX? QRZ de W6ISQ."

"Dit-dit-bibble-bibble-te-dit-dah-dah-bibble-ti . . ."

"Oh my . . . forgot. Right in the center of RTTY frequency. QSY again . . ."

"Down a few kc. and . . . 'CQCQCQCQCQ W6ISQ.'"

"W6ISQ . . . W6ISQ — W6ISQ — QSL-W6ISQ — ISQ — QSL —"

"Yiiii . . . at least ten calls and *all* for me . . . and they all want my QSL . . . I'm flattered . . . can't imagine . . . 'QRZ W6ISQ.'"

"W6ISQ . . . W6ISQ . . . QSL . . . QSL . . ."

"Ohhh, yes, I know — AHA — Award Hunters Association. Gee, I forgot . . . I'm one too! #496 . . . yeah! OK, OK boys, I'll QSL everybody — one at a time now . . . WA4 . . . K6 . . . WB2 . . . K1 . . . W9 . . . etc. . . .

"Twelve minutes' air time — and $1.24 postage! Oh well, got seven new ones! Bet even W6KG doesn't have that one county in Vermont. Oughta give him a call on the CATS net . . ."

"Maybe if I called CQ down a bit I could get a ragchew . . . 'CQCQCQCQ W6ISQ.'"

"QSY . . . QSY . . . you're on Gus's frequency . . . ya lid."

"Gus? But everybody's waiting for Gus on s.s.b. And he's not there either."

"QSY . . . ya lid."

"Oh well, QSY down some more. About out of the band . . . 'CQCQCQCQCQ W6ISQ.'"

"QSY . . . QSY . . . you're dead beat with rare SMOM Dxpedition . . . QSY . . . ya lid."

"Well Marge, there y'are! One end to the other . . . and what'd I get? Patchers, closed-circuit ragchews, a.m., RTTY, QSL, DX-ers . . .

"I tell ya, maybe the FCC oughta issue all new kinds of licenses so's they give a special "Class P" ticket to the Patchers, a "Class D" for DXers, "R" for RTTY, and all the rest. And don't worry about frequencies . . . just try and inch into another piece of the band. Pow! You heard 'em! Them fellas are patrolling their bit better than all the FCC monitors put together.

"Yeah . . . well . . . it's happening all over, Marge . . . even here. Guess ya just gotta be a *Specialist* these days." QST

NEW BOOKS

A Programmed Course in Basic Electronics, by the Staff of Electrical Technology Department, New York Institute of Technology. Published by McGraw-Hill Book Company, 330 West 42nd St., New York, N. Y. 10036. 416 pages, including index, 7¼ by 10 inches, paper cover. Price, $6.95.

A Programmed Course in Basic Transistors, by the above staff. 473 pages, including index. Price, $7.95.

A programmed course is a method in which the information you acquire has been arranged so that you also participate in the instruction. This method is called programmed learning, and is a different and interesting approach to study. Either you study each question and attempt to answer, or you simply read along as with most textbooks.

The authors assume the student has a background in electricity, and so the basic electronics book develops further electronic principles from electron emission and diodes, through all types of tubes, amplifiers, cathode followers, oscillators, superheterodynes and power supplies.

Each question is presented as a factual statement (called a "frame"), the last sentence containing a space for the key word you should have deduced. The answer is shown in parentheses preceding the next frame, but naturally, you defeat its purpose if your eye wanders ahead. On most pages there are diagrams that clearly illustrate the questions, and "information panels" that further clarify groups of questions.

The book on basic transistors takes you from semiconductor fundamentals through transistor fundamentals, parameters, equivalent circuits, characteristic curves, bias stabilization, use of characteristic curves and charts, audio amplifiers, tuned amplifiers, wideband amplifiers, oscillators, transistor construction methods, reading transistor specifications and transistor measurements. — *W1ZIM*

The Transistor Radio Handbook, by Donald L. Stoner and L. A. Earnshaw. Published by Editors and Engineers, Ltd., Summerland, California. 178 pages, including index, 6¼ by 9½ inches, hard cover. Price, $5.00.

This book presents transistor theory and related design information for the ham or hobbiest. The basics of audio and r.f. amplifiers are covered with many example diagrams. The sections on audio amplifiers, transmitters, power supplies, and receivers contain many construction projects for both the beginner and the more advanced. The construction projects include an audio compressor, a communications receiver, v.h.f. converters, a 40 meter s.s.b. transceiver, and a tunnel diode transmitter. Associated semiconductor devices, such as the tunnel and Zener diodes, are also discussed.

GE Silicon Controlled Rectifier Manual, 3rd edition. Published by General Electric Company, Auburn, New York. Obtainable from any GE components distributor or SCR Manual, Third Edition, Box A, Auburn, New York 13022. 412 pages, 6½ × 8½, paper cover. Price, $2.00.

This third edition of the popular *SCR Manual* has some new information on light-activated SCR's and gate turn-off switches. Included are characteristics, ratings and some suggested circuits for a variety of applications. Speaking of circuits, this manual also has new circuits for high-gain phase control, inverters and choppers, along with tables of circuit constants and examples of their usage. — *W1CUT*

More Anniversary Letters

From A. F. McNAMARA, EI8A,
President, Irish Radio Transmitters Society:

At the annual general meeting of the Irish Radio Transmitters Society it extends congratulations on the fiftieth anniversary of your society and pledges unanimous support in all your future aims and activities.

From OSMO A. WIIO, OH2TK,
President Suomen Radioamatoorilitto r.y.:

Best wishes from all Finnish amateurs to your members. We are very grateful for all the outstanding work your League has done and for the valuable support ARRL has given to other amateur societies. May the ARRL grow and prosper.

From EUGENE P. KLAMPP, W2PXQ,
Acting International President, NABET:

WHEREAS the National Association of Broadcast Employees and Technicians, AFL-CIO, CLC comprises a large number of technical employees in the radio and television industries, and

WHEREAS numerous members of this union have received or augmented their training by means of amateur radio, and

WHEREAS this International Executive Council of the Union recognizes the contribution the American Radio Relay League has made to all its members,

NOW THEREFORE BE IT RESOLVED that this Council goes on record by congratulating the ARRL on the occasion of its fiftieth birthday and wishes it continued success in its efforts to bring to the amateur fraternity the best magazine in the field of amateur radio, of which we are proud to be a part.

UNANIMOUSLY ADOPTED

From RUDOLF RAPCKE, DL1CA,
President of Honor of D.A.R.C.:

On occasion of fiftieth birthday of A.R.R.L. let me congratulate you with cordiality and best wishes for future!

D.A.R.C. and its 15,000 members know very well what fraternity of US-Amateurs in Region II of IARU has done for us in time past — with much thankfulness. Ten years as president of whole DARC and five before of British-Zone of Germany showed me during Conferences and on many other occasions what friendship is between short wave amateurs.

I personally worked on sparks since 1908 and have been associate member of ARRL — I think — since 1924 (except wartime). That means nearly 40 years of friendship with your staff. Last, not least, I had much opportunity of personnel entertainment with W1BUD, W6ZH and W1LVQ and many others in last years. Result was that we knew that amateurs of the whole world have to stay together.

Referring to your last success let me also congratulate for the new Inter American Union of IARU Region II ("It seems to us" June *QST*).

International work of amateurs, which knows neither differences of nations, races, religions, nor boundary-lines, working together in friendship and freedom, shall ever be a fundamental rule of our activity!

From HENRY L. WILSON, EI2W,
past President Irish Radio Transmitters Society:

My heartiest congratulations on fifty years of solid progress and achievement for amateur radio.

From ALBERT COVARRUBIAS Z.,
CE3TV, President, Radio Club de Chile:

Por la pte. nos es grato saludarle muy atte. y hacerle llegar por estas lineas, las sinceras felicitaciones del Directorio del Radio Club e Chile, comotivo del 50 Aniversario de la A.R.R.L., cuya presidencia Ua. tan dignamente dirige. —

Hacemos votos de prosperidad y felicidad y como un recuerdo de este Directorio, nos es grato adjuntarle un banderin.

From KENITI KAZII,
Chairman Japan Amateur Radio League:

Our most heartfelt congratulations on your fiftieth anniversary. We all wish you continued prosperity and good luck.

FROM W. J. D. DALMIJN, PA0DD,
President Vereniging voor Expermienteel Radio Onderzeck in Nederland:

On the occasion of the Golden Jubilee of the League, members and officials of VERON extend hearty congratulations and best wishes to the American Radio Relay League.

VERON commemorates the invaluable work done by ARRL for the general cause of radioamateurism and — as a member of I.A.R.U. — expresses gratitude for the hospitality given to HQ-IARU and the efforts bestowed on IARU-matters.

From G. M. C. STONE, G3FZL,
President Radio Society of Great Britain:

The President and governing Council and members of the Radio Society of Great Britain send heartiest congratulations to the American Radio Relay League on its fiftieth anniversary. May the many past achievements form a sound foundation for the future and may the bond between the League and the Society become even closer in the years to come.

From ANDRES EBERGENYI B., XE1LA,
President Liga Mexicana de Radioexperimentadores:

It is with pleasure that we present MR. GEOFFREY LORD, XE1GE as our official representative to attend your National Convention.

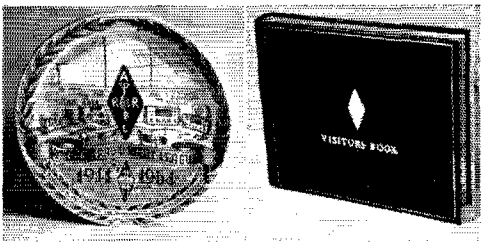
This year you are celebrating your Golden Anniversary. In view of this, we thought it particularly fitting that Mr. Lord, one of our most distinguished amateurs and founding member, with 33 years of active service in our organization, be chosen as our spokesman.

Please accept our heartiest felicitations upon attaining your fiftieth birthday. We are aware of all the tribulations you have suffered but you have come through stronger than ever. We are envious of your history and can only hope to emulate your record of successful activity.

May your National Convention, the outstanding event of this Golden Year, be a complete success. Greeting and salutations to all our amateur friends attending the Convention and as they say in Mexico, "Un Fuerte Abrazo Fraternal".

ARRL, 1959-1964 ★

The Quickened Pace



A highlight of the ARRL's Golden Anniversary has been the receipt of a great many kind words of congratulations and good will, from members, from industry, from government agencies, and from foreign amateur societies. Two of our sister societies went beyond the message stage: The guest book shown here, now in use at headquarters, is a gift of the Radio Society of Great Britain while the Netherlands society, VERON, presented the League with a beautiful handmade plate of Delft china, designed by PAØUB.

IN THE LATE FIFTIES, ham radio presented a robust picture. Each year saw new highs in the amateur radio population, records in League membership and peaks in gross receipts. Radio conditions were good, though off a bit from the middle of the decade. Amateur representatives had just brought home the bacon from another world radio conference, preserving *status quo* for the western hemisphere's frequency allocations and holding adjustments elsewhere to the bare minimum.

Yet underneath this facade, was everything as sound as it appeared on the surface? Some serious observers thought not. For instance, only 1% of the amateur population had reached for the Extra Class license — a large part of that group doing so on the "grandfather clause," at that. There seemed to be more discourtesy, loud parties and profanity. Splatter, overmodulation, key clicks could be heard without much listening. After emergency communications had been performed, there were found as many examples of deplorable conduct and procedure as praiseworthy. Most of all, there seemed to be an air of stagnation.

By ones and twos, thoughtful amateurs separately reached the conclusion that, though amateur radio was still in excellent shape, it was headed in the wrong direction. Something must be done, they felt, to turn it about, and create a rebirth of the amateur spirit.

The League was made more responsive to democratic control in 1959 by allowing the election of three additional Directors to the Executive Committee, to insure that men directly elected by a portion of the membership were in the majority on the Executive Committee. At the same time, the Treasurer and Communications Manager became non-voting special members of the committee.

In July of 1962, the Executive Committee discussed at length the problems they saw coming upon the amateur radio service. As a first expression of their concern, the committee adopted a resolution calling for proper technical operation of equipment and asking that the Headquarters staff institute a program for better understanding of technical capabilities and limitations of equipment, and of operating techniques.

Again, in January 1963, the Executive Committee spoke out, calling on amateurs to choose the proper bands for the distance to be covered, to maintain equipment flexibility, to use minimum bandwidth, to use v.h.f. for local communications and to use minimum power necessary for the communications being undertaken.

In February *QST* appeared the now-famous editorial proposing a return to incentives through reactivation of the Advanced Class license (which had not been available to new licensees since 1952) and restoration of restricted phone bands. Members were invited to comment, and comment they did! About six thousand comments — evenly divided for and against — were received between the appearance of the February issue and the meeting of the Board in May and were forwarded to the appropriate division. After a great deal of discussion, much of it informal, the Board adopted an eight-point program: modernization of the exams, reinstatement of the Advanced Class license with restricted phone band privileges, expanded educational program through *QST* and within the affiliated clubs, a more effective official observer system, joining the AREC and NTS into a new Amateur Radio Public Service Corps, *QST* articles stating the accomplishments, goals and history of the League, and observance of its specified operating principles. The remaining point, to limit the term of Conditional licensees, was set aside when the Commission took a series of steps on its own to insure ethical administration of the test, and to limit the number of future amateurs eligible for it. Discussion continued, not all of it at a high level. Some 15,000 letters were written to the League. Petitions of other groups and of individuals for variations on the incentive licensing theme were filed with FCC in Washington.

While awaiting action on that point, the League went ahead with some of its others. A series of articles designed to fill in the technical background of the average amateur, written by *QST*'s erudite technical editor, George Grammer, W1DF, appeared under the masthead, "Basics for Beginners." This was followed by a series dealing with the use of an oscilloscope by the same author. Additional audio-visual training aids have been added to the League's lending file for use by affiliated clubs. The Amateur Radio Public Service Corps has united the National Traffic System and the Amateur Radio Emergency Corps, so that the "long-lines"

function of the NTS complements the local coverage of AREC nets without destroying the individuality of each. *QST*'s reports on these activities have been given a more prominent spot well forward in the magazine, and they have been supplemented by feature articles describing effective operating technique. The Simulated Emergency Test has provided an actual operating experience wherein the two main branches of ARPSC can work together.

The special section of which this article is a part has run all during the 50th anniversary year. It attempts to drive home the fact that the League is not merely the headquarters employees, nor again the Board, but rather that the League is the whole body of amateur radio working together for the preservation and improvement of the art.

Between 1959 and 1964, eight new directors were seated. In 1960, Percy C. Noble, W1BVR, resigned as vice president and Canadian Director Alex Reid moved up. A. L. Budlong, W1BUD, announced his own retirement at year-end; John Huntoon, W1LVQ, became Secretary and General Manager of the League, Secretary of the IARU and Editor of *QST* on January 1, 1961. In September, Robert M. Booth, Jr., W3PS, 1961 president of the Federal Communications Bar Association, was appointed General Counsel of the League. In 1962 Arthur K. Meen, VE3RX, was appointed Associate Counsel for Canada, a new post. In 1962 Goodwin L. Dosland, WØTSN, declined re-nomination as president because of the pressures of his law office. Herbert Hoover, Jr., W6ZH, a long-time amateur, engineer, geologist, businessman, diplomat and Undersecretary of State in the Eisenhower administration, was unanimously elected as League president.

An early clue that amateur radio may need some powerful preservatives in the coming decade appeared in 1963, at the Extraordinary Administrative Radio Conference on Space Communications held at Geneva. There was no anticipation of proposals involving the amateur service, and therefore the U.S. did not include an advisor on amateur matters when the delegation was made up. As a precautionary measure, however, the

Countdown for Oscar I, December 12, 1961: Capt. Turner, USAF; W6SAI, Project Oscar, Inc.; W6MLZ, ARRL; WØTSN, ARRL; K6LFH, Project Oscar, Inc.

Sidelights, 1959–1964

Phone bands in Canada were expanded to read: 7.15–7.3, 14.1–14.35, 21.1–21.45 and 28.1–29.7 Mc. In the States, the phone band on twenty became 14.2–14.35 Mc. . . . Portions of the U.S. 6- and 2-meter bands were set aside for "weak-signal" work with the restriction of 50.0–50.1 at ARRL request and 147.9–148.0 Mc. to A-1 emission. . . . The Canadian rules were changed to again permit the use of any modern language by VEs so long as the basic identification was given in either English or French. . . . The League requested that a stamp commemorating amateur radio be issued in 1964, in connection with the 50th Anniversary of ARRL. . . . The Cover Plaque Award, to the author of the month as determined by the directors, was begun; the actual printing plate of the *QST* cover, chromed and mounted on a plaque, forms the recognition presented to winners. . . . The Board adopted GMT as official time in all ARRL publications. . . . VEs lost half the eleven-meter band to the General Radio Service, equivalent to the U.S. Citizens Radio Service, in the spring of 1961. The remainder 26.96–27.0 Mc. has been preserved for amateur use which continues today. . . . FCC issued its notice of proposed rulemaking on license application fees early in 1962; the fees have been collected since March 17, 1964, but litigation continues. . . . Well over a thousand members qualified as ARRL Boosters in a special membership campaign, winning special lapel pins in the process. . . . A National ARRL Convention was held in Portland, Oregon in 1962 and in New York in 1964. . . . FCC denied requests of individuals for further expansion of the 20-meter phone band, for the right to play the Star-Spangled Banner twice a day at any amateur station, for Technician operating privileges in the 10-meter band and for extensive changes in the licensing structure. . . . Conelrad monitoring was deleted from the amateur rules in July 1962. . . . The Amateur and Citizens Division of FCC was created in a reorganization of the Safety and Special bureau. W3GD became chief of the division with W4GF as a branch chief. . . . The power limit of 50 watts on the 420–450 Mc. band was dropped at ARRL request, permitting a kw. in that band except within 200 miles of certain space centers. . . . ARRL officers and staff assisted the Senator Goldwater's office in rewriting the reciprocal operating bill, and spoke at hearings. The bill finally became law in 1964. . . . Mobile log-keeping was simplified by FCC along lines earlier proposed by ARRL. . . . A cumulative index covering twelve volumes of *QST* was published in 1963. . . . A question as to whether QSL shipments in bulk violated the "private express statutes" was resolved in the amateurs' favor, so long as the cards merely repeat information already exchanged on the air. . . . Several adjustments were made to the sharing arrangements between the amateur service and the Loran service in the 1.8–2.0 Mc. band, with amateurs in every state. New rules for the administration of Novice, Technicians and Conditional Class license examinations went into effect late in 1963. . . . The League's petition for rulemaking to reactivate the Advanced Class license was filed with FCC and assigned the file number RM-499. The first amateur license to be handled by automatic data processing equipment was issued in March 1964. . . . The 1964 Board meeting reaffirmed its support for RM-499 on a 14-to-1 vote. . . . The gift of equipment from K7LJA for W1AW by Mrs. Thorne Donnelley was gratefully accepted. . . . The Post Office announced in June, 1964, that a stamp commemorating radio amateurs would be issued during the year in recognition of the League's 50th anniversary and in recognition of amateur emergency work, such as in the Alaskan earthquake. . . . The reciprocal operating bill was signed May 28, 1964; first agreement under it was with Costa Rica, in August.

International Amateur Radio Union made up a strong team of observers, including IARU-ARRL Secretary Huntoon, Bill Orr, W6SAI, of Project Oscar, Inc., and ARRL General Counsel Booth. Our representatives initially expected to return in a week or ten days, but ended up staying for the whole conference period when a serious hassle developed. The United Kingdom presented a proposal that amateur earth satellites be permitted to operate on 144–146 Mc. The United States view had been that no action was required, the Geneva regulations being broad enough to accommodate amateur satellite operation. The U.S.S.R. felt that amateurs had no business in satellite operations at all. The amateur service finally emerged with a clean authorization for amateur satellites operating in the 2-meter band, but at the same time this implied that satellites could not operate in other international amateur bands.

Prior to the space conference there had been a "Panel of Experts" study of congestion on the radio spectrum between 4 and 27 Mc. Captain Paul Miles of the United States was one of the experts; he went to the meetings armed with extensive information about each radio service prepared by a "Panel of Experts Advisory Committee" on which W1BUD and W1LVQ represented the amateur service. Fortunately, the work of the panel stayed on matters other than allocations and thus did not affect amateurs.

In 1964 it was announced that the International Telecommunications Union would hold a Plenipotentiary Conference in Montreaux, Switzerland, beginning on September 14, 1965. While the "plenipots" has the right to conduct any phase of ITU business, the major nations normally will not be prepared to talk about frequency allocations or service requirements. Instead, diplomats rather than technicians will be present to pick a new ITU secretary (to replace HB9IA/W3GG who will be retiring), to act on admission of new members, to alter arrangements for support of ITU by its members and so on.

ARRL has begun some studies in preparation for the next allocations bash, whenever it occurs, a good guess being 1968 or 1969. Morever, the Board of Directors has earmarked the sum of $100,000 for the defense of amateur frequencies.

Awareness of amateur radio as an international art increased sharply during this period. The U.S.S.R. was among several countries whose national amateur societies joined the IARU. An International Amateur Radio Club was formed with 4U1ITU as its headquarters station. IARU Region I conferences were held at Folkestone, England, in 1960 and at Malmo, Sweden, in 1963. League President Hoover and other officials have made visits to several European societies since 1962. In 1964, the Region II societies organized a division within IARU under the name Inter-American Union of Radio Amateurs, with help from IARU Region I officials and IARU Headquarters. Official delegates from the League, WØNWX for the U.S. and VE3CJ for Canada, attended the formative meeting in Mexico City in April. Antonio Pita, XE1CCP, became president of the IAURA. Both ARRL delegates were chosen for membership on the regional executive committee, with VE3CJ becoming international treasurer as well.

Countdown for new headquarters building, March 28, 1962: members of the Executive, Finance and Housing Committees approved the final plans, and set May 10 as the date for receipt of contractors' bids.

Other big news of the period included the conception, organization and development of the amateur satellite program by Project Oscar, Inc. and launching of its first two beacon satellites. A more sophisticated transponder satellite was virtually ready for launch late in 1964.

In 1958 the Board set up a Building Committee looking toward a new headquarters. The group first examined a possible move of the headquarters to the center of the U.S. It was once again concluded that business and personnel problems it would entail far outweighed possible benefits.

After extensive examination, the decision was made to construct a new building to the League's own specification, on the seven-acre W1AW plot in Newington. Members were asked in an editorial whether the League should use its reserves or conduct a building fund drive. Letter response was overwhelmingly in favor of the fund drive, and the Board authorized action along those lines. Although the campaign has been very low-pressure compared to the campaigns carried on by other institutions, in less than three years more than 90% of the goal has been reached in actual money, not merely pledges. In the summer of 1962 construction began, and was completed by the end of June, 1963.

The ARRL has emerged from the shadow of a local radio club in 1914 to a position of strength and leadership in 1964.

With a membership aware of long-term and continuing problems, with an alert and vigorous Board, supervising the activities of a knowledgeable and experienced staff, and with a building adequate for a lot of future growth, there is every indication that the second fifty years of the League will write a record even more impressive than the first.

Operating, '60-'64

THE popularity of the different bands underwent very considerable changes after World War II. The changes were due to some changes in regulations, some in technique, and of course with the changes in propagation due to the sun spot cycle. In a decade v.h.f. work had increased from about 6% to 13% of all amateur operating.

The IGY Project had terminated in '59 with praise for the amateurs taking part from the National Academy of Sciences as well as from the USAF Research and Development Command. Based on the operational v.h.f. experience of a thousand or more enrolled amateurs, data was collected on all the more unusual forms of radio wave propagation. As a 'new frontier' in operating, new v.h.f. results were now very much in the spotlight. W6NLZ and KH6UK got the League's '60 Merit Award based on their pioneering work on tropospheric propagation in '59 and '60. This was recognized by their receiving the Edison Award the following year. In July '60 W6HB and W1BU completed the first recorded two-way contacts (on 1296 Mc.) by moon bounce. The 10,000 Mc. record was extended to 265 mile two-way work that same month by W7JIP/7 and W7LHL/7. Another survey of amateur operating interest was made (by *QST* card) and the results published in 1960 showed that ten meter operation which had represented a quarter of all amateur operating in '47 was now of the order of only 12% . . . and that 75% of all operation continued in the 15- to 160-meter h.f. bands.

The 'new' 15-meter band held a well divided, c.w. and phone interest. In 1960 this amounted to about 13% of all operating interest. The twenty, forty and eighty bands held almost 60% of our operating. Phone operation by 1960 was approximately 50:50 s.s.b. and a.m. operation (80 and 40) with almost 70% of the 14 Mc. voice work by s.s.b. These three bands held almost equal interest and use by amateurs with 20 popular for DXing and 80 for traffic.

The National Traffic System continued to make performance gains. The net schedules tied together in NTS provided a systematic means by which any individual amateur might communicate for himself or others, by placing a formal message on his section net, this to be relayed through regional and area stations. "Grass roots" net operation, with League encouragement was expanded in many ARRL Sections as to the number of net sessions. Where possible these were made *daily*, instead of on a once a week basis to further the maintenance of a real message service. The number of nets registered in the ARRL Net Directory advanced from 580 in '60 to 788 in the latest (Dec. '64) directory. In this recent five year period total individual message handlings have constantly run between 1.7 and 2 million per year.

In 1961 the hospital ship SS *Hope* made its way around the world. W8OLJ/MM developed and maintained hundreds of contacts with USA, handling morale and personal traffic. But the shining highlight for '61 was the finalizing of technical and operational plans for our earth orbiting satelite. Oscar I was put in orbit December 12, '61, and Oscar II successfully orbited June 2, '62, beeping its fraternal "hi" to the world. This marked a new milestone in amateur attainment and the Project Oscar Association was awarded the '62 ARRL Merit Award.

Amateur interest in all operating contests has been extensive in recent years. The reports have been fully detailed in *QST*. Stressing emergency preparations, the annual ARRL Field Day (June) has consistently embraced the testing of more and more equipment for more and more operators. With something like 15,000 operators afield a new high was achieved in '63 with 3815 receiver-transmitter setups in operation reported for this FD weekend! The 29th annual Sweepstakes in '62 brought an all time high in the number of logs with scores almost beyond belief. ARRL International DX Contests even under the spell of the unfavorable propagation conditions seldom bring less than 1500 logs from participants. The "SS" all time record score was posted in the '62 "SS". W5WZQ scored 290,000 with 1600 QSO's in 73 sections.

K4LPW (W3DGM earlier), a many-time leader in the November "SS" and in CD Parties rolled up 141,000 phone points for Tennessee in the 1960 "SS"

W. Penna. SEC W3WRE, with OM W3WRC and K3EDV at the key of Cambria County RACES set up.

The v.h.f. Sweepstakes has come up to be one of the "big four" in ARRL contests with June and September V.H.F. QSO Parties a close second in commanding popular operating attention by v.h.f. operators. Many thousands of v.h.f.ers have made it a point never to miss these chances to pick up more states and roll up new DX records with their transmitters. Between 1500 and 1600 competing logs are received after a January v.h.f. "SS". Operation from the mountain tops is popular in the June and September activity with versatility on several bands aiding multipliers.

The Novice Roundup in this five-year period has commanded increased interest. Even though the number of new FCC licensees is substantially constant each year, current reports show a 33% increase.

In the award field, between 6500 and 7500 qualify as new members of the Rag Chewers Club with each passing year. There has been no fall off in the number of annual applications for WAS certification, even with the addition of two states to the Union. The peak year for WAS was probably '62 with 1011 issuances.

Since 1962 there has been a continuing crusade for good operating and clean signals, reminiscent of the period that followed the institution of government requirements for the use of pure d.c. plate supplies and stabilized transmitters in the early thirties.

In '63 and more recently, numerous DXpeditions put new countries within the grasp of DXers. We had the announcement of new excursions by Don Miller, V. C. Harvey-Brain, and by Gus Browning. The following DXpedition's calls will bring these to mind: FR7ZC/T FR7ZC/G, FR7ZC/J, AC5A/AC4, AC7A, W9WNV/KG6, VQ8BFA, just to name a few.

The 27th ARRL Field Day was held in 1963 and produced a brand-new high in the number of logs, the number of units afield and the scores . . . 3815 transmitters tested and representing about 5% increase from the highest previous showing on any FD.

The operating news these last twelve months records all the customary zest for operating achievement, for organized activities, contests and awards. A summary of recent developments must include that:

(1) ARRL and the Red Cross, long partners in disaster work, have renewed and updated a cooperative agreement or understanding to assist in communications planning for emergencies.

(2) The popular ARRL code practice sessions have been expanded to give *two* tape sent runs each day over a wide variety of speeds.

(3) To promote good operating procedures listings of Operator of the Month have been introduced.

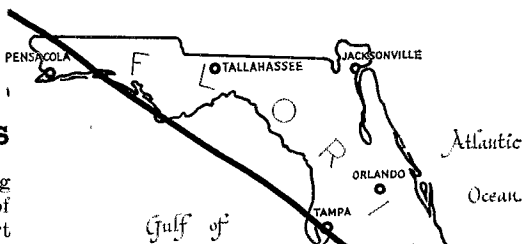
(4) The current year's Simulated Emergency Test was a combined AREC-NTS test. Results show the degree to which the Boards' combining of the Amateur Radio Public Service Corps (to have Amateur Radio Emergency Corps and National Traffic System divisions) has been bearing fruit. Progress is exemplified also in Section level exercises such as the joint NNJ AREC-NTS Test sponsored by K2ZFI, W2QNL, W2CVW as a Public Service Corps drill. The SET score ratings have steadily advanced from '57 to the present time.

(5) Our account must mention in conclusion that as '64 comes to a close there are thousands of v.h.f. operators and members awaiting the word that Oscar III, our *relay* satelite is to be orbited . . . *new* fields to conquer. With stations of every mode and frequency band participating widely in *organized* amateur operating, there's no limit to the practical communications capabilities the Amateur can boast.

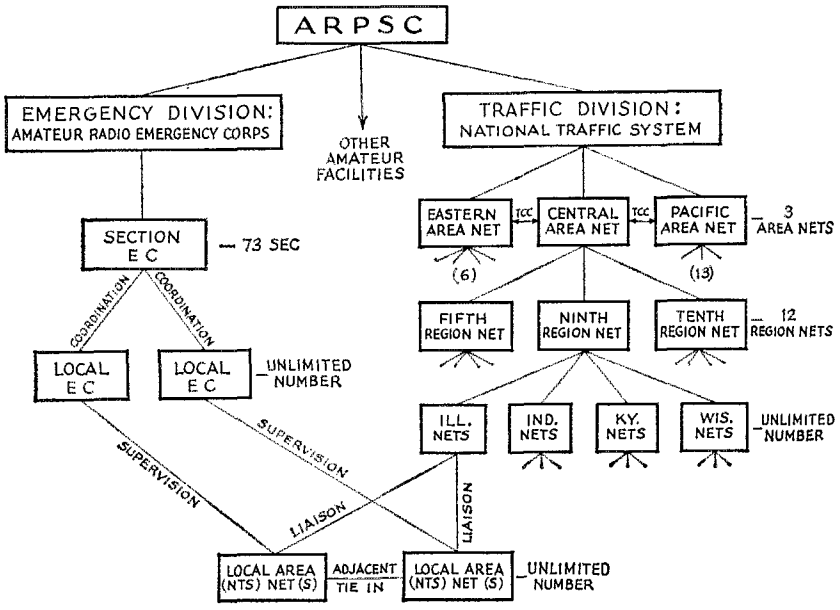
Fifty Years Emergency Communications

DURING the past semi-decade an increasing awareness of the public service values of amateur radio has come to the fore on the part of those of the fraternity not previously connected with this branch of activity. With attention focusing on the value of the amateur rather than on "how to have fun," our public service activity, both in operating and in technical fields, has come under sharp scrutiny.

While all this is happening, amateurs continue to render the communications services they have always rendered. The closing of ranks to perform this service in a fully-organized fashion and pattern augurs well for the future, but during the period from 1960 to the present only a bare beginning has been made in this direction. Let's review briefly the emergency



Among the best-organized for emergency operation is the state of Florida. In 1961, the two SECs organized a "Simulated Emergency Test (SET) to end all simulated emergency tests." "Hurricane SET" was dug from the Weather Bureau's historical files and used as an example to test AREC facilities.



This block diagram illustrates how the AREC and NTS were tied together to form the Amateur Radio Public Service Corps in 1963. While the two divisions are centralized at the top level and conduct liaison at the bottom, in an emergency situation liaison among leadership appointees exists at all levels.

communications picture during the past five years, then consider for a moment what the future holds or can hold for us.

In February of 1960, many American amateurs stationed in the area took part in communications problems connected with the disastrous earthquake in Morocco. In March and April there was extensive flooding in the midwest, and of course amateurs were conspicuous by their presence. In September we had Hurricane Donna, which made some memorable history in the annals of Florida emergency communications.

A year later, in Sept. 1961, Hurricane Carla drove inland from the Gulf of Mexico across Texas as far as Waco, where she dispersed after causing untold damage and alerting thousands of amateurs in the southwest, many of whom performed notable emergency communications deeds.

In March of '62 a widespread storm on the Atlantic Coast brought amateurs on the scene in many areas. And most readers will remember Typhoon Karen, that monster which all but wiped out our establishment on the island of Guam in November of '62.

On Good Friday, 1964, came the disastrous Alaskan earthquake which showed us so much, both good and bad, about our public service establishment. A week later a tornado ripped Wichita Falls, Texas, precipitating a communications crises in which amateurs responded nobly.

As we write this, reports of amateur operation during a series of Florida hurricanes (notably Cleo, Dora and Isbell) and one which hit Louisiana (Hilda) are crossing our desk and going into files from which source material for recording in *QST* will be taken. Right down to the present time, amateurs have made themselves felt in every and all communications emergencies, to a greater or lesser extent.

Probably one of the most significant occurrences to affect emergency preparation during the period since 1960 has been ARRL's program to upgrade the amateur service. Although our AREC and NTS organizations have been doing just this for periods of thirty and fifteen years respectively, the new drive put the spotlight on our program, gave it increased emphasis and support. Headquarters staff working on public service projects such as AREC and NTS was increased. More prominence was given these subjects in *QST*, some innovations were made, and recruiting and training programs were undertaken.

One of the more significant developments was the combination of AREC and NTS under a single heading without changing the basic and essential functions of either — the birth of the Amateur Radio Public Service Corps as a single entity in fact rather than as just a "feeling" among public-service-minded amateurs.

"Stuck away in the back pages in small print," says *With the AREC*, May '63 *QST*, "an announcement of the creation of a new entity will make no big splash." But, the announcement goes on, this is a "go-slow, take-it-easy, spontaneous progression which one falls into in the natural course, like love and mar-

riage." Most of the AREC and NTS had gradually been worked into such a program through the years, and there was no great reaction, nor was there intended to be one. The creation of ARPSC was like the hatching of an egg long in incubation. Many were pleased, some were excited, but no one was really surprised. This was a perfectly logical and natural development, long in the making. This is the spirit in which the amateur accepted the Amateur Radio Public Service Corps; and with the present emphasis on this type of activity, the concept has made giant strides.

We promised to look into the future. The ARPSC program is a positive one, and as such there is no limit to the extent of its impact on the amateur fraternity. Its two principal components, AREC and NTS, have long utilized the services of those amateurs who derive their greatest satisfaction out of doing something which is useful or valuable to others. A few have participated out of a sense of duty, though not very enthusiastically and not for long. The pure fun-seekers and hobbiests have, for the most part, gone their own way, most of them unaware of or uncaring about the needs for public service by amateurs to justify the use of frequencies.

Our crystal ball seems to show that public service operation, with ARRL emphasis and encouragement, will become a fad, a hobby in itself, a "way of life" among thousands of amateurs, increasing in number until it is a principle activity in amateur radio. ARPSC organizations will become larger but at the same time tighter, to the extent that emergency preparedness will exist not just because a net or net system drills once per week or so, but because it is continuously active in traffic handling or/and other regular public service pursuits.

A new breed of amateur will become common in our ranks — the versatile amateur, who is equally at home on c.w. or voice, s.s.b. or a.m., v.h.f. and h.f., who has RTTY equipment installed and ready to operate whenever it can be useful, who is mobile-equipped for the road and has emergency power available at home, and who has the interest and ability to use all these things to best effect under any conditions.

And because of this, along with increased technical proficiency, the amateur radio service will retain its operating frequencies.

Technical

THE technical achievements of the past few years have been so inextricably tied in with operating that there is no need to repeat them here. The main direction seems surely to be toward extending v.h.f. and u.h.f. ranges by every conceivable means, including orbiting active satellite repeaters (OSCAR).

The technical history has always been tied closely to operating. In the beginning, with spark transmitters and crystal receivers, true *communication* was largely a matter of operating cooperation (staying off the air until it was your turn). Transcontinental relays in a single evening were made possible only by full cooperation all along the way. Technical refinements in transmitters and receivers couldn't alter the basic fact that spark and crystals could never make up an efficient narrow-band communications system.

With vacuum tubes the situation changed considerably. The road toward narrow-band high-efficiency systems was opened (although it was quite a few years before the paving was completed!). New frequencies — the "short waves" — became available. Slowly the inquisitive and the adventurous pushed the road farther and farther into the spectrum, often into areas considered useless or unprofitable by other services. The curiosity led to h.f. daytime DX and other extensions of operating range (in distance and in time). When finally amateur "band" operation (as opposed to the "channel" operation of all other services except, possibly, the military) became established, the technical problem was basically that of crowding an increasing number of stations into any given band without losing communications effectiveness. This led to A1 instead of A2 code, improved receiver selectivity, transmitter stability, and s.s.b. With the exception of the d.c. regulations, a result of regulation "forced" upon the amateurs (at their request), the remainder were improvements initiated by the amateurs themselves. Without these technical advances, and some old-fashioned amateur cooperation, it would be impossible to pack as many hams as we do into the bands we have.

Getting along with other services has always been an amateur problem, sometimes social, sometimes technical. At one time interference with broadcast reception was a big threat to amateur radio, and several decades later TVI became an even greater menace. These challenges were met, not yet happily for everyone perhaps, but at least the problems are completely defined and the solutions are known.

Up To Now

DECEMBER 1915 through December 1959 — most of the life span of a fellow old enough to copy NAA or WCC before World War I — were the years covered by our ten preceding installments on the industry and its advertising in *QST*. By 1960 the amateur radio business was

well stabilized. S.s.b. was established, electronic keys were fairly common, the conventional kilowatt beam station was just another signal in DX pile-ups. Although many manufacturers brought out new models during the years of 1960 through 1964, equipment with performance exceeding even the dreams of the hams of the thirties, there were no radically new developments like single signal or s.s.b. to advertise. The only significant change in operating practice due to commercially built equipment was the sharp increase in the use of transceivers.

In fifty years of amateur radio the change in companies has been great. Firms have disappeared from the advertising pages of *QST*: more have come in. Perhaps we forget how many friends we now have in the business—such as manufacturers who are consistently developing new gear and distributors who take our old equipment in trade and accept monthly payments for the new.

Let's look at the companies who have been genuinely interested in us hams during the years of 1960 through 1963, and who in 1964 are still proving their interest through the advertising pages of *QST*:

Receivers, Converters

Ameco Equipment Corp.
Collins Radio Co.
R. L. Drake Co.
Eico
FM Sales Co.
Gonset Division
Hallicrafters
Hammarlund Mfg. Co.
Heath Co.
International Crystal Mfg. Co.
Justin, Inc.
National Radio Co.
Scientific Associates
Squires-Sanders Inc.
Technical Materiel Co.
Tecraft
Vanguard Electronic Labs.

Transmitters, Transceivers, Amplifiers

Ameco Equipment Corp.
Barker & Williamson, Inc.
Collins Radio Co.
R. L. Drake Co.
Eico
FM Sales Co.
Galaxy Electronics
Gonset Division
Hallicrafters
Hammarlund Mfg. Co.
Heath Co.
Hunter Mfg. Co.
International Crystal Mfg. Co.
E. F. Johnson Co.
Justin, Inc.
James Millen Mfg. Co.
National Radio Co.
P & H Electronics, Inc.
R. F. Communications Assoc.
Sideband Engineers, Inc.
Squires-Sanders, Inc.
Swan Electronics Corp.
Technical Materiel Corp.
Tecraft
Vanguard Electronic Labs.
Whippany Laboratories, Inc.

Antennas, Rotators, Towers

Alliance Mfg. Co.
Antenna Specialists Co.
Barker & Williamson, Inc.
B & K/Mark Div.
Barrington Specialties
Columbia Products
Communication Products Co.
Cornell-Dubilier Electronics Div.
Cubex Co.
Cush Craft
E-Z Way Products, Inc.
Finney Co.
Gain, Inc.
Gotham
Hi-Par Products Co.
Hornet Electronics Co.
Hy-Gain Antenna Products Co.
E. F. Johnson Co.
Herb Kreckman Co.
Lattin Radio Labs.
Mini-Products, Inc.
Master Mobile Mounts
Mor-Gain
Mosley Electronics, Inc.
New-Tronics, Inc.
Rohn Mfg. Co.
Skylane Products
Telrex, Inc.
Tri-Ex Tower Corp.
Vesto Co., Inc.
Webster Mfg. Co.
World Radio Laboratories

Distributors, Equipment Wanted

Adirondack Radio Supply
Aircraft Radio Industries
Airex Radio Corp.
Allied Radio Corp.
Amateur Electronic Supply
Arrow Electronics, Inc.
Walter Ashe Radio Co.
Barry Electronics

Burstein-Applebee Co.
Communications Equipment Co.
Corky's Division
Crawford Radio
Theodore E. Dames Co.
Evans Radio
Fort Orange Radio Dist. Co.
Grand Central Radio
Harrison Radio
Harvey Radio Co.
Henry Radio Stores
Lafayette Radio
Newark Electronics
Organs & Electronics
Radio, Inc.
Bill Slep Electronics
Smalley's Radio Ltd.
Trigger Electronics
Van Sickle Radio Supply Co.
Willard Wilson, Inc.
World Radio Laboratories

Vacuum Tubes

Amperex Electronic Corp.
Eitel-McCullough, Inc.
Penta Labs
RCA Electronic Components and Devices
Sylvania Electric Products, Inc.

Operating Accessories, Components, Test Equipment

Alkan Products
Allinger Mfg.
Alltronics-Howard Co.
Astatic Corp.
Barker & Williamson, Inc.
Belden Mfg. Co.
British Radio Electronics, Ltd.
Clemens Mfg. Co.
Collins Radio Co.
Cush Craft
Dow-Key Co.
R. L. Drake Co.
Eico
Electronicraft, Inc.
Electro-Voice, Inc.
Electrophysics Corp.
Fichter Electronics
Frederick Electronics Corp.
Gertsch Products, Inc.
R. W. Groth Mfg. Co.
Hallicrafters
Ham Kits
Ham World Wide Novelty Clock
Hammarlund Mfg. Co.
Heath Co.
H & M Engineering Lab
International Crystal Mfg. Co.
E. F. Johnson Co.
Kit Kraft
Kolin Engineering Co.
Lampkin Laboratories, Inc.
Linear Systems, Inc.
LTV University
McCoy Electronics Co.
Mach Electronics
Master Mechanic Mfg. Co.
James Millen Mfg. Co.
J. W. Miller Co.
Mosley Electronics, Inc.
National Radio Co.
New Products
Pennwood Numechron Co.
Productive Tool & Mfg. Co.
Punches Division
P & H Electronics, Inc.
Radio Amateur Call Book
Seco Electronics, Inc.
Shure Bros. Inc.
Technical Materiel Corp.
Telex/Acoustic Products
Tepabco
Terado Corp.
Topaz Transformer Products
Trans-Pro Labs.
United Transformer Corp.
Vanco Sales
Vibroplex Co.
Waters Mfg. Co.
Wisco
WA6DUW
W3KT QSL Service

Miscellaneous Helps

Ameco Equipment Corp.
Camp Albert Butler
Cleveland Institute of Electronics
Douglas Instrument Lab.
Editors & Engineers, Ltd.
Epsilon Records
Gardiner and Co.
Instructograph Co.
I. E. E. E.
W. J. Miller & Co.
Radio Publications, Inc.
Raytheon Co.
Teleplex Co.

Quite a list! The radio amateur is no longer the little boy in the attic. Two hundred and sixty thousand U. S. hams are now buying about forty million dollars worth of equipment, accessories, towers, beams, etc., each year.

The circulation of *QST* is now greater than 110,000. Advertising rate card No. 16 went into effect with the June 1961 issue. The cost of one page is $476.

We can be proud that more than one hundred and fifty companies are catering to our needs. It should be obvious to everyone—even to the prophets of doom who from time to time briefly emerge from well deserved oblivion—that amateur radio is here to stay and that its growth is steady and healthy. QST

Reciprocal Operating Agreement

ARRL Opposes CB Expansion

FCC Procedural Changes

COSTA RICA RECIPROCAL AGREEMENT

The first agreement between the U. S. and another country under the terms of the reciprocal operating law was reached in late summer by Costa Rica and the U. S. (See also the photograph in the IARU News section of this issue). FCC action on regulations to put the agreement into practice should be announced soon. Meanwhile, negotiations continue between the U. S. and several additional countries looking toward agreements under the newly-amended Communications Act.

ARRL OPPOSES CB EXPANSION

The American Citizens Band Association recently filed with FCC a petition (RM-661) for rulemaking asking that the Commission assign the frequencies 28.0 to 28.32 Mc. to the citizens radio service for hobby-type communications, or alternatively, that the Commission assign the frequencies 26.105 to 26.475 Mc. for that same use. The latter frequencies are now assigned to the Radio Broadcast Service for remote pick-up.

Although the chances of the matter even getting to the Docket stage seem remote, the League has filed an opposition pointing out that the transfer of 28.0–28.32 Mc. from the amateur service to the citizens radio service would be contrary to the Radio Regulations, Geneva, 1959 wherein the frequencies 28.0–29.7 Mc. were assigned exclusively to the amateur service worldwide. There are of course a great many additional comments which could be made and indeed would be made if the matter should receive formal consideration by FCC.

NO REFUNDS

The Federal Communications Commission has announced that it no longer will give refunds of amounts $2.00 or less submitted in overpayment of an application fee.

Amateurs are reminded that fees for the amateur service are these:

New licenses	$ 4.00
Renewed Licenses	$ 4.00
Modified and renewed licenses	$ 4.00
Modifications only	$ 2.00
Special calls (only in accordance with Section 97.51)	$20.00
Novice licenses	no charge
RACES authorizations	no charge
Military recreation stations	no charge

Members having questions not resolved by the above are invited to ask the headquarters staff.

EXAM CIRCLE CHANGES

Last month we reported on Docket 15,640, FCC's proposal for a change in the distance criterion for Conditional Class eligibility from the present 75-mile minimum to a 175-mile minimum. As was reported then, comments by interested persons in favor of or opposed to the proposed rule making were to have been filed by November 16. A request for a thirty-day extension of time for filing in the docket has been received at FCC; such requests normally are granted by the Commission as a routine matter. Therefore, those who want to comment but have not done so may submit an original and 14 copies of their remarks to the Federal Communications Commission, Washington, D. C., 20554, before December 16, with the expectation that the deadline will be extended until that time.

CONGRESSMEN PRAISE AMATEURS

The Hon. F. Bradford Morse of Massachusetts made an "Extension of Remarks" in the Congressional Record on September 22, 1964, to praise the activities of amateurs in general and K1GHT in particular. On October 3, the Hon. Thomas P. O'Neill, Jr. extended his remarks with several newspaper clippings in praise of K1GHT and the men of Navy MARS Net 4E4Y. Several emergency medical calls from South American amateurs have been handled recently by the Greater Boston amateurs. Work in the Alaskan emergency was also included in the remarks.

CLUB LICENSES

An application for a change in the trustee of an amateur radio club station is always considered as a new application, regardless of the time left to run on the old license. The theory behind this policy is that the club license is considered almost as a second-station license of the trustee; it carries the same expiration date as his own operator-and-station license, and he is fully responsible for its operation.

Thus, Part I of FCC Form 610 is used to apply for change of trustee, the club call is entered in Item 8, the original or a photocopy of the license being replaced is attached, and the whole business is sent with a check for $4 to FCC, Gettysburg, Pennsylvania. The club call will then be issued on a new license to the new trustee.

(Continued on page 188)

Summary of Rules—1965 ARRL DX Contest

AMATEURS throughout the world are invited to participate in the 31st ARRL International DX Competition. A certificate will be issued to the top phone and c.w. scorer in each country. For those DX stations that do not receive complete DX Contest rules (next month in *QST*) in time for the contest, here is a summary of the rules for the 1965 ARRL DX Contest — they are unchanged from 1964.

1. DATES:

This 1965 DX Contest will be held two week ends each for c.w. and phone:

PHONE: February 13–14 and March 13–14
C. W.: February 27–28 and March 27–28

S.s.b. as well as a.m. stations are invited to participate in the phone contest. Phone and c.w. are separate contests.

2. TIMES:

The starting time in each instance is 0001 GMT Saturday and ends 2400 GMT Sunday.

3. OBJECT:

DX stations try to QSO as many W-K-VE-VO-KH6-KL7 stations as possible during the contest in as many different call areas possible *per band.*

4. EXCHANGES:

DX stations send RS or RST report followed by a three-digit number representing power input. For example, on c.w. you might send 579050, which means RST 579 and power input 50 watts. U.S.A.-Canada stations will send a number consisting of RS or RST report followed by the name of their state or province, whose abbreviations follow:

Call Area (W/K WA/WB)	Call Area (W/K WA/WB)
1. — CONN MAINE MASS NH RI VT	*9.* — ILL IND WIS
2. — NJ NY	*0.* — COLO IOWA KANS MINN MO NEBR NDAK SDAK
3. — DEL MD PA DC	*VE1* — NB NS PEI
4. — ALA FLA GA KY NC SC TENN VA	*VE2* — QUE
5. — ARK LA MISS NMEX OKLA TEXAS	*VE3* — ONT
6. — CAL	*VE4* — MAN
KH6 — HAWAII	*VE5* — SASK
7. — ARIZ IDAHO MONT NEV ORE UTAH WASH WYO	*VE6* — ALTA
KL7 — ALASKA	*VE7* — BC
8. — MICH OHIO WVA	*VE8* — NWT YUKON
	VO — NFLD LAB

5. SCORING:

Repeat QSOs on additional bands are permitted. Your multiplier is the total call areas (not states) QSOed *on each band* (maximum of 21 *per band*). The 21 call areas are listed above. Each completed QSO counts three (3) points. For DX stations incomplete contacts count two (2) points. FINAL SCORE is the number of QSO-points times the multiplier.

6. ENTRY

Free log forms are available on request from ARRL. You don't have to use these forms. Logs should contain calls, dates, times, bands, exchanges, and points. Sign your name to the statement: "I have observed all competition rules and regulations for my country." Send your log with summary data to:

AMERICAN RADIO RELAY LEAGUE
225 MAIN STREET
NEWINGTON, CONN. 06111, U.S.A.

Your entry must be postmarked by April 24, 1965, to be eligible.

Strays

The October, 1964 *QST* report on the Official Results — 1964 ARRL International DX Competition omitted the Ohio c.w. score of K8ZPK, with 67,363–1030218-C. This raises the West Park Radiops club aggregate score to 269,373 making Don the c.w. certificate winner for the club.

Anne S. Ellis, K5DEM, has produced an excellent little booklet entitled *CQ Colega* containing many useful Spanish phrases and expressions in the amateur field. While only a few copies are available, as long as they last they may be obtained for $1.50 each. Address her at 300 Sunset Lane, Odessa, Texas.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS* WIFZJ

Moonbounce

THE recent contacts between HB9RG and W1BU by way of 1296-Mc. moonbounce and the contact between W2UK/KH6 and W1BU on 420-Mc. moonbounce indicate the strides which have been made in the various techniques involved in exchanging moonbounce signals. The first moonbounce contacts were the result of many arduous weeks of schedule keeping before the first exchange of signals was accomplished. The schedule with W2UK/KH6 resulted in a contact on the first try when we were both on the air. The schedule with HB9RG on 1296 Mc. resulted in a contact on the first night in which we were both transmitting. The first night's schedule on this effort was rewarded by a good one-way transmission. The transmitter at W1BU was put into operation only minutes before the second night's schedule and contact was established immediately thereafter. The fact that these two latest contacts were so readily achieved is a tribute to the amount of time and effort expended by the various parties concerned.

As I mentioned previously, it is no longer a question of whether or not the contacts can be made, but rather a question of whether you're ready to try it or not.

The moonbounce crew who put their shoulders to the wheel on the Swiss end of the moonbounce effort have been building and improving their equipment for over three years. Obviously, like any other ham project, the effort involved spare time hours, and progress under these circumstances is usually quite slow. Nevertheless, practically all spare waking hours are concerned with improving the equipment or the techniques to the point where everything is unquestionably ready for the effort. The experience gained by the people involved makes each continuing project come easier and easier. Unfortunately, the promulgation of this knowledge is very slow. It is, in fact, quite difficult for the Swiss crew to explain on paper how they solved the problem of tracking the moon, or feeding their dish, or stabilizing their transmitter, or for that matter, tuning their parametric amplifier.

Each facet of the moonbounce project is a separate complete project by itself. There are no shortcuts to doing the job right and there isn't any easy way to accomplish a moonbounce effort. It isn't the type of project where you can go to the local parts house and buy the equipment, plug it in and make a contact. As a matter of fact, if you're seriously planning a moonbounce project, you should think in terms of a full year of preparation before you're really qualified to evaluate how much work remains to be done.

We are making a determined effort to answer all inquiries about moonbounce projects as rapidly as we can. Unfortunately, some questions are not easily answered and we don't have a supply of stock answers to cover all subjects. Getting information from the Swiss crew, the Hawaiian

25 Years Old This Month

As we near the end of the ARRL 50th Anniversary Year, we pause to mark the 25th anniversary of *QST*'s monthly coverage of the v.h.f. scene, which comes up with this December, 1964, issue. With a quick glance backward, let's see what life was like in the world above 50 Mc. in December, 1939, when the undersigned prepared our first v.h.f. column.

It was "*On The Ultra Highs*" then, for all frequencies above 30 Mc. were spoken of in that way. Our bands were 56 to 60, 112 to 116 and 224 to 230 Mc. Everything above 300 Mc. was "experimental" — open to all comers!

Just a year before, the 5-meter band had been cleared of modulated-oscillator transmitters by the FCC stabilization edict. Freed at last from the limitations imposed by the unstable transmitter and its raucous companion, the superregenerative receiver, 5-meter men were going great guns, despite the considerable occupancy dip that resulted from having to meet the new strict technical requirements. W9ZJB had become a v.h.f. immortal by working all nine call areas on 56 Mc. Some leaders were into the 30's in states worked, though we had no accurate records in this category. W3BZJ had worked a phenomenal seven call areas in one evening the past summer. The DX record by "lower-atmospheric refraction" had passed 400 miles. Auroral effects had been observed, and there was a rush to capitalize on this new mode, now that crystal-control and superhet receivers were the order of the day.

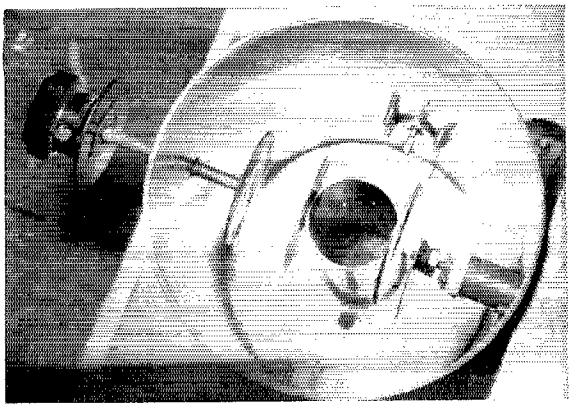
The simple-gear enthusiasts, no longer able to hold forth on 56 Mc. had moved to 112 in considerable numbers. The pioneering methods used on 5 were being employed successfully on 2½, and mountain portables such as W9WYX and W9VTR had covered up to 150 miles. Most work was essentially local, but there was lots of it, and it was great fun. Use of 1¼ was still rather rare, but ARRL Official W1KH was making a big noise in the Boston area with a 224-Mc. oscillator rig running up to 300 watts unput.

Not all the 112-Mc. work was with simple gear. We had a few paragraphs about the power doublers being used on 112 Mc. at W1HDQ and W1HDF. Imagine what these unshielded triodes, running 100 watts input or more and using self-resonant hairpin plate tanks, would have done to television reception, if TVI had been a problem in that happy day!

One problem of that day has not changed. We concluded our first monthly effort with a plea for regular and complete reporting. Such reader cooperation is needed in 1964, just as it was in 1939.

— *W1HDQ*

* P.O. Box 334, Medfield, Mass.



Business end of K2CBA's parametric amplifier for 432 Mc. (Jud has sketches if you write and ask.)

contingent, the California, Finland, Wisconsin, South Carolina, Tennessee, and all the other groups who have put in considerable effort on their moonbounce installations is not an easy matter. In the first place, one must know what questions to ask. Unfortunately some of the most useful information is concerned with things which someone who has already solved the problem would never think of asking. Having once solved the problem, one is inclined to assume that that problem is no longer hard and everyone now must know how to do it. For the past five years I have been assembling a question and answer book on problems involved in amateur moonbounce. Naturally, the pamphlet has never been completed because the moonbounce effort has never been completed. Everytime we set up for another effort we improve the equipment, we learn more answers to more problems and everything must be updated. We have a natural tendency to start deleting questions which now seem irrelevant but which are, in fact, questions basic to the problems involved. We haven't given up on preparing the question and answer book, but it has now reached proportions which make it impossible for us to make more than one copy. At least in this form it will facilitate answering questions on individual problems.

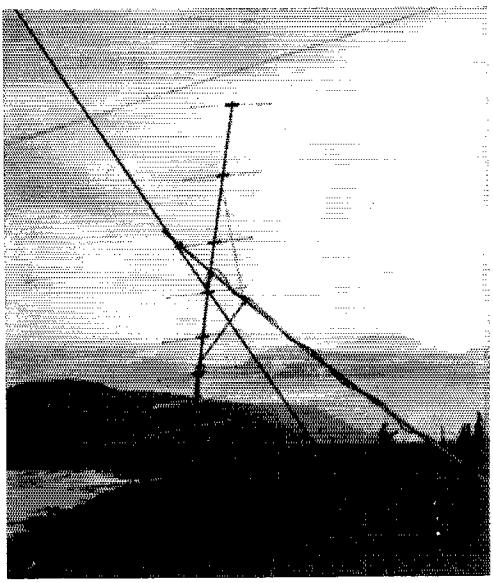
If you are looking for something to do in the moonbounce line, there is a group of amateurs in Australia who are interested in making a 144 Mc. moonbounce effort. There is another group in South Africa who are also interested in 144. Mc. moonbounce as a starter. A third and fourth group in New Zealand are interested in 432 Mc. moonbounce schedules. A fifth group in England is interested in 432 Mc. moonbounce. We are presently maintaining schedules with the New Zealand, Australian, South African boys on the 40 meter band. Schedule times vary considerably, but the frequencies involved are 7095 kc. for the out-of-country stations and 7205 kc. for the W stations. No liaison frequency has been arranged with the English group. The Swiss moonbounce crew can be reached on 14.278 Mc. at 2100 GMT most any day. Efforts to obtain liaison between W's have so far been fruitless. At the latest reading W2UK/KH6 is preparing to make an effort at 220-Mc. moonbounce. The crew at W1BU intends to cooperate on this effort. If there are any other groups interested please send information immediately to either W2UK or W1BU as we are anxious to find a third or fourth party to get involved in this effort.

50 Mc.

The following was received from Ron, KA2RJ (W9VCH), VHF Technical Editor of the "FEARL (M) NEWS": "Thought I should fill you in on v.h.f. operation in Japan. We have only two v.h.f. bands here, 50-54 Mc. and 144-146 Mc. Power input is limited to 50 watts. The normal microwave bands (starting at 1231 Mc.) are available also with 50 watts maximum input. Almost all of the operation here is on 50 Mc. a.m. Six meter DX from Japan includes Korea and Okinawa via sporadic E in the summer and Australia via trans-equatorial skip in the Fall and Spring. KA2's CM, DF, JW, KS, LD, MB, NA, PA, RD, SF, YP and KA9's AB and FH are all on six meters. KA2KSM JA2RJ and KA9FH are also on two meters. KA2RJ is on s.s.b. with transverters." Thanks so much for the information Ron. Now see if you can just keep those fellow in the same location until the MUF comes up again in a few years. THEN we'll talk to 'em'.

At Locke, New York, WB2IPX sez that best DX on six meters during September was VE3BPR at Belleville, Ontario plus VE3ETO and VE3CTE. Don, WB2MLK/2 at Cheektowaga sez that in the western New York area six has settled back down to local activity on groundwave. K3USC reports that during an auroral session during the late evening of September 21, he heard 1's, 2's, 3's, 4's and 8's-and-that on the 28th, 29th and 30th excellent groundwave conditions were observed to the southwest. Stations in Illinois, Indiana, Wisconsin and southern Ohio were heard and worked.

Report on 50 Mc. from K7ICW sez that no E



144-Mc. moonbounce antenna used at VE2SH/2 on June 14, at Mt. Orford, Quebec.

activity was noted and that M/S and tropo was poor. "Ionoscatter, excellent! During the VHF QSO party on the 13th, skeds with stations in 4 states paid off with new sections. Tropo tests with WA6KAM paid off with gud tropo QSOs on the 13th, 16th and 17th. On the 17th worked WB6CXR who was running 75 watts input c.w. (240 miles) with an RST 5-5-9 for him." WA8DXW notes that conditions were poor during the QSO party. John observed several very short openings into Indiana, Illinois, Ohio and Wisconsin but was unable to make contact in those areas. All of his contest contacts were in Michigan. (Hope you sent in your log!)

W8MBH at Detroit tells us that: W8JPR worked into Lorain, Ohio on September 12 and into Chagrin Falls, Ohio on the 6th; that—K8TCL, K8LOQ, WA8LYJ, K9DSQ, K9OPC, K9UNQ all on s.s.b., had a nice round table on September 22; that—a new teen-age bet has started in Detroit on 50.250 Mc.

At Monroe, Michigan K8WXO has been doing some antenna work. Gratt sez: "Have moved antenna up from 40' to 60' to continue log periodic experiments. In doing so am rebuilding log periodic (trial model not permanent). At present have HB 4-element six-meter beam back up. Unusually good tropo propagation observed on six meters, particularly during daylight hours. Have worked paths up to 300 miles in every direction during past month. Stations worked have been running comparable powers (10-60 watts) with similar antenna equipment (3-5 element parasitic beams). Since antenna is now out of surrounding trees am unable to compare with past results when antenna was lower." Keep up the good work Gratt, and let us know how things work out.

144 Mc. and Up

Out in Indianapolis, W9MHP has been experimenting extensively in mobile gain antennae for 420 Mc. Don sez that so far a drooping radial ground plane mounted atop a fiberglass whip (bumper mounted) seems to give the best results. Golly, here's another VE3 who is active on 432. There is a catch this time though, he is VE3AEC/W9. Ray would like the boys to give a look for him on the band since he is now operating out of Indianapolis, Indiana.

According to Joel, K3CFA, the month of September "was one of the best two meter months observed in my two years on the band. W4WNH in Kentucky and W9OII in Wisconsin were worked on September 1 for two new states on 144 Mc. W8ZCJ in Michigan was worked on September 2 and W2AMJ in New Jersey was heard with W3BYF being worked at Allentown, Pennsylvania on the 3rd. W3RUE was worked for an hour on c.w. on September 5. W3LML in Delaware and W8IJG in Ohio was worked on the 6th. K3ARN in Maryland, K2KGN, W2ZKF, WA2VAI, W3IYR and WA2CJK all in western New York plus VE3ESE and VE3EWZ were worked on September 7. W4WNH and W8AXR were heard and W8BKI in West Virginia was worked on September 11. K4YYJ in North Carolina and W2FDI near Rochester, New York were worked via tropo and W1JSM in Massachusetts was worked via aurora on the 21st. W3ZKR, VE3DSE and VE3EZZ were all worked on September 29." Joe notes that his 24-element collinear for two meters was successfully erected on a pipe mast on September 1. He isn't giving the new antenna all of the credit, but I'll bet it does deserve some of the credit for the stations heard and worked during the month of September.

RECORDS

Two-Way Work

50 Mc.: LU3EX — JA6FR
12,000 Miles — March 24, 1956
144 Mc.: OH1NL — W6DNG
5250 Mi — April 11, 1961
220 Mc.: W6NLZ — KH6UK
2510 Miles — June 22, 1959
420 Mc.: KH6UK — W1BU
5092 Mi — July 31, 1961
1215 Mc.: W1BU — KH6UK
5092 Miles — August 9, 1962
2300 Mc.: W1EHF/1 —W2BVU/1
170 Miles — July 1963
3300 Mc.: W6IFE/6 — W6VIX/6
190 Miles — June 9, 1956
5650 Mc.: W6VIX/6 — K6MBL
31 Miles — October 12, 1957
10,000 Mc.: W7JIP/7 — W7LHL/7
265 Miles — July 31, 1960
21,000 Mc.: W2UKL/2 — W2RDL/2
11 Miles — Oct. 18, 1959
Above 30,000 Mc.: W6NSV/6 — K6YYF/6
500 Feet — July 17, 1957

In Michigan K8PBA tells us of a three-state s.s.b. QSO on 144 Mc. which included WA9DOT (Wisconsin), WA2RDE (New York) and K8PBA (Michigan), on September 2. On the 3rd of September Bob worked K9RUG in Chicago and W5RCI in Mississippi, both via s.s.b. and he heard the boys on the Smoky Mountains at Gatlenburg, Tennessee and Arkansas. On the 21st, another three-state 144 Mc. s.s.b. QSO took place, but this one included W1PBT in New Hampshire and W2FDI in New York, plus Joel, K8PBA. This contact was via aurora also.

At Saginaw W8FZ sez that the night of September 6 was the best night of the month on 144 Mc. with WA8GBG working K3UIK in Erie, Pennsylvania, WA8GKK (Port Clinton, Ohio), WA8BTS (Columbus, Ohio) and a number of others he did not manage to "catch". W8CVQ goes along with the above observations concerning conditions during September on 144 Mc. saying that "occasional periods of very good propagation, especially favorable conditions on September 2; and Western Pennsylvania and Western New York stations came through on several evenings.

Seems that the mid-West is "hanging together" 'cause Denny, WA9HQP also sez that he noted good conditions to the South on the 2nd when he worked his first Kentucky station (W4WNH) on two. On the 21st, five New York stations were heard during a ten-minute auroral session at Denny's QTH, Michigan City, Indiana. Up in Portland, Maine, K1OYB sez that two meters is finally beginning to open up with W2's being heard most nights and VE1's coming through into Portland. Marty is building a two-meter s.s.b. mixer at the present time and hopes to have a 50' tower erected soon.

Special weekly Thursday skeds with K5TQP (144.100 Mc.) are being kept by K7ICW to determine the best method to break down the path which is 510 miles. First results indicate no background tropo signal at all. A study is being made of weather maps to catch a front passing through both locations to take advantage of it for ducting. These ducts are extremely rare in the southwest. The distance is very

(*Continued on page 168*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How (cont'd):

Last month's Thanksgiving observations led us into the realm of manual wireless communication skills and ham radio's contribution to the field. There's a lot more to competent operating than mere ability to transmit or transcribe given signals at given speeds. The polished radio communicator possesses an uncommon combination of sharpened faculties and facilities beyond such simple statistical summation.

He is, to be sure, proficient in the language he employs, be it telegraphic or phonetic. It also goes without saying he must be familiar with the many other tools of his art, his apparatus and its limitations. Familiarity, however, is not necessarily mastery. Armed in the fundamentals a radioman may successfully strive toward excellence. He may also never make the grade.

Some authorities maintain that potential ace radiops are born, not made. There is evidence to support this belief; you can observe it in every annual ARRL Novice Round-up. But alertness, coordination and dexterity can be cultivated from modest beginnings, too, just as musclemen occasionally develop from those proverbial 97-pound weaklings. The secret is no secret: Hard work is the adequate substitute for much natural aptitude.

One must differentiate here between the record communicator and the rag-chewer. Conversationalists can communicate very effectively within the limited scope of their purpose. But we're discussing the payoff, accurate wireless shipment or intercept of data wherein studied form becomes almost as important as substance. Indeed, form *is* substance under some circumstances, so meticulous attention to procedural details must be the mark of the truly competent communicator. That's why he usually gets QSLd first on the 80-meter nets or in the mailbox.

Okay, so you're already a smooth 35-w.p.m. man with a keen "intercept ear," a hairtrigger response to circuit discipline, and a crackerjack knack with panels full of knobs and dials. Have you got it made? Not necessarily, OM. There are a few more key operational attributes that separate fine radiomen from the boys.

One is *endurance*. Can you pace yourself to the job at hand? A superior op who fizzles out after a few hours in the DX Test might as well stick to the parlor TV. Another requirement is *patience*. Can you calmly coax high performance from mediocre gear and inexperienced ops at the other end, or can you deal only with experts? Then there's that tricky item *courtesy*. You can be so discourteous you never get through, and you can be so overcourteous you never get through. Top radiops seem to sense the optimum courtesy requisite per situation, and their results are consistently maximal. Also, *concentration* is a must. "Sorry, missed your last 'cause the kids are noisy tonight." Bah, little less than an earthquake shakes the topflight op. ARRL's contests and other operating activities are carefully tailored to test and sharpen all these traits as well as your electronics know-how.

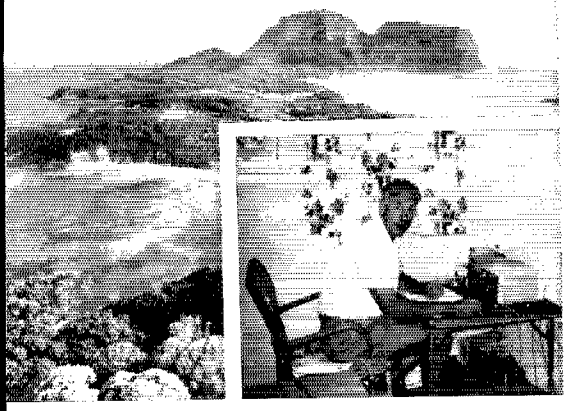
Becoming *and remaining* a first-class operator is not just a matter of hours of exposure to communications work. After getting past the pitfalls of rudimentary liddism there must continue a steady effort toward improvement. When the time comes that an OM no longer consciously works to polish his performance he has gone about as far as he will go. Except backward.

These things have all been well stated before and elsewhere. But we gladly take our turn in pointing with pride to hamdom's unique role as a universal school for development, perfection and perpetuation of competent radio communicators and their art. A toast to some of our best instructors — QRM, QRN, QSB and the DX pile-up, molders of men!

What:

Autumnal propagation prosperity, indeed. Our fall DX boom seemed more like a dull thud, a small *pop!* followed by the hiss of escaping ionosphere. The old DX rhyme, "When the nighttime starts to lengthen, then the signals start to strengthen" may have to be replaced by something like "When the daylight starts to drop, poor old 20 goes kerPLOP. "Well, we promised a more general tour with the "How's" Bandwagon this month, so let's look in on

*7862-B West Lawrence Ave., Chicago, Ill. 60656



VK2AGH brought off one of the year's DX highlights with an April DXpedition to Lord Howe Island, a rugged seaspeck 430 miles northeast of Sydney. Graham used an Australian 70-watt transceiver, a multiband vertical and an 80-meter Windom for 430 c.w. QSOs and 220 s.s.b. contacts with all continents. L. H. boasts perfect weather to compensate for such usual DXpeditionary shortcomings as expensive accessibility and erratic mains voltages.

15 **phone** where **W8YGR**, **Ks** 6OVF 7VMO ØJPL, **WAs** 2WIJ 6WPG ØEMS, **WBs** 2BAL 2CAN 2FVD 6CUU 6HSO 6HTM 6IFC and **DL4IO** defy the laws of something or other in grabbing **CEs** 2HX 3CZ* 3YU 4FH, **CN8s** GC *1900 GMT*, MZ, **CRs** 4AD 4BA 5SP (21, *170 kc.*) 10–11, 6DB 18, 6JA 20, 7CK* (340) 15, **CT1s** GK 22, IH* 14, GX3AAM, DU6GT (250) 4, **EA8**DX, **FB8**WW (60) 12, **FO8**BL* (300) 23, **FR7s** ZD (270) 13, ZJ* (270) 13, **GC3**KAV, **HCs** 1AH 0, 1OW* 2RY 7BO*, **HB9**FU*, HK3AZ 23, **HR9**EB (330), **IS1**BCO, K6OZL/**KP4***, **KG4**BQ*, **KP4s** BFF* BJJ*, **KR6**KS* (400) 0, **KZ5s** JK LT* OA* PR* TT* WE* WI* WW, **LUs** 3AEF* 5EB 22, 8DB, **OAs** 4CV 22, 4PI* 5W, **PJs** 2CZ 2MI 23, **PYs** 1BQK* 2BQY 2CYE 2PE* 4CH* 6AM* 7SO* 8NO, **TG9s** CO RJ* (445) 23–0, **TIs** 2EV* 2LA* 2PCF* 2TAC* 5KW 23, 7HP/2, **TJ8**AC (270) 16, **TU2**AE, **VKs** 2ADC* (400) 2, 2ADE (230) 0, 2AHM (200) 2, 2AKF 2APK 2AVY (230) 0, 2KM* (400) 2, 3ACD* (400) 2, 3ATN* 3BG* (400) 2, 3QV (410) 1–12, 3VL (160) 0, 4LT* 4RH* 5EK (200) 2, 5ZK* (400) 3, 6QL, **VP3**VN, **VQ2s** JN WR*, WA2UMY/**KP4***, XEs 1KE 1WB 3, 1ZO 3CM, **YNs** 1JOA* 1MAN* 1RK 1CF* 4TM 9AK*, **YVs** 3KV* 4IG 4IQ 5AGM 5AXA 5AYB 5DA 6AV/2 6AX, **ZLs** 1AIX* 1CA (240) 0, 1HA (300) 0, 1RI (200) 0, 2UD (24 5) 0, 2WS (441) 21, 3JO (250) 0–1, 3QK* 3TD*, **ZP5**CF*, **ZS8s** 6AD 7R*, 4S7DR, 5A1TK, 5N2JKO*, **5X5**IU* (400) 21, **5Z4**AA (400) 11, **6O6**BW* (425) 20, **6Y5s** LK* UC 19, **7Q7**PBD* (420) 19, **7X2**SP, **9GIs** DM EC, **9L1**WN, **9Q5s** AB* (400) 19, AG (260) 17, BJ NM (310) 18, YL, **9U5**MV and **9X5**AV (180) 18, the asterisks indicating single-sideband sending. Are the sidewinders finally making their move into this a.m. territory?

15 c.w. grudgingly gives ground to **W8YGR**, **Ks** 3UXY 6OVF ØJPL, **WA2**WIJ, **WBs** 2CAN 2FVD 6GFZ 6HTM, **WNs** 2NVJ and 6IWX, accounting for **CN8**GB, **CRs** 6AI 7IZ (65) 15–18, 9AH 10, **EA6**AM, **EL8**X, **EP2**CR, F3BX, **FB8**XX, **FR7**ZI, HI8WSR, **HKs** 4AOY 5CR, **IS1**VEA (50) 18, JA3DWT, KP4QV 18–19, KZ5AW, LU2EZ, **PYs** 1MCC 2EV 18–19, 2OE 2SO 5ASN 7NJ, **PZ1**CM (70–97) 14–23, **SU1**IM (50) 12–17, UT5BL, VE1AJR/**SU**, **VQ8s** BC BL, **VS9s** ADM AMD (64) 16, VU2GG 10, **WP4**BRH, **YNs** 1AA 3KM (60) 22, YV5ATX/6 (130) 15, **ZB1**RM (58) 15, ZE1BL, **ZSs** 1XR 10–12, 6JF, **4X4s** FU NTB, **5H3s** HD JJ, **5R8s** AB BX, 5X5AU, 5Z4IV, **9Ms** 2LJ 2LO 10, 4LP (50) 7, **9Q5s** AB 10, QR and **9X5**MW. Some quality in there but the quantity's down.

40 **c.w.**, standing the night watch while 20 swoons, presents **Ws** 1ECH 7DJU 8YGR 9NN, **Ks** 1DFC 3GEK 4MYO 5JVF 7QXG, **WAs** 2FUL 2UQQ 2WIJ 4PSA 5EID 5IIS 6VAT 6VUW, **WBs** 2ALF 2GJM 2JWB 6CUU 6FMJ 6GFZ 6HTM 6IFC 6ITM, **WN6s** 1WX KKF and **DL4IO** with an entirely satisfactory selection: **CEs** 2DI (17) 5, 2DK 3GT (6) 4, **CMs** 2EJ (25) 10, 5FS (13) 3, **COs** 2BB (3) 13, 2HS 6–7, 2QR 2XM 6AH (10) 10, **CP5s** AQ (4–11) 1, EZ (10) 3, **CRs** 6AI (12) 2, **7CI** (9) 4, **CT1**DJ (8) 6, **CXs** 1FB (16) 10, 8CD (13) 2, **DMs** 3NBL 4SKL, EL2s AD (13) 2, AM (15) 2, **F2**MA (10) 0–1, **FB8**XX (6) 1–4, **FG7**XC, **FK8**BC (6) 8, **FY7**YK (10) 10, **GD3**TNS (20) 23, **HAs** 1KSA (11) 0, 5AW, **HC2**AC (16) 12, **HK0**AI (1) 3, **HR2**FR (5) 0, **IIs** AZ BAY 0, IT1AGA (3) 0, **JAs** 1AGK 1CFD 1CSX 1FNR 1HGB 1HLR 1JQY 1JWM 1KKZ 1KVG 1LCM 1LPZ 1LWI 1NAJ 1NFY 1NLX 1NRY 1PVK 1RPZ 1YAC 1YL 2BVL 2BVS 2DCN 2EEY 2PY 3CKI 3CZH 3GHN 4AKL 4IF 5ALA 5AJQ 6AFO 7AAV 7AKQ 7AXP 7BVO 7LK 8AGE 8ATG 8CR 8OW 8YF 9AA ØAIF ØRC all 8–15 near the low edge, K6PPO/**KP6** (10) 8, **KC4s** USB (30) 4, USK (48) 2, KG4AM, **KL7s** CVX ELG PI, **KW6**EI (15) 9, **KZ5**EC (12) 6, LU1ZC (25) 5 of the subantarctic, **LZs** 1KDZ 1KPW 2KSK, **MP4**BEQ (5) 1, **OEs** 1RG 2WSL 3FS (3) 23, plenty of OKs, **ON5**AM, **OR4**VN (2, 15), 2–7 in Antarctica, **OY3**SL (15) 23, **OZ7**BF (15) 22, **PJ3**CC (4) 3, **PY2**SO (7) 5, **SM7**TE (5) 0, oodles of SPs, **UAs** 1DV 1KAE/2 1KEI 3GM 6DK 6FG (5) 1, **0FF** ØKZB (5) 11, **UB5s** AU KGL (7) 0, KDS (3) 0, KJE (3) 1, YN, **UI8**LC, **UO5**AP, **UP2**KNO **UT5s** CC RP, VE1AJR/**SU**, dozens of VK/ZLs, **VK8**JI, **VPs** 2AV (18) 11, 2KJ (1) 23, 2KT (11) 7, 2SM (2) 11, 4GH (8) 0, 5BM 6AT 6BW (6) 2, 8HJ (16) 5, **VRs** 2EG 4ED (6) 12, 4EG (5) 11, **XE2s** EM LLP SSX, **YNs** 1AA (8) 10, 1SL (37) 11, 3KM (6) 11, **YOs** 1CT 1RI 1RPR 3AAK 3AAS 3VU 4XF 4ZF 5KAI 6ADW 6ST 8KAE 9HI, **YUs** 1BCD 1KAU 1KMN 2HCD 3APR 4JOP, **YVs** 4AU 5BMN, **ZE4**JE, **ZSs** 1ASF 19, 1O (7) 4, **5H3**HZ (12) 5, **5N2**JKO, **5Z4**IV (2) 21, **6W8**AJ (2) 5, **6Y5**XG, **7X3**CT (13) 6 and **9Q5**AB.

40 **phone** gets in a few licks when *Radio Petruvia's* circuit-breaker kicks out, so **Ks** 1DFC 3GEK, **WA4**JJY, **DL4IO** and listener P. Kilroy make out with **DM6ZAI*** (45) 11, **GW3**AX, **HRs** 1BL 5, 2BS (200) 4, **KC4s** USB 6, USK 6, **KG4**CI, **KH6s** HP RJ 6, **KP4**CKC, LX1BW* (55) 9, **OY7**MIL, **SM5**CFN*, **UD6**BR (30) 21–23, **UR2AR**(31) 9, **VKs** 2AVA 2PU 3IF 4RH all around 7080 kc., W9ITF/**KP4** 6, XE2OU (203) 4, YV4GD 5, ZL2WS 8, **ZS1**ZII and 5H3AD, the stars blinking for non-s.s.b. protagonists, a rare DX breed on 7 Mc.

80 **c.w.** is coming along steadily, with **Ws** 1ECH 7DJU, K5JVF, **WB2**ALF, **WN6s** 1WX and LDV glomming such goodies as **CO2**QR (8) 10, DJ6FO, **DM3**MD 3, GC3HFE 23, **JAs** 1AEA 1DMX 1DSW 1IUE 1JOH 1KAU 1KCA 2WB 3DGE 5AJY 6AK 7ACM/mm 7JQ 7LK 7NK ØRC ØVZ/Ø, **KL7**CGE, **MP4**TAV, **OY7**FP, **PAØ**LV (1) 4, **PX1**YR, SP8CA, **TI2**CMF (5) 5, **UAs** 1KED of Franz Josefland, **9CM** 9WS **0**KED, **UW9**DP, VE1AJR/**SU** (2) 23, **VKs** 2QK 2QL 2RA 2SA 2YB 5HO 6VK, WN6KOG/**KM6**, **ZB1**RM 6-5. **ZLs** 3OX 4GA 4JF (6) 8 now probably QRT on the Campbells, **3A2**BP and **6Y5**XG (7) 4.

75 **phone** is a live one on the Continent according to **DL4IO** and s.w.l. Kilroy who specify activity by DL3LG, **DM3**ZOL, G3s GSI PUX, GB2ASH* (3640) 21, **KH6**FIZ 6, LX1BW (3675) 15, **OE3s** ZL ZMI/p, **OY7**MIL (3820) 33, **PAØ**ELS, **PJ2**MI (3800) 0, **VP9**BN (3800) 23, XE1OE 6, YV5BPJ 6 and **5Z4**AA (3840) 22, the asterisk for a.m. — — . . . Here's a good spot to sneak in a few lines on **10** **phone** where activity relapsed sharply as short-skip openings declined in the northern hemisphere, **WB2**BAL and the clubs spotted signals from **IH8**WSR*, **PY9**HL 17, **VP7**CC*, YV1GD*, **5A3**TL 18, **7X2**SW 17 and **9Q5**AB (600) 19, the stars for sidebanders.

160 **c.w.** — and **phone**, for that matter — is about to receive its annual shot in the arm from the 160-Meter Transatlantic and World-Wide DX Tests, a series of activities fostered by W1BB and friends since way back in 1932. Let's quote Stew's pronouncement on the subject: "Reminiscent and symbolic of the original pioneering trans-Atlantic crossings by Deloy, Schnell, Reinartz, Godley and others in 1921, the Tests will be held this 1964–'65 season on the following Sunday mornings — December 6th and 20th, January 3rd and 17th, February 7th and 21st — from 0500 to 0730 GMT. W/K/VEs should call CQ DX TEST for the first five minutes of the hour, listen the next five minutes, call again during the third 5-minute period, etc., until contacts are rolling. Set your clocks accurately!" Generally speaking, eastern U.S.A. stations will be found from 1800 to 1825 kc., and westerners from 1975 to 2000 kc. Most Europeans will use 1825–1830 kc., VKs like 1800–1860 kc., ZLs prefer 1875–1900, JAs stick to 1880 kc., and other DX usually concentrates between 1800 and 1830 kc. "Working DX on 160 is challenging and extremely interesting," W1BB continues. "Obstacles such as QRN, BC harmonics, QRM, loran, QSB, etc., all require great patience, a topnotch station and careful operating techniques. Remember, these Tests are *not* meant to be contests." W1BB will appreciate full reports on your 1.8-Mc. DX results this season and, as in the past, he will develop the data and pass it along to Jeeves and other editorial relay points. We urge all potential 160-meter buffs to refer to p. 60, July 1963 *QST*, for detailed information on frequency allocations and authorized power inputs in their particular regions. Good luck and good fishin'!

Twenty meters will have to wait till next month when **Ws** 1ECH 1YYM 3HNK 6EAY 7DJU 8YGR, **Ks** 3UXY ØJPL, **WAs** 2UJM 2UQQ 2WIJ 4JJY 5ABG 5ESW 5HS 6VAT ØDGH. **WBs** 2BAL 2CAN 2JJK 6HTM 6IFC and KA2TP report some c.w. lowdown, and **W8**YGR, **Ks** 3UXY ØJPL, **WAs** 2WIJ 4JJY ØDGH ØEMS, **WB2s** BAL and CAN, plus additional correspondents, give us a 14-Mc. phone fill-in. And who can be sure we won't have to break out with a special for 160? See you on the Bandwagon next month!

Where:

OCEANIA — 5W1AZ writes, "Still have a few ZK1BV cards left. Anyone I've overlooked can obtain a QSL from me via the ZL bureau or through my Western Samoa address. After packing up my operations from Aitutaki in early February I made stops in Fiji and New Zealand before reaching Apia. For this reason my replies to some cards have been long delayed. Those received without self-addressed envelopes and International Reply Coupons were answered via bureau and may take some months to reach destination." Incidentally, George advises that his address is okay for any 5W1-bound QSLs . . . . FO8AQ tells W6FFM he prefers his QSLs direct, not via the local bureau. Pat and the Tahiti boys point out that French Polynesia, not French Oceania, is the correct geographic and postal designation for their region . . . . After QSLing 100 per cent all QSOs for October, 1963, through January of '64, W2BTQ/KH6 (now KA2TP) finds U.S. returns of 50.5 per cent, foreign returns of 48.3 per cent . . . . S.w.l. C. Maher of Mississippi suggests, "Those needing confirmations of QSOs with the late VR4CU might try W6WNE who verified my July '63 reception of that station." . . . . VK2EG tells W1VG he continues as QSL aide for VRs 1B 1B/a and 3H . . . . K8SWW/KG6 writes from Agana, "Marianas Amateur Radio Club has almost a thousand QSLs for Guam hams who left the island with no forwarding addresses. We request these ex-KG6s to send s.a.s.e. to MARC so their cards may be forwarded to them." . . . . "KW6EI says the printer has him 'way behind and pleads for the gang's patience," remarks K5JVF.

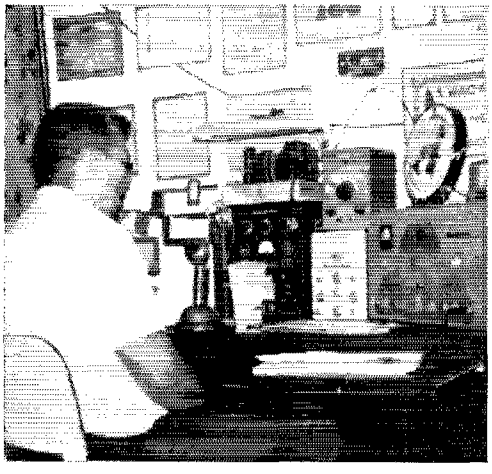
ASIA — "*How* do you get QSLs out of Americans on Okinawa?" asks WAØEMS. We've heard that query before. What say you KR6s? . . . . W4LRN's AP5HQ QSL managership (North Americans only) dates from October but Clem may be able to help confirm earlier contacts. Self-addressed stamped envelopes or self-addressed envelopes with International Reply Coupons, please . . . . W9WHM confirms that Saudi Arabian 7Z calls are for non-residents, HZ calls for natives, and 7Z3AA is MP4BDM . . . . WB2FMK pens, "I've already sent out about 500 QSLs for EP2DM but there must be at least that many more in logs yet to arrive. Tell the lads to be patient; I guarantee a QSL for every first EP2DM QSO. Anyone who hasn't received one for QSO before December 31, 1963, should advise me immediately." . . . . Ws 5LAK and 8BKE are back in the Lebanon locale with rarish intentions. West Gulf DX Club's *DX Bulletin* understands that W8ZCQ will coordinate W8BKE's QSLing, while W5LAK will handle his own cards . . . . VERON's *DXpress* reports DL3RK's receipt of DJ4EK/TA logs for September QSOs, other transcripts to follow . . . . "Since ham radio is under ban in the Republic of Cyprus the post office here will not accept mail obviously intended for amateurs," writes a ZC1GT staffer to KP4TL. Plain-type envelopes without radio reference, fellows.

AFRICA — ZD8WR (KH6FJM) declares, "QSLs may be delayed several months but I will do the best I can." . . . . I've recently become QSL manager for EL2AP," confirms WB2BAL. "He's active almost daily on 20 c.w." . . . . DJ3GI writes, "I am ET3JF's QSL manager and have logs dating from his first QSOs in Ethiopia." Ship s.a.e. with IRCs to Dieter if you're on the list . . . . "I will be handling QSLs for 9L1HX commencing September 20, 1964," states VE1OX. "S.a.s.e. is a must; no cards will go via bureaus." . . . . "I'm the QSL manager for 7Q7GB in this hemisphere," reports W5UBW, specifying s.a.s.e. and the address P.O. Box 881, Alamogordo, N. Mex. . . . . According to WGDXC, operator Marcel of FB8WW will be reachable at Cite Waron, Les Capucines Nr. 2A, Le Point du Jour, Saint Brieuc, Cotes du Nord, France, when he returns from Crozet isle next month . . . . DL3BK is said to be QSL charge for the African doings of DLs 3ZG and 9HF.

EUROPE — SP9ADU affirms that those Cracow SP9 stations can be QSLd to SP9s bearing the same suffixes (SP9RF to SP9RF, etc.). The special prefix was authorized during an International Marathon DX activity held from May through September. Andy, QSL manager for special station SP9UJC, says cards for that call will go via bureaus unless s.a.e. and IRCs come to hand . . . . ON4UQ (K2BKU) desires all W/K/VE QSLs through his U.S. address, others via ISWL or Antwerp C.W. DX Club, P.O. Box 331, Antwerp, Belgium. Bill also points out that the latter organization will QSP QSLs to any Antwerp station and handles cards for LX3s AX and AZ as well . . . . "S.a.s.e. will be much appreciated by my QSL manager, WA6WNG," advises DL4LF (W6MINN) . . . . WA2WIJ hears that KØBLT can help confirm 8M6VR QSOs . . . . WB6AKZ feels that all who sent s.a.s.e. and/or IRCs to him for their OH2BS/Ø cards should have their wallpaper by now. Others should watch their bureaus . . . . Ain't no OY1BB, according to OY7ML. Martin has terminated his QSL-handling arrangements with W6NJU and DL6EQ and now handles his own confirmations through Box 184, Torshavn . . . . Old-timer RAEM will see to it that UA1KED's Franz Josefland QSLs go out promptly when the logs arrive Moscow, says VERON's *DXpress*.

SOUTH AMERICA — Our neighbors to the south get a QSL commendation from K7QXG. "South Americans respond better than the U.S.A., 87 per cent *vs.* 82 per cent. Africa, however, is poor (25 per cent or less), and the other continents average between 55 and 70 per cent." WA9ICQ's statistics are at odds with Bob's findings. John observes, "South Americans are only 40 per cent in my books, while the Caribbean Latin Americans hit 80 per cent. And Cubans, whatever their other difficulties, seem to be among the world's best QSLers, usually responding direct by airmail." . . . . HKØAI wants no direct mail, all correspondence and QSLs via W9WHM . . . . QSLs for the joint Easter Island output of Ws 4QVJ and 6UF should go to the home

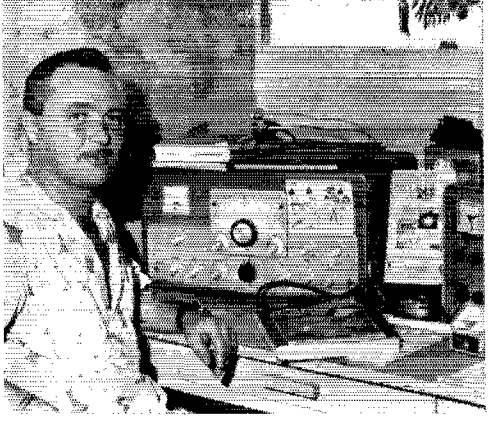
CN8s AW (left) and FW do much toward keeping Morocco a bright spot on our DX map. Tommy, CN8AW, is a skilled voice operator and very active in the Kenitra and Sidi Yahia amateur societies. CN8FW turned in the top c.w. score from Africa in the 1964 ARRL DX Contest. (Photos via W1YYM and K4EZL)



QTH of the former with the customary s.a.s.e., or s.a.e. with IRCs, and Greenwich Mean Time QSO reference . . . . . CE0AG (VE3DGX) hopes to clean up his Easter QSLs shortly after returning home in April. Meanwhile his XYL will try to dispose of s.a.e.-plus-IRCs applications as soon as log transcripts get back to Ontario . . . . . K7QXG reports LU3ZI QSLs beginning to get around in September.

HEREABOUTS — K7AEJ/4Y7 is a neat collector's item and quite legitimate. Don also signs DJ0IR/mm now and then off the Washington coast . . . . . VP2KR offers to serve as QSL headquarters for St. Kitts, Nevis and Anguilla. His address is John F. Stratfull, Audit Dept., St. Kitts, Leeward Islands, West Indies . . . . . "Thanks to 'How's' someone sent me QSL info resulting in cards from FY7YJ and 6W8BL. Only one I need now for 100-per-cent response is a UP2." This from W3HNK . . . . . WA9ICQ feels that W/K QSLs are getting too doggoned look-alike. He votes for a return to originality in design and presentation . . . . . Ws 1ECH 8TRN 8YGR, Ks 3SLP 5LIL 7QXG, WAs 2WIJ 4JJY 5ABG 6MWG 6VAT 8LST, WBs 2FVD 2GJM and 6IFC nominate this month's "QSLers of the Month," being particularly impressed by the prompt pasteboards of CN8AW, CRs 6EI 9AI, CXs 1AA 9PP, DJ6SI, DU7SV, EA9AY, EL2AD, EP2BQ, ET3BG, FP8CK, G3SR, GI4RY, HK0AI, Hs IZ RB, JT1CA, KA2LD, KC4USK, KG6IF, KL7WAF, KS6BN, KW6EI, LA2AE, LU9ACZ, MP4BEQ, OE1ZL, OH2AH/0, OK1AFC, ON5AX, PY4s AYO ZG, SM6VR, SV0WKK, TFs 2W1L 3AB, TG9SM, TU2AU, UA0KIG, UC2WP, UJ8AC, VE1AJR/SU, VP2KJ, VU2LE, YN1SL, ZD3A, ZE1AS, ZP5OG, ZS7R, 4S7EC, 5N2s JAB JEB and 9G1DM, plus the punctual performance of QSL aides Ws 2CTN 2GHK 8NGW, Ks 5SGJ 7CAD and WA9AXX. Any quick QSLers you'd like to applaud herein? . . . . . Halp! WA5IIS hunts hints on confirming contacts with VP5SG, UA0RH; WA6VAT likewise re KG1FU, VQ2AG; and WA9ICQ needs a nudge toward DU0DM and XF1LM . . . . . WA6VAT and WB2BAL offer their services as QSL laborers for deserving overseas DX operators . . . . . Here's a helping of specific data, all or any of which, of course, is necessarily neither "official," complete nor accurate. Be our guest:

AP5HQ (via W4LRN)
CE0AG, G. Hrischenko, VE3DGX, 3156 Bruce Av., S. Windsor, Ont., Canada
CP5EZ (via W2CTN)
CR4BA, Box 90, Sao Vicente, Cape Verde Islands
DL1EE, I. Falster, 8500 Nuernberg, Bernadottestr. 27, W. Germany
DL4KD, Box 3305, APO 57, New York, N. Y.
DL4LF (via WA6WNG)
DL5GU (to K2ABW)
EA9EO (via EA4GZ)
EL2AP (via WB2BAL)
ET3BG, B. Gibson, APO 843, New York, N. Y.
ET3JF (via DJ3CI)
F0AD (to ON4RC)
FK8BC, Box 97, Noumea, New Caledonia
FO8BL, C. Trondle, B.P. 15, Papeete, Tahiti, Fr. Polynesia
FY7YK, c/o PTT, Cayenne, Fr. Guiana



FO8BL (F3RP), a government radio engineer, expects three years of a.m. and s.s.b. DX work from Tahiti. Charles logged previous rare DXperience as FQ8AO and FI8AO. (Photo via W6JFM)

GC3JAG/p (via RSGB)
HK0AI (via W9WHM)
HP1AC (via W2CTN)
HP1FH, P.O. Box 3398, Panama City, R.P.
K2LJU/mm (via WB2DXM)
K2RXQ/mm, W. Rugg, jr., Staff, ComDesRon 18, FPO, New York, N. Y.
K7LMU/3W8 (via K6EVR)
KA2TP, Col. T. Paul (W2BTQ) U.S. Army Logistical Center, APO 354, San Francisco, Calif.
KG6IF, H. Train, jr., RM1, USCG Loran Stn., APO 315, San Francisco, Calif. (or via K7CAD)
KW6EI, C. Davis, Det. 4, 1502nd ATW, APO 101, San Francisco, Calif.
LU1DHZ, Box 65, Cordoba, Argentina
LU6ZM, A. Lujanand, Lavalle 1246, DTO 2, Buenos Aires, Argentina
LU9ZF, J. Dawson, Rep. Libano 2530, Victoria, Buenos Aires, F. C., Argentina
LX3YQ (to DL3YQ)
MP4TBJ, Box 300, Abu Dhabi, Trucial Oman (or via RSGB)
OX3OM (to OZ9OM)
OY1PU (to OZ1PU)
OY2GHK (to W2GHK)
OY3SL (via OY7ML)
PZ1CM (via W2CTN)
SP0UJC (via SP9ADU)
TG9HC (via WA8LST)
VK9TL (to VK3TL)
VO2JM (via VO1AA)
VP1TA (via W2CTN)
VP7DJ, E. Kasprzyk, jr. (K5JTP), RCA, c/o PAA, Allan Cay, Patrick AFB, Fla.
VS9AN, Amateur Radio Club, RAF Khormaksar, BFPO 69, London, England
VS9OC, RAF Radio Club, Masirah Island, BFPO 69, London, England
ex-W2BTQ/KH6 (to KA2TP)
W4EXM/KH6, A. Monsees, c/o PAC GEEIA ZPMIEL, APO 915, San Francisco, Calif.
W9WNV/XU (via K6EVR)
WA2HUA/VE6/VE8 (via WA2MMD)
WA4SXO/mm, C. Cole, USS *Lawrence* (DDG-4), FPO, New York, N. Y.
YN3KM, J. Murphy, Box 9, Leon, Nicaragua
YS1HUKE, U.S. Army Mission, c/o U.S. Embassy, San Salvador, El Salvador
YV4AZ, N. Leal, Box 18, Maracay, Venezuela
YV5ATX/6, V. Sandri, Box 62, Puerto Ordaz, Bolivar, Venezuela
ZB1RM (via W2CTN)
ZB2AI (via RSGB)
ZC4TX (via RSGB)
ZD8BB (via W7ZMD)
ZD8GK (via K0BKW)
ZD8WR, W. Duane, jr. (KH6FJM), Ascension AAFB, c/o PAA, Box 4187, Patrick AFB, Fla.
ZD9BB (via ZS6SI)
ex-ZK1BV (to 5W1AZ)
4W1F (via W2CTN)
ex-5N2IJS-VQ3EX-VP2LO (to VP2KR)
5W1AZ, G. Ashton, Faleolo Airport, Private Bag, Apia, W. Samoa
5Z4IV (via W2CTN)
6W8AJ, Box 1408, Dakar, Senegal
7Q7GB, G. Shelburne, P.O. Box 104, Zomba, Malawi (North and South Americans via W5UBW)
7X3CT (via W2CTN)
9G1DV (via W2CTN)
9L1HX (via VE4OX)
9M4LS, D. Llewellyn, Post Box 25, Paya Lebar, Singapore 19, Malaysia
9M4LX (W/Ks via WA2WUV)
9Q5GO, c/o Box 1316, Kitwe, No. Rhodesia

The preceding who's-where is the result of research by **Ws** 1ECH 1VG 1WPO 1YYM 2BTQ 2EAF 2HIE 3AFW 4VPD 4ZM 5UBW 6JFM 6MNN 7UVR 8TRN 9NN 9WHM, **Ks** 1FLG 2BKU 2RXQ 3SLP 3UXY 5IVF 6DQB 0JPL, **WAs** 2WIJ 5ESW 5IIS 6MWG 6VAT 8LST 0EMS, **WB2s** FMK GJM, **DL4LF**, **KP4TL**, **ON4UQ**, **OY7ML**, DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Florida DX Club *DX Report* (W4HKJ), International Short Wave League *Monitor* (12 Gladwell Rd., London N. 8, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (W2FGD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (W1BPW), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON'S *DXpress* (PA0s FX LOU VDV WWP) and West Gulf DX Club *DX Bulletin* (W5IGJ). Good show, DROMS!

Whence:

EUROPE — Radio Society of Great Britain invites world-wide participation in its 21/28-Mc. Telephony Contest scheduled for the period 0700 GMT, the 5th of

HM5s BF and BG, a rare OM-XYL DX team at Pusan, appear on 40 and 20 meters with a 100-watt 829B rig and 13-tube receiver. (Photo via W1WPO)

this month, to 1900 on the 6th. Stations outside the British Isles will collect QSOs with G GB GC GD GM and GW chappies at 5 points per contact, plus a 50-point bonus for the first contact with each U.K. numerical prefix (G2 G3 G4 G5 G6 G8, GB, GC2 GC3, etc.) plus a 20-point bonus for every ten stations worked in each category (ten G2s, for example). The usual RS001, RS002, etc., serials will be traded, a station may be worked once per band, and a multioperator division is available. Entries listing date and GMT of QSO, call of station worked, serials sent and received, band, bonus points claimed, and contact points claimed, should be filed with RSGB Contests Committee, 28 Little Russell St., London, WC1, England, postmarked not later than December 21, 1964, and must include this signed statement: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was . . . watts." Certificates of outstanding performance will be awarded to leading scorers in each country as well as to each U VE VK W/K ZL and ZS call area leader. Let's keep our fingers crossed for DXceptional conditions on 10 and 15 that week end! . . . . DARC (Germany) advises ARRL's K1FLG of a new address for WAE and other awards correspondence. The Society's DX Bureau is run by DL1EE at the QTH appearing in "Where" . . . . W1YYM was pleased to be the first U.S. contact for 3A2CQ (K8JUA) on Dave's September Monte Carlo stopover . . . . DL5GU saves postage costs when keeping in touch with the family back home. Dad is W2HIE . . . . W6MINN claims a 142/123 c.w. DX tally in eleven months as DL4LF. Lee has a new 500-watt linear and 250-ft. long-wire in the works . . . . OY8KR spent some time in Israel recently but newly licensed OY3SL took up the Faeroes DX slack with an outburst of 7-Mc. QRP work. Neighbor OY7ML anticipates early visits by W6NJU and K2UYG . . . . SV0s WGG and WKK of Crete like 14-Mc. s.s.b. and c.w. respectively . . . . LIDXA observes that the most recent visit to Rockall island, that 70-ft.-high crag some 290 miles off England, was made in 1955 by an HMS *Vidal* helicopter. Nope, no QSOs.

OCEANIA — VK9TL will be the call used by VK3TL on Norfolk next month, s.s.b. and c.w. on 15 through 80 meters . . . . 5W1AZ (ex-ZK1BV) expects to be increasingly active on 20 c.w. . . . . FO8AG is firing up a new HT-37, and FO8BL is mounting a fresh TA-33 for the fray, according to W6JFM. Pat finds that the transceiver idea hasn't much appeal for overseas DX ops, many of whom like to scan nonham frequencies for weather, entertainment and SWBC news from home . . . . VK2AGH found Lord Howe isle free from TV, ignition noise, static and other civilization hindrances to DX reception. Nice 120-ft. pines for antenna masts, too, if you can negotiate them. VK2EO, WA6EPQ, W2s FZY and SCC helped open Graham's April operations. "QSOs seemed to occur in spasms. There were many times when I called CQs for half an hour with no reply although stations were working all around me. Then someone would find me and a small pile-up would develop. I'd knock it over and the sequence would repeat itself. IIZL and 5A1TW were firsts on their continents, HC8FN was also worked, but I still need him from the home QTH." WA6UNF got in just under the wire on April 28th, VK2AGH/LH's last QSO before packing for home . . . . VK2EO tells K5JVF that VK9DR should have concluded his holiday for return to Christmas by Christmas . . . . K5JVF finds VR4EG's 9-watter a good receiver-tester on 40 c.w. . . . . LIDXA learns that ex-KC6JC, Truk, may regain active DX status from Ponape soon.

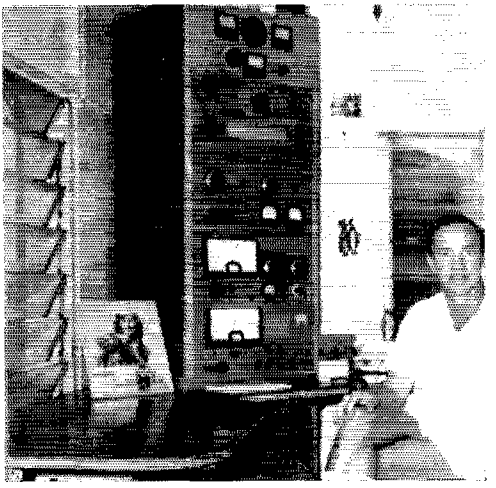
ASIA — AC3PT writes Ohio listener E. Riggle that he will be active this winter from the palace at Gangtok . . . . "We now operate from the British zone of Cyprus as ZC4s," writes an ex-5B4 to KP4TL. "The suffixes remain as before." ZC4s CZ GT and MO are among those available, the latter on a.m. . . . . "I finish my Peace Corps assignment at Ipoh in December," notifies 9M2JJ (W8SWN). "I will probably not immediately return to Michigan as I'm planning to do a little visiting about Asia. All my old *QSTs* will be left here for local interest. I'll miss the easy DXing from 9M2!" . . . . WB2FMK discloses that friend EP2DM now studies electronics on a Rotary scholarship at Southern Technical Institute, Box 8777, Marietta, Ga., and would like to hear from on-the-air friends through that address . . . . Seagoing K2EVW enjoyed a month's lay-over among the Bombay gang this summer. "The VU2s are a great group and they made me feel at home during my stay." . . . . "Just put up my antenna to begin a new DX career as KA2TP," writes ex-W2BTQ/-KH6, armed with his DX-20 and TA-33 jr. on 14- and 21-Mc. c.w. . . . . K5ZMS comments, "In my two years in Turkey I had ample opportunity to read the mail on h.f. bands. Despite the problem of unnecessary QRM, American hams on the whole adhere to the League's principles of good operating." Ray heard the Yank 75-meter s.s.b. gang regularly and feels they could work much more DX if they listened attentively toward the east during evening hours. 9M4LS generally agrees with K5ZMS's operational observations, testifying, "I have always found U.S. stations to be courteous, kind, helpful and patient during QSOs with me." . . . . Asia notes via the clubs and groups: HS1s BDJ and X and other Thailanders keep banging away on 20 around 1200 GMT but no W/Ks can apply (ITU/FCC Ban List). Same goes for PK4LB, Padang. . . . W9WNV/XU and K7LMU/3W8, a joint effort by Don and XW8AU, ran up several kiloQSOs in September-October Cambodia and Viet Nam DXpeditionary developments. 'Tis said that even W1FH needed XU-land. . . . VU2s GG GK GW LE MD NR on c.w., PP TP on a.m., AK CK and NR on s.s.b. head up DX action in India these days. Best time to W/K/VEs has been 1445-1600 GMT. . . . SU1IM/9K2 was a cute late-autumn item on 20, and MP4QBF/MP4T's call was code practice all by itself on 14-Mc. c.w. in October.

AFRICA — Ascension Island's local QRM continues to soar. ZD8s are becoming almost as plentiful as VP9s. ZD8WR (KH6FJM) is another latecomer with a KWM-2 on 20's high edge. "I'll also spend some time working straight-a.m. stations on the low end," promises Dick, expecting a six-month stay . . . . "7Q7GB is W5VIH from Amarillo," reveals W5UBW. "He's a teacher at a mission school near Zomba and will be there for two or three years. 7Q7GB soon will have a rhombic to go with his Invader and 2B on 14, 21 and 28 Mc., sideband and c.w." . . . . W0LBD tells of CE3XA's move to Madagascar where he hopes to become a 5R8 shortly . . . . ZE4JS, according to W3HNK, seeks Montana for WAS around 21,040 kc. at 1800 GMT on Tuesdays. WA0EMS finds that CR6DB hunts Wyoming for the same reason, 14,260 kc. around 2030 GMT on Saturdays . . . . Check with LARA, Box 1053, Nova Lisboa, Angola, for details on Z36A, a diploma awarded for proof of contacts with various African areas. Doesn't look easy . . . . CR7GF lists W7TDK, WA2EPO and W7WLL among winners of a July Mozambique DX test . . . . Africa addenda culled from the clubs press: ZD9BB zigzags about 20 c.w., 1300-1700 GMT on Sundays. . . . CR4BA, 21,130-kc. a.m., makes 15 worth watching with his 45-watt-fed quad. . . . TR8AD peek-a-boos around 14,015 kc. on c.w., 21,230 kc. on a.m., at 1830 GMT or so. . . . DLs 3ZG and 9HF, XYL and OM,

have a 20-meter sideband set with them on a tour that may touch TJ8 TN8 TR8 TT8 TZ2 5H3 7Q7, Rio de Oro and Ifni. . . . 7G1IX (OK1GL) shut down after some 3000 *contacts. Lada may be back in Guinea later.*

SOUTH AMERICA — W4QVJ advises, "Probably by the time December *QST* hits the hands of readers I will be either in flight or just starting operations from Easter island with an SR-150, SX-117, TH-2 beam and assorted dipoles for operation on 10 through 80 meters, c.w. and s.s.b. I believe this will be the first time for Easter on *single-sideband.* C.w. *frequencies will be* 3502 kc. at 1000 GMT daily, 7002 kc. at 1100 daily, 14,002 and perhaps 21,002 kc. on week ends. Phone spots will be 7097 kc. at 1030 GMT, 14,125 and 21,397 kc. on week ends. The trip entails a 20-hour over-water nonstop flight to and from the island with slight possibility of a short stopover on Juan Fernandez, scene of my October '63 operation. Probably no QSOs from J. F. this time." W6UF, a brass-pounder of long renown, is scheduled to accompany Ed. If conditions are poor it may not really matter, for this pair could manage it on ground wave . . . . . On the heels of the preceding dispatch comes notice from VE3DGX that he will sign CE0AG on Easter from the middle of this month through mid-February. "It looks like mostly single-sideband and some c.w. on 20, 75 and 80," says George, guaranteeing all DXers ample QSO opportunity. A load of Easter presents this Christmas, gang! . . . . . CX1FB, an inveterate 80-meter digger, asks K5JVF where all the 3.5-Mc. W/K/VEs are hiding . . . . . W6HAW and HK5EV haven't given up their San Felix DXpeditionary aspirations entirely . . . . . LUs 1ZC and 6ZM keep c.w. customers happy near 14,047 kc. . . . . KC4USN's 14,285-kc. sideband is often loud and clear off a rhombic and KWM-1 at the Pole. FB8YY, OR4VN, VK0s and other KC4s also are active on the icy continent.

HEREABOUTS — Are you ready for it? Can your station stand up to it? We mean Long Island DX Association's all-year-long DXCC Contest, a marathon beginning at the crack of midnight on the 31st of this month. Participation particulars appeared here last month, and further details are available from the LIDXC contest committee, W2s FGD MES, K2MGE and WA2QNW. The results should weed out DX has-beens from new-era *giants of the art. Better not tackle this project if you've* settled back to being just a sporadic DXpedition-chaser, OM, 'cause those fiery newcomers will be after your scalp . . . . . W1AW's W1WPR learns that FG7XC is among the Caribbean gang knocked QRT by this year's hurricane season. Many of our Fours and Fives took a beating, some of whom are just getting back in action with new skywires . . . . . Young Jamie, heir to the White fortune, seems determined to squeeze into the tight operating schedule of W1s WPO and YYM. Can't you slow down his *License Manual* progress with a new Thunderbird or something, Ellen? . . . . . K5JVF sews 160-meter seeds among his 80- and 40-meter contacts. Dave has KZ5EC, VP2AC, XE1AX and others interested in this season's topband possibilities . . . . . WA9ICQ/6 wonders when enterprising DX men are going to activate such private countries as Outer Baldonia and New Atlantis. The former lies off Nova Scotia and is owned by a U.S. businessman, while the latter, near Jamaica, is the property of a brother of late author Hemingway . . . . . "Been interested in hamming since my dad had a spark gap," writes WN2NVJ. "They even made an operator of me in the Army. I started to become a ham in '47 but various projects kept getting in the way. Finally, while building some hi-fi equipment, the bug really scored after 17 years. Today I worked my first DX, DJ5TH and HK4AOY. *What* a thrill! Where have I been all these years? I'll even throw away my golf clubs." Jack's advice to any new ham who would work DX: Master *the art of listening* . . . . . Old-time "How's" helper W6EAY backed off for a spell and comes back roarin' with 35 watts and a long-wire. "Got the new 4-400As final finished but I'm having more darned fun working KW6 JA OA VP8 FO8, etc., with a little 2E26 and no beam." Okay, Eric, but after a few pile-ups we bet you'll reach for that big red switch . . . . . K2RXQ/mm collected 2500 QSOs and 117 countries aboard Navy's USS *Lawrence* this summer, running s.s.b. and c.w. on 20 . . . . . WA2HUA will have an NCX-3 active as WA2HUA/VE8 for a spell . . . . . Local lore courtesy club organs: 6Y5LK dropped over to Grand Cayman for some 14-Mc. sidewinding in October. . . . QSLs from a certain assortment of 220 California stations may qualify you for NCDXC's California Award, details available through W6GPB. . . . K1NOL relinquishes his half of NEDXA *DX Bulletin* coeditorship due to a shortage of time. . . . W1EVT think he's a Six or something? *Vine* 140-ft. towers? . . . VP2KJ may try it from St. Lucia early in '65. . . . W6TI, with W6WX punching, spreads DX news on 14,002-kc. c.w. at 1600 and 2130 GMT on Sundays under auspices of the Northern California DX Club.



ZK1AR's 704 contacts in this year's ARRL DX Contest was an outstanding Oceania c.w. feat. Compare Trevor's current stacked installation with the photo of ZK1AR in "How's" for December, 1961. (Photo via W1YYM)

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Details appeared on page 35, August *QST. Let's hear from you.*

During October the following additional amateurs were nominated in recognition of their extra skills and courtesies:

WB2ACH	W5KSI
WB2DPR	K5LTK
K4CPX	WA6UUS
K4DAD	KN7UHF
WA4GAX	W8CXS
W4LWZ	VE2DR
K5ANK	VE8CO
	KC4USK

Strays

A new product from Viking Products, Orange, Massachusetts, will impress friends and shack visitors, and enable the owner to see at a glance his countries count and QSL confirmations. Numbered wheels behind six windows at the bottom of the two-color card allow for digital readout. The DX QSO Recorder measures 8 × 10 inches. A white area at the top of the gadget provides space for call letters or the station QSL card.

— . . . —

The National Electrical Code, 1962, to which reference has been made a number of times recently, is available in an inexpensive edition published by the National Board of Fire Underwriters, designated NBFU No. 70. W2GOK sent us a copy that he obtained for 30 cents at the local office of the Middle Department Rating Bureau in Pennsauken, N.J. Try your local building inspector's office.

18th V.H.F. Sweepstakes—January 9-10

ATTENTION v.h.f. operators! The 1965 V.H.F. Sweepstakes will start at 1400 your local standard time on Saturday, January 9, 1965, and end at midnight local time on Sunday, January 10. Remember, contacts count only when the contest is in progress at both ends of a QSO. So join in the fun this year. Just call CQ Sweepstakes or answer such a call.

Remember that, unlike the v.h.f. QSO parties, in the SS sections count only once no matter what band they are worked on, although you may work the same station on a different band again for additional contact points. Example: W1HDQ works W1FZJ on 50 and 144 Mc. for complete exchanges of 2 points on each band; 2 + 2 gives 4 points but only *one* section multiplier. So bandhopping will increase your score.

In scoring, the multiplier is the number of sections worked *plus ten*. Each complete exchange counts two points. Here is a scoring sample. Suppose W3HYJ made 100 contacts in 17 different sections:

100 QSOs
×2 (if all SS data exchanged in both directions)
200 (QSO points)
×27 (17 sections plus 10)
5400 (claimed score)

You can get log forms by writing to ARRL, 225 Main St., Newington, Conn. 06111. Let us know how many you need. Logs must be postmarked by February 6 to be eligible for score listing and awards.

Rules

1) *Eligibility:* Amateur operators in any ARRL section (see page 6) operating at home, or mobile or portable *under one call* on or above 50 Mc. are invited to take part. Yukon-N.W.T. (VE8) counts as a separate multiplier.

2) *Object:* Participants will attempt to contact as many other stations in as many ARRL sections as possible.

3) *Contest Periods:* The contest starts at 2:00 P.M. your local time, Saturday, Jan. 9, 1965, and ends at midnight, Sunday, Jan. 10, 1965. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the zones concerned.

4) *Exchanges:* Contest exchanges, including all data shown in the sample, must be transmitted and receipted for as a basis for each scored point.

5) *Scoring:* (a) Contacts count *one point* when the required exchange information has been received and acknowledged, a *second point* when exchange has been completed in both directions.

(b) Foreign entries: All contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together as one, and a section multiplier of *no more than one* may be claimed for contacts with all foreign stations contacted. Foreign stations may only work stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

(c) Final score is obtained by multiplying total contact points by the sum of different ARRL sections worked (the number in each of which at least one SS point has been credited) plus 10.

6) *Conditions for Valid Contact Credit:* (a) Repeat contacts on other bands confirmed by completed exchanges of *up to two points per band* may be counted for *each different station* worked. (*Example:* W1HDQ works W1FZJ on 50 and 144 Mc. for complete exchanges of 2 points on each band; 2 × 2 gives 4 points but only *one* section multiplier.)

(b) Cross-band work shall not count.

(c) Portable or mobile station operation under one call, from one location only, is permitted.

(d) A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest (with the exception of family stations, where more than 1 call is assigned to one location by FCC/DOT).

(e) Contacts with aircraft mobiles cannot be counted for section multipliers.

(f) Contacts made by retransmitting either or both stations do not count for contest purposes.

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e able to communicate over at least a mile).

7) *Awards:* Entries will be classified as single- or multi-operator, a single-operator station being defined as one manned by an amateur who neither receives no gives assistance to any person during the contest period. Certificates will be awarded in each ARRL section to the top-scoring amateur in the single-operator classification. In addition, a certificate will be awarded to the top Novice in each ARRL section where *at least three* such licensees submit valid contest logs. Multioperator work will be grouped separately in the official report of results in *QST*.

When three or more individual club members compete and submit logs naming the club with which they are identified, an ARRL certificate will be issued to the leading club member. When less than three individual logs are received there will be no club award or club mention.

A gavel with an engraved sterling-silver band will be offered the club whose secretary submits the greatest aggregate score, provided such scores are confirmed by receipt at ARRL of the *individual contest logs* from such members. Only the score of a bona fide club member, operating a station in local club territory, may be included in club entries. Claims from federations, radio club councils, or other combinations of radio clubs, will not be accepted, nor can special memberships granted for contest purposes be recognized.

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

9) *Reporting:* Reports must be postmarked no later than Feb. 6, 1965, to be considered for awards. QST

EXPLANATION OF V.H.F. SS CONTEST EXCHANGES

Send Like a Standard Msg. Preamble, the.....NR		*Call*	*CK*	*Place*	*Time*	*Date*
Exchanges	Contest numbers 1, 2, 3, etc., a new NR for each station worked	Send your own call	CK (Readability and strength or RST of nation worked)	Your ARRL section	Send time of transmitting this NR	Send date of QSO
Sample	NR 1	W1AW	59	CONN	1402	JAN 9

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr.

Seasonal Messages . . . How to Start Them. It's about that time of year again and the spirit of Thanksgiving and Christmas have a special personal and family appeal. There's a fine holiday spirit. Also we want to say that the holiday season is one of the great opportunities for participating amateur radio operators to demonstrate the use of the favorite hobby to exchange greetings and other appropriate messages of good will both for amateurs and others.

Amateurs newer in the game as well as the old timers can use the new ARRL Net Directory (out early this year), also their own state or section net as their entré for origination and handling of the message *they* start, to be relayed to almost any domestic destination. Let us here note for the benefit of many new timers that regular routes do *not* exist to most other countries outside our U. S. A. and Canada. (International 3rd party communications by amateur radio are taboo, forbidden by treaty except with the amateurs of some eighteen other nations that have deposited special agreements with the U. S. Department of State. In these countries which are mostly in this hemisphere certain third party exchanges are permitted, but as an exception to the general rule). We are permitted by FCC's Sec. 97.111, freely to handle traffic, holiday or other, as long as there is no compensation, direct or indirect from use of our amateur station authorization. But we started to explain for the uninitiated just how best to make use of our amateur service's "messaging capability." In short how do you set up as a real communicator.

On Preparing the Message. The simplest thing is to put this on an official ARRL message form. This gets the parts all in the right order to send. You will have to put an R (for routine) precedence between the number you give the message and the station of origin (your own station call), the three items that go at the start of the message. There's to be an extra box for this precedence indication on the next re-do of our message form. Consult our (gratis) operating booklet for the message form and details as to the meaning and purpose for each part of the message. It's very important to get the address correct and complete. Put the telephone number after the address if you have it; this is to give greatest assurance the message gets through and can be delivered.

Sending Your Traffic. Be sure to send your message with all the parts in this correct order; any other order invites the possibility of errors. Unless you have a direct radio schedule with an amateur at the delivery point, you will be wise to put it through your (or the nearest) local traffic net. It does not usually pay to gamble on any casual amateur you run into that he will be interested, even if you can find one near the destination. You can try this sometimes by using a directional CQ. But 'tis preferable just to *listen* thumbing through your call book, as you pick out someone to call who seems to be at or close to your addressee. But there are much better ways to insure how traffic can move toward your addressee.

Our firm recommendation is to set up on your section net frequency. See the net directory listings and find the frequency and operating time for such a net. You may also consult the Station Activities in *QST*, for possible traffic stations and section net frequencies. Most of the section nets, phone or c.w., are part of NTS, the National Traffic System. The net control can direct the proper station to take your message (when he tells you to send it) so it will be relayed through the regional and area points to get to the state of destination. Listen on the net frequency for the Net Call; report in when recognized by the NCS giving the state or city your message is for. Hold your traffic until told what station to give it to. Then when your message is acknowledged by radio by this station (after any necessary fills) this conveys the acceptance of that operator's individual responsibility for further handling. The message will go forward by later connecting 'skeds' and you can rest easy that your message is on its way.

If you're not active or on the air by any chance you can of course try to file your message with any nearby amateur that you know holds official station appointment, such as ORS, OPS, or OES (v.h.f.) who has net connections or traffic outlets. We think though there's lots *more* satisfaction in sending the message from your own station equipment, by your own hand and skill. Such can be high adventure, if you've never attempted this. We recommend that you start your holiday traffic any time in early December and not wait until late in the month when there may be so much seasonal traffic your message suffers delay. Incidentally remember that you can report on a net *anytime*, all year, and enjoy the close association with these operators. In most cases you are *even more welcome* in any intermittent reporting on the net, if you have a message to send.

News? W6QMO on behalf of the Northern California Amateur Radio Teletype Society is lining up local members who can use their RTTY gear when the time comes, punching teletype tape for a computer facility in connection with the expected reports on Oscar III. *Dora* and *Hilda* were bad actors and furnished us with major problems in the disaster field in the south and along the Gulf Coast. Amateurs as usual rose to the occasion to provide advance weather warnings and to maintain emergency communications circuits. Look for the reports on this work in this and subsequent issues of *QST*.

About Training and Slow Speed Nets. ARRL welcomes all reports on the scheduling of nets that help with our self-training and the acquisition of sharp procedure knowledge and traffic know-how. The 1964 Net Directory, just issued lists quite a few groups and all newer amateurs might do well to monitor the operations of these and the regular traffic nets to become familiarized with the procedures. Knowledge of clean, disciplined, practical operations is the basis for all successful traffic and DX work, and the way to be a contributor rather than an impediment in any operating situation.

An excerpt from the Net Directory may be of interest to those who would like to tune-in on some such nets, or arrange to take part or start similar nets.

The days of operation and the time follow the name of the net:

3663 Kc.	QMN Slow Speed Net (Mich.)	Dy 2300 GMT
3682.5 Kc.	Oklahoma Slow Speed Net	M-S 0345 GMT
3690 Kc.	Slo Net (WØ)	Mon. 0200 GMT
3700 Kc.	Northwest Slow Speed Net	Dy 0300 GMT
3710 Kc.	Wisconsin Training Net	T-S 0130 GMT
3715 Kc.	Mo. Slow Speed Net	Dy 0300 GMT
3725 Kc.	N. J. Novice Net	T, Th 0020 GMT
3733 Kc.	E. Mass. Novice Net	MWF 2230 GMT
3745 Kc.	Miss. Novice Tfc. and Training Net	M-S 2330 GMT
3748 Kc.	Eastern Area Slow Net	Dy 2300 GMT
3775 Kc.	Colo. Training Net	Sn T Th 0345 GMT

We know of few better ways to get code and procedure experience up first than to belong to some net that makes a point of traffic and procedure. SCMs will welcome and assist those who wish to get together to form such nets. We shall welcome reports on the organization of training nets so we can arrange to list them, and we hope to register all (in CD-85) where they have continuing significance.

The ARL-Check. Numbered text messages are a special tool of the trafficker, not only for holiday needs, but for amateur work in disasters as called for. The CD-3 forms (in the back of each ARRL logbook also) list all such messages. To shorten transmission at such times when the circuits are likely to be overloaded the ARL numbers (representing messages) go in the place of all these words in the texts. Purpose is not to conceal meanings but for abbreviation so more traffic can be passed in a short time.

When a text is condensed to a number from the ARL-abbreviations, ARL should be sent *both* in the group count or check and just ahead of the spelled-out number in the text. Receiving operators at destination must of course expand all such messages to the full text. The person to whom the message is delivered unless a trafficker himself would be left in the dark unless you as the expert delivering the radiogram "spell it out" in accordance with the CD-3 list of ARL texts. Any amateur *not* having this list can get one without charge if he will originate a radiogram to ARRL CD requesting CD-3.

Other Holiday Work Possible. You will find lots of both voice and c.w. traffic nets operating. Some 702 nets to operate are registered this season. If you specialize in voice operation the holidays may offer other ways to operate constructively. This might be your time to ask some persons who are not licensed and who have no way to visit distant families to talk to their friends and convey greetings back and forth across the country. You must remember, of course, to log the names of any "third parties" who talk, or visit your shack, as per FCC rules (sec. 97.103 (b). Best of success with amateur radio operations in the holiday season.

— *F.E.H.*

A.R.R.L. ACTIVITIES CALENDAR

Dates shown are in GMT

Dec. 3: CP Qualifying Run — W6OWP
Dec. 19: CP Qualifying Run — W1AW
Jan. 8:CP Qualifying Run — W6OWP
Jan. 9–10: V.H.F. Sweepstakes
Jan. 16–17: CD Party (c.w.)
Jan. 19: CP Qualifying Run — W1AW
Jan. 23–24: CD Party (phone)
Feb. 1: CP Qualifying Run — W6OWP
Feb. 6–21: Novice Roundup
Feb. 12: Frequency Measuring Test
Feb. 13–14: DX Competition (phone)
Feb. 17: CP Qualifying Run — W1AW
Feb. 27–28: DX Competition (c.w.)
Mar. 13–14: DX Competition (phone)
Mar. 27–28: DX Competition (c.w.)
June 12–13: V.H.F. QSO Party
June 26–27: Field Day

OTHER ACTIVITIES

The following lists date, name, sponsor, and page reference of *QST* issue in which more details appear.

Dec. 5–6: New England QSO Party, Connecticut Wireless Assn. (p. 138, this issue).

Dec. 5–6: 21/28 Mc. Telephony Contest, RSGB (p. 102, this issue).

Dec. 12–14: Virginia QSO Party, Roanoke Valley Amateur Radio Club (p. 88, last month).

Dec. 13: Tenth Annual Wisconsin QSO Party, Milwaukee Radio Amateurs' Club (p. 94, last month).

ELECTION NOTICE

To all ARRL members residing in the Sections listed below:

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are *required* on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be received at ARRL on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nominating form is suggested. (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL [place and date]
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— *F. E. Handy, Communications Manager*

Section	*Closing Date*	*SCM*	*Present Term Ends*
West Indies	Dec. 15, 1964	William Werner	Aug. 10, 1963
Alaska	Dec. 15, 1964	Kenneth E. Koestler	Apr. 10, 1964
Mississippi	Dec. 15, 1964	S. H. Hairston	Sept. 27, 1964
Connecticut	Dec. 15, 1964	Robert J. O'Neil	Feb. 6, 1965
North Dakota	Dec. 15, 1964	Harold A. Wengel	Feb. 11, 1965
Colorado	Dec. 15, 1964	Donald Ray Crumpton	Feb. 14, 1965
Minnesota	Dec. 15, 1964	Mrs. Helen Mejdrich	Feb. 23, 1965
Sacramento Valley	Dec. 15, 1964	George R. Hudson	Feb. 25, 1965
Missouri	Dec. 15, 1964	Alfred E. Schwaneke	Mar. 1, 1965
Eastern Florida	Dec. 15, 1964	Guernsey Curran	Resigned
Maine	Dec. 15, 1964	Arthur J. Brymer	Resigned
British Columbia	Feb. 10, 1965	H. E. Savage	Apr. 10, 1965
Michigan	Feb. 10, 1965	Ralph P. Thetreau	Apr. 10, 1965
Alberta	Feb. 10, 1965	Harry Harrold	Apr. 10, 1965
North Carolina	Feb. 10, 1965	Barnett S. Dodd	Apr. 10, 1965
Idaho	Feb. 10, 1965	Raymond V. Evans	Apr. 10, 1965
Canal Zone	Mar. 10, 1965	Thomas B. DeMeis	May 10, 1965

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Maryland-D.C. Bruce Boyd, W3QA Dec. 10, 1964
Alabama William S. Crafts, K4KJD Dec. 26, 1964

In the Montana Section of the Northwestern Division, Mr. Joseph A. D'Arcy, W7TYN, and Mr. Joseph H. Radcliffe, K7EGJ, were nominated. Mr. D'Arcy received 78 votes and Mr. Radcliffe received 70 votes. Mr. D'Arcy's term of office began Sept. 9, 1964.

In the Nevada Section of the Pacific Division, Mr. Leonard M. Norman, W7PBV, and Mr. Charles A. Rhines, W7VIC, were nominated. Mr. Norman received 74 votes and Mr. Rhines received 53 votes. Mr. Norman's term of office began Oct. 22, 1964.

In the New Hampshire Section of the New England Division, Mr. Robert Mitchell, W1SWX/K1DSA, and Mr. Henry L. Sepessy, W1YHF, were nominated. Mr. Mitchell received 169 votes and Mr. Sepessy received 55 votes. Mr. Mitchell's term of office began Oct. 26, 1964.

A.R.R.L. AFFILIATED CLUB HONOR ROLL

This December we're proud to list more Honor Roll clubs that will shortly receive our "100% ARRL club" certificates. June '64 *QST*, page 106, carried the earlier section of our Honor Roll including all then-known affiliates having recorded in their '64 Club Report their 100 per cent ARRL membership. Each year our listings are completed from data given us in the current Club Annual Report (CD-18) forms. Next February we plan again to forward to every active ARRL-affiliated radio club the form for new annual filings. This will be examined in connection with the Board's 51 per cent requirements for continuing affiliation and also for further *QST* 100%-listings.

The Honor Roll clubs are those whose *entire* membership consists of members of the League and are additional to those commended with such special recognition in June *QST*.

Binghamton A. R. Assn., Binghamton, N. Y.
Blue Ridge Radio Society, Inc., Greenville, S. C.
Butler County V.H.F. Association, Hamilton, Ohio
Casper V.H.F. Society, Casper, Wyo.
Delmont Radio Club, Glenside, Pa.
Enid Amateur Radio Club, Inc., Enid, Okla.
Hi Line Radio Club, Havre, Mont.
Inglewood Amateur Radio Club, Inglewood, Calif.
Loudon County Amateur Radio Club, Lenoir City, Tenn.
Mid-Island Radio Club, Freeport, L.I., New York
Mike and Key Club, Inc., Greenville, So. Car.
Minute Man Radio Club, Whiteman AFB, Mo.
Nortown Oldtimers' R. Assn., Toronto, Ont., Canada
Palmetto Amateur Radio Club, Inc., Columbia, S. C.
Rhododendron Swamp V.H.F. Society, Medfield, Mass.
Smoky Valley Radio Club, Inc., Abilene, Kans.
Southeastern Mass. A. R. Assn., Inc., South Dartmouth, Mass.
Southern California V.H.F. Radio Club, Paramount, Calif.
South St. Louis Amateur Radio Club, Crestwood, Mo.
Wichita Amateur Radio Club, Inc., Wichita, Kansas

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of Amateur Radio Clubs, Inc., Ronald D. Mayer, W7NGW, Secy., P.O. Box 1335, Portland, Oregon 97207

Amateur Radio Council of Arizona, Bob Dreste, K7VOR, Chairman, P.O. Box 3073, Scottsdale, Arizona

B. C. Amateur Radio Association, Dave Gilmour, VE7YG, Secy., 1150 Comox Street, Vancouver 5, B.C., Canada

Central California Radio Council, Virginia Schooley, WA6PTU, Secy., c/o NPEC, 22 Alta Vista Dr., South San Francisco, Calif.

Council of Amateur Radio Clubs of Delaware Valley, Jonathan B. Baleh, W3AES/K3HWX, Secy., 903 Chetwynd Apts., Rosemont, Pa.

Federation of Eastern Massachusetts Amateur Radio Associations, Eugene H. Hastings, W1VRK, Secy-Treas., 28 Forest Avenue, Swampscott, Massachusetts

Federation of L. I. Radio Clubs, Inc., Warren Mayer, W2OUQ, Secy., 25 Allard Avenue, Rockville Centre, L.I., New York

Manitoba Association of Amateur Radio Clubs, Gordon F. Cummer, VE4CF, Secy., 88 Sunset Blvd., St. Vital, Winnipeg 8, Manitoba, Canada

Michigan Council of Clubs, Howard W. Rieman, K8IIN, Secy., 16124 Locherbie, Birmingham, Mich.

Ohio Council of Amateur Radio Clubs, James W. Benson, W8OUG, Secy., 2463 Kingspath Drive, Cincinnati, Ohio 45231

Puget Sound Council of Amateur Radio Clubs, Inc., Bob Stuart, W7ECX, Secy., 106 W. Main St., Centralia, Wash., 98531.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090 21,090 kc.
WIDE-BAND F.M. 52,525, 146.94 Mc.

W1AW SCHEDULES

Operating Hours

Daily: 2330 to 0530 GMT.

While the reconstruction program is in progress, there is *no* provision made for visiting of the station. Visitors to the ARRL headquarters building, located on the same premises, are of course welcomed during regular office hours from 8:15 A.M. to 4:30 P.M. EST Mon. through Fri. The station will be closed Dec. 25, Christmas Day, and January 1, 1965, New Years' Day.

Operating Frequencies

C.W.: 3555 7080 14,100 **Voice:** 3945 7255 14,280

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:

C.W.: Mon. through Sat., 0100; Tues. through Sun. 0500.
Voice: Mon. through Sat., 0200; Tues. through Sun., 0430.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Dec. 19 at 0230 GMT. Identical tests will be sent simultaneously by transmitters on 3555, 7080 and 14,100 kc. The next qualifying run from W6OWP only will be transmitted Dec. 3 at 0500 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0230 GMT Dec. 19 becomes 2130 EST Dec. 18.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m. you may try later for endorsement stickers.

Daily tape-sent code practice transmissions are available on an expanded basis this season. The'e start at 0030 and 0230 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0230–0320; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0230–0320, 10, 13 and 15 w.p.m. daily from 0030–0100 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0230–0320 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your list by sending *in step with W1AW* and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0230–0320 GMT practice on those dates:

Date Subject of Practice Text from Oct. *QST*

Dec. 2: *It Seems to Us*, p. 9
Dec. 8: *Coaxial-Tank V.H.F. Filters*, p. 11
Dec. 11: *A Different . . . Antenna System*, p. 34
Dec. 17: *Oscilloscope Setups . . .*, p. 40

Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition

Dec. 21: *Parallel Resonance*, p. 25
Dec. 30: *High- and Low-Q Circuits*, p. 25

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for September Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
K6BPI	81	2288	2167	121	4657
K0ONK	195	2097	2032	83	4407
W3CUL	191	1973	1860	102	4126
WØLGG	136	710	616	42	1504
WØBDR	37	690	682	14	1423
WA9CCP	70	880	564	61	1375
W7BA	4	566	526	39	1135
W7DZX	12	573	460	3	1048
WA9BWY	219	391	388	33	1031
W6RSY	22	428	389	121	960
K9IVG	9	459	401	9	878
WØOHJ	20	403	383	20	826
K9KZB	18	382	365	17	782
W2RUF	21	409	253	71	754
WB6JUH	39	344	302	41	726
W1PEX	94	310	267	32	703
K1WKK	15	344	340	3	702
W3EML	34	379	269	3	685
K7JHA	24	325	303	3	655
W3VR	32	291	283	5	611
WA2RUE	42	294	222	23	581
W5CEZ	18	289	244	8	559
W6JXK	8	267	29	238	542
W9CXY	56	243	238	5	542
W4DLA	20	289	247	5	541
K4VEY	128	201	190	11	530
K5TEV	1	251	255	6	518
WA2UWA	17	248	233	10	508
W8UPH	8	247	205	41	501
Late Report:					
K0ONK (Aug.)	125	815	792	64	1796
W7DZK (Aug.)	11	422	376	3	812
K1WKK (Aug.)	30	292	275	3	600
W3NEM (Aug.)	31	266	232	34	563
WB6BBO (July)	43	271	243	5	562

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	851	1545	1113	432	3941
W6YDK	1579	601	587	18	2785
KR6GF	704	17	5	46	802
K9OUN/6	10	317	301	6	634
Late Report:					
W6YDK (Aug.)	2348	419	400	19	3186

BPL for 100 or more *originations-plus-deliveries*

K4FLR 210	W4RHA 137	WA4IMC 112
W7APS 208	WA2TQT 130	VE3DRF107
WA9CNV 191	WA8DDI 125	W1UYY 105
W2EW 181	W2OE 124	WA9IZR 105
WA4BMC 162	W5GHP 117	K9IMR 103
K6GZ 138	W8DAE 117	W1BGD 102

BPL medallions (see Aug. 1954, p. 64) have been awarded to the following amateurs since last month's listing: W1LES.

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 origination 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.

W1AW NOTE

The building construction changes at W1AW are well nigh complete, antenna and other changes are still in progress. Operating continues from the temporary location in the basement as we write this in October. Full bulletin and code practice schedules continue to be sent on our 20-, 40- and 80-meter frequencies. Note elsewhere on this page the frequencies and times for bulletins and for the two daily sessions of tape-sent code practice so as to make full use of these services.

When power has been restored to the enlarged operating spaces, operations will be transferred upstairs. Resuming our schedule from new operating positions will then have first priority. The schedules on additional operating bands will be reinstituted as rapidly as new equipment under construction and procurement becomes available and is installed.

DX Century Club

The following list contains the call letters and country totals of holders of the DX Century Club Award who have submitted confirmations to ARRL for the period from October 1, 1962 through September 30, 1964. New Members in DXCC for the period from September 1, through September 30, 1964 also appear in this list. DXCC members qualifying for the Honor Roll appear in the Honor Roll list below. Since the necessary space to run the complete DXCC Roster is not available (the total number of DXCC certificates issued as of September 30, 1964 was 10,138), this list contains only the calls and totals of those who have shown an active interest in their DXCC rating over the indicated 24-month period.

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries, less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date and time of receipt. All totals shown represent submissions received through September 30, 1964.

W1FH.....311/337
CX2CO.....311/332
W9RBI.....311/336
W6CUQ.....311/336
W8BRA.....311/334
W8JIN.....311/336
W4GD.....311/332
G4CP.....311/335
G3AAM.....311/335
W2AGW.....311/335
W4DQH.....311/335
W8UAS.....311/332
W8PQQ.....311/328
W2TQC.....311/330
4X4DK.....311/329
W7GUV.....311/334
W3GHD.....311/335
KV4AA.....310/334
W1GKK.....310/335
PY2CK.....310/333
W9NDA.....310/334
W2JT.....310/329
W8KIA.....310/334
W3LMA.....310/332
W2BXA.....310/334
W2DEC.....310/326
W8DMD.....310/332
W7PHO.....310/328
W8MPW.....310/328
W8BF.....310/331

W2LV.....310/329
W9YFV.....310/334
W1ME.....310/333
W2LPE.....310/331
W1BIH.....309/333
G2PL.....309/332
W9LNM.....309/332
W0QVZ.....309/330
W8QCW.....309/326
W9HUZ.....309/329
W8EWS.....309/333
W5MMK.....309/330
K3UPG.....309/333
W8JBI.....309/328
DL3LL.....309/325
W0DU.....309/331
CE3AG.....309/333
W3KT.....309/333
W2BOK.....309/326
W2ZX.....309/328
HB9J.....309/333
W8KML.....309/329
W1JYH.....308/331
W6YY.....308/328
W7GBW.....308/332
W4TM.....308/330
W0AIW.....308/331

W6EBG.....308/333
W8LKH.....308/328
W4AIT.....308/331
W4ML.....308/328
K2DCA.....308/325
VE7ZM.....308/332
LU6DJX.....308/332
W6GPB.....308/329
W5KC.....308/331
W1CLX.....307/330
W6AM.....307/332
W5ABY.....307/324
W2ZGB.....307/323
W0BFB.....307/325
OE1ER.....307/329
K2BZT.....307/324
W0ELA.....307/330
W2SUG.....307/324
W3JTC.....307/330
W0ODF.....307/324
W2UVE.....307/325
W5CKY.....307/326
WH6GW.....306/331
G8KS.....306/324
W7ENW.....306/330
W8DAW.....306/329
W2OKM.....306/324
W2FXN.....306/320
K4LNM.....306/320
W2FVR.....306/324

W2WZ.....305/328
W0SYK.....305/323
W1ZW.....305/322
K6ENX.....305/322
W4LYV.....305/325
W3EGR.....305/322
5Z4AQ.....305/323
W2LAX.....305/322
W2AYJ.....305/324
W4GXB.....305/326
W4VPD.....305/322
WØNTA.....305/325
W1MV.....305/322
K2GFQ.....304/325
W5ADZ.....304/326
W6CYV.....304/322
W4MR.....304/324
W9AMU.....304/321
W2GUM.....304/326
W7AG.....304/328
W4OPM.....304/319
W1HZ.....304/322
G3YF.....304/326
W5AFX.....304/329
W2HMJ.....304/324
K6EVR.....304/321
W8PUD.....304/321
K2DEA.....304/320
DJ2BW.....304/321
W5UX.....304/319

W3GAU.....304/327
W3RNQ.....304/322
W5ASG.....303/327
W2SAW.....303/320
W9KOK.....303/327
W8IRN.....303/321
PA0FX.....303/323
IIAMU.....303/322
W3WGH.....303/318
W2FZY.....303/316
G3FXB.....303/321
W4PLL.....303/318
HB9MQ.....303/320
W7WVE.....303/320
K2LWR.....303/316
K4RID.....303/317
W0PGI.....303/318
W8NGO.....302/319
W4OM.....302/324
W5OUG.....302/323
W9GIC.....302/319
W0QGI.....302/318
K4AIM.....302/316
W6WWQ.....302/319
W2OHH.....302/323
HB9FL.....302/318
ON4DM.....302/321
W4BYU.....302/320
W2HTI.....302/317

Radiotelephone

CX2CO.....311/332
W9RBI.....311/334
PY2CK.....310/333
W3RIS.....310/335
W8GZ.....310/333
W7PHO.....310/328

4X4DK.....310/328
W8BF.....310/331
W1FH.....309/330
W2ZX.....309/328
W4DQH.....309/331

W8PQQ.....308/325
W8KML.....308/329
5Z4ERR.....308/330
PY4PK.....308/325
W6YY.....307/327

W3JNN.....307/328
W2JT.....307/321
W2BXA.....305/327
W9JFF.....305/322
W0AIW.....304/325

W8HGW.....302/324
W4QGW.....302/315
IIAMU.....302/321
W6AM.....302/320
T12HP.....301/323
ON4DM.....300/319

323
W8BKP
VK3KB

322
ZL1HY

321
W6KEV

320
W6EPZ
W6TZD

319
W2YTH
W3CGS
W4LVV
W5KBU
G3AAE

318
W5EGK
W6LDD
DL3RK
G5VT

317
G6ZO
W2CYS
W3EVW
W6TS
W9FID
WØMLY
SM5LL

316
W2DS
WA2IZS
W2NUT
W3EPV
W5IGJ
W9FKC

315
W5PQA
W6BZE
W9WHM
W9YSX
DL6EN
HB9EU

314
W6CYI
W7KTN
W9UXO
DL1IN

313
K6EC
WØNLY
WØPNQ
DL7AA

312
W2CNT
W2DOD
K2UVU

311
W2GT
W2HO
W2SSC
W4AAU
K5BGB
W5HDS
W6BVM
W6PUY
W8TMA
G3DO

310
W1FZ
W2PCJ
W2TP
W3NKM
W3OP
W5LGG
W5PSB
W6CAE
W6FOZ
W6OSU
W9HCR
VE3DIF
G2BVN
SM3BIZ

309
W1RB
W9SFR
WØVBQ
VE2WW
LA7Y

308
W5CE
W6ID
WØBTD
DL7BA

307
W1BAN
W2CR
W3IYE
W4BJ
W4CFD
W4EPA
W5BRR
W5PM
W7HKT
WØAJU
WØBMQ
IT1TA1

306
W1GYE
W3KVQ
W3LMO
K4RPK
W6ANN
W6BSY
W6CHV
W2GLF
W2JVU
W5QK
W7ADS
W7GXA

305
W2ESO
W6NJU
W7CMN
W8ONA
VE3BWY

304
W1ZZK
W4BQY
W8WZ
W9FVU
KØRAL
G6XL

303
W1ADM
W1HA
W2AEB
W2GNQ
W4DKP
W4LRN

302
W1IAS
W2CTO
W4AZK
W4DHZ
W4NNH
W6KZL
W8CLR
WØTJ
VE2NV

301
W1AZY
W2BBS
W3ZAO
W4DQS
W4ZRZ
W5MMD
WA6EYP
W6NGA
W6VE
WØIJW

300
K2FC
W2RDD
W3KDP
W3MFW
K4ICK
K4PDV
K4RJN
W4SSU
W6UOV
K6VVA
KH6CD
K8LSG
W9EXY
W9GFF
W9HB
W9RKP
DL1BO
GI3IVJ
OH2NB
W8GLK
W8JSU

299
W2RGV
W7CMO
WØGKL
JA1DM

298
W2SHC
K6LGF
W6MX
W6TXL
W9MQK

297
W2EQS
W5BUK

296
W9KXK
W9QYW
W9YNB
DJ3KR

295
W2CTN
W2IRV
W5AWT
W5FFW
W7EJD
W8KBT
W8ZCQ
PAØLOU
ZP5CF

294
W1CKA
K4TML
W9DWQ
CR6BX

293
W2BRV
PZ1AX

292
W1CBZ
W1WDD
W3GJY
W3RUT
W7AQB
KL7PI
VE3RE
G3HDA
LU5AQ
YS1O

291
W1TS
W4KFC
K6RWO
W8PHZ
VE3ES
DL9OH
LA5HE
W9FJB
G2BOZ

290
W1TYQ
W2FBS
W2FXA
W2MUM
W3MWC
W4BBR
W4CKB
W4JDR
K4JVE
K6CQM
W6KG
K6KII
W6MVL
W6OME
W6SQP
W6ULS
K8ONV
K9CJK
K9EAB
W9JUV
W9WFS
WØMCX
DL3BK
F3YR

289
W1BGA
W1KXU
W4AVY
W6LN
DL1KB
ON4NC
YV5AB

288
W1BGW
G3HCT
KP4CC
SM5CO

287
W1OOS
W4EEE
W6DQH
W6UHA
W7BTH
SM5CCE

286
W1OJR
F8BS

285
K5ADQ
W7HIA
WØAIH
WØANP
KP4WD
ON4FU

284
W1MQV
W2HSZ
W2KIR
W2WMG
W5NW
W8SZS
WØLWG
VE2BV
VE2YU
VE4XO

283
W2VUF
W3PGB
K4GSU
W4HA
K4ZKI
W6GMF
W6IBD

282
W1ELR
K2CPR
W2ZKQ
W4GRP
W4MCM
W6HX
W9WYB
LA3DB

281
WA2ELS
W4IF

277
W4MS
W6WX
KH6IJ
W7AH
W8EV
W9TKV
WØBSK
WØSNL

280
W1RAN
W2CWK
W2ZVS
W3AYD
W4HUE
W4UKA
G3AIZ
PY4OD

279
W1ACB
W7DLR
ZL1AH
ZL2HP

278
W1ORV
W5EJT
W7ZAS
W8QJR
W9GDI
W9PQA
DJ3JZ

276
W1JNV
W9LTR
VE1PQ
KP4YT
HB9EO
W6UQQ
K8OHG
DL7EN
ZS1RM

275
W1WY
W2HQL
W2ICO
W2TQR
W5ARJ
W5QVZ
W8WT
DL3ZI
EA1BC
TG9AD

274
W1AEW
W5PWW
WØDEI

273
K2QHL
W2JAE
W3AFM
W4NT
W6HYG
W6STA
W8SCU
K9AGB
K4EDF
K4HNA
W4JJL
W4NJF
W5DA
ZS1OU

272
W1EOB
W2EMW
K4LPW
W4RBZ
WØNFA
DL7AB

271
W1OHA
W1UOP
W2FAR
WA2OJD
W3DKT
W3KBC
W6BUO
W6GRX
I1XK
PY1GJ

270
K1SHN
W2JAE
W2MES
K2ZKU
W3PN
W3WU
K4ASU
K4EDF
K4HNA
W4JJL
W4NJF
W5DA

W6BYB W6PBI W6YK W7GHB W7UMJ W9RQM W9UZS W9WIO VE6JR G3NUG HB9KU KZ5WZ ZS6FN

269
W1ICP W2BMK K2JGG K9BVR W9QIY JA2JW

268
VE3DKY SM7QY

267
W4OEP W7BA W8IBX

266
W1LHZ WA6TGY OY7ML

265
DL7AP G2FFO JA7AD ZP5ET

264
K4TWF W5VSQ W6KUT W6KYG VE3PK DJ2KS HB9UL LA8LF SM7MS ZP5LS

263
W2AZS W2BHM W3GRS K4AJ W4RLS W5HJA WA6SBO W7BGH G3FNN I1UA

262
W6AFI WA6AMZ W8KMD W2MJ W4BFR W4THZ W5TIZ W6BIL K6EDE W6PHF DL1DC DL7CS

260
W2LSX W2OBX W2PDB W2RWE W3INH K4HYL W4JII K4SCT K4TEA K4WIS W6LGZ W7CSW W8CUT K8IKB W8QNW W9TKD

WØAUB KØLFY WØOAQ VE2WA VE3JZ KP4RK ST2AR

259
W1BGY K2GUN W3KFQ W3RBW W5WW W7AUS I1SM

258
W3VKD G6LX SM5WJ

257
W1FQA K1MLI W1YDO W9PIO WØLBB VE2YA PAØRLF

256
W5LCI WØYCR G3BHW I1ZL

255
W1FPH W2CKY K4BVQ W9HKL VE6TP

254
W1BPW W2AYU W2GDX W3LPF W4VZB W5QN W9HLY W9IHN VE5JV DL1EE KP4AOO

253
W6ATO K6BHM WA6DUG K6EIV W8YBZ OE1FF SM5WI

252
W2DXX W3AYS W4EEO W4HVQ K8WOT W9ERU W9ZB VE7CE G6VQ SP9KJ

251
W1AJG W1BOD W2QKJ K4HRG W4NO W8LY F8PI

250
W1ICV W1OOA W1PFA W1VAN WA2DIG W2PZI K2UKQ K2YXY

K3DCP W3EYF W3KA W4FNQ W4QVJ K5AAD W5EZE K5KBH W6GMC W6ISQ W8CQ W9EHW W9UIG W9VP DL1FK G3FPK G3KZI JA8AQ SP9RF

249
W7HDL K9ECO I1KDB OK1KTI SP7HX YU1AG

248
W4DLG W9ABB VE1WL YV5AE

247
K1JDN K6ENL KP4BEA

246
W1TSL K7GCM HB9MX SM5BPJ

245
W1NHJ W2RA W6PLK SP8CK

244
W5RDA W7ACD DJØIK

243
W2GKZ K2MGR W8ZJM VE3CIO DJ5VQ PAØVB

242
W1LOP W3YZI W4IKL K4TWK W5PMK W7ABO W9KMN W9RH DL6MK SM5BCE ZB1CR ZE8JJ

241
W3SOH W3WPG K4TKM K5RFJ W6KYT W8ETU W9AZP W9FKH WØBPA DL1QT DL7AH F3FA ZL4BO

240
K1MOD

WA2AEI W2UFT W3QQL W5BOS K5JKH W5VA K6JIC W8DUS K8KAE W8KSR W9IRH DL1GU G8JM KP4AQQ ZL3IS ZS6ATA

239
W8KIT OZ4RT OZ7GC

238
W1WLW VK3AHQ

237
LA6U

236
W1AUR WA2RAU W3VRJ K5FKD W9TQL G2IO SM5AHK

235
K2JFV W6ABA

234
W3BVL W5LRY W8EVZ W8ILG W8YCP W9WKU HK3LX OZ7BG PY7YS

233
W3KDF W3NOH W4IUO W8QQH WØLDP DL9RK

232
K4JEY K4LTA K6OHJ WØCPM DJ4DN DL7BK F8EJ OZ3Y SM5KV YV5BZ

231
W1IKB W2JB W2NOY W4HKJ K4ZKZ K6CYG W6OF W6PZ W8IJZ

230
W1RLQ W2QDY W2QQ W2VYX W4BHG K4SXR K5JZY W5KTW W5TPC W8TTN K8VDV K9COS

W9HQF W9QGR KØTJW G2FYT G2GM G5VU I1FO LU8BAJ OK1CX ZL1PV

229
W1NS W1WK K6AHV K9GZK G2MI

228
W1CKU W4EEU W6IPH K8DYX K8MTI W9QFC HB9JG SM5DW VK3YL

227
W1CUX K1DIR W3ZQ W9MBF DL1JW JA6AO OH6RA

226
W1IJO W7AHX W9OTS WØIWR HB9NL JA1BK OH2LA SM5BAU

225
K1YRO W6ERS K6RTK W8QWI W9NGB W9VZP PY1ADA SM3AG

224
W3QMG K4BAI W5ERY W5UVR DL1BS DJ1VS

223
W1HWH KØMNO DL7CW EA4CR UC2AR VP7NS

222
W1QV W4YMG K8QJH VE3ADV I1IF LU5ABL VK5RX

221
W3DJZ W4EJN K3HQJ W4PRP W5LGS W6AAO WA6GLD K6HOR W8JXY W9LJU WØGUV VE3TB HB9DX

OK3EA ON4LX

220
W1IKE WA2CBB W2ZY K4IEX W4JBQ W4LZW W4RVW W5CK W5LEF W7ATV W7NRB W9EGQ W9NLJ W9WHY WØSLB VE7PU DL1IA DL9YX JA5FQ LA5YE OE3WB OK1ZL ZK1BS ZL3AB ZS6A

219
W1AW K2TQC W8LAV WØSMV DL3BJ IT1AGA

218
W2CDP W6FLT WØQMD SP9TA UA3HI

217
WA4ACA W9DSO K6IEC W6VNJ W8YGR

215
K1ANV W8DX K9BGM W9IVG F3AT IT1ZGY

214
K2INP W4JQM W8YPT CR6AI DL3TW G3ABG VK2NS

213
K1HVV W2GFW W2REH W7DIS W9WJH

212
W1WHQ W2BXC K4DRO K8IQQ W9YT OK1GT ZS2AT

211
K1IGO W3HDZ W6VVR K8PUU W9MZP DL7HU G6RC VK5QR

210
W1FTX

W2LNB W3FSF K4GXK W4TP W5AI W5FJE K5UXP K6CTV W6OUN W9KQD W9NN W9RDI VE3AGC VE4OX DJ4TZ DJ5GG DL9KP F3ZU F9IL

209
W1FJJ K1IMP K6BPR W8JAQ W8VLK CR7LU OH1TM

208
EA1GZ

207
W1EIO W3MQC W7UVR WØMAF DL3SZ G3HCL W6BZ W9CMQ CR6CA DL1PM PAØFAB

205
W1GKJ W3HTF W4SHX DL1HH LA4ZC SM5AJU

204
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203
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202
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201
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200
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199
W1WQC G3JLB

198
DL9NA

197
G4FN SM3AZI VR2DK

196
WA2OMR W3EKN

195
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194
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193
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192
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191
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190
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189
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188
K2PKT K8JWC W9GHK DL3AR

187
W1NJL W2BXY W2VJN W3DAO W5EJV LA5Q 9Q5AB

186
W4TFL/1 W6LDA I1CWN ZS4F

185
W3GOQ I1RC ZL2PM

184
W1DBM W2ASF W2HDW W6OMR WØFDL OK1MP YU3OV

183
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182
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181
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180
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179
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178
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177
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176
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175
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174
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173
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172
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171
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170
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169
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168
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167
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166
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164
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163
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159
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158
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157
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156
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154
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153
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152
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130
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121
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119
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114
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112
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111
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XE2OK

109
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108
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107
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106
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105
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104
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103
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KØWTT
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VE2JD
VE6IZ
VE7NW
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DJ4MP
DL9ZE
G2DF
HA8CF
HS2M
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JA8ADQ
JA8GR
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OH3VX
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SL5CX
SP8ABQ
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YU1DO
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102
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K3EUR
K3ICA
K3JOZ
K3PKI
K3TVU
WA4-AMU
W4CHK
W4CZ
WA4FAZ
W4IVN
K4JAG
K4LPR
W4MRH
W4MVB
W4RZN
K4NTS
K4TSQ
K5UBL
W7CQR
K7CVL
W7YFO
W8ILC
W9ALP
W9DGK
K9DKU
W9MLR
K9VLE
K9WRX
KØTFP
VE1VN
VE3CWQ
VE7AC
DJ1XF
DJ1ZH
DJ2OV
DJ3GY
DL7CF
DL9BS
F2DG
GI6YM
HK1AAF
IS1SZU
JA7OD
JA7FS
KG6AII
LU9WA
OE3HY
OE5LX
OH1SM
OK1AFC
OK2BAT
OK2BCI
OZ5MJ
PAØPOC
UA2BD
UA3KHA
UA3LR
UA3XN
UA9JH
UA9WL
UB5DQ
UI8LB
YU3TT
YV5BKA
ZC4SJ
ZS3EW
ZS6AMS
4X4MR
5B4RF

101
W1ATP
K1CXP
K1JKS
K1LQP
W1MRQ
W1QUS
W1SGU
WA2-DQH
WA2FIJ
WA2ISQ
WA2-KRN
WA2-KWH
K2QEY
WA2-QMC
W2RBB
K2YTC
WA2-UWA
K2VAC
W2VIR
K3GIQ
K3MCO
W3MFY
W3TIE
K3TIQ
K3UWE
K4KHT
W4ZPO
W5DRW
W5HTM
K5TNR
K6BIA
K6JT
WA6MJP
K6OBA
W6YIJ
K6YVV
W7BCV
W7YWF
K8EXX
W8KXH
W8LT
K8TNE
K9BJM
W9DOW
K9OBQ
K9ROR
W9RVN
W9VKC
W9ZYD
WØCXY
WØPFG
KØPUB
VE1KS
VE5JI
AP5CP
DJ2JE
DJ3NQ
DJ3VK
DL4BM
DJ6HE
F9HM
FO8AA
G3ADZ
GI3OTV
HA5BG
JA2TH
KP4BAJ
KR6LD
KX6BC
LA9AF
LU7AU
OA4FT
OH3XQ
OK1ADP
OZ3LI
SM5ARQ
SM6BGJ
SL6BH
SP8KBM
UA3HP
UA4QA
UA9HA
UAØKCA
UB5ES
UC2AF
UC2KAR
UQ2CC
YO3AC
YU2BHI
YV5-AWM
ZL2AQV
ZL2ASM
ZS6AZQ
ZS6JQ
9G1GN

100
W1BA
W1EOA
K1KDP
K1LDK
K1MBM
K1NFP
K1NOL
W1PLJ
W1QJB
W1RWU
W1RY
K2BMI
K2BJR
WA2BWS
W2CUC
WB2-CWO
W2EAF
WA2HLH
WA2-KMV
K2KYS
W2LQP
W2PPG
WA2-RMP
K2RQC
W2RSO
K2VHU
W2WAS
WA2-WUV
WA2YBR
W3DYP
K3BTT
K3EHM
W3GJR
K3GKF
W3HNK
K3IKM
W3JHT
K3JNP
K3JQU
W3LIV
W3LXN
K3LXN
K3MHZ
W3NCW
W3QQR
K3SLP
W3TYW
K4DRU
K4GSX
W4GTS
W4HAE
W4HHN
W4MQB
K4MSS
K4NVI
K4USA
K4VGQ
W4WHK
W4YE
W4YOK
K5HRH
K5IJU
K5MUX
K5REN
K6BOB
WA6CAL
WA6CEF
W6CLZ
WA6CZR
W6FZD
K6ISN
WA6IVM
W6ORC
W6QBH
W6WXC
W7UXP/KH6
W7KMU
W7VKO
W7ZHZ
WA8ENO
K8WOU
K8ZPC
W9BHD
W9CLH
W9DNE
K9DWG
W9GFL
W9GXH
K9HUY
W9JGV
W9KPC
W9MRZ
K9PZD
K9VKH
K9WIE
K9YBC
W9ZMK
KØALL
WØFOQ
WØJWD
KØKLH
KØTZH
VE1ADH
VE1ZE
VE3NN
VE4MF
CN8GB
DJ1QX
DJ2VKC
DJ4VO
DL5DQ
DJ6EO
DJ6LD
DJ6LN
EA2GC
EA3NA
ET3LF
ET3PT
G2CKK
G3KAB
G3LAS
G3NOZ
G3PJW
GI3NKQ
HA5FQ
HA5KGC
HB9AAG
HI8MMN
KA2RJ
OE1HGW
OE1ZK
OK2QX
OZ4PM
OZ6HS
SM2ABX
SM5BKZ
SM5CEU
SM7UV
UW3AO
UA3FL
UA3NG
UA4AZ
UA4SM
UA6KMP
UAØKFG
UAØLL
VK2AXK
VR2EH
XE1FE
ZD6OL
ZS5S
4X4MZ
5R8AA

Radiotelephone

316
W9NDA
G5VT
HB9TL

315
W2OKM
W3KT
G2PL
DL3LL

314
W9WHM

313
K4AIM
G3FKM

311
W3GHD
W6GVM
W8DMD
WØJYW
G8KS

310
W1BIL
W9YSX
WØQVZ
DL3IR
LU4DMG

309
W1ONK
W2HTI
W9RNX

308
W2GLF
W8UAS
ZL1HY

307
DL1IN
HC1FG

305
G3DO
ZS5JM

304
W2FXN
W2LV
SM3BIZ

303
W9BVX

302
W1BAN
W4PDL
W5AFX
W5KBU
HB9J

301
W1LLF
W4ANE
W5PQA
W8JIN
OE1ME

300
K6LAS
W8EAP
OZ7FG
ZP5CF

299
K8RTW
VE3QA

298
DJ2YI
5Z4AQ

297
DL6EN
G3FXB

296
W2TP
W2WZ

295
W3NKM

(Continued on page 172)

Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1830 local time. DSMN meets Tues. on 50.4 Mc. at 2100 local time. Renewals: K3CNI as OES; K3CNI as OBS. Hats off to DEPN with K3LEC as NCS and DSMN with K3AZH as NCS for the net alerts during the watch on Hurricane Gladys. W3HKS and the ORS had MDD well covered also. Fortunately the frivolous "lady" decided to ignore us, but the First State Emergency Nets were ready for action. Delaware ARC officers for the coming year are K3OWS, pres.; K3UNH, vice-pres.; K3NHL, secy. The First State ARC Annual Dinner will be held early in November. W3DEO spent a camping vacation in the Catskills, and also near Hyde Park, N.Y. K3CNI also went camping. Traffic: (Sept.) K3YZF 54, W3EEB 30, K3OWS 16, K3YHR/3 13. (Aug.) K3OWS 13.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: W3SAO, W3SGI. The E. Pa. C. W. Net had QNI of 327 and QTC of 178. The PTTN training net had QNI of 146 and QTC 56. K3WEU is a new OBS in the Philly area. K3MVO spent his vacation in the New England states. The Susquehanna Chapter QCWA Dinner was held Nov. 14 at Lancaster. Philmont Mobile RC celebrates its 15th anniversary in Nov. The Main Line V.H.F. Assn. meets the 4th Thurs. at the Lower Merion Township Bldg., Ardmore. The Mobile Sixers held its 7th Annual Banquet, Nov. 7. K3SLY has completed fitting out his new shack. K3KTH still is chasing the gremlins in his big rig. New Gear Dept: A new NC-303 for K3IAN; an HA-4 keyer for K3-YQJ; a new s.s.b. final for K3MEH. K3HHY made DXCC phone. W3EEN has a new Volkswagon and is planning mobile installation. New Extra Class operator: K3RTX. New Generals: WA3AFF, K3FGO, and K3ZXA. A new resident in the Levittown area is WA2-WFM. K3QNB has a new harmonic (baby girl). W3EU is dusting off the 160-meter rig for the coming winter activity. K3NZD and W3LXN claim little activity on the 6-meter band. More calling and less listening is the possible solution. W3ID made a number of feedline changes for winter weather. K3YEO operated portable from Long Beach Island, N.J. WN3BFR added an 80-to-10-meter vertical to the antenna farm. W3QDW, EC for Lackawanna County, is active on the local v.h.f. traffic nets. Reports are welcomed from your local v.h.f. nets to be added to this column. Engineers now working at radio station WHHS are K3OMP, K3MTE, K3-PWM and K3JHF. W3BUR still is working in W2-Land but finds time to make week-end traffic nets. W3NNL started a local fad by showing his transistor VLF converter to the locals. WN3BFR is active in the Warminster area with an Eico 720 and an HQ-100 and works 80, 40 and 15 meters. The Eastern Penna. section quarterly meeting was held at Allentown. A report on it will be sent all section appointees. Traffic: W3CUL 4126, W3EML 685, W3VR 611, K3MYS 238. K3MVO 204, K3-YQJ 118, W3AXA 52, W3ELI 47, K3WEU 44, K3MQE 42, W3RV 42, K3HNP 40, W3ZRQ 40, W3JKX 39, K3-RUA 39, K3YVG 34, K3KTH 28, K3PWM 27, K3RZE 27, K3HHY 21, W3VAP 18, K3LSV 17, W3PDJ 17, K3-JHF 14, W3QDW 12, K3HKW 11, K3MHD 9, W3OY 6, W3EU 4, W3BFF 3, W3LXN 2, W3KEK 1, K3NZD 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE. RMs: W3QCW, K3JYZ. W3ZNW, W3MCG. PAM: W3RKK. The MDD meets daily on 3649 kc. at 0000Z. The MDDS (slow) net meets daily on 0130Z on 28.1 Mc. The MEPN meets on M-W-F at 2200Z and on Sat. and Sun. at 1700Z on 3820 kc. W3ATQ has been rebuilding equipment. W6AGK is now in our section. W3CDQ, W3AKB and W3BWT find little time to get on the air. K3DNO is getting his antennas ready for winter. W3ECP is driving a new car and will be mobile again soon. Van has a ten-element 2-meter beam up and working. K3EJF attended the World's Fair and stopped in to see K2US. W3EOV has his antennas ready for winter and is installing a mobile rig with solid state rectifiers. K4-EZL/3-CN8FW has returned from Morocco and will be in our section. W3HQE has his antennas ready for winter. K3KMO has finished the 400-watt amplifier. K3-LLR has a matchbox antenna tuner and the antenna problems are over. W3MCG travels a lot but finds time to get on the air and in the Frequency Measuring Tests. W3MSR missed all of the Frequency Measuring Tests. K3NCM reports that the MEPN assisted in communications by summoning police and an ambulance for an accident on Route 301. K3NCQ has a twin 8 antenna and works fine. K3OAE is home from school until February. W3PQ has been busy with traffic. W3QCW is to be complimented on the fine work he did in drawing up the SET plan for the MDD, and arranging liaison with the other nets. K3QDD is busy with school work. K3QFG is back on the nets. K3QOO is in Indiana, at 420 Keenan Hall, Notre Dame, South Bend. W3RKK may be found on the v.h.f. bands. Lee is doing a splendid job as PAM for the Md.-D.C. section. K3SGD reports that the Baltimore AREC group had an SET on Chesapeake Bay using boats. K3UFV attended the ARRL National Convention. K3URZ has an 80-meter dipole up and worked his first VK. K3VHS says he uses his receiver for monitoring his signal. W3YKQ is building a tri-band beam for 15-20-40 meters. K3ZIB is operating as portable 6 in the San Francisco area using an HX-30 transmitter. W3ZUH has a new SE-300 receiver and is waiting for an SB-400. The new officers of the PVRC are W4ZM, pres.; W4KXV, vice-pres.; W3-GRF, secy.; W4GF, treas. Traffic: (Sept.) K3UFV 146, W3QCW 104, W3PQ 74, K3QDD 56, W3HQE 55, K3-KMO 49, K3TJE 37, W3ECP 29, W3EOV 16, K3URZ 13, K3GZK 10, K3OAE 8, K3LLR 7, W3ZNW 7, K3RWT 6, W3MCG 3, K3NCM 2. (Aug.) K3LLV 102, K3KMO 32, K3URZ 8.

SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs: WA2BLV and WA2VAT. New appointments: WB2PHV, Northfield, as EC of Atlantic County, replacing WA2-OZQ; W2MMD, Monroeville, as OBS. W2RG, Merchantville, visited Vermont recently. N.J. Phone & Tfc. Net totals for Sept.: 30 sessions, QNI 619, traffic 236. Net Mgr. W2ZI plans a trip to the West Coast and Hawaii. Asst. Mgr. W2PEV will handle net affairs during his absence. WB2FJF, Mt. Holly, has joined Army MARS. Present DXCC totals of K2CPR, Merchantville, are 286/282. W2BZJ, Pennington, reports the need for operators at State RACES control center. WA2KIP and WB2BPZ have signed up to help. W2BEI, Audubon, has increased his DXCC total to 130. The Gloucester County AREC Net meets Fri. at 8 P.M. on 50.9. W3YA, Atlantic Div. Director, spoke at the Gloucester County ARC in Oct. The Penn-Jersey V.H.F. Society held its 2nd annual auction in Trenton during Oct. The Gloucester County ARC-sponsored code and theory classes are being held in the Pitman High School. Atlantic County operators are urged to contact WB2PHV, the newly-appointed EC for that county. WA2IEK, formerly of Cherry Hill, is now WA3BAS, Silver Spring, Md. W2JAV, W2EZM, WA2ONB, W2REB and K2PI, all SJRA members, attended the National Convention. All club secretaries are urged to supply me with lists of their officers for 1965. W2UA and daughter, K2INQ, both Burlington County Radio Club members, started a European cruise in Oct. Traffic: W2ZVW 166, WA2WLN 116, W2RG 98, WA2KIP 94, WB2GUK 59, W2MMD 54, K2RXB 38, W2ZI 32, WB2FJF 21, K2CPR 13, W2BZJ 10, W2BEI 4, W2GIW 3.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ RMs: W2RUF, W2EZB and W2FEB. PAM: W2ZPI. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3510.5 kc. and 3993 kc. (s.s.b.) at 0900 Sun. and 3510.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 1900, TPN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 and 2345 GMT. Congratulations to BPLers W2RUF and W2OE. Appointments: WB2OSA as OES, WB2JQS as OBS, WA2AHP as OO. Endorsements: K2RTQ as OPS. K2QDT as OPS. K2HWI has WA Conn Award, CP25 and an Extra Class license. WB2FPG has a new valiant. Chemung AREC supplied

communications for the Soaring competition at Elmira. Participants were K2DNN, K2TXO, WA2CIE, WA2-FJJ, WA2HFL, WA2STG, WA2TCZ, WA2ZBD and WB2HSR. W1DIF/2 is on 6 meters with a kw. WB2GJV is attending Alred U. K2UOV has a new Tri-bander. The Amateur Radio Council of W.N.Y. has formed a 6-Meter net of N.Y. State. Net frequency is 50.172. The club is based in Cheektowaga. Officers are WB2MLK, pres.; WA2UQP, vice-pres.; WN2NZR, secy. The club has ambitious plans. All interested should contact WB2MLK, 30 Andres Pl., Cheektowaga, N.Y. The RARA reports a record enrollment in code classes, conducted by WA2AIL each Fri. at 7:30 in the Museum on East Ave. in Rochester. The RARA Club call has been changed from W2QCN to K2JD. W2UTH and W2ICE have been presented a special citation from the State Civil Defense Commission as a reward for long and continuous service. Congratulations. Fourteen top FCC officials visited W2AN in the AWA's barn. The occasion was a special FCC meeting at the monitoring station in Canadaigua. W2AKU (engineer-in-charge) suggested that they visit the museum and they spent several hours looking at old equipment and reminiscing. This is probably the largest collection of FCC brass to ever visit an amateur station. W3YA, Atlantic Division Director, has been on an extensive tour of our section visiting various club groups. This has been an excellent opportunity to exchange views with our elected representative on the ARRL Board. We appreciate the time and effort he has spent on our behalf and I'm sure many of us have a much clearer understanding of current events and League policy as a result of his visits. Traffic: W2RUF 754, W2GVH 438, W2OE 383, WA2KQG 249, WB2GAL 187, W2HYM 126, W2MTA 115, K2JBX 101, K2QDT 60, W2FCG 57, K2AYQ 40, K2IMI 34, WB2DPR 29, WB2JCE 18, W2RQE 17, K2DNN 13, WN2FOJ 11, K2HOH 6, WA2NDC 5, WB2FPG 4, WA2-GLA 4, W2QHQ 3, K2RYH 2.

WESTERN PENNSYLVANIA—SCM, John F. Wojtkiewicz, W3GJY—SEC: K3OTS. PAM: W3TOC. RMs: W3KUN, K3OOU, W3UHN, W3NUG. Traffic nets: WPA, 3585 kc, 0001 GMT 7 days weekly; KSSN, 3585 kc, 2330 GMT Mon. through Fri. W3LIV resigned as SEC and much credit is due him for bringing up the section AREC membership 100 percent during his tenure in office. K3OTS now holds down the SEC post and advises that ECs and Asst. ECs are needed in many of our counties. If *you* desire to serve, drop the SEC or SCM a card or message and the appointment will be forthcoming. WA3BJV is a new General. With deep regret this column records the passing of W3IWH and W3KYM. K3SKA brought back a Utica 6-meter transceiver from the Warren, Ohio, Hamfest. The Venango Christian High School ARC is now an ARRL affiliate. K3CFA is knocking 'em dead on 2 meters, while K3USC reports 2-meter conditions excellent in his area. K3FFJ scored 113 QSOs in the Pa. QSO Party and participated in the last OO run. K3VPI plans ham TV experimentation. W3LOS handles traffic again. W3-JHG was mobile during the SET. K3PIE moved to York, Pa. K3OFB is confined to his bed with casts on both legs. K3ZMH picked up his QRP-300 endorsement sticker. Two very active RMs are W3KUN and K3OOU, both doing fine jobs as net managers on WPA and KSSN, respectively. The Two Rivers ARC is in the process of being incorporated. K3KLW conducts code practice sessions on 28.4 Mc. Mon., Wed. and Fri. from 8:30 P.M. to 10:30 P.M. Those within viewing distance of WQED are reminded that the station televises classes on TV and General Electronics at 6:30 P.M. Mon. through Fri. Hats off to those hams in Elizabeth who have offered their services to alleviate TVI in that area. K3SHP has moved to Minnesota, K3FGL works s.s.b. with a new NCX-3. K3QFB finds DX on 20-meter c.w. W3AOL is using an HT-40 on 6 meters. K3RTG moved to Dover, Del., for an indefinite period. New appointments: K3ZMH as EC; K3SOH as ORS/OBS; K3OTS as SEC; K3WNG as EC. Endorsements: W3TOC, W3-KUN, W3NUG, K3OOU, W3UHN, K3EDO, W3CA, K3EXE, K3HID, K3HTJ, W3IYI, W3IDO, W3KNQ, W3KQD, W3LOD, W3LOS, W3MFB, W3MIZ, K3NZB, W3TAS, W3YA, W3QYG, W3UGV, W3BWU, W3KWL, K3PSN, W3QCN, W3SUK, K3VPI, W3ZZO, W3BJQ, W3BOZ, W3RSB, W3WFR, W3NQA, K3ENF, K3JCZ, K3RAJ and W3SAY. Does your license expire soon? Renew. Traffic: (Sept.) W3KUN 81, K3PYS 71, W3LOS 55, W3GJY 48, K3PIE 48, K3NZB 27, W3JHG 23, K3-ZMH 18, K3OOU 17, K3SOH 16, K3TEZ 15, W3KWO 14, K3SMB 14, K3VAR 14, W3UHN 9, W3SMV 8, W3-IYI 6. (Aug.) W3NEM 563, W3JHG 93, K3NZB 45, K3-HID 12.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. PAM: W9VWJ. RM: W9USR. Cook County EC: W9-HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CST. The EC Net meets every Sun. at 1600 GMT on 3840 kc. W9GRW was featured in the Bell Telephone's monthly publication, *CATS*. "CHI-RTTY" gave a demonstration at the National Electronics Conference held in Chicago. The Chicago Area Radio Club Council's station, W9TEM, also was active during this conference at McCormick Place. W9EGS has been appointed as new Radio Officer for the State of Illinois Civil Defense Office. W9NIU and XYL have added a new grandson to the family. W9IDA is going to forsake W9-land for W5-Land. Good Luck, Shorty, the Midwest gang will miss you and your traffic count. WA9-DXA is back on the air with a new Drake 2B bringing the DX signals. WA9CNV is the first member of the female sex to operate from submarine USS *Silversides*. The Society of Radio Operators held its 24th anniversary party in Niles Oct. 17. WA9JSF, WA9JTM and WA9JTO have received their General Class licenses. K9AQW joined the ranks of the Silent Keys at the age of 27. WA9FMT and W9BMG have new Galaxy IIIs. W9FQA has built a 4-811A linear for his powerful output. K9VVL is president of the RHO EPSILON honorary radio society at the Illinois Institute of Technology. New officers of the Institute's ham club are W9YW, K9RAS, WA9BQQ, WA9BMG, K9IOI and K9VVL. A new Novice heard is WN9NAO. The Worth Amateur Radio Club put on a demonstration of low-band and v.h.f. ham radio at the new Alonzo Stagg High School before and after dedication ceremonies. The North Central Phone Net had a traffic count of 1648 for the month. W9HPG attended the 50th anniversary meeting of the Indianapolis Radio Club. WA9AIH made WAS on c.w. only. K9PXC is the newly-appointed EC of Henry County. Other appointments include WN9MSD and W9RSV as OESs, WA9CCP, K9KZB and WA9CNV are recipients of the BPL award this month. Traffic: (Sept.) WA9CCP 1375, K9KZB 782, WA9CNV 384, W9-HAS 172, K9BTE 89, WA9CCQ 60, K9HSK 56, K9KWV 45, KØTDB/9 37, K9UOV 31, WA9AJF 26, W9PRN 10, K9UIY 5, W9LNQ 4. (Aug.) WA9CCQ 42.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. PAMs: K9CRS, K9GLL, K9IVG. RMs: W9TT, W9DGA. Net skeds in GMT: IFN, 1330 daily and 2300 M-F on 3910 kc. ISN, 0000 daily on 3920 kc. QIN, daily at 0000 and RFN, at 1200 Sun. on 3656 kc. New appointments: K9-ZPN as EC of Allen Co., WA9ASZ as OES, W9FZW as OPS, WA9IES as OBS. BPL winners: WA9BWY, K9-IVG and WA9IZR. QIN honor roll: K9VHY, K9HYV, WA9BWY and W9TT. W9JPX is the call of the Indiana School for the Blind Radio Club. Officers are WA9CYG, pres.; ex-WN9JPW, vice-pres.; John Huffman, secy.; W9DNQ, trustee. Indiana stations now NCSs for 9RN are WA9AUM on Sun., W9QLW on Tue., and W9JOZ on Thurs. The Central Ind. Mobile Club has about ten Motorola units in service on 448 Mc. W9HRM, ex-W5-LFX, now is in Princeton and is looking for gear. W9-SNQ was elected by the IRCC to replace W9QYQ as director. Officers of the newly-formed Jay Co. ARS are WA9KBT, pres.; K9VXH, vice-pres.; WN9LFV, secy.; WA9BFF, treas.; W9SNQ, trustee; W9TZD, W9STG and W9SNQ, directors. WA9DFQ's traffic (July 41, Aug. 195) was incorrectly credited to WA9DFQ. *Amateur Radio exists because of the service it renders.* Sept. net traffic: IFN 330, ISN 310, QIN 207, RFN 49, Hoosier V.H.F. 92, and 9RN 546 with Ind. represented 100%. Traffic: (Sept). WA9BWY 1031, K9IVG 878, WA9AUM 364, WA9IZR 233, W9QLW 213, W9TT 203, K9RWQ 181, W9ZYK 108, K9HVY 98, K9DHN 80, K9VHY 54, K9-EFY 52, W9YYX 46, W9CC 40, K9CRS 39, WA9FDQ 34, W9DGA 30, W9RTH 30, W9SNQ 27, W9CLY 24, K9ILK 16, W9BUQ 15, W9DZC 14, W9BZI 12, W9FWH 12, K9-GEL 12, K9QVT 11, W9FZW 9, W9DOK 8, K9UEO 6, WA9AXF 5, W9BDP 5, K9SJR 4, K9WET 4, K9KTL 3, W9AQW 2, W9DKR 2, W9EJW 2. (Aug.) WA9AUM 452, W9SNQ 20, K9WET 7, WA9FHF 4.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9BCC. RM: W9IQW. PAMs: K9IMR, W9NRP and W9NGT. Nets: WIN on 3535 kc. daily at 0045Z, BEN on 3950 kc. daily at 2400Z, WSBN on 3985 kc. daily at 2315Z, SWRN on 50.4 Mc. Mon. through Sat. at 0300Z. New appointees: W9HWQ as OPS and OES. Renewed appointments: K9KJT, W9VRI and W9SSA as ECs; W9SAA as OPS and ORS. Net certificates: W9-VAJ for WIN; K9DJY, K9FHI, K9LWZ, K9WIE and K9ZMI for BEN; WA9IVH and K9UTQ for WSBN; WA9AKE for CAN. W9CXY acted as CAN manager while W9DYG was on a well-earned vacation. W9FNT is on 432 Mc. TV. BPL certificates for Sept. traffic went to K9IMR and W9CXY. Excellent reports were received from all AREC, RACES and MARS groups helping out during the Port Washington Tornado. WA9FMQ earned a KZ5 Commemorative certificate. K9UTQ has been appointed Asst. EC for Wood County. W9VSO led Wis.

(*Continued on page 126*)

THE HEART of the crystal frequency synthesizer used in the HRO-500 solid state receiver is a *phase-locked oscillator* — a circuit new to most amateurs, but in wide use in military communications equipment.

A PHASE-LOCKED oscillator is an oscillator which is tightly controlled in frequency, or locked, to a reference source of frequency information — resulting in an oscillator which will not shift frequency under extremes of temperature, voltage, or vibration as long as it is locked to the reference signal. In the new HRO the phase lock technique is used to lock the synthesizer high frequency oscillator to the output of the spectrum generator — thereby producing discrete crystal-stable HFO signals for eventual injection into the first mixer. The phase-locked oscillator is necessary because the output of the spectrum generator consists of *many* signals 500 Kc apart — and it would be well-nigh impossible to inject only the desired signal into a mixer, or to prevent the many unwanted spurious responses caused by the adjacent 500 Kc inputs. So . . . a tunable oscillator which covers the entire band of frequencies required for HFO injection is phase-locked to the proper reference output from the spectrum generator — an immensely easier task than using the spectrum generator for direct H. F. injection into the first mixer.

HOW DO YOU "phase-lock" an oscillator? Assume a free-running oscillator of average stability — or even a relatively poor oscillator which, when monitored in a receiver, sounds like background music for a science fiction movie.

A SAMPLE of the output from the oscillator is injected into a phase detector (almost identical in circuitry to the well-known product detector). The output from a separate *highly stable* oscillator to be used as a reference is also injected into the phase detector. The output of the phase detector will be an A. C. voltage — the frequency of which will be a function of the difference between the two oscillator frequencies. If that A. C. voltage is now applied to a vari-cap (variable voltage capacitor) across the free-running oscillator, the vari-cap will *start* to sweep the free-running oscillator at a rate equal to the frequency of the A. C. voltage. However, before an entire sweep cycle can be completed, at one point in the cycle the frequencies of the free-running and reference oscillators will be identical. At that point the output of the phase detector becomes a *DC* voltage of the proper amplitude and polarity to hold the vari-cap at precisely the correct value to keep the (formerly) free-running oscillator *phase-locked* to the reference oscillator. Any attempt to change the frequency of the now phase-locked oscillator by external means will produce a change in phase detector output voltage which will shift the vari-cap enough to maintain phase-lock to the reference signal.

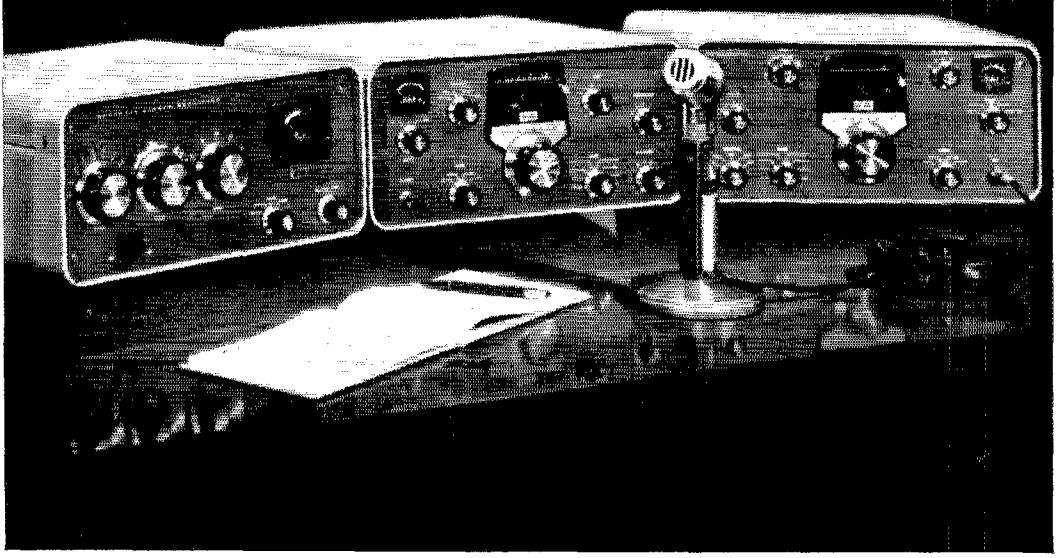
THE characteristics of a phase-locked oscillator are extraordinary. No external influence will shift its frequency unless it is so great that the controlling range of the phase detector and vari-cap is exceeded. For example, an exposed free-running transistor oscillator at 20 Mc. shifts frequency dramatically when a hand is waggled near it. If the same oscillator is phase-locked to a separate reference oscillator, it is possible to physically grasp the coil of the oscillator without changing its frequency by a cycle Needless to say, the comparatively less severe variations in voltage, temperature, humidity, etc. encountered in actual use in a receiver have no effect.

THIS PRINCIPLE (with a few more refinements than described above) is used in the HRO-500 to lock the high frequency oscillator of the synthesizer, as mentioned previously, to the crystal-stable output from the spectrum generator. Its effect is to produce 60 discrete HFO injection signals — each one as stable as a separate crystal oscillator, but without the cost or band-to-band recalibration required with separate crystal oscillators.

THE PHASE-LOCKED synthesizer technique developed by National makes it possible to produce a new HRO which sets an enviable standard of comparison — a superb solid state receiver with the same stability from turn-on, one kilocycle dial accuracy and calibration, and 10 Kc. per turn tuning rate, throughout the entire spectrum from five kilocycles to 30 Mc.

MIKE FERBER, W1GKX

3 Reasons Why You Should Treat Yourself To New Ham Gear This Christmas



1 Deluxe HEATHKIT® SB-200 KW Linear Amplifier!

• 1200 watts P.E.P. input SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—Antenna relay—Solid-state power supply • Automatic Level Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit for maximum efficiency & low distortion • Circuit-breaker power supply protection—no fuses • Designed for 120/240 volt operation. Neat, compact and transportable (only 35 lbs.). The sturdy, yet lightweight construction of the SB-200 is achieved through the use of a heavy-gauge one-piece aluminum chassis that is partitioned for extra strength and isolation of circuits. Easy assembly is assured with clean, open circuit layout and high quality, well-rated components. The modern low-profile styling of the SB-200 makes it a neat, compact desk-top linear that is ideal for use anywhere!

Kit SB-200, 42 lbs.....$200.00

Note: Unit suitable for overseas operation.

SB-200 SPECIFICATIONS—Band coverage: 80, 40 20, 15 & 10 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 100 watts. **Duty cycle:** SSB, continuous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** 30 db or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pre-tuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter Switch, Grid-Plate-Rel. Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572B/T-160-L (in parallel). **Power requirements:** 120 volts AC @ 16 amperes (max.), 240 volts AC @ 8 amperes (max.). **Cabinet size:** 14⅞" W x 6⅝" H x 13⅜" D. **Net weight:** 35 lbs.

2 Deluxe HEATHKIT® SB-300 Receiver!

• Complete coverage of 80 through 10 meter amateur bands • All crystals included, plus provision for VHF converters • Hermetically sealed 2.1 kc crystal bandpass filter • Built-in 100 kc crystal calibrator • Smooth, non-backlash vernier dial mechanism • 100 cps stability after initial warmup • 1 kc dial calibrations—100 kc per dial revolution (provides bandspread equal to 10 feet per megacycle) • Provision for transceive operation with SB-400 Transmitter • Prebuilt linear master oscillator (LMO), wiring harness and two heavy-duty circuit boards for fast, easy assembly.

Kit SB-300, less speaker...22 lbs.....$265.00

SBA-300-1 Optional AM Crystal Filter (3.75 kc) 1 lb.....$19.95

SBA-300-2 Optional CW Crystal Filter (400 cps) 1 lb.....$19.95

SBA-300-3 6 meter converter, 2 lbs.....$19.95

SBA-300-4 2 meter converter, 2 lbs.....$19.95

Export model available for 115/230 VAC, 50-60 cps; write for prices.

SB-300 SPECIFICATIONS—Frequency range (megacycles): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. **Intermediate frequency:** 3.395 megacycles. **Frequency stability:** 100 cps after warmup. **Visual dial accuracy:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps on all bands. **Backlash:** No more than 50 cps. **Sensitivity:** Less than 1 microvolt for 15 db signal plus noise-to-noise ratio for SSB operation. **Modes of Operation:** Switch selected: LSB, USB, CW, AM. **Selectivity:** SSB: 2.1 kc at 6 db down, 5.0 kc at 60 db down (crystal filter supplied). AM: 3.75 kc at 6 db down, 10 kc at 60 db down (crystal filter available as accessory). CW: 400 cps at 6 db down, 2.5 kc at 60 db down (crystal filter available as accessory). **Spurious response:** Image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Power requirements:** 120 volts AC, 50/60 cps, 50 watts. **Dimensions:** 14⅞"W x 6⅝"H x 13⅜" D.

3 Deluxe HEATHKIT® SB-400 Transmitter!

• Built-in power supply • Complete transceive capability with SB-300 Receiver • Linear Master Oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts P.E.P. SSB, 170 watts CW • Crystal filter type SSB generation • Operates SSB (upper or lower sideband) & CW • VOX & PTT control in SSB operation, VOX operated CW break-in • Crystal controlled heterodyne oscillators • 1 kc dial calibration—100 kc per dial revolution • Dial bandspread equal to 10 feet per megacycle • 500 kc coverage per bandswitch position • Switched 120 V AC for external antenna relay • Sturdy, lightweight, heavy-gauge aluminum construction throughout • Neat, modern "Low-Boy" styling! • Variable loading!

Kit SB-400, 33 lbs.....$325.00

Export model available for 115/230 VAC, 50-60 cps; write for prices.

SB-400 SPECIFICATIONS—Emission: SSB (upper or lower sideband) and CW. **Power input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohms—less than 2:1 SWR. **Frequency range:** (mc) 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0. **Frequency stability:** Less than 100 cps per hr. after 20 min. warmup. **Carrier suppression:** 50 db below peak output. **Unwanted sideband suppression:** 55 db @ 1 kc. **Intermodulation distortion:** 30 db below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **ALC characteristics:** 10 db nominal @ 0.2 ma final grid current. **Noise level:** 40 db down from single tone output. **Visual dial accuracy:** Within 200 cps (all bands). **Electrical dial accuracy:** Within 400 cps (all bands). **Audio input:** 600 ohms or high impedance microphone **Audio frequency response:** 350 to 2450 cps at 6 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14⅞" W x 6⅝" H x 13⅜" D.

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SIDEBAND ENGINEERS

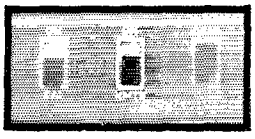
new! SB34

NEEDS ONLY MIC., ANTENNA, POWER SOURCE.

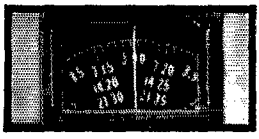
12V DC / 117V AC POWER SUPPLY IS BUILT-IN!

Connect the equipment directly to the 12 volt vehicle battery... or plug it into the 117 volt AC wall outlet. (Two power cables are provided—one for AC—a second for DC operation).

ONLY 500 MILLS STANDBY DRAIN FROM VEHICLE BATTERY

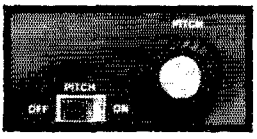


Drain-saving panel switch turns off transmitter tube filaments and power supply for casual listening.



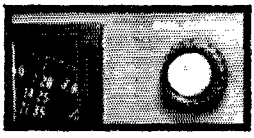
EXPANDED FREQUENCY COVERAGE

250 kc, 80-40-20-15, with overlaps covering MARS, out-of-band DX.



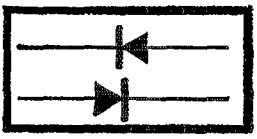
DELTA RECEIVER TUNING

Receiver is tunable several kilocycles ± transmitter frequency.



SOLID-STATE DIAL CORRECTOR

Varactor circuit sets transmitter frequency to dial calibration.



SOLID-STATE SWITCHING

Receive to transmit switching is all solid-state. No troublesome relays. **A breakthrough!**

OTHER FEATURES: SINGLE-KNOB, DUAL-SPEED TUNING • LOW FREQUENCY DRIFT • VOX AND 100 KC CRYSTAL CALIBRATOR AVAILABLE AS ACCESSORIES. (SB-34 is pre-wired to accept VOX and Calibrator—has receptacles on rear of the chassis for this purpose).

SBE **SIDEBAND ENGINEERS** 317 ROEBLING ROAD, SOUTH SAN FRANCISCO, CALIF.

Export sales: Raytheon Company, International Sales & Services, Lexington 73, Mass. U.S.A. RAYTHEON

SBE

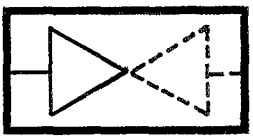
SB-34 . . . FEATURE-WISE, DOLLAR-WISE, THE BIGGEST SSB TRANSCEIVER VALUE . . . EVER!

Photograph shows home station installation of SB-34 with matching amplifier.

Now . . . from **SBE** . . . a completely new SSB transceiver, **SB-34.** All of the design features introduced originally in the SB-33, and now well proved, have been retained . . . and an entirely new series of "plus performance" features have been added. SB-34 is handsome equipment—conservatively styled, attractively appointed . . . comes in a physical "package" even smaller than SB-33. Transistors and diodes replace vacuum tubes throughout except in RF driver and Final Amplifier stages for substantial reduction in current drain—cooler operation—long life expectancy.

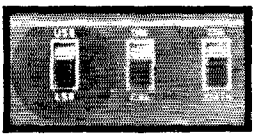
Suggested price. (Including built-in AC/DC power supply)

$395



BI-LATERAL MIXERS/AMPLIFIERS
Same transistors operate both transmit/receive by switching direction of amplification.

COLLINS MECHANICAL FILTER
Used both transmitter and receiver—gives steep slopes . . . clean, sharp transmitted sigs.



PANEL SWITCH SELECTS USB or LSB
Sidebands are locked to carrier—no dial shift.

SIMPLE TUNE-UP AND OPERATION
One knob controls bandswitch/exciter tuning.

HIGHLIGHTS: 135 watts p.e.p. input (slightly lower on 15). **Freq. range:** 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc. 23 transistors, 18 diodes, 1-zener diode, 1-varactor diode, 2-6GB5's PA, 1-12DQ7 driver. **Speaker built in** (external speaker provisions)
SIZE: 5"H, 11¼"W, 10"D. Approx. 20 pounds.

SBE 317 Roebling Road, South San Francisco, Calif.
Please send data sheet on **SB-34** transceiver

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NUMBER STREET

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SEE SBE SB-34 COMPLETE, SELF-CONTAINED, 4-BAND SSB TRANSCEIVER AT YOUR DISTRIBUTOR

SB-34 is available at most of the SBE distributors listed below:

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Butler

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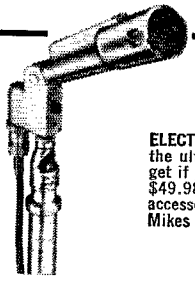

ELECTRO-VOICE dynamic cardioid mike for the ultimate in SSB operation—the one to get if you want the very best. Model 664—$49.98. Beautifully styled stand is a useful accessory. Model 419—$5.88. Other E-V Mikes from $4.50.

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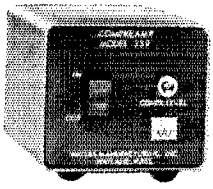
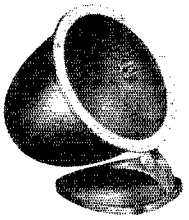


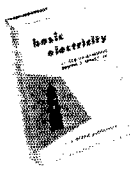
for you to give.... *or get*

FOR THE COMPLEAT SHACK



DESK LOUDSPEAKER BY JENSEN for highly intelligible speech reproduction in the presence of static, radio transmission and acoustic background noise. 5" speaker rated at 5 watts. Heavy cast base has felt pad. 3-4 ohms matches most receiver outputs. Model AP-10—$17.95.

THIS WORLD TIME CLOCK is a valuable accessory for any ham or short wave listener. Handsome, chromeplated 24-hour wall clock, has adjustable polar map with world time zones on inner dial. Master Crafters Model 191—$8.47.



GIVE THE KEYS TO KNOWLEDGE. Famous Rider books from Harrison instruct, inform, entertain. Here are some examples: The Safe and Simple Book of Electricity—$2.95, 103 Simple Transistor Projects—$2.75, Radio Operator's Q and A manual—$7.10, Citizen's Band Radio—$3.90.

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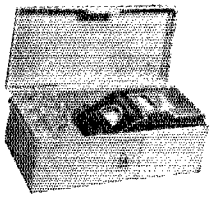
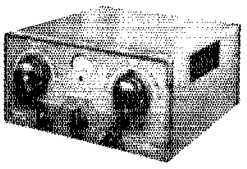


MILLEN GRID DIP METER—compact and completely self-contained. AC power supply is "transformer" type. Frequency coverage—1.7 mc to 300 mc. Range can be extended to 220 kc with additional coils (not included). Can be battery operated. Complete with carrying case. Model 90651—$68.85.



MILLEN TRANSMATCH—allows transmitter to work into 50 ohm unbalanced load for which it was designed. Converts multi-band antenna to 50 ohms between 3.5 and 29.7 mc. Matches 10 to 500 ohm unbalanced loads. Handles a KW. Model 92200—$129.00.

Harrison is the shortest distance between two points—you, and the gift you want to give or get for Christmas. Here, at "Ham Headquarters, U.S.A.," you'll find every item and service to make shopping easy for ham and tyro alike:

LARGEST SELECTION—Come see our special store and window displays of all the newest and best in Hamdom . . . as well as a large selection of electronic kits, books, tools, etc.—all in stock now.

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"NO PROBLEM" RETURNS—Any gift purchased may be returned unopened up to ten days after Christmas for full exchange.

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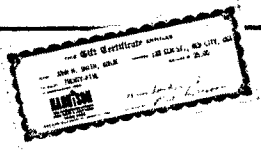

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Take the Amperex 5894, a twin tetrode widely recognized by communications equipment designers and end-product users alike for its overall superiority. Take the Amperex instant-heating Harp Cathode, the same Harp Cathode that is now proving its exceptional qualities in the rapidly growing Amperex family of instant heating communication tubes. Put the two together and the advantages to designers of transistorized communications equipment—whether its back-pack or land safety—are unbeatable.

Like the famous 5894, the new 8509 is designed for use as an RF power amplifier, oscillator, modulator and frequency multiplier. It features high-gain, unfailing uniformity and extreme reliability.

Unlike the 5894, however, and thanks to its Harp Cathode, the 8509 has an operational warm-up time of only 0.5 second thus insuring an ideal marriage with transistorized circuitry, and the reduction of battery power supply-size without sacrificing either power output or equipment efficiency.

Under Typical Class C Telegraphy ICAS operation as a Push-Pull RF Power Amplifier, the 8509 will deliver a Power Output of 96 watts at 250 mc. At reduced ratings the tube may be operated up to 500 mc.

For complete data on the new 8509 and other Amperex instant-heating communication tubes for mobile applications, write: Amperex Electronic Corporation, Tube Division, Hicksville, Long Island, New York 11802.

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(*Continued from page 114*)

OOs with 5 notices sent in Sept. WAØIAW is chairman and WA9ACI engineer of the Lakeshore Halls ARC. Net reports: WSBN, 617 offered and 501 cleared in 25:01 by 1241 check-ins; BEN, 107 offered and 79 cleared in 19:10 by 553 check-ins; WIN, 93 offered and 79 cleared in 10:30 by 225 check-ins. Nets all need more outlets to help up that percentage cleared. Traffic: (Sept.) W9-CXY 542, W9DYG 350, K9IMR 308, W9GOC 121, K9-HJS 90, W9CBE 80, K9GSC 57, W9IQW 56, WA9EDZ 42, W9NRP 41, K9GDF 40, WA9HJN 20, W9YT 17, K9-UTQ 16, W9HWQ 12, W9OTL 12, W9FNT 11, W9HPC 10, K9QKU 9, W9ONI 8, WA9FMQ 3. (Aug.) W9NRP 50, W9HWQ 22.

DAKOTA DIVISION

MINNESOTA—SCM, Mrs. Helen Mejdrich, WØOPX—Asst. SCM: Herman Kopische, WØTCK. SEC: WAØ-BZG. RMs: KØJFJ, WAØEPX. PAMs: KØFLT, KØ-VPJ. MSSB: WØHEN. The MSSB Set meets M-F on 3812 kc. at 0045Z and 3805 kc. at 1730Z; MJN (slow-speed c.w.) M-Sat. on 3595 kc. at 0010Z; MSN (c.w.) M-S on 3595 kc. at 0030Z; MSPN (noon) 1805Z on 3820 kc.; MSPN (evening) at 2330Z on 3820 kc. The newly-reactivated North Star YL Net meets each Tues. at 1500Z on 3820 kc. All YLs are invited to check in. Congrats to new appointees WAØCQA, WAØFUR and WAØACI as ECs and KØGNH as Asst. EC. A warm welcome is extended to the Tri-State Amateur Radio Club and Steel County Amateur Radio Club, newly affiliated with ARRL. EC KØHKA organized a Lake and Cook Co. AREC net with WAØDCD as NCS. WØGSX is chairman of a newly-formed Tri-State ARC TVI committee, assisted by WØNLF, KØQMV and WØ-GWJ. KØRSL, club secy., reports that WNØKDS is a new member. The Rochester 6-meter gang reports nightly contacts with Minneapolis. New RTTY OBS WØFLK is receiving reports of their reception as far away as Texas. John's newest building project is a flying spot scanner for ATV. ORS-OBS was interviewed on WCO's "My Fair Ladies Show" at the State Fair. Asst. SCM WØTCK and WØTZB are using 6-meter converted f.m. units with 60-ft. ground-plane antennas. Former NCS KØSBB, who has signed up for another 1½ years as a member of the Dunwoody team serving in Bombay, India, visited old friends in the Rochester area. Old-timer WØUUI, newly retired from the Navy, is sporting a new S/Line and Mosley beam on a 50-ft. tower and will be looking for old friends on 20-meter phone s.s.b. SCM WØOPX and family enjoyed an extensive vacation tour of the West. We stopped en route to visit an old friend, W9RHZ, his XYL, K9UMK, and jr. operator Diane, K9BLJ. Now it is time to wish each of you a very Merry Christmas and a Happy New Year. Traffic: (Sept.) WØRA 120, KØLJU 82, WØHEN 61, KØERQ 43, KØFLT 43, WØOPX 36, WAØBZG 33, KØVPJ 32, KPZZR 26, WAØAAM 23, WAØEPX 23, WAØFUR 21, WAØEDN 20, WAØDXV 18, KØZKK 18, WAØDSH 17, WØATO 16, W9GOC 16, KØZRD 16, WØKYG 15, KØIKU 13, KØMIA 13, WØRIQ 13, KØ-UMX 12, KØUBA 11, WAØDGW 9, WAØCQG 8, KØ-RCF 8, WAØEZQ 4, WAØIEF 4, KØHKA 3, WØLIG 3, KØSXP 2. (Aug.) KØJFJ 57, WAØEPX 26.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—Asst. SCM: Jene H. Melton, WAØDEM. SEC: WØ-SCT. RM: KØGSY. KØTVJ is teaching in the Canton public schools. Newly-elected officers of the Black Hills ARC are WØIOF, pres.; WØTKU, vice-pres.; WAØ-BWF, secy.; KØCXL, treas.; WØWWH, act. mgr.; KØCXM, WØNPV, KØWYC, WØFJZ and WØJIS, directors. Sioux Falls AREC officers are WØCUC, pres.; WAØCWW, vice-pres.; WØRRN, secy.; WØRWE, treas. The BHARC had 178 confirmed QSOs in its Mt. Rushmore QSL Party. WØZWL reports the Weather Net has resumed operations for the 10th consecutive year. Wedding bells rang for KØORH and WØIHS. They have moved to Cheyenne, Wyo. 4X4FN is doing research work with Raven Industries, Sioux Falls. New members of the Black Hills ARC are WNØISD, WNØ-ITC, WØQQQ and W8TSF/Ø. The BHARC sponsors transmitter hunts the 2nd and 4th Fri. of each month at 2000 MST. The club furnished communications for all check points at the annual Sports Car Rally. 3825 kc. is monitored by club members to assist mobiles in the Black Hills area. Traffic: KØGSY 203, WAØAOY 74, KØVYY 67, WØSCT 48, KØZBJ 22, WAØCIJ 18, WØ-ZWL 14, WAØFUZ 9, WAØARZ 8, KØBMQ 6, KØCXL 6, KØTXW 5, KØBSW 4, WØCQN 4, WAØCVZ 4, WAØCKH 2, WØDIY 2, KØYJF 2, WAØBMC 1.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: W5NPM. RM: K5TYW. PAM: WA5GPO. NMs: WA5AVO and K5IPS. I would like to remind all Arkansas amateurs of the availability of ORS, OPS, etc., appointments to interested and qualified hams. Join in a net now and handle some Christmas traffic. Net reports for Sept.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave. Tfc.*
OZK	3790	0100Z	Daily	29	171	227	5.9
QAN	3695	0400Z	Daily	28	60	146	2.2
APN	3885	1200Z	Mon.-Sat.	26	27	916	1.0
RN	SB3815	0030Z	Daily	27	68	263	2.5

Top stations on QAN were W5DTR 24, WA5CBL 22, WA5HNN 19, WA5AVO 19, QAN certificates 1-4 go to WA5HNN, W5DTR, WA5CBL and WA5AVO, respectively. Top stations on OZK were W4DTR 23, WA5AVO 20, WA5HNN 20, K5TYW 16, WA5CBL 16, WA5GUL 15, WA5BDU 12, K5TCK 10. WA5CBL has a new NCL-2000 on the air. WA5CBL is 206/183 on his DXCC. W5-DTR has a new 70-ft. tower and a three-element beam. SET activities were high in the state with WA5CBL, WA5HNN, WA5AVO, K5TYW, K7RWI/5, W5DTR and W5YM taking the most active rolls on our c.w. nets. WA5AVO's QAN Hamfest turned out real nice except for some bad weather. K5GKQ operated portable 5 at the Faulkner County Fair and originated a lot of traffic, with WA5CAW assisting. Active on c.w. during Hurricane Hilda were WA5CBL, WA5AVO, WA5HNN and W5DTR, who did a nice job as NCS of RN5. Traffic: WA5AVO 344, WA5CBL 250, WA5HNN 226, W5DTR 205, WA5BQI 83, K5TCK 71, WA5GPO 70, K5TYW 48, W5YM 37, WA5-GUL 15, WA5BBS 9, K5ALU 7.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—SEC: W5BUK. RM: W5CEZ. PAM: W5TAV. K5SNI has been active on 40 and 20 with a new Drake TR-3. K5SNH has gone s.s.b. with a new SB-400. K5OKR reports into LAN occasionally. K5KQG is active handling traffic on the Delta SSB Net. WA5EID has a new 14AVS but the receiver is acting up. WA5GNM was contacted by the hospital ship *Hope* 250 miles in the Carribean when a lady doctor on board suffered a cerebral hemorrhage. Contact was wanted with a doctor in Chicago. WA5GNM called Chicago on the landline and instructions were relayed. The patient was removed from the *Hope* by Navy helicopter. Contact was on 40-meter s.s.b. Shreveport now has four new hams, WA5-KBS, WA5KJP, WA5IFG and WA5JEQ. K5WWR is a new OBS. WA5HRD is busy with LAN and AREC. W5FMO is busy with communication service and will go to school in Cedar Rapids shortly. WA5BLO is one of the main anchor stations on LAN and RN5. W5JFB reports 100 per cent increase on 2 meters over last year. W5EA is another bulwark in LAN. K5OVR reports problems with CBs. W5MXQ regretfully had to give up the SEC post but manages to be on the air daily with MARS, LAN and various phone nets. W5CEZ and W5-GHP made the BPL. Hurricane Hilda found the South Louisiana gang ready. Outstanding work was done by LAN, the Gulf Coast Hurricane Net, the Delta S.S.B. Net and the Morning Round Table Net. Traffic: W5-CEZ 559, W5GHP 151, WA5BLO 90, W5PM 33, W5FMO 32, K5SNH 27, K5OKR 13, W5MXQ 12, W5EA 10, WA5-HRD 10, K5KQG 7, K5OVR 7.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Glad to hear K5YGT and W5UTL back on the air again. W5IZS and W5EPT are doing fine jobs with the Civil Defense Net. W5JHS is still doing a wonderful job with the Gulf Coast Side Band Net. W5JDF, W5WZ and others are very faithful to the Mississippi C.W. Net. W5CQJ sure does have a fine signal always. WA5GHF is now one of the net control stations for the Miss. C.W. Net. WA5IMU is going great on 80-meter c.w. WA5CSK, WA5ENS and WA5DXI are at Mississippi State and now using the club station. WN5JOY is active from Poplarville. He has both Novice and Technician class licenses and is working on the code. WA4-ATC/5 is now in Pittsboro. WA5GHF is busy in Laurel. Glad to hear WA5FAD active in Meridian. WA5AUR is johnny-on-the-spot when needed. Please send in station activities reports. Several appointments are open. Traffic: W5JDF 138, WA5GHF 67, WA5IMU 33, W5WZ 29, W5EMM 5, WA5DXI 2.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: W4RRV. RM: W4MXF. PAMs: WA4AIS, K4-WWQ, W4RMJ.

Net	*Freq.*	*Time*	*Days*	*QTC*	*QNI*	*Ave. QTC*	*Ave. QNI*
TPN	3980	0645C 0800C	M-Sat. Sun.	143	980	4.7	32.6
ETPN	3980	0640E	M-Fri.	27	440	1.3	20.9
TSSB	3980	1830C	M-Sat.	114	1034	4.4	39.8
TN	3635	1900C	M-Sat.	119	230	4.6	8.8

K4PUZ/6 is expecting an 18-month stay in Turkey. W4ZZ expects to operate from CT3 and EA8 in December with an NCX-3. K4HRY has a new son. Congrats, John. K4FZJ reports 65 stations in the Oct. SET,

(*Continued on page 128*)

(*Continued from page 126*)

a fine turnout for this important phase of our public service. TN was activated for Gulf Hurricane watch in Sept. and Oct. The 2nd Annual Tenn. QSO Party sponsored by RATS, Nashville, will be held Feb. 7. The Bristol RC is buying a portable generator for FD and emergency. There are openings for OBS appointments in Middle Tenn. for v.h.f. W4HPN reports much time on Navy MARS. W4MXF invites comments on the 7-Mc. TN daytime standby frequency. Interest in a section slow-speed net to meet one hour prior to TN is being shown. Any comments? Traffic: W4ZJY 239, W4PQP 150, W4MXF 116, WA4IBZ 104, W4FX 64, K4SXD 64, W4OGG 63, WA4HRG 60, WA4OXL 59, WA4GQM 46, K4WWQ 46, W4UVP 42, K4EWI 37, W4RMJ 29, WA4MCC 28, WA4NUJ 26, W4WBK 21, W4CAT 19, W4LLJ 19, W4VNU 19, W4YAU 18, WA4AWG 16, WA4GLS 13, W4HPN 11, WA4KOG 11, K4UMW 11, K4JXG 8, K4OUK 7, K4RCT 7, K4LTA 5, WA4HGQ 4, WA4RQD 4, WA4EWW 3, W4VTS 3, K4JMF 2, WA4PSU 2, K4QWV 2.

GREAT LAKES DIVISION

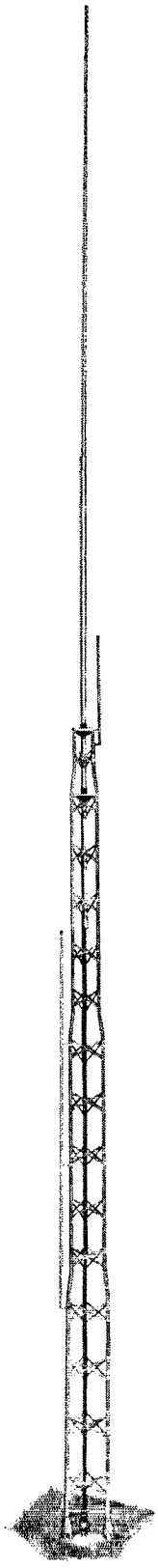
KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: K4URX. PAMs: W4BEJ, W4SZB, K4DMU. V.H.F. PAM: WA4IUW. RM: WA4LCH. Appointments for Sept.: W4RHZ as OBS; K4YZU as OPS; W4BEJ as OBS; WA4OMH as OES. It is with deep regret that we announce that **K4ECJ**, of Happy, Ky., has joined Silent Keys. He had a heart attack the last week in September. Sept. net report as follows:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	0630E	M-F	23	296	145
KYN	3600	0900&1900	Daily	59	499	321
KTN	3960	1830E	Daily	26	660	93
LATN	21150	2100E	M-F	21	71	54

The Central Ky. Emerg. 6-Mtr. Phone Net reports 8 sessions, with 79 QNI. The Kentuckiana Radio Club is sponsoring the Kentuckiana Colonel Award available to all amateurs. Residents of Ky. send 15 cents to K4FLP if interested in the award. Out-of-state amateurs must work 15 holders of the award to qualify. W4CDA has a new Ranger. WA4GTU is attending Sue Bennett College in London. K4KJQ has an SB-400 kit that he is slowly putting together. W4SZB is out of the hospital after a serious illness. Nice to hear him back on the MKPN as PAM. WA4LCH was high QNI on 9RN this past month. Ky. was present 96.5%. Send those AREC applications to your EC. If you don't know who yours is, find out. If by chance you do not have one, send it to K4URX, your SEC. Western Ky. is badly needed on KYN. Why don't you QNI? Traffic: (Sept.) WA4AGH 469, WA4LCH 364, W4RHZ 271, K4DMU 178, WA4MEX 163, W4BAZ 147, WA5DYL 139, K4YZU 134, K4DZM 127, WA4BSC 104, K4VDO 58, W4CDA 35, WN4RVP 26, W4BTA 21, W4KJP 14, W4SZB 8, WA4GHO 3. (Aug.) WN4UMN 9.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8ELW, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAM: W8PT. Appointments: K8JJC, K8KMQ, WA8KXO, K8QLL, and W8SH as ORSs; WA8ASK, WA8CUL, WA8GBN and K8GKX as ECs; W8DSW as OBS; K8PBA and W8SH as OESs. After many years of doing a fine job as RM, W8FWQ resigned and was replaced by W8ELW, another trafficker of many years. After living in this area for 83 years, W8VT decided to retire to Texas. He has held 8VT since Jan. 6, 1923. New officers of the Catalpa ARS are W8AMZ, pres.; W8VVD, vice-pres.; K8ONV, rec. secy.; K8UOQ, corr. secy.; W8CMQ, treas. K8ZKL had a heart attack in Milwaukee and was there 6 weeks before being allowed home. One OT still is using twisted pair feeders with fair results, and another OT, K8DX, is using a Marconi umbrella antenna to his DX-100B with excellent results. The K8TCAs with 9 kids, celebrate their 25th wedding anniversary. If interested in Toroids, ask K8PBA, who has been working with them. *HAC Publications* has a new editor, W8JXU, who starts off with an excellent editorial by W8DDO. WA8CHD and W8VKQ had a 7-mile contact on the 1296-Mc. band K8GOU (SEC) gets out a nice AREC-ARPSC bulletin, printing by W8UCG. W8MRM operated through the SS at the Henry Ford Museum. The MCRC station has been going there since OT Nite, last May. A good write-up on "How to Work Into a Net" is in *Grid Leaks* of the HVARA, by K8NJW. A Silent Key is ex-W8EFI, Walter Malec, who used to do so much work at the DARA Ypsi Hamfests during the "thirties." WA8DDI made the BPL on originations and deliveries. WA8CXF finally got both fixed and mobile working. WA8DXW is going to the U. of M. W8DC, Grand Rapids ARA station, now has an SX-117 and an HT-44. There are now six Novices in Saginaw: WN8-

(*Continued on page 130*)



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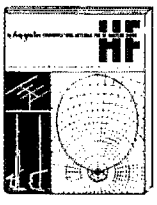

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(*Continued from page 128*)

MAS, WN8MHN, WN8MWS, WN8NDL, WN8NLC and WN8LTX. Traffic: (Sept.) K8LNE 340, K8NJW 249, K8KMQ 240, W8ELW 189, WA8DDI 169, K8HLR 132, WA8CPH 116, K8GOU 108, K8TDJ 100, K8IUZ 96, W8BEZ 65, W8FWQ 62, W8EU 51, K8PKU 49, K8BYX 47, WA8KXO 45, W8EJR 39, WA8DZP 37, W8FX 33, K8VCB 30, K8JED 29, WA8CHH 26, K8JJC 22, K8EXE 16, WA8HGE 16, W8AHV 14, W8AUD 13, W8HKT 13, WA8CTE 10, WA8CXF 10, W8ZHB 10, W8WVL 8, W8DSE 7, K8ZXB 7, K8QLL 4, W8TBP 4, W8AAM 3, WA8DXW 3, K8GJD 2, K8VDA 2. (Aug.) WA8CPH 189, K8IUZ 50, W8TBP 17, K8MFO/8 16.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RAIs: W8BZX, W8DAE and K8LGB. PAMs: W8VZK, K8BAP and K8UBK. This is being written by W8DAE. Acting SCM. Weck still is in VA Hospital and has done very well after a serious operation; he now is awaiting eye surgery. I see him often. Eunice, K8ONA, of the Apricot Net has been in to see Weck on two occasions. I met K8ZFR in the hospital recently. He used to help with the radio station at Crile Hospital on the west side. W8ECB has been inactive because of a heavy work sked in a new job. K8JLK has a new BW6100 and RME S.S.B. slicer, trap vertical and *much* debt! WA8AJZ received his USA/CA 500 award. W8GIU has a 40-ft. power pole in the ground and is building a quad. He has made several applications for various U.S.A. awards for CR6FW (GIU is the QSL Mgr. for him). W8AQ has a GSB-20 linear and plenty of soup, 80 through 10. Nice going, Ev. K8ONQ was on vacation for a week in N.J. and Penna. with jr. operator David and XYL Elaine, visiting both families. W8IEP says "moonlighting" is about over and he will be getting back to OSN. WA8CFJ has a new Valiant. FB, Malc! K8OCL has moved to 3100 Somerford Road, Columbus, Ohio 43221. K8MMZ worked his first UA, LZ ON, I-1, YO and YU on 20-meter c.w. He is in his senior year at OSU. Good Luck, Stan! WA8CJP is Central Ohio hostess for the World Travel Assn. and has met overseas people via Ohio radio and at her home. Huron County held its first hamfest on Aug. 16 with about 200 attending, reports K8ZES. *Ham Shack Gossip* of Toledo: A corn roast was held Aug. 8 at K8TVX's and K8TVW's. There is a good article on TVI in the Sept. Bulletin. WA8FQR's and WA8FQS's daughter Barbara returned from Europe and left Aug. 23 for Puerto Rico, where she will study for four months and then be assigned to Peru under the Papal Volunteers. On Aug. 6 their daughter Sharon received her white veil and took the name of Sister M. Garcia. Their son Mike got his General Class license and now is WA8EIS. BPL for Sept.: W8DAE and W8UPH. I have enjoyed writing these three columns and trust that Weck will be home in time for the next one. If not, I shall do it again. K8DIU reports for Sept. 1964: BN, 30 sessions held, traffic 316, average 10.9, rate .305. Traffic: (Sept.) W8UPH 501, W8DAE 415, WA8GYT 385, W8CHT 155, WA8HVR 117, W8TV 99, W8BZX 90, K8LGA 90, W8MGA 65, K8VMI 53, W8GRG 50, W8CXM 48, WA8ETX 43, WA8EIF 39, WA8AWH 34, W8QCU 34, WA9AJZ 31, W8ERD 21, WA8IPN 19, K8DDG 9, W8LZE 7, W8GIU 4, K8LGB 4, K8ONQ 4, K8PJH 4, W8RO 4, W8ECB 2, W8IEP 2. (Aug.) WA8CJF 68, W8LT 18, K8OCL 1, K8ONQ 1.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2100 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2200 GMT; Emergency Coordinators on 146.550 kc. Fri. at 0015 GMT. Appointments: WB2HYA as ORS and WB2FXB as OPS. Endorsements: W2KGC as SEC, WA2QAO as EC, K2DEM as OO and OPS, WA2MID as OPS and WB2FXB as OES. Around the club circuits in Sept.: The Schenectady Club demonstrated the capabilities of its 2-Meter F.M. Net with repeater station, mobiles, base station and handy-talkies. In Albany, W2BBT spoke about a fully-transistorized receiver which he built. The Westchester Club had a speaker from Clagg Labs. Down in New Rochelle, the president of Hammarlund spoke about the DXpedition of the month. K2SJN, Westchester County EC, again is teaching classes in radio for New Rochelle. WB2HZY, an OES, has his General. A new tri-band beam is in use at WB2FVD. Our congrats to WA2OOO as high scorer in E.N.Y. during the DX Contest. Nice to hear from K2PRB, who received his B.S. in Physics and M.S. in Astronomy from Yale. K2DEM reports his DX score is 102/93, almost to the magic number for DXCC. Phone traffic man WA2JLW has a new tower. NYS net member and expert c.w. traffic-handler WA2HGB is attending Cornell. The

(*Continued on page 132*)

NOW DIRECT CRYSTAL CONTROL TO 160 mc With AOC Plug-In Transistor Oscillators

- Portable Signal Standards
- Signal Generators For Receiver Alignment
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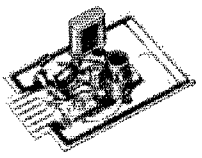
HIGH FREQUENCY (20 mc – 160 mc)

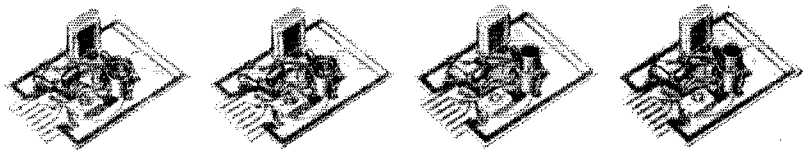
Five transistor oscillators covering 20 mc - 160 mc. Standard 77°F calibration tolerance ±.0025%. The frequency tolerance is ±.0035%. Oscillator output is .2 volts (min) across 51 ohms. Power requirement: 9 vdc @ 10 ma. max.

OSCILLATOR TYPE	OSCILLATOR RANGE	CRYSTAL TYPE	TEMPERATURE TOL. —40°F to 150°F	OSCILLATOR (LESS CRYSTAL) PRICE
OT-24	20-40 mc	CY-7T	±.0035%	$ 9.10
OT-46	40-60 mc	CY-7T	±.0035%	9.10
OT-61	60-100 mc	CY-7T	±.0035%	15.00
OT-140	100-140 mc	CY-7T	±.0035%	15.00
OT-160	110-160 mc	CY-7T	±.0035%	15.00

CRYSTAL FREQUENCY	CRYSTAL PRICE
20-60 mc	$ 6.90
60-100 mc	12.00
101-140 mc	15.00
141-160 mc	18.00



Order direct from International Crystal Mfg. Co.

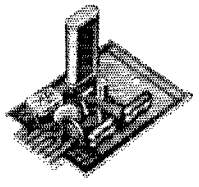


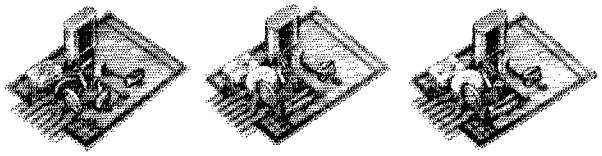
LOW FREQUENCY (70 kc – 20,000 kc)

Four transistor oscillators covering 70 kc - 20,000 kc. Trimmer capacitor for zeroing crystal. When oscillator is ordered with crystal the standard will be ±.0025%. Oscillator output is 1 volt (min) across 470 ohms. Power requirement: 9 vdc @ 10 ma. max.

OSCILLATOR TYPE	OSCILLATOR RANGE	CRYSTAL TYPE	TEMPERATURE TOL. —40°F TO +150°F	OSCILLATOR (LESS CRYSTAL) PRICE
OT-1	70-200 kc	CY-13T	±.015%	$7.00
OT-2	200-5,000 kc	CY-6T	200-600kc ±.01% 600-5,000kc ±.0035%	7.00 7.00
OT-3	2,000-12,000 kc	CY-6T	±.0035%	7.00
OT-4	10,000-20,000 kc	CY-6T	±.0035%	7.00

CRYSTAL FREQUENCY	CRYSTAL PRICE
70-99 kc	$22.50
100-200 kc	15.00
200-499 kc	12.50
500-849 kc	22.50
850-999 kc	15.00
1,000-1,499 kc	9.80
1,500-2,999 kc	6.90
3,000-10,999 kc	4.90
11,000-20,000 kc	6.90





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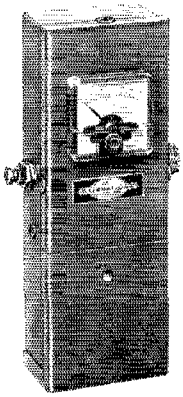
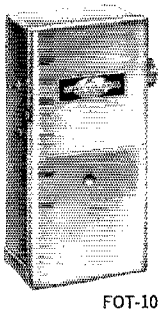
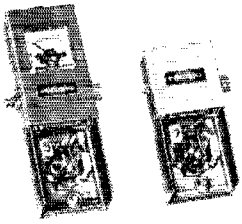
Small portable cases for use with the OT series of plug-in oscillators. Prices do not include oscillators. (When oscillator and crystal are ordered with FOT-10 case a 77° F tolerance of ±.001% may be obtained at $2.00 extra per oscillator/crystal unit. When oscillator/crystal units are ordered with FOT-20 case, a single unit can be supplied with temperature calibration over a range of 40° F to 120° F. Correction to ±.0005%. Add $25.00 to the price of FOT-20 and oscillator/crystal unit.)



FOT-20



FOT-10



FOT-20 For high accuracy calibration requirements. Includes battery and output jack, output meter circuit and battery check, as well as thermistor temperature measuring circuit. **$87.50**

FOT-10 Basic case with battery and output jack for general wider tolerance applications. **$14.50**

MT-1 Oscillator board mounting kit. **$4.95**

(Continued from page 130)

Westchester Amateur Radio Assn. meets the 2nd and 4th Thurs. of each month at the Westchester County Center. It cordially invites area amateurs to join up to get the most from ham activity. The association will be *thirty years old* come March and plans the greatest anniversary in its history. Traffic: (Sept.) WA2UZK 280, WA2VYS 220, W2OGH 206, WB2FVD 141, WB2CPU 117, K2TXP 107, WA2LJM 78, K2SJN 73, K2DEM 46, W2EFU 45, W2ANV 39, W2URP 35, W2PKY 24, WA2VYT 22, WA2JWL 20, WB2HYA 17, WA2HGB 15, WB2FXB 14, WA2OOO 4. (Aug.) WB2FVD 30, WA2LJM 7, WA2ZPD 5, WB2HZY 2.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—SEC: K2OVN. Section nets:

NLI	3630 kc.	1915	Nightly	WA2EXP-RM
VHF Net	145.8 Mc.	2000	TWTh	W2EW-PAM
VHF Net	146.25 Mc.	1900	FSSnM.	W2EW-PAM
NYCLIPN	3932 kc.	1600	Ex. Sun.	WA2QJU-PAM
NLS (slow)	3630 kc.	1845	Nightly	WA2RUE-RM

NYC-LI AREC Nets: *Pick one near you and join up!*

County	*EC*	*Net*	*Mc.*	*Day*	*Time*	*NCS*
Bronx	WA2QAO	Hudson # 1	146.18	F	2000	WA2QAO
"	"	Hudson # 2	50.8	Th	2000	WA2QWQ
"	"	Hudson # 3	28.71	M	2130	WA2FMB
Kings	W2CKU	Kings #1	145.26	M	2000	WA2GAB
"	"	Kings #2	146.88	M	2000	WA2HTA
"	"	Kings #3	50.4	M W	2030	WA2RAQ
"	"	Kings #4	29.64	M	2100	K2IWC
New York	WA2MMW	Manhattan 2	146.94	M	2030	WA2VKK
"		Manhattan 6	50.4	Th	2030	WA2MMW
Nassau	W2FI	Nassau Command	146.1	M	2100	K2DHC
"	"	Hempstead 2	147.0	M	2110	K2UIB
"	"	Hempstead 6	50.25	M	2130	K2UIB
"	"	N. Hempstead	146.82	M	2110	W2UAL
"	"	Oyster Bay	145.32	M	2110	W2HSB
"	"	Nassau 10	28.72	M	2100	W2ZAT
Queens	W2IAG	Queens #1	146.25	Th	2000	K2UHD
"	"	Queens #2	146.62	M	2000	WA2TAQ
"	"	Queens 6-1	50.52	M	2000	WA2WAO
"	"	Queens 6-2	50.25	Sa	1830	WA2WAO
"	"	Queens 10	29.5	M	2000	W2IAG
Richmond	W2VKF	Richmond 2	147.12	M	1930	W2VKF
Suffolk	W2KNA	Suffolk 2	145.5	M	2100	K2BGP
"	"	Suffolk 10	29.56	M	2000	K2BGP
"	"	Huntington 2	145.6	M	2100	K2HTX
"	"	Huntington 6	50.46	M	2030	K2HTX
"	"	Huntington 10	28.73	M	2000	K2HTX
"	"	Brookhaven FM	146.34	M	2100	W2OQI

The Nassau Amateur Radio Assn. has been formed with W2HSB, pres.; W2NOS, vice-pres.; K2DGI, secy.; W2FT, treas.; W2OIC, program mgr. Starting with 50 members, the NARA will meet every 1st Fri. in the Plainview Public Library at 8:30 P.M. Appointments: WB2DZZ as OES, WA2JKX as OO, WB2HWB and WA2EQK as OBSs. WA2RUE made A-1 Operator; so did WB2EUH, but WB2DBW picked up a CP-25 sticker. BPL certificates went to WA2RUE, WA2UWA, WA2TQT and W2EW. WB2HWB is now on 15 meters and hears some pretty wild calls when it opens. WA2PJL went off to college, but WA2YLL and WB2IQG are carrying on with their Oscar III plans. WA2EXP is mobiling around with a Sixer and a Squalo. WB2LGR got his General and worked a CR6 on 15-meter a.m. with a Ranger in that order. WB2MLN, long-time 40 Meteorite, is enraptured with v.h.f. now that he's on 2. How about this, that rascal W2GKZ put a new four-element beam on the new tower I told you about! WB2LUK is now chairman of the Lincoln H.S. Radiogram Committee. WB2AWX is going to Hunter College. WA2OOL is now in MARS. W2PF was in the hospital. Those wishing him speedy recovery were W6RT, W4PR, WØCVU, WA6YGM, WA2ZZC and K2HFU. W2EHA has given the 10-meter mobile a little more starch with a pair of 807s in linear. The dynamotor went into shock, but is OK now. W2LGK is using a Twoer into a 66-ft.

(Continued on page 134)

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POWERFUL!
TOP VOICE QUALITY!
THE BEST TRANSCEIVER
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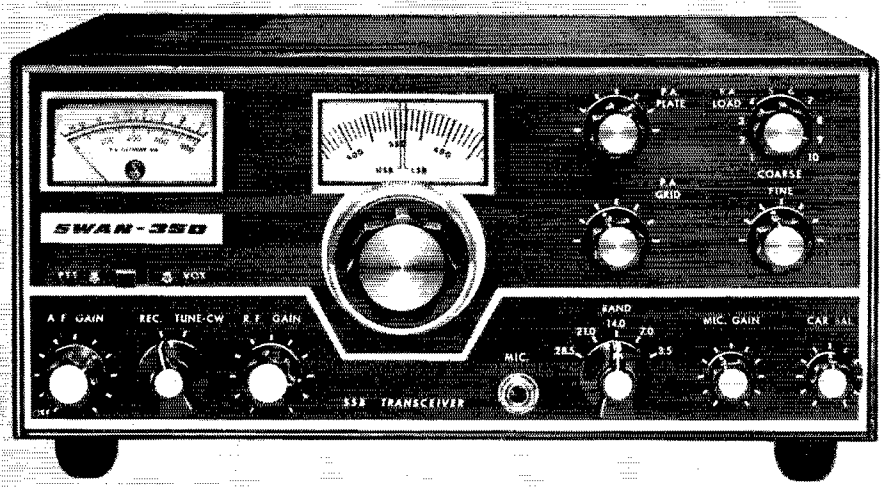
THE NEW SWAN-350 TRANSCEIVER



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HOME STATION — MOBILE — PORTABLE

- 3.5 - 4.0 mc, 7.0 - 7.5 mc, 13.85 - 14.35 mc, 21.0 - 21.5 mc, 28.5 - 29.0 mc (10 meter full coverage kit available.)
- Transistorized VFO, temperature and voltage stabilized.
- Precision dual-ratio tuning.
- Crystal lattice filter.
- ALC . . . AGC . . . S-Meter.
- 5½ in. high, 13 in. wide, 11 in. deep.
- 400 watts SSB input
  320 watts CW input
  125 watts AM input
- Sideband suppression: 40 db
  Carrier suppression: 50 db
  Third order distortion: 30 db
- Lower sideband on 80M and 40M.
  Upper sideband on 20M, 15M, and 10M.
  (Opposite sideband kit available.)

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ASK THE HAM WHO OWNS ONE!

ACCESSORIES:

- AC power supply, matching cabinet with speaker. Model 117-C.....$ 85
- 12 Volt DC Power supply. Model 412.....$130
- Plug-in VOX. Model VX-1.....$ 35
- Accessory kits to be announced.

SEE THE NEW SWAN-350 and THE DELUXE SWAN-400 AT YOUR DEALERS NOW!

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Oceanside, California

(*Continued from page 132*)

Zepp. Traffic: WA2RUE 581, WA2UWA 508, WB2HWB 293, W2EW 273, WB2EUH 237, WB2HLM 206, WA2QJU 201, WA2PJL 190, WB2IQG 168, WA2TQT 140, WA2LJS 115, W2DBQ 87, WB2DBW 76, K2US 69, WA2EXP 51, WB2LGR 50, WA2UYQ 50, W4TRU/2 44, WB2MLN 36, W2GKZ 32, WB2LUK 28, WA2PMW 21, WB2EGV 12, W2EC 7, WBAWX 6, WA2WAO 6, WA2OOL 4, W2PF 2.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM: Louis J. Amoroso, W2-LQP. NNJ ARPSC nets:

NJN	3695 kc.	7:00 P.M.	Daily	W2TFM-RM
NJ Phone	3900 kc.	6:00 P.M.	Ex Sun.	W2PEY-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2ZI-PAM
NJ 6&2	51150 kc.	11:00 P.M.	M-W-Sat.	K2VNL-PAM
NJ 6&2	146700 kc.	10:00 P.M.	Tu-Sat.	K2VNL-PAM
16 N	1880 kc.	7:30 P.M.	Tue.	WA2UOO-RM
NJNN*	3725 kc.	7:20 P.M.	MTWTh	WA2SRK-RM

*Novice and slow speed. All times local. AREC net sked information is available from SEC K2ZFI. New appointments: WB2ICH and WB2AEJ as ORSs; WB2IYO as OPS; K2RDX and WA2JVO as OESs. Congratulations to WB2KQJ, WB2LDY, WB2KDD and WB2LDX on the receipt of their General Class licenses. WB2AEJ has a new homebrew half-kw. linear. WB2HLH worked his first DX at the new QTH. W2ZAL reports the Jersey City Club is planning big things. WB2JWB, Asst. EC, is promoting the 10-Meter Bergen County AREC Net. WA2SED, EC, conducts a net on 29.2 Mc. Thurs. at 8 P.M. WB2BCS is installing a sophisticated frequency measurement system. WB2IYO, OPS, participates in the Raritan Twp. RACES, 50.7 Mc., Mon. at 7:45 P.M. WA2ZQH has 47 states. W2NIY calls into NJN when time permits. How about some of you other old-timers? WB2KDD has a new homebrew 150-watt c.w. rig. WN2-NOY and WN2PFE are new hams in Colonia. WA2-DEW/KV4CQ made one of his excursions to Virgin I. in October and operated 20 and 15 meters. WA2FWD has a new HQ-145. W2SUS is working DX with a DX-40. K2GSF is the new trustee for the State Line Club station, K2LSA. WA2HGL has a new SR-160, and won 1st place N.J. in the Georgia QSO Party. W2DME is operating lower sideband 144.5 Mc. K2IBF has been tied up organizing East Coast V.H.F. Society activities including participation in the recent HARC ARRL National Convention. WA2UDT has an HQ-170A and an HX-50. WA2MNU has completed a 50-Mc. v.f.o. and will now build a d.s.b. kw. for 6 and 2. WB2ALF says that the 2-meter division of NJ 6 & 2 needs some pepping-up; so come on you v.h.f.ers, this is the only section traffic net open to all license classes, 146.700 kc. at 10 P.M. Tue. and Sat. WA2UOO worked 14 countries on 80 c.w. during August. WA2BNF, K2UCY, and W2EW are cooperating in handling NNJ-NYC traffic on 2 meters. WA2YJV is RTTY on 2 meters. WA2LTM is building a kw. for 2 meters. WB2FYB and WA2JVO are building and testing 220 and 432 Mc. WB2GKF is building a ham-TV camera. WB2ALF will look for schedules via Oscar III. WB2KLD worked 10 states as a Novice on 2 meters. WB2JCP has a new 75A-4. Merry Christmas to all! Traffic: (Sept.) K2VNT, 408, WB2ALF 304, WB2AEJ 216, WA2VID 138, WB2HLH 101, K2UCY 96, W2ZAL 83, WA2MYB 82, WA2UOO 75, W2PEV 71, WB2DEP 42, W2CVW 41, WA2GOZ 41, WB2JWB 41, WA2KRC 41, WB2ICH 30, WA2BNF 26, K2ZFI 25, WA2TBS 24, WA2WHZ 23, WA2CCF 22, WA2QPX 22, WA2TEK 22, WB2GFY 20, WB2BCS 19, WA2WAJ 19, WB2KXG 18, W2TFM 17, K2AGJ 16, WA2PWT 16, W2-BVE 14, WA2KVQ 12, K2EQP 10, WB2IYO 10, WA2-ZQH 10, W2CFB 6, WA2TWS 5, W2ABL 2, WA2UDT 2, W2EWZ 1, W2NIY 1, WA2ZOW 1. (Aug.) WB2KXG 55, W2DRV 23, K2JTU 19, W2CFB 8, WB2JEE 4, WB2-KDD 4, WA2KVQ 4, WB2JPR 1.

MIDWEST DIVISION

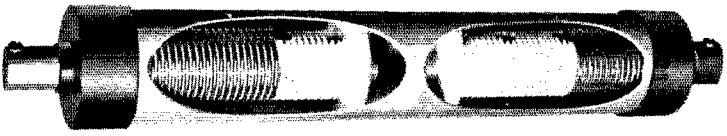
IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. RMs: WØLGG, WØUSL. PAMs: KØBBL, WØLSF. Net reports: Interstate S.S.B.—QNI 983, QTC 486, sessions 30. 160-Meter Net—QNI 607, QTC 2, sessions 30. 75-Meter Phone Net—QTC 918, QTC 66, sessions 26. Hamilton County Net—QNI 130, QTC 3, sessions 27. Traffic: WØLGG 1504, WØBDR 1423, WØNTB 89, WØUSL 86, KØQKD 76, WAØFSW 64, WØTDO 10, WAØDYU 8, WØYDV 8, KØEVC 7, WØGPL 4, WØQVZ 4, WØCQC 3, WØDHO 1, WØGQ 1, WØTFT 1.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: KØBXF. Asst. SEC: KØEMB. RM: WØSAF. PAM: KØEFL. V.H.F. PAMs: KØVHP, WØHAJ. Net traffic report for Sept.

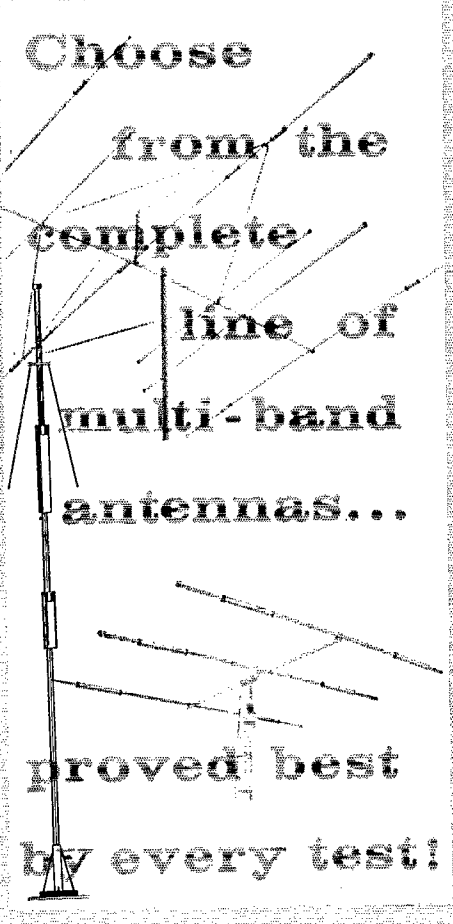
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*Ave.*
KPN	3920	1245Z	M-W-F	15	65	257	17.13
"	"	1400Z	Sun.				
QKS	3610	0030Z	Daily	22	30	87	4.0

(*Continued on page 136*)

HERE'S THE ORIGINAL !



None Better HAS EVER BEEN Made !



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(Continued from page 134)

Your SCM wants to congratulate all those who have helped to keep our traffic nets going and those who sent in their monthly reports. Keep up the good work and keep those reports coming. This is the only way to keep everyone informed that the Kansas section is an active one. Note by the grapevine that WØVBQ and WØJUV still are real active contest-wise and copped a couple of awards for it. Hi! Again this coming year your SCM will award a trophy to each of the top people in each classification. Perhaps next year you will find yourself a winner. All it takes is activity and regular monthly reports to your SCM. There also will be a trophy for the outstanding club in the 1965 Field Day so start planning now. A very Merry Christmas and a Happy New Year to you all. May your blessings be bountiful. Traffic: WØOHJ 826, WØCET 351, KØGII 202, WØSAF 174, KØJMF 163, WØALA 93, WAØEDD 71, WØBYV 60, WØZUX 42, WAØCCW 25, KØGIG 24, KØLHF 23, KØEFL 13, WØBMW 11, KØPSD 9, WØWFD 7, KØDVN 4, WØFDJ 4, KØGQO 4, KØVQC 2, KØYGR 2.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. RAMs: WØOUD, KØONK. PAMs: WØBUL, WØBVL, WAØFLL (v.h.f.), WØOMM, WAØFLL has been appointed V.H.F. PAM for the PHD Net. Appointments renewed: WAØDJG as OBS, KØWOP as OPS, WØGBJ and KØLGZ as ORSs. MEN, MoSSB and MON were active during the SET with extra sessions and traffic. The St. Louis gang, including WØKIK, KØAEM, WØHVJ, WØWYJ and KØLIR of St. Louis ARC, were extra busy with the SET. SEC WØBUL is to be commended on the statewide coordination of SET activities. KØONK reports relaying over 300 SET messages. KØFPC received his TCC certificate. WAØEMS is out of the hospital after an operation. KØCVM was the surgeon. New stations active on MON are WAØCXI, WAØHAS and XYL WAØHSK. WAØFKD attends jr. college in Fort Scott but is home each night for net activities. More antenna experiments, receiving this time, are in the process at WØOUD. WAØJIH is a new General Class licensee in Parkville, Central Mo. ARC has started a net on 29.0 Mc. at 7 P.M. WAØAZL is NCS. WAØZBR, at California, Mo., is back on 75 after losing his station in a fire. This report will appear in Dec. *QST* so ARL-56 to each one. Net reports for Sept.:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2345Z	M-W-F-	12	239	65	WØBUL
MON	3580	0100Z	Tu.-Sun.	26	208	174	WØOUD
MNN	3580	1900Z	M-Sat.	26	97	35	WØOUD
SMN	3580	2200Z	Sun.	4	26	16	WØOUD
MSN	3715	0300Z	Daily	30	60	4	KØONK
MoSSB	3963	2400Z	M-Sat.	26	138	118	KØIHA
PON	3810	2100Z	M-F	21	222	107	KØBWE
PHD	50.4	1245Z	Wed.	5	76	—	WAØFLL

Traffic: (Sept.) KØONK 4407, WØWYJ 351, KØFPC 216, KØAEM 170, WØOUD 112, KØTCB 67, WØHVJ 63, WØTPK 39, KØEQY 22, WØBUL 21, WAØEMX 18, WØKIK 17, WAØDGT 15, WAØFKD 15, KØBWE 14, WAØDJG 13, WØZLN 10, WØBVL 3, WØRTW 1. (Aug.) KØONK 1796.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Net activity for the month reached 3804 QNI in the section. All amateurs are urged and invited to check into their area nets. Net reports:

Nebr. Morn Phone	3982.5	1330Z	QNI	591	QTC	85
West Nebr. Net.	3850	1400Z	QNI	635	QTC	19
Nebr. Emer. Phone	3982.5	1830Z	QNI	937	QTC	31
Nebr. Storm Net	3982.5	2330Z 0030Z	QNI	1180	QTC	16
AREC Net	3982.5	1430Z Sun.	QNI	106	QTC	2
Nebr. CW Net	3525	0100Z 0400Z	QNI	335	QTC	42
Nebr. AREC CW Net	3782.5	0000Z	QNI	20	QTC	0

A very successful SET was held throughout the state this year with good usage of all bands. Traffic: WØLOD 157, WAØBID 38, WØFIG 29, WAØAES 23, WAØBIE 12, WAØBOK 12, KØJFN 12, WØNIK 9, KØUWK 8, KØEJT 7, WØGGP 7, WØVEA 7, KØHNT 4, WAØBYK 3, WØHOP 3, WØBFN 2, WØCIW 2, WAØERN 2, WØZHV 2, WØOCU 1, WØPQP 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Robert J. O'Neil, W1FHP—This report was submitted by W1YBH.

Aug. net reports:

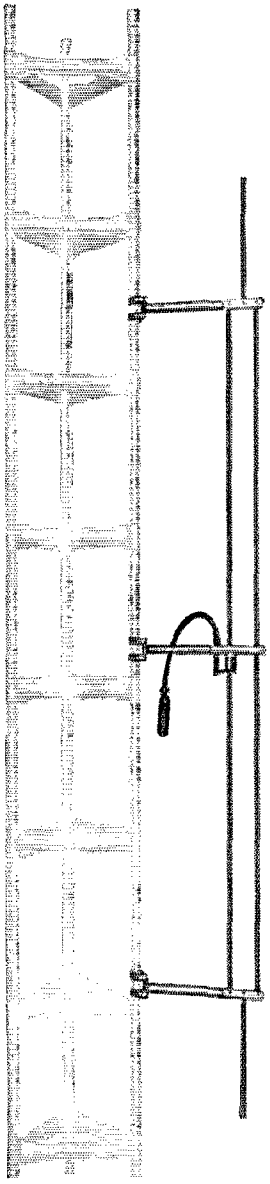
Net	*Sess.*	*QTC*	*QNI*
CPN	31	152	765

Sept. net reports:

CN	30	202	396
CPN	30	104	750

Attendance leaders: CPN—(Aug.) K1LFW, W1LUH, K1OJZ/1, W1GKF, K1OQG, K1EIC, W1YBH. (Sept.)

(Continued on page 138)



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CERTIFIED PERFORMANCE!

CAT. NO. 320-509, FREQUENCY RANGE 30-54 MC*

BASE STATION SIDE-MOUNT ANTENNA

*Exact frequency must be specified

Cat. No. 320-509 Side-Mount 2.5 db Gain Antenna is designed for applications requiring an antenna which must be side mounted on existing or new towers. This antenna has essentially a cardioid pattern and has approximately 2.5 db gain in the forward direction. High strength aluminum alloy is used for all antenna parts, except the mounting clamps, which are made of stainless steel. All insulators are made of the best available materials for the various uses involved. Each antenna is supplied cut to the desired operating frequency and is assembled ready for installation.

SPECIFICATIONS

Electrical:

Nominal input impedance	50 ohms
VSWR	1.5:1
Bandwidth	±1.0%
Maximum power input	500 watts
Flexible terminal extension	18 in. of RG-8A/U
Termination	Type N male with Neoprene housing
Lightning protection	Direct ground

Mechanical:

Radiating element material	6061-T6 aluminum
Insulated support material	Phenolic
Feed point insulator	Polycarbonate
Overall length	10 ft. at 50 Mc, 16½ ft. at 30 Mc
Spacing from tower	8"
Rated wind velocity	100 MPH
Lateral thrust at rated wind	45 lbs. at 30 Mc
Weight	15 lbs. at 30 Mc

Stainless Steel Mounting Clamps supplied to mount antenna on round tower legs 1 in. to 1½ in. diameter.

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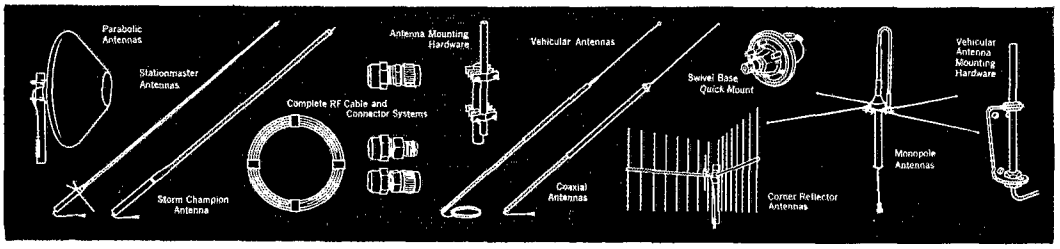

(Continued from page 136)

W1LUH, K1AQE, K1LFW, K1OQG, W1YBH, K1SRF, K1EIC, K1NTR, W1GKF, K1OJZ/1. CN—(Sept.) K1ZND, W1WHQ, K1STM. Congrats to our two BPL winners in Sept., K1WKK and W1BGD. Traffic: (Sept.) K1WKK 702, W1BGD 413, K1LFW 226, K1ZND 150, WA1ALZ 122, K1GGG 91, K1YIX 19, W1CTI 16, K1SRE 10, W1YBH 10, W1QV 8, W1BDI 7, W1AW 1, W1YYM 1. (Aug.) K1WKK 600, W1BGD 360, K1YIX 209, W1YBH 39, W1BDI 34.

NEW ENGLAND QSO PARTY

December 5-6, 1964

sponsored by
The Connecticut Wireless Association

Times: CWA calls this its SEVEN-ELEVEN PARTY because the operating periods are as follows: 7-11 P.M. EST Saturday night, 7-11 A.M. EST Sunday morning, 7-11 P.M. EST Sunday night. Seven and eleven are lucky numbers . . . Try your luck!

Eligibility: All amateurs in New England are eligible and are invited to participate. Only single operator entries will be considered for awards; CWA members not eligible; Portables and mobiles to "rare" counties welcome, and they may compete from more than one county if desired.

Frequencies: All amateur bands may be used; it is suggested that the 25 kc. low edge of each band and sub-band be used. A station may be worked twice per band; once on phone and once on c.w. Those taking part are urged *not* to disrupt net operations for contest points.

Exchange: Call "CQ New England" on phone; "CQ NE" on c.w. Exchange will consist of QSO number, signal report, name of county (may be abbreviated) and state. For example, W1EIA might send: "NR 7 589 HARTFORD, CONN."

Scoring: 1 point per complete QSO. Multiply total QSOs by number of NE counties worked, and then again by the total number of NE states worked (Maximum 67 counties and 6 states). For example, if W1TX works 50 stations, 35 different counties and all 6 states, his score would be $50 \times 35 \times 6 = 10{,}500$ points.

Awards: A handsome plaque, engraved with the winner's name and call, will be awarded to the highest scoring station. Certificates will be awarded to the 1st and 2nd place scorers in each state, to the top NE Novice scorer and to the top NE Technician scorer. CWA members are not eligible for awards.

Logs: Logs must show date and time (in GMT) of each contact, complete exchange information, call and address of operator and final score calculations. If competing for special Novice or Technician awards, be sure to so indicate this. Mark each new county or state as worked. Mail copy or carbon of log to: Conn. Wireless Ass'n., c/o Gary Foskett, W1ECH, 1 Marlon Place, Cromwell, Conn. 06416, not later than January 11, 1965.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—SEC: W1AOG. PAMs: K1BGK for 6, W1DOM for 2, K1OWK for 10, W1UIR for 75. RMs: W1EAE for 80 c.w., K1PNB for 80 c.w. Novice Net, W1AQE for 15 c.w. W1AOG received reports from ECs, W1STX, K1PNB and K1DZG. WA3BQX, ex-K1BUR, now is in Bethlehem, Pa., and will be on 75. K1GVM is pres. of the Hingham ARC. K1IPB is in Parker's home. W1BZ is a Silent Key. K1AFF is moving to Whitman. Officers of the T-9 Radio Club are W1MNK, pres.; W1IIB, secy.; W1ISX, treas. WN1CQI will be on our EMNN. K1ZBZ is on 2 and 6. W1HXK has a new Drake TR-3. W1IH is on 6 meters. W1ZQQ is on 75, also W1THT. W1LXR has a Drake TR-3. K1PPP sends in his final report as net mgr. of the Central N.E. Net: 26 sessions, 744 QNIs, 4 traffic. K1PJQ takes over. W1NF gave a talk on QQ work at the Chelmsford ARC. K1SAU is pres. WN1CPV is new in Medford. The T-9 Club met at W1WNK's. K1UIW has a new QTH in Abington and is going to school in Boston. The Middlesex ARC, W1HEB, has new officers: K1SNP, pres.; K1YVY, vice-pres.; K1OGA, secy.; K1TWV, treas. W1AAR is on 2 some. EM1OMN had 4 sessions, 26 QNIs. W1HSN has a mobile net on 2 and 6 in Stoughton. W1VAH has a Drake 2B and is waiting for a 100-kc. calibrator. W1ALB is on a visit to Dallas. On 6: W1ISU, K1FLU, WA1AYO, WA1CDG and K1HDH on

(Continued on page 140)

Clegg

22'er

TWO METER TRANSCEIVER

There is just no better way of getting started in VHF than with the newest of the new in the Clegg line — the 22'er two meter transceiver. This ready-to-go station combines many of the fine features that have made the Clegg name famous in VHF ham circles for years plus refinements to make 2 meter AM phone operation more interesting and challenging. It is realistically priced — your distributor will have complete information.

NOW AVAILABLE
AMATEUR NET $239.50

Features

RECEIVER

1. Special triple conversion design with two crystal controlled injection oscillators
2. Selectivity about 10 KC at 6 db and less than 16 KC at 50 db
3. Freedom from spurious responses, IF leak through and images
4. Panel Meter doubles as calibrated S Meter on receiver and "relative output" meter for transmitter tune up
5. Full 143.8 MC to 148.2 MC coverage with tuning dial calibrated 144 to 148 MC
6. Adjustable Squelch
7. Excellent AGC performance
8. NUVISTOR RF stage and low noise first mixer provide .25 μv sensitivity (6 db S + N to N)
9. 2 watts audio output available with self contained high efficiency speaker for operation in high ambient noise associated with mobile operation
10. Effective Automatic NOISE LIMITER

TRANSMITTER

1. Broadband exciter stages to simplify rapid QSY
2. High efficiency straight through final amplifier with crystal controlled 18 WATT input
3. High level plate and screen modulation for typical Clegg "HIGH TALK POWER" performance
4. PUSH TO TALK with provisions to switch external LINEAR and VFO
5. TRANSMITTER frequency SPOTTING SWITCH
6. Self contained universal solid state power supply for 115 volts AC and 12 volts DC
7. Tube line-up

6CW4	RF Amplifier	12AX7	AF Amplifier
6KE8	Tripler/1st Mixer	6AQ5	Rec. Audio/ Modulator
6EJ7	2nd Mixer		
6BA6	10.7 MC IF Amplifier	6AQ5	Modulator
		6KE8	VLO/Buffer
6BE6	3rd Mixer	6KE8	OSC/Tripler
6BA6	456 KC Amplifier	12BY7	72 MC Amplifier
6AL5	Diode Detector/ Noise Limiter	12BY7	Doubler
		2E26	Power Amplifier

Other S-S Products: SS-1R, HF Receiver, SS-1S Noise Silencer, SS-1V Video Bandscanner; Venus, Thor 99'er Transceivers; Interceptor B VHF Receiver; Allbander HF Converter; Zeus Transmitter; Apollo Linear Amplifier

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(*Continued from page 138*)

s.s.b. K1VOK worked YO3CR on 20-meter c.w. K1ZHS is busy at school. W1PEX made the BPL again. EM8ON reports 30 sessions, 187 QNIs, 176 traffic. WA1CRK/WA2UF1 has a Heath Warrior and an ROOA membership. K1YSJ is pres. of NMRS RC. K1YSE has a beam for 2. K1PNB is starting code practice on 3733 kc. at 8:30 P.M. Mon., Wed., Fri. nights. WN1CJJ is in EMNN. W4COW/K1RTK spoke at the Framingham Club on Antique Receivers. The Wellesley ARS held 2 meetings, one on the NCX-5 transceivers. K1TWJ, secy. of the Danvers ARA, reports that the club has been supplying communications with its c.d. truck for the Governors Highway Safety Program and has received new equipment. WA1CAV is a new member. K1ICJ, Sharon EC, says that a club is going to be formed in the high school. Congrats to W1QJB on receiving an Honorable Mention for the Golden Anniversary Essay Contest for *QST*. W1UIR is going to retire. WA1AFD has his Tech. The QRA had a talk on the NCX-5 and the HRO-500 receiver. W1BB reports that the Winthrop drills have started up again. *Ham News* from the Yankee RC has been received. Appointments endorsed: W1DDN and WA1AFD as OES; W1HLQ, Stow, as EC; K1VOK as ORS/OPS; K1PNB as RM; W1UIR as PAM; W1AOG as SEC and OBS. The 6-Meter Crossband Net had 21 sessions, 304 QNIs, 13 traffic. K1ESG has been endorsed as ORS. WN1AVT is now an RCC member. EM2MIN had 22 sessions, 188 QNIs, 125 traffic. EMINN had 72 QNIs, 30 traffic. K1PNB had v.f.o. troubles and helped K1YSE put up his Tribander on his 60-ft. tower. K1PNB is looking for news for his Novice bulletin. W1HBB is the new Reading EC. After 33 years W1MRQ made DXCC. K1LVV is on RTTY as an OBS. K1DZG Somerville EC is looking for all hams in his city to sign up with him. K1WHM is a new OBS on 6. Traffic: (Sept.) W1PEX 703, K1ZHS 171, K1ESG 140, W1EMG 131, K1PNB 110, WA1CRK 100, W1LES 89, W1OFK 85, W1DOM 83, K1GKA 64, K1WJD 53, K1VPJ 42, W1AOG 39, K1VOK 31, W1ZLX 29, K1LCQ 23, W1ZSS 20, W1BJE 17, W1CTR 16, WN1AVT 13, K1BGK 7, W1ALP 1. (Aug.) K1PNB 42, K1BGK 13, W1AUQ 4.

MAINE—Acting SCM, Herbert A. Davis, K1DYG—SEC: K1DYG. PAMs: K1BXI, K1ZVN. RM: K1NAN. V.H.F. PAM: K1QIG. Traffic nets: Phone—Seagull Net meets on 3940 kc. 1700-1800 local time and 2000-2100 daily except Sun. C.W.—The Pine Tree Net meets daily at 1900 on 3596 kc. State C.D. Nets, Wed. on 3530 kc. at 1900 and Sun. at 1100 on 3993 kc. A.R.E.C. Net Sun. 0900 on 3940 kc. Two-Meter Phone and Emergency Net on 145.08 Mc. Thurs. at 1930-2030. Participation, cooperation and understanding is needed in all the nets. Many thanks to W1AHM for the nice job he did, and the best to him from all. Some counties are running nets for local interest on various bands and frequencies. During the hurricane weather the Maine nets and stations kept frequencies clear for those who needed them. Traffic: (Sept.) K1NAN 41, W1JMN 4. (Aug.) K1NAN 108, K4BSS/1 91, W1OTG 5.

NEW HAMPSHIRE—SCM, Albert F. Haworth, W1YHI—The GSPN meets on 3842 kc. (alt. freq. 3845 kc.) Mon. through Fri. at 6:30 P.M. and Sun. at 9:30 A.M. The VTNHN meets Mon. through Fri. at 7:00 P.M. on 3520 kc. The appointment of W1JB as OBS is announced. K1AEG has been reappointed as OO Class III and IV. It is a pleasure to report the formation of the Southern New Hampshire Ten-Meter Net which operates Fri. at 8:30 P.M. on 29 Mc. This net is open to all. W1ET again is active after the summer vacation. Word has been received from K1APQ that his resignation as PAM is effective as of the expiration of my present term. Ed did a fine job in rebuilding the GSPN during his term of office. As this is the last report I will be filing I take this chance to thank all who have cooperated with me during my term of office and trust that this cooperation will continue and that more support will be given by appointees and clubs to my successor. I did not seek reelection because of other commitments I have taken on since my election and as a result of same have not the time available to devote to this position.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. PAM: W1TXL. RM: W1BTY. V.H.F. PAM: K1TPK. New appointment: W1VWR/W1CVY as OPS. Endorsements: K1TPK, W1JFF and W1POP as ECs. RISPN reports 30 sessions, 703 QNI, 89 traffic. RIN reports 22 sessions, 127 QNI, 68 traffic. W1KMV, the club station at the University of R.I., is now building a Heath SB-400 for DXing and to contact its research ship the *RV Trident* when at sea. W1QLT reports that W1KMV also is a second state control station for the AREC. W1VKQ has a new 99'er tower and beam for 6 meters. K1NJT is working on a new 2-meter rig.

(*Continued on page 142*)

YOU WRITE THE Rx . . . IF IT'S FOR AMATEUR, CB OR COMMERCIAL TWO-WAY ANTENNAS, HORNET CAN FILL IT!

Model
TB-1000-4

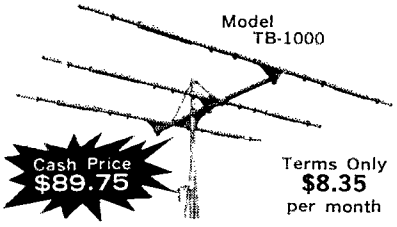
Cash Price
$112.50

Terms Only
$10.50
per month

You will be proud to own this beautiful four element beam for 10-15-20 meters. It is unexcelled in performance and features commercial quality construction throughout. The only tri-bander with four working elements on 15 and 20 meters. This gives you that extra four element punch—plus better F/B ratio. The TB-1000-4 is rated at 1000 watts 100% amplitude modulated. It weighs only 64 pounds and has a turning radius of 17' 6". Install the TB-1000-4 at your station now!

Note: Special extended terms on this model available if purchased before January 1, 1965.

Model
TB-1000



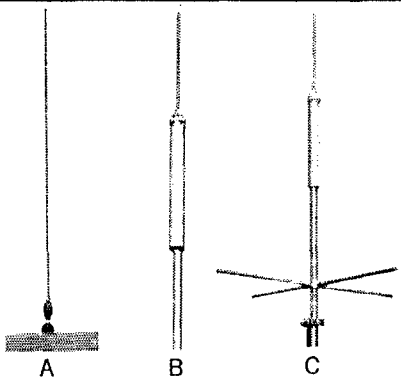
Cash Price
$89.75

Terms Only
$8.35
per month

The TB-1000 features the same quality construction as the four element antenna above. Three working elements on 10-15-20 meters gives you performance unsurpassed by any other three element triband beam. It weighs only 44 pounds, and has a turning radius of only 16 feet. It is rated at 1000 watts, 100% amplitude modulated. Dollar for Dollar you can't equal the TB-1000. Buy it today!

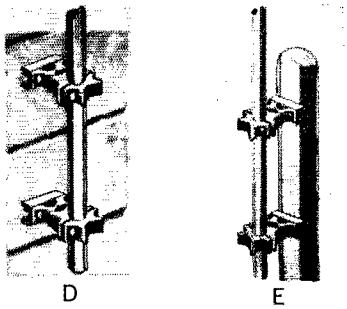
Brochures are being prepared on our extensive new line of Monoband Antennas for Amateur and CB. Write for quotation and delivery date on your specific requirement.

We invite inquiries from Commercial Two-Way Radio and Citizen Band dealers. When writing for prices and information, please use your business stationery.



A B C

We have many different types of antennas available for Amateur, CB and Commercial Two-Way Radio. Example.—Fig. 'A' for 2 meters, CB and 150 Mc. Business Radio. Fig. 'B' and 'C' available for all services in frequencies ranging from 25 to 500 Mc. Write for complete information stating frequency required.



D E

If you need Special Purpose Antenna Mounting Hardware, you can depend on Hornet to supply it. Fig. 'D' and 'E' above illustrate two of the many types available. Fig. 'D' will easily mount to masonry walls. Fig. 'E' solves the usually difficult problem of erecting an antenna on a power pole. Brochure available on other types.

MAIL YOUR ORDER TODAY

HORNET ANTENNA PRODUCTS COMPANY, Inc.
19 North 8th St., P. O. Box 880
Duncan, Oklahoma 73533

Phone: 405-AL 5-7520

Please rush the Hornet antenna indicated below for a 10 day trial. If not satisfied, I agree to return the antenna prepaid within 10 days without obligation. All prices f.o.b. factory.

- ☐ Payment in full is enclosed.
- ☐ I wish to use your time-payment plan. One monthly payment is enclosed.
- ☐ I prefer shipment to be c.o.d. 25% is enclosed.
- ☐ Send literature only on items listed below.

Note: If you wish to use our time-payment plan, please list two credit references.

Model	Description

NAME_____ CALL LETTERS_____

ADDRESS_____ PHONE_____

CITY_____ STATE_____

The Model TB-750 is still available at $67.50. Only $6.30 per month.

(Continued from page 140)

W1OP, the Providence Radio Assn. has a new seventeen-element Yagi in operation for 2-meter DX. K1HZN spends his spare time on the AREC activities while studying at Providence College. The R.I. Emergency Net meets every Mon. at 2000 local time on 51.5 and 28.9 Mc. SET Messages were received from K1TPK, K1VEX, W1VWR, W1YNE and W1KMB. Traffic: W1TXL 136, W1BTV 115, K1TPK 68, W1YNE 61, W1YKG 56, W1VWR 54, K1NJT 40, K1YDR 27, K1YYI 26, W1QR 23, K1VYC 16, K1YOA 8, K1BRJ 7, W1QLT 4, K1EWL 2.

VERMONT—SCM, E. Reginald Murray, K1MPN—RM: W1WFZ. The Green Mtn. Net meets on 3855 kc. daily at 2230Z; Vermont Fone Net on 3855 kc. Sun. at 1400Z; VTNH Net on 3520 kc. Mon. through Fri. at 2400Z; Vt. C.D. RACES Net on 3993 kc. (a.m.) Sun. at 1500Z. K1FSY has a DX-100. New officers of the BARC are W1BRG, pres.; W1HRG, W1WFZ, K1PPW and K1YCZ, trustees; K1FTA, clerk. For the first month of operation the VTNH Net had 104 check-ins with 54 pieces of traffic handled—a good start but we can always use more operators. The CVARC is building 2-meter walkie-talkies as a club project. K1OXG has a new MX-50. K1WZD and K1LHN are going to UVM. WA1ACN is going to Norwich. Net check-ins for Sept.: Green Mt. 579, Vt. Fone 123, VTNH 104. W1VSA has been appointed SEC for Vt. Don't hesitate to get in touch with him. Happy Thanksgiving to all. Traffic: K1BQB 147, W1WFZ 56, K1UZG 45, W1IZS 12, K1MPN 11, W1JLF 6.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. C.W. RM: K1IJV. 75-Meter PAM: K1RYT. Hampden County 10-Meter Traffic Net Mgr.: K1PKZ. During September W1BVR was guest speaker at the annual banquet and installation of officers of the Montachusett Radio Club and also at the October meeting of the Berkshire County Amateur Radio Association. The West. Mass. C.W. Net handled a total of 148 messages at a rate of .26 messages per minute, with the following stations reporting during the month: W1DVW, K1VPN, K1IJV, K1YMS, W1BVR, K1LBB, W1QKX, W1UYY, WA1AEV, W1DWA, W1AMI, K1ZBN, K1YST, W1QFJ, W1BKG and W1LLN (listed in order of activity on the net.) W1ZPB is getting set up in a new home. K1ZHJ has a new Heathkit receiver. Washington Mountain now has four hams in the area, the latest being K1NSU. W1QNI and W1NGE are now on 6. W1HJL has transferred to GE in Philadelphia. Sorry to lose you, Ray. W1COI is now chasing So. America with a new Vee beam. K1MRP has a new Warrior final. W1UUK worked 65 countries on 20-meter c.w. in a 3-week period. Nice going! W1GTO is getting a new vertical. The Hampden County Radio Association now has a new meeting place—the Feeding Hills Church. W1QWJ spoke on the subject "Moonbounce" at the latest meeting. Traffic: W1BVR 126, W1UYY 123, K1IJV 105, K1LBB 82, W1DVW 32, K1VPN 27.

NORTHWESTERN DIVISION

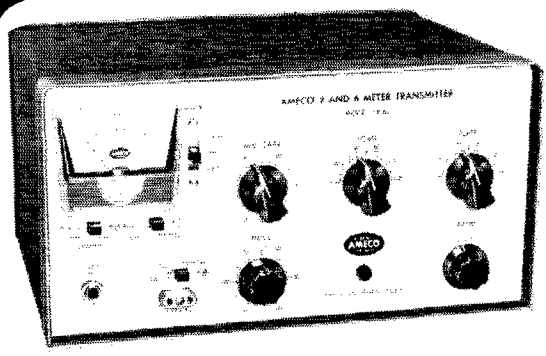
IDAHO—SCM, Raymond V. Evans, K7HLR—RM: W7EMT. PAM: W7GGV. New officers of the FARM Net are W7GGV, net manager, and K7ZSW, net control. Glad to see Helen, W7GGV, back in there working again as she well understands traffic and the workings of traffic nets. New officers of the Eagle Rock RC are W7DMP, pres.; W7DZH, vice-pres.; Tom Moss, secy; WA7BGK, treas.; K7DZA, EC. The SET exercises left very much to be desired in this section. Perhaps next year with more advance planning we can improve the operation. The radio control bug hit in the Magic Valley area and W7GDA's plane zeroed in on his own automobile. Traffic: K7HLR 52, W7EMT 30.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Walter R. Marten, W7KUH. L.F. PAM: W7YHS. V.H.F. PAM: W7TYN. The Montana S.S.B. Net meets Mon. through Fri. on 3910 kc. at 0100 GMT; the Missoula Area Emergency Net on 3890 kc. (AREC) Sun. at 1600 GMT; the Montana Section PON on 3885 kc. Sun. at 1530 GMT with K7PWY as NCS. W7TQM is back in Great Falls going to school and is on with a new s.s.b. rig. New mobiles include W7BKB and W7TQC at Anaconda and K7ECF at Dillon. W7EQP is on 2 meters with a converter and an SCR-522. W7CJN, at Butte, is looking for skeds on 2 meters in the evenings. Orvil is running 120 watts input with a 3-r.f. stage nuvistor converter. K7SVR is on with a new kw. final and is putting out an FB signal as NCS of the Montana S.S.B. Net. Montana still is in need of more check-ins into RN7. W7NPV is now on s.s.b. K7ASW is moving to Butte from Lewiston. All enjoyed the well-

(Continued on page 144)

AMECO *Leader in Compact, Quality Ham Gear*

NEW 2 and 6 Meter TRANSMITTER



The NEW AMECO TX-62

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

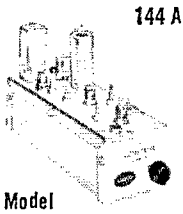
SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.
Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.
Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
Meter reads final cathode current, final grid current and RF output.
Solid state power supply.
Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
Potentiometer type drive control. Audio gain control.
Additional connections in rear for key and relay.

Model TX-62 Wired and Tested only $149.95

• HAS BUILT-IN MODULATOR AND POWER SUPPLY • 75 WATTS PHONE AND CW • ATTRACTIVE LIGHT GRAY PANEL AND DARK GRAY CABINET • COMPACT SIZE 11½″ WIDE, 9½″ DEEP, 6″ HIGH.

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

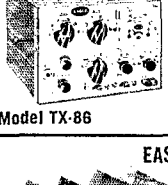
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired, (specify IF.) **$49.95.** Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) **$34.95**

ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS

MODEL PCL, Wired, $24.95
MODEL PCLP with built-in power-supply, wired, $32.95

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required—120 V. at 7 ma. and 6.3 V. at .27 A. —can be taken from receiver or Ameco PS-1 supply. Size: 3″x5″x3″.

COMPACT 6 THRU 80 METER TRANSMITTER



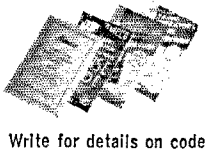
Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5″ x 7″ 7 7″ — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**

CB-6

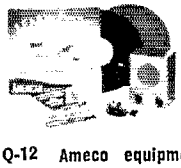
CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix. 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10 50**
PS-1W — Wired $11.50

EASY TO UNDERSTAND AMECO BOOKS



Amateur Radio Theory Course **$3.95**
Amateur License Guide ..... **.50**
Radio Operators' Lic. Guide, EL 1-2 ..... **.75**
EL 3 ..... **1.75** **EL 4** **1.25**
Amateur Log Book ..... **.50**
Radio Electronics Made Simple **1.95**

CODE PRACTICE MATERIAL



Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4″ speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear. **Dept. Q-12** **Ameco equipment at all leading ham distributors.**

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Affiliated with American Electronics Co. and Ameco Publishing Corp.

(Continued from page 142)

planned Glacier Hamfest put on by the Capitol City Radio Club at Helena. W7CPY, the new Vice-Director, is living in Arizona for the winter. If you are interested in forming a mobile net, please send your ideas to your SEC, W7KUH, at Great Falls. Traffic: K7EWR 259, K7SVR 10, K7UPH 3, K7YNZ 2.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. Appointments: K7IWD as OBS. Net reports: (Aug.) OSN, sessions 29, QNS 180-high 10, QTC 103-high 15, average 3.55. BRAT awards went to W7BVH, W7ZFH, K7IWD and K7SGX, also an active member of RN7. (Sept.) OSN, sessions 22, QNS 143-high 10, QTC 64-high 8, average 2.90. BRAT awards to K7IWD and K7SGX. K7THX reports that a group of v.h.f.-u.h.f. hams held a pot-luck dinner at Silver Creek Falls State Park near Silverton Aug. 16 with 43 stations from 19 cities of Willamette Valley, a total of 127, attending this all-day affair. K7YNO is on the air with a DX-100. K7VMV is pushing an 832 linear with a Heath Twoer also using a triple 5 Yagi. EC W7DEM reports the following for the Grants Pass area: W6YPM spent some time there looking for old radio gear, K7-WSW is busy with Navy MARS, K7PNT is converting a DX-40 for mobile use, K7RDP has a homebrew 815 linear on 2 meters, K7VMV has started his second year as an electronic student at OTI in Klamath Falls, W7-ADF has completed his combination doghouse and ham shack, the Southern Oregon Radio Club has two code classes going, W7ZQM is a Silent Key. Traffic: (Sept.) K7IWD 161, K7SGX 136, W7LT 60, W7ZFH 57, W7ZB 26, W7MAO 12, K7EZP 8, W7DEM 7, K7DVK 2. (Aug.) W7JHA 281, K7IWD 205, K7SGX 98, W7ZFH 91, K7-KBK 70, W7MAO 10, W7DEM 7.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett Young, W7HMQ. RM: W7-AIB. PAM: W7LFA. Some 270 amateurs attended the 18th Annual Walla Walla Picnic Sept. 19 and 20. W7-GYH, W7ZAW and W7GYC, with others assisting, put on a demonstration for the public in emergency communications at the Southeastern Washington Fair recently. K7YIC is away at college. W7NSU is looking forward to a new NCX-5. K7RAM and K7RAO have a new beam. W7GYC renewed his OBS appointment. W7-REC is going RTTY soon. The Skagit Club is working an emergency program on the new 2-meter f.m. channel with good success throughout Skagit County. K7CHH will transmit bulletins on 3600 and 7100 kc. Mon., Wed. and Sun. at 1900-1930. The Noontime Net had 26 sessions with 846 check-ins and 375 QTC in Sept. K7TCY has a gooney bird on 6 meters. The Northwest S.B. Net is going well with a growing list of operators checking in. K7CTP took a vacation in Nevada and New Mexico. K7MGA is working on a station setup for the Central Washington Fair. W7AIB spent three weeks vacationing on the beach near Sequim. W7AMC had his first full month of activity in some time. Reports have it that Helen, K7HSD, conducts code practice on 21.120 kc. at 1830 PDT Sun. through Wed. for about forty minutes each session. K7MGA and family vacationed along the Oregon Coast. K7JRE worked FP8CK. K7IAE passed the Amateur Extra Class exam. A new ham club has been formed in the Spokane area called the Northside Dial Twister. Officers are K7ZZD, K7GKI, K7WNE, K7UNB and K7YTN and meetings are held the 1st and 3rd Wed. K7ROF has a new 50-ft. tower and W7UOJ a new 40-ft. tower and five-element beam. K7OUV is putting up an all-new antenna system. K7RSM is stationed at the NTS, San Diego, Calif. K7ZRF is wiring an S.S.B.-10 into his Ranger. K7RRM is attending Whitman College. W7CXJ has come out of hibernation. K7OFW and K7OFX are building a patio and a new fireplace. K7DFS and his XYL bagged one bear and a 1300-lb. moose in Northern B.C. W7OEB received a Public Service award for traffic work in the June Montana flood. W7AMC renewed his OBS appointment. W7-HDL turned in a nice OO report. The Vancouver Club has purchased a new HX-50 sideband transmitter and is in the process of building a linear amplifier. The club has a very excellent setup for emergency working with the e.d. W7SUQ is installing a new antenna setup. K7-USN is joining the Air Force. K7SRI editor of *RST*, a 7 call news letter. Traffic: (Sept.) W7BA 1135, W7DZX 1048, K7JHA 655, W7APS 259, W7OEB 256, K7TCY 60, W7AIB 42, W7AMC 37, W7BTB 34, K7MGA 8, K7JRE 7, K7IAE 6, W7JC 2, W7EVW 1. (Aug.) W7DZX 312, W7OEB 143.

PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—SEC: WA6OLF. K6KQD's son is attending Oregon State for his Ph.D. in Oceanography. W6UB was in bed with

(Continued on page 146)

How red the rose?

(Or 599X Color TV)

We have a magnificent new color TV picture tube at Sylvania. And a colorful story to tell on how it was developed.

To begin with, you might say that the picture tube has been the industry's biggest bottleneck in color TV. Partly because the red phosphor has been a weak and shifty character. Give it half a chance and it turns orange or refuses to cooperate with the blue and green phosphors. To compensate for this weakness, it has been necessary to damp down the blue and green phosphors to achieve some semblance of color balance---at the expense of brilliance.

You'll get the picture if you'll view the screen of a color tube as islands of phosphor dots. Each island is made up of a red, a blue and a green dot in the form of a triangle. The dots in each triangle are optically coupled. If all three are equally excited, you get a pure white. If they are unequally excited, you achieve the same results as you would by mixing paints.

Great---except for that weak link in the color chain. If the red won't stay red, you're bound to come up with some odd hues that bear no relation to reality.

Well, it so happens that our research people, among others, had successfully developed a laser capable of generating an intense beam in the red spectrum. The "lasing" material used is europium, a metallic element of the rare-earth group, first discovered in 1896. And, as one idea follows another, it became obvious that a europium-base phosphor would also solve the red problem in color TV.

The trick was to find a suitable "host" material for europium...and we finally did. The resultant red phosphor came through with flying colors. This, in turn, permitted us to upgrade the blue and green phosphors and, all together, resulted in a measured brightness some 43 percent greater than the industry standard. And, for the first time, a picture that could be viewed in daylight. But the most spectacular thing is the ability of the tube to reproduce faithfully what it "sees."

At the same time, we came up with a new screening process. We call it dusting. The result is something like making a stencil with a spray gun, and it makes possible larger particle size. It's the broader crystalline surface of these particles that largely accounts for the increase in overall color intensity. And it all adds up to far better picture definition and color control. Monochrome pictures are superior for the same reasons.

Funny thing about europium---it's never had any really useful purpose in life until now. Which leads one to wonder about the riches of the earth and man's mind, and the way they come together.

73,

Bob Lynch

K2RMN

SYLVANIA

SUBSIDIARY OF GENERAL TELEPHONE & ELECTRONICS GT&E

(*Continued from page 144*)

malaria for 2 weeks but still found time to work with K6ERM and report some crashes and obstructions on the highways in and around San Leandro. W6QDN is operating portable from Walnut Creek. W6TYM has just completed his 4-1000A equalizer. K6TFT was a volunteer fireman during the forest fires the week of Sept. 20. WA6GUM's itinerary for Sept. included Watsonville-Sta. Cruz-San Jose plus 2 weeks in South America. Napa area hams were activated to provide communications during the forest fire emergency on Sept. 20. Among those active were W6NOP, WA6YST, WA6OGB, WA6SMK, WA6UHO, W6WLW, K6ZZP, W6PFO, WN6-IOG, WA6IST and WB6BNR. Part 97 of Rules and Regs. call for the recognition and enhancement of the value of the amateur service as a non-commercial service, particularly with respect to providing emergency communications. This operation is what ham radio is all about. Keep up the good work, fellows and girls. K6SPP has traded his Mohawk for an SP-600-JX-17. Hams from the MDARC participated in the SET on Oct. 6. The test involved a simulated plane crash in the middle of town. K6TFT, W6OJW, WB6JIW, W6LNN, W6ZY, W6TXL, K6LRN, W6LKE, WA6MIE, WA6-WNG, WA6OLF, K6DOQ, K6HTJ, W6ZF and K6-HWL were among those from the East Bay Section attending the Pacific Division Convention at Sacramento. Our thanks to the Sacramento group for a good time. WB6CRC is back to plain old WA6WNG in Berkeley and is QRL school but finds time to QNI NCN and turn in a good traffic total. WA6VAT reports DXCC 80/70 and is getting a 75-ft. tower on which to put his quad. Bob also is constructing a 432 tripler and converter. W6SAD is back from a two-month relief trip as 3rd radio officer on the SS *Pres. Roosevelt*. K6GEP donated a ditto machine to the EBRC. WB6HHK is now General class. The NBARA toured KTVU studios on Sept. 9. WA6QAZ, W6LKE, K6IAV, WA6MIE, WA6-FBS, W6POU, WA6DKG, WA6NFF and K6OCF of the MDARC provided communications for the annual Trail Ride on the slopes of Mt. Diablo. Operation was on 6 meters. The MDARC is issuing the WACCC award. Contact J. Howell, WA6MIE, at P.O. Box 1122, Concord, for details. WB6AUT, at Hayward, was formerly KØEOZ. The NCN meets on 3.635 at 0300Z daily. Sure would like to see QNIs from the Oakland, San Leandro, Hayward and Livermore areas. Traffic: (Sept.) WA6-ANG/WB6CRC 65, WA6FBS 52, K6TFT 39, WA6MIE 30, WA6ZLZ 14, WB6ETY 11, K6LRN 9, WA6ECF 2. (Aug.) WA6ZLZ 12.

HAWAII—SCM, Lee R. Wical, KH6BZF—Asst. SCM/SEC: Ernie J. Kurlansky, KH6CCL. RM: KH6-EWD. Acting PAM: KH6ATS. KH6BZF has just returned from a pleasant visit with many of our fellow hams in KG6-Land. On the way back to Oahu he had a long chat with W7ZQX/KG6 and WA8GCW/KG6. KH6GF, it's rumored, has his SBE-33. Speaking of that rig, a knock came at my door a few weeks ago and KG6AED was visiting the neighborhood, he too sporting a SBE-33 back to Guam. Please check page 6 for my latest mailing address. If you heard about a Cameron Pierce landing a 400-lb. marlin while aboard the good ship *Malia* during the past Kona Hawaii Billfish Tourney, that's our Cam, KH6EPW. KH6BQQ was in W6-Land vacationing. KH6CPW is back in Kaneohe, setting QSO records, after trips to Hilo and Maui. KH6SL, the former engineer-in-charge of the local FCC office, now retired, has gone into the printing business. WØHGU/KH6 has left for DU-Land. Robbie will work for the Navy near Subic Bay, P.I. I received a nice card from Emily and T. A. Templeton, P.O. Box 1021, Erie, Penna. 16512, saying Aloha to all his old cronies. He'd like to contact all those of you from back when. Traffic: KH6BGS 70, KH6ATS 16, KH6BZF 8, KH6KS 6.

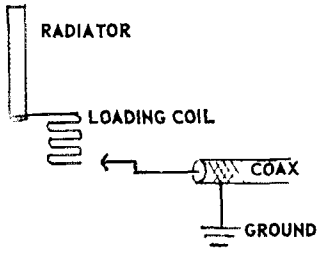
NEVADA—SCM, Leonard M. Norman, W7PBV—Thanks again to each of you who have supported this column by your interest in sending your station activity reports. It is hard for your SCM to report other than local news unless these reports are received. It has been my pleasure to support ARRL and represent all of the radio amateurs in Nevada for the past two years. Nevada was represented at the Sacramento Convention by W7s AEE, JU, PBV, SHY, THH, TQE, PC, CXH, K7GQD, SFN, VYT and W4CJD/7. The new QTH of W7ASU, ex-W6KZN, and XYL, ex-W7CUM/WA6RMS, is Las Vegas and they are active on 40-meter s.s.b. K7-WLR has a Pacemaker on 20 meters. WN7AVE is making lots of contacts with a Globe Scout. W7YRY is running a new Galaxy. W7BVZ is home from the hospital and doing fine. K7UGE will be moving to a new QTH soon. RTTY activity is booming with WA7ARZ, WA7BEU, W7BJY, W7CTK, W7DNE, K7HYP, W7-HQS, K7NYU, W7PBV, K7PYF, K7RKH and K7ZOK

(*Continued on page 148*)

GOTHAM VERTICALS

MANUFACTURE CONTACTS

Thousands of 'em. Some near-by. Some thousands of miles away. On many bands. On any frequency within that band. Without traps. Without troubles. Without obtrusiveness. Just a strong, straight-forward design to perform its job: To manufacture contacts.



We are often asked if a Gotham vertical antenna will operate on MARS, C.D., C.B., MARINE, or other non-ham frequencies. Here is a simple method of tuning to any desired frequency within the range of the antenna: The inner conductor of one end of the coax is moved up the loading coil a turn at a time while the other end is coupled to a grid dipper tuned to the desired frequency. At one point, there will be a decided dip, and this is where permanent connection is made. With an SWR indicator, this point will indicate minimum SWR. With a field strength meter, maximum radiation will be achieved. Using a transmitter, this point will permit proper loading.

GOTHAM VERTICALS DELIVER THE CONTACTS

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PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71
"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159
"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more," W. A., Alaska.

CASE HISTORY #248
"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111
"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613
"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483
"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146
"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555
"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84
"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

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- Absolutely no guying needed.
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- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

73.
GOTHAM

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☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

Name.....

Address.....

City.....Zone.....State.....

(*Continued from page 146*)

having a machine on the air or about ready to get on. Traffic: (Sept.) K7FER 320, WA4CJD/7 78, W7JU 13, W7PBV 4. (Aug.) K7FER 124.

SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6HYU. At the highly successful Pacific Division 1964 ARRL Convention held in Sacramento, our very fine League Pres. Herbert Hoover, Jr., W6ZH, in addressing the Forum, indicated that ". . . the opportunities for the hams to perform *public service* is unlimited" . . . "that the surface has been barely scratched" and urged everyone to do his share. The convention was further honored by the presence of the following Executive Committee members, convening for their meeting: VE3CJ, W5NW, W1BDI, W1LVQ, W3PS, WØBUO, WØNWX, W1EFW and W6HC. Plans are being made to develop a Council of Radio Clubs in the Sacramento Valley section. The Yolo Amateur Radio Club's new gavel, a gift from W6DUW, had its *first* use when wielded to officially open the convention. WA6YKR won the Galaxy 3. Enthusiasm shown by many local clubs in the SET program along with individuals was most gratifying. Messages in correct form covering race riots, jet airliner crash, train wrecks, brush fires and intersection were received by your SEC. The El Dorado County Amateur Radio Club used its new Portable Communications Center during the SET reporting 11 Full Members in the AREC on 145.5 Mc. and a tie-in with Sacramento weekly on 146.25 Mc. The RAMS is consumed with rabbit hunts, night rabbit hunts, annual rabbit hunt and plans for its annual Christmas Party. Your SCM, W6BTY, and Asst. SCM/SEC, WA6HYU, wish to express their appreciation for the cooperation and wonderful support of the clubs and individuals throughout the S.V.S. during this past year. A Merry Christmas to all!

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—WA6HWA is the new EC for Fresno County. WB6IFS is heard on 6 meters. W6ASV and XYL, W6IRV and XYL, W6ARE and XYL, W6OHT, W6BYY, WA6TQL, WA6DEA and WB6ETQ attended the Sacramento Convention. W6BYY and his crew won the 75-meter hidden transmitter hunt. WB6HVA is active in NCN and has a Galaxy III. W6JPS, W6DVL, WA6HSP, WA6DTO, K6DYC and K6MHC all went deer-hunting in Utah and W6JPS held daily skeds with WN6JHN on 40 meter c.w. W6JMP is getting his 32-V transmitter on RTTY using a Model 19. K6PBL has a 522 and is getting on 2 meters. WA6OIB is active in the CAP. W6BJI has a 60-ft. tower on his garage. W6HXR is deer-hunting in Nevada and is mobile with his Galaxy III. W6UBK is heard on 20-meter s.s.b. WA6NRB is heard on 6 meters. WA6FFJ and W6EYU are on 160-meter mobile and are reporting 60 miles from mobile to mobile. W6ILR is an active check-in on the SJV Net. WA6BVR is on 2-meter f.m. The Fresno Amateur Radio Club meets every 2nd Fri. at the PG&E Building on the 10th floor and everybody is welcome. Merry Christmas, everybody, and hope all of you have one that you can remember for a long time. Traffic: (Sept.) W6ADB 263, WA6VPN 50. (Aug.) WA6VPN 53.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NVO. SEC: WA6HVN. RM: W6QMO. V.H.F. PAM: WA6RXB. The Santa Clara Valley section was well represented at the Pacific Division Convention in Sacramento during September. The SCM, SEC and RM attended all traffic and emergency organizational meetings. The convention was a success and much in organizational work was accomplished. Conditions on 80 meters have become poor during the past weeks and we are now coming to poor winter conditions, plus long skip conditions from the minimum of the sunspot cycle. We ask all hands to bear with these conditions on the low band nets and if possible shift some operation to 160 or 2 meters. W6RSY complains about RTTY QRM on RN6 but still makes BPL. W6JXK works NCN and RTTY Net. K6GZ reports traffic normal even though signals are rough. K6DYX attended the Pacific Division Convention and spoke on the Traffic Panel along with WA6HVN. Our RAI, W6QMO, is signing up new prospects for ORS and is doing topnotch work on NCN and in c.w. traffic organization. W6DEF is active on NCN and as EC for the Redwood City area. W6AUC works the QCWA Net and is active as OO. K6YKG helped in planning for the SET at W6UW. W6ZLO has been heard operating c.w. of late. K6LFZ reports that a recruiting drive in the Hollister area netted six new members. Bob reports that the Hollister Emergency Net meets at 7:30 P.M. local time Wed. on 146.475 Mc. and would like any amateurs in the area to check in when possible. K6MTX spent much time preparing for RTTY operation in the SET

(*Continued on page 150*)

(Continued from page 148)

W6MMG is helping Novices in the Belmont area get set up on the air. W6IBW sends several fine newspaper clippings of amateur operations from the *Palo Alto Times*, and reports that of late several articles have been appearing that have given amateur radio in the area a big boost. W6DEF sent in a clipping of a feature story of amateur operation appearing in one of the San Francisco papers. W6YHM is back home from Alaska and hopes to be able to take a more active part in traffic operations during the coming months. Don attended the Pacific Division Convention. W6ASH is active as OO Class I. The Santa Clara Valley section is saddened by the passing of John Reinartz, K6BJ, who resided in the section for several years. John was one of our greatest pioneers, having helped give us short wave radio. His loss will be felt by all and our heartfelt sorrow goes out to his family. May they rest in the knowledge that he was a great amateur and will be remembered even though his key is now silent. Traffic: W6RSY 960, W6JXK 542, W6YBV 219, K6GZ 170, K6DYX 128, W6AIT 118, W6QMO 86, W6DEF 60, W6AUC 27, W6ASH 22, K6YKG 19, W6ZRJ 18, W6ZLO 4, K6EQE 3, K6LFZ 3, K6MTX 3.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RM: WA4FJM. PAM: W4AJT. V.H.F. PAM: W4HJZ .Newly-elected officers of the Carolina V.H.F. Society are, W4HJZ, pres.; W4BUZ, vice-pres.; K4NUB, secy-treas. Congratulations to the Triangle Amateur Radio Club and the Wake County Amateur Radio Assn. on their affiliation with ARRL. The NCSSBN is now meeting at 2330Z nightly. WA4ICU has a brand-new A-1 Operator certificate on the wall. WA4PDS is now on 2 meters with a Twoer. WA4ANH reports a successful SET exercise with 11 stations participating. WA4EIS has a new TO keyer. W4BZL and W4LEN combined Orange and Durham County AREC groups for a successful SET exercise. WA4FJM is building a new 2-meter rig. Appointments completed since the last appointment report include: V.H.F. PAM: W4HJZ. OOs: W4BZL and K4CWZ. ECs: WA4DLF, W4BZL, K4QDO, WA4ANH, WA4FFW and W4IRE. If you are tired of the same old ragchewing and would like to make your station available for *Public Service* send in your application for a *Station Appointment*. Net traffic: NCN (E) 412, CCEN 170, SSBN 149, NCN (L) 147, THEN 83, SSBN (Aug.) 218. Traffic: (Sept.) WA4PDS 294, W4LWZ 249, WA4ICU 176, WA4KAC 166, WA4LWE 154, W4EVN 148, K4CDZ 120, W4IRE 120, WA4FJM 70, WA7ANH 64, W4BNU 44, W4BDU 43, K4EO 35, WA4EIS 30, WA4PYJ 24, W4FDV 23, WA4BSJ 22, W4RWL 22, WA4BVF 17, W4BAW 10, K4GNX 10, K4QDO 8, K4QWQ 8, W4AJT 7, W4BZL 5. (August) WA4LWE 150, K4QWQ 8.

SOUTH CAROLINA—SCM, Charles N. Wright, W4PED—SEC: K4HJK. RM: K4LND. PAM: K4OCU. Nets: C.W. 3795 kc. at 0000Z and 0300Z; A.M. 3820 kc. at 0000Z; S.S.B. 3915 kc. at 0000Z. OBS WA4LPV prerecords his bulletins and sends them with an "Automatic CQ Sender" from Oct. '63 *QST*. Hurricane Dora made two passes at this area and found all section nets ready and in operation. The S.S.B. Net in two emergency sessions checked in 807 stations and handled 47 pieces of formal traffic. Flooding conditions as a result of heavy rains in the northwest part of S.C. brought need for emergency communications which were ably furnished by amateurs in the Greenville area. WA4IKU reports the high score for S.C. in the July CD Party and lots of DX. We need more OPSs, OESs and OBSs in the state. Lots of you are qualified, so let's have those applications. Again, let me request that a.m. and s.s.b. stations send me their monthly traffic reports. Net traffic: S.S.B. Net 202, A.M. Net 20. Traffic: WA4PFQ 335, K4LND 76, K4OCU 73, W4HMR 57, W4AKC 53, W4PED 50, WA4EMY 46, W4WQM 43, W4JA 29, WA4LPV 11, W4NTO 5.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM: H. J. Hopkins, W4SHJ. PAMs: W4JMA (s.s.b.) W4DKP (a.m.) RMs: W4ZM, mgr. VN; WA4EUL, mgr. VFN: WA4SUF, mgr. VSAM; W4OKN and W5VZO/4, asst. mgrs.; VSBN; K4DOR mgr. VFN. The amateur situation looks good in Virginia. We have four fine traffic nets and a growing interest in organized activity. WA4FCS looks for increased activity in the coming months. Up Roanoke way, the RVARC is working for establishment of an EC for the area. The (VSAM) Virginia Section A.M. Net was activated on Sept. 1 by PAM W4DKP. Bill has been most helpful to the Va. section during the year. He was instrumental

(Continued on page 152)

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DK60 SERIES

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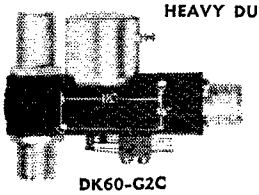

DK60-G2C

Heavy duty SPDT 50 ohm impedance. 1 kw rating. Life expectancy 1,000,000 operations. VSWR less than 1.15:1 from 0 to 500 mc. DK60-G and DK60-G2C feature patented automatic receiver protecting connector for positive isolation of r.f. from receiver greater than 100 db isolation between receiver and transmitter lines from 0 to 500 mc.

DK60-G2C has DPDT external contacts for switching auxiliary circuits. Size: 2¾ x 3¾ x 1⅛". Wt. 9 oz.

With UHF Coaxial Connectors, AC or DC **from $12.45 ea.**

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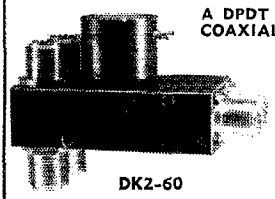
A DPDT SWITCH for SWITCHING 2 COAXIAL LINES SIMULTANEOUSLY



DK2-60

Frequency range 0 to 500 mc. Power rating to 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance. Size: 2¾ x 3¾ x 1¾". Wt. 12 oz.

With UHF COAXIAL CONNECTORS _____ **from $19.00 ea.**

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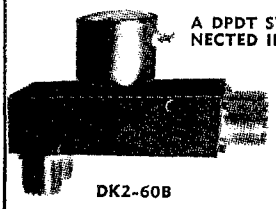

DK2-60B

Ideal for switching in and out a power amplifier between an exiciter and antenna. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.15:1 from 0 to 500 mc. Isolation greater than 30 db @ 500 mc. Loss less than 0.03 db @ 30 mc. Life over 1,000,000 operations. 50 ohm impedance.

Connectors UHF. Size: 2¾ x 3¾ x 1¾". Wt. 12 oz.

Available in all standard AC, DC voltages _____ **from $19.00 ea.**

DK71 SERIES

DK71

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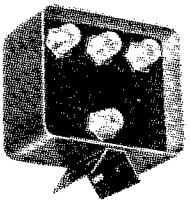
Weatherproof. Common connector may be switched directly to any one or combination of six positions. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.1:1 at 100 mc. Isolation greater than 40 db at 100 mc. Life expectancy greater than 1,000,000 operations. 50 ohm impedance.

Size 5¾ dia. 2¾" deep. Wt. 3 lbs. With UHF Coaxial Connectors __ **$49.50 ea.**

DK72 SERIES



DK72

1P3T COAXIAL RELAY FOR REMOTE SWITCHING of r.f. SOURCES

Weatherproof. Frequency range 0 to 500 mc. Power rating 1 kw. VSWR less than 1.1:1 at 100 mc. Isolation greater than 40 db at 100 mc. Life over 1,000,000 operations. 50 ohm impedance. Size: 4" x 3½" x 2⅝". Wt. 1 lb., 8 oz.

WITH UHF CONNECTORS _____ **$22.95 ea.**

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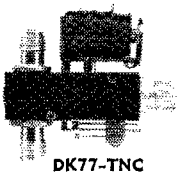

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MINATURE, LOW COST 50 ohm SPDT COAXIAL RELAYS

DK 77 relays available with phono, TNC and BNC coaxial connectors—with high performance characteristics. Freq. range 0 to 1000 mc. Power rating 250 w. VSWR less than 1.1:1 @ 500 mc. Isolation greater than 30 db @ 500 mc. Insertion loss less than .03 db @ 500 mc. Life expectancy over 1,000,000 operations. Models with 1C in mfgrs. type have SPDT auxiliary switches rated at 5 amp @ 110 VAC resistive.

Wt. less than 3.5 oz. **from $7.90 ea.**

Comply with MIL-5541, AN-C-170 and MIL-S-5002.

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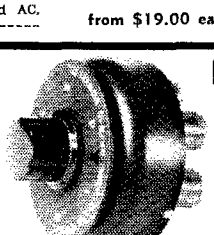

New Manual Coaxial Switches

New manual DK78 series coaxial switches with excellent r.f. characteristics (not wafer switches). r.f. rating, 1 kw. 50 ohm impedance. VSWR less than 1.05:1 at 150 mc. Isolation greater than 50 db @ 500 mc. and greater than 80 db @ 30 mc. With dial plate and knob. Wt. 10 oz. Size: 3" dia. x 1½" deep.

Available: 1P2T, 3P3T, 1P6T and crossover switch _____ **from $12.75 ea.**

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DK60, DK2-60, DK2-60B, DK71, DK72 available in standard AC, DC voltages. Also available with types BNC, TNC, N & C Connectors. DK77 all st. DC voltages. DK78 with BNC, TNC, N & C connectors.

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DK201
Panel Mount Male Connector
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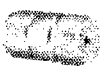

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(*Continued from page 150*)

in putting the Sideband Net on steady legs and we hope that VSAM will fare as well! W4OKN is mgr. of the late VSBN session and K5VZO/4 is mgr. of the early stint. K4CG (USCG) club station reports that the new Holligan Net meets Mon. through Fri. on 14,270 kc. W4ZM was elected president of the PVRC; K4KXV, vice-pres.; W3GRF, secy.; W4GF, treas. The LARC is starting an annual license training program. W4DLA says he is busy with DX with 32 zones on the 7-Mc. band. WA4SHD has returned to W1-Land as W1-DYE. K4GRZ, EC, is doing an FB job in emergency work and nets. W4KFC attended the National Convention in N.Y.C., finished an antenna tuning unit, worked Cambodia and took part in the VE-W test and LO-Nite. W4MK has coverage 10 through 160 on a trip dipole. WA4EUL, VSN mgr., is starting the winter season with a Drake 2-B. W4IOD reports 7 more Novice class hams on Eastern Shore. K4WUM now has mobile facilities. K4JKK has a new jr. operator. W4KX put up a new antenna. K4RNH is back at M.I.T. W4JUJ received the WAS/YL and the Worked All Bermuda Awards. K4ISM reports that Hurricane traffic was heavy. Traffic: (Sept.) W4DLA 541, W4RHA 279, WA4EUL 217, W4ZM 162, W4-MXU 140, K4FSS 132, W4SHJ 102, W5VZO/4 93, W4-OWE 84, W4OKN 69, W4NLC 65, WA4FCS 53, K4ISM 41, W4NVX 35, W4DKP 34, K4GRZ 32, W4TE 27, K4-SDS 22, K4WUM 21, W4KFC 18, W4LK 18, WA4HQW 14, W4JUJ 14, W4MK 14, W4QDY 13, K4RNH 12, WA4-SHD 12, K4LMB 8, K4CG 7, WA4JRY 6, W4ZAU 6, W4ZMT 6, K4NOV 5, W4PTR 5, W4KX 4, K4BAV 2. (Aug.) K4SDS 41, WA4SHD 17, WA4KVR 9, K4EZL 8.

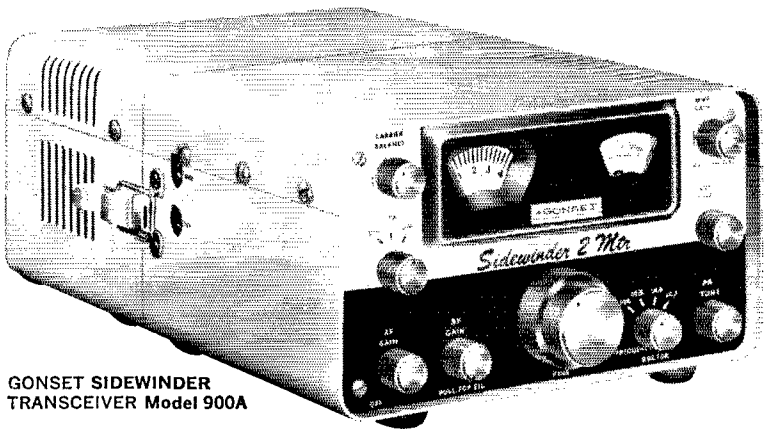
WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. PAM: K8CHW. RM: K8HID. S.S.B. Net Mgr.: W8EEO. C.W. Net Mgr: W8LMF. State Nets meet on 3570, 3890, 3903, 3905 kc. WVN C.W. Net held 16 sessions, 65 stations handled 49 messages. The Phone Net, with 17 sessions and 329 stations, reports 60 messages. W8BKK reports amateur TV operating in the Huntington area, with K8YEU very active. WA8KCJ is quite active on 6. WA8KGU, Oak Hill, is a new General Class licensee. K8MNG is going to Wheeling College and has the rig at school and is active in OO reporting. W8DUW reports regular skeds with Cincinnati on 144 Mc. The Kanawha Radio Club has issued 450 WWVA Awards, an excellent project for promotion of amateur radio in West Virginia. K8TPF comes through with another fine traffic report. WA8JWM is hoping to organize a v.h.f. club in the Newell-Chester area. WA8KUW reports that school work, band and football keep activity down. New officers of the Bluenerhassett ARC of Parkersburg are W8MIT, pres.; K8BOT, vice-pres.; Vern Lytle, secy-treas.; Bill Delamey, activities; Bob McKinley, publicity. K8WMQ, K8WWW and WA8DAU worked in the V.H.F. Party from Paddy's Knob in Pocahontas County. Traffic: K8TPF 232, W8CKX 60, WA8KUW 50, W8LMF 33, W8HZA 26, K8CHW 15, K8-ELH 14, K8CFT 8, WA8FIE 7, WA8BSE 4, K8MHR 4, K8ZDY 2, K8ZPN 2, WA8ALI 1, K8BIT 1, W8CZT 1, W8TGF 1, K8ZDV 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØ-TTB—SEC: WØSIN. Thanks to the SEC and others for their help. Reports from around Colorado are picking up. Now, if we could get the P.O. to cooperate, we may get ours out on time. Most reports from the northern part of the state were postmarked on the 1st and arrived here on the 10th. Of course, we still run Pony Express here! Spent a grand day on the Narrow Gauge Railroad trip to the top of 12,000-ft. Cumbress Pass. Sure would like to take a rig up there someday next summer for Field Day. High Noon Net traffic: 148. Traffic: KØZSQ 125, KØDCW 97, WAØHYG 8, KØ-DXF 5, KØITG 5, KØKUP 5, KØLCZ 5, KØTTB 5, WØCUZ 1.

NEW MEXICO—SCM: Newell Frank Greene, K5IQL—Asst. SCM: Kenneth Mills, W5WZK. SEC: K5QIN. The New Mexico Breakfast Club meets week days at 0700 MST on 3838 kc. NMEPN meets on the same frequency at 0730 Sun. WA5DUH is shouldering a big load, meeting TWN, but doing a fine job. K5QIN reports a light turnout for the SET, but Hurricane Hilda was competing for attention. WA5CPB, ashamed to put the old rig in his new wagon, is busy assembling an s.s.b. transceiver kit. The Ham Picnic at Cloudcroft, sponsored by the White Sands ARC was a big success. Plans are to skip next year. Let's hope they will change their minds. W5SA and several others are regular check-ins on the Eyebank Net. The net is performing a fine service. Your SCM is holding solid skeds with K5TQP on 2 meters. Fred is copied as far as Odessa, Tex., and welcomes any stations for a test. Traffic: W5LUX 15.

(*Continued on page 154*)



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(*Continued from page 152*)

UTAH—SCM, Marvin C. Zitting, W7MIWR/W7OAD—SEC: W7WKF. K7ZRT is a new OES in Provo. K7SDF has been busy with school lately. W7VEX now has a Collins 30-K on 80 through 10 meters. K7JVF can be heard on 160-meter c.w. when DX isn't coming in on 20. W7CYH has a new YL jr. operator, Bob Holland, ex-W7VEL, now WB6ISW, recently mobiled through Utah. WN7AYM is a new ham in Holladay. K7VTJ still has time for bowling despite her busy traffic schedule. W7LQE has been busy on TWN, PAN, BUN and the FARM Net. W7OCX reports that K7MPQ was awarded the PICCON Award for 1963 in a ceermony at Moab Sept. 9. W7QAG/M recently provided communications for obtaining help when an auto accident occurred in a remote part of the state. Traffic: W7LQE 87, W7OCX 70, W7VTJ 52, W7MIWR 3.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM and ORS: K7QYG. PAMs and OBSs: W7TZK and K7SLM. Nets: Pony Express, Sun. at 0830; YO, Mon.-Wed.-Fri. at 1830 on 3610; Jackalope, Mon. through Sat. at 1230 on 3920 kc. New officers of the Sheridan Radio Club are K7LZL, pres.; W7QPP, vice-pres.; Dean Seibert, secy. The Cheyenne AREC group participated successfully in the SET under the direction of its new EC, K7POX, and Asst. ECs W7HLA and K7IVJ. Our SEC got back on the air in September with a mobile transceiver and is hoping to get his home station reactivated soon. The Casper Club started its winter session of code and theory classes Oct. 6. Interest in ARPSC is increasing and our SEC hopes to have the state-wide ARPSC organization in full swing in the near future. Traffic: K7IAY 102, W7HH 34, K7VTM 23, K7SLM 16, K7LOH 15, K7YPT 9, K7OAF 6, W7NKR 5, W7AEC 4, K7AHO 4, W7TZK 3, W7CQP 2, K7POX 2, K7RFL 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William C. Crafts, K4KJD—SEC: W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. W4RLS won the Ack Radio Trophy for top Ala. phone score in the ARRL DX Contest. W4PRP won the c.w. one. Everything indicates Alabama had another tremendous SET. WA4MGI was elected NM of the Gulf Coast AREC V.H.F. Net. K4IKR and W4USM are on 6. New equipment: W4YNG, SX-117; WA4PUX, Clegg 99er; W4WGI, Clegg 99er and 40/80 vertical. W4DS now has an emergency power unit. Sept. net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Av. QNI*
AENB	3575	0100	Daily	31	4.5	8.8
AENM	3965	0030	Daily	30	4.2	53
AENO	50.55	0115	T/T.Sat.	13	1.2	22.7
AENP	3955	1230	Mon.-Sat.	26	2.5	18
AENP	3955	2400	Daily	34	2.44	25
AENR	50.55	0115	Wed./Fri.	9	1.5	21
AENT	3970	2230	Daily	34	2.058	7.23

Several stations were active in the recent V.H.F. QSO Party. Would like to see more stations active in the QSO, CD and LO Parties as well as the larger activities. Merry Christmas. Traffic: (Sept.) W4NML 119, K4WWP 119, WA4EXA 101, K4WHW 66, K4ANB 58, WA4EXB 50, WA4JWS 50, W4YNG 46, K4NUW 38, WA4FJF 35, K4KJD 20, K4NSU 19, WA4HKZ 14, K4GXS 13, K4RIL 13, WA4HGN 12, WA4EBS 11, K4BTO 6, W4DGH 6, K4FZQ 5, WA4BQI 4, W4DS 3, WA4SMA 3, W4YRM 3. (Aug.) WA4MGI 6.

CANAL ZONE—SCM, Thomas B. DeMeis, KZ5TD—SEC: KZ5OC. The following report was written by KZ5OC. The CZRA held its monthly meeting Oct. 1. The results of the KZ5 Amateur Radio Week were given out. Over 7000 contacts were made by approximately 70 operators during this week. 711 certificates and 1759 non-certificate letters were sent out; 15 foreign countries received certificates. Every state except Vermont and Wyoming and 63 foreign countries were worked. The Atlantic-side amateurs had the most contacts per area with 1650 and Los Rios led the Pacific-side with 1026. KZ5LT and KZ5TT led the number of contacts with 457 to their credit. Those reporting on the test received the Panama Canal Review, a KZ5-LAND QSL and the Commemorative Certificate. KZ5UR along with many other KZ5 amateurs spent many hours tabulating the final results. The KZ5 Amateurs Week was a smashing success. KZ5OC spent five days in Washington, D.C. KZ5BI is trading his SBE for a KWM-2A. KZ5OC is working 20 meters with his SWAN 400 feeding into a vertical with amazing results.

EASTERN FLORIDA—SCM, Guernsey Curran, W4GJI—I wish to thank K4KDN, for his earnest effort

(*Continued on page 156*)

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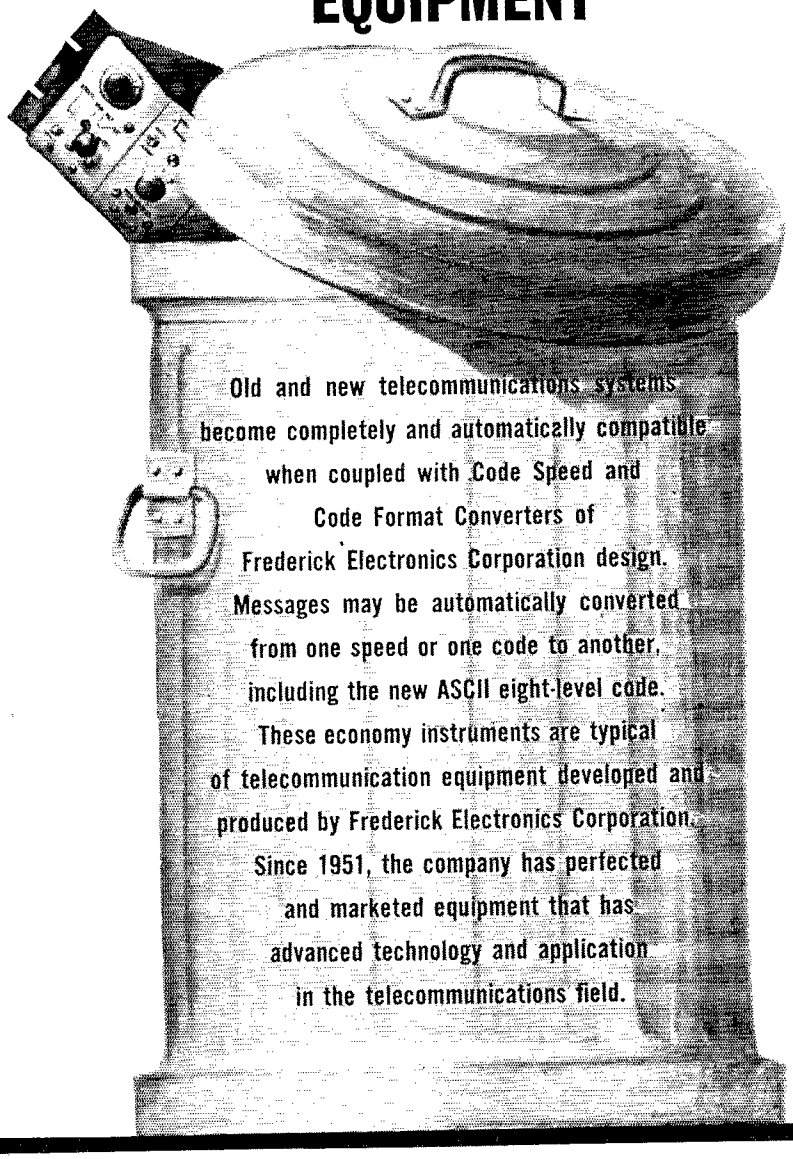

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(*Continued from page 154*)

to aid me as the SCM and for the very solid three years he gave to this section as the RM. During my tenure of office he has smoothed the way for me and stepped into the breach to take over on the c.w. nets time and time again when situations occurred because of illness or other unavoidable contingencies. Good Luck, Herb! Any comments with regard to the operations during "Cleo" and "Dora" are futile. The function of the Florida Sidebanders Emergency Net was conducted in accordance with the Civil Defense Plan, all its NCS and membership complied and the scope of their combined abilities was not only greatly appreciated by the civil defense agencies all throughout the state but by the directors of the state and region as well in writing. The SECs did not call up alternative nets to handle welfare traffic. These nets were called up for the Oct. 3 SET. We could take a page out of the book of those nets operating during Hurrican Hilda. They ran a show that was near perfect. Take care of your own valves with a fan, chaps. I'm cleaning up my golf clubs and rods and reels just to enjoy a real hobby. May my successor find as capable leaders as our best. So long and thanks for the many fine letters and especially those fine station activity reports that the record shows were almost all on time. Traffic: (Sept.) WA4BMC 368, K4BY 207, K4KDN 175, W4DFU 163, WA4IJH 149, WA4NEV 137, W4WHK 129, W4SDR 122, W4URX 119, WA4NBE 105, W4TRS 100, W4LUV 88 W4IYT 85, W4OGX 66, WA4COR 65, W4VWL 54, W4BKC 50, K4DAX 50, K4ILB 47, K4COO 45, WA4GDS 44, W4GWF 43, WA1AFP 42, K4QAY 41, W4GJI 40, WA4RSQ 40, WA4FYV 39, W4AKB 38, WA4IWO 35, K4SJH 35, WA4RXG 29, W4AYD 24, W4IEI 16, WA4KDL 14, W4FP 12, WA4IYG 12, WA4GEM 6, K4MIP 6, K4MZR 6, W4UXZ 5, W4LVV 4, WA4IXI 2, WA4JYB 2, WA4STJ 2. (Aug.) WA4GBM 41.

GEORGIA—SCM, Howard L. Shonher, W4RZL—SEC: K4DMC. RM: W4DDY. PAMs: K4PKK, WA4EHT, WA4HSN. K4WRG and K4YGD now are on v.h.f. WA4ARI is building a new modulator. WA4EHY and K4YSA are experimenting with extended groundwave on 50 Mc. WA4PPN has a new 6-meter mobile. K4AUM is looking for a mobile rig. Going QRT, A1? WA4JSU has a new kw. mobile. K4OKS, K4QNA and WA4FOE are new net controls for the Ga. S.S.B. NET. K4EJD has an HW-12 perking. WA4MOC adds authority with a 4-1000. WA4LLI, as Navy NØ TYF operated 14 hours during Hurricane Dora and 25 hours during Hurricane Cleo. He also assumed responsibility as net manager of MATN. WA4PSA is forsaking v.h.f. for s.s.b. WA4MPD enjoyed the Sept. QSO Party. The Georgia Teenage Net, 3900 kc. meets at 1600 GMT each Sat. Contact WA4HSN for information. WA4GAY has been bitten by the DX bug. WN4SRH is working v.h.f. MARS. Enjoyed a nice eyeball with K4PKK and W4WKP in Macon. W4YE, c.w., mobiled over 12 states. WA4FNY now is mobile all bands. WA4JXL is NCS of GTN. K4EIK is being transferred to Virginia. W4HYW is active again on all bands. WA4QHQ's activity is limited because of school. Congratulations to W4DDY, winner of the Ga. S.S.B. Assn. Ham of the Year Award. Traffic: K4FLR 282. W4RZL 164, W4DDY 151, K4MCL 134, W4NSO 93, K4EIK 88, W4PIM 52, WA4FNY 50, WA4MPD 48, WA4LLI 45, K4DKJ 43, WA4BVD 31, WA4PSA 26, K4AUM 18, WA4CJN 18, WA4QHQ 15, WA4HSN 13, W4YE 10, WA4GAY 5, WA4JXL 5, W4HYW 3.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. W4MLE sold his HQ-170 to K4VNJ and ordered an SB-300. WA4DCN and K4TDT are at F.S.U. WA4EOQ is on s.s.b. with an HT-37 and a Drake 2 B. K4DAD has an NCX-5. Madison: W4PBO and W4RCO lost antennas during a storm. Marianna: EC WA4DED's emergency drills paid off when a real tornado struck his QTH, cutting off power and downing antennas. K4UNT is conducting a code and theory class for prospective hams. Panama City: WA4NRP has started a c.w. training net to teach message-handling. A 2-meter beam, 80 ft. high, was installed at County C.D. Hq. Defuniak Springs: K4VWE spent many hours handling traffic on WFPN during the recent FFA/CAP/Civil Defense joint exercise. W4TFL, in Crestview, provided a link to FAA. Fort Walton: W4ZWD shipped out as R.O. aboard the S.S. *Santa Emilia* to Egypt. Milton: K4NMZ has a homebrew linear using 4-811As with solid state P/S. He also edited the new edition of *QRV!*, WFPN Newsletter. Pensacola: K4YJW is the new Escambia County EC. K4SOI keeps the 10-meter net going strong; he is building a 3-400Z linear. WA4ECY was instrumental in the rescue of a ship disabled at sea recently. Traffic:

(*Continued on page 158*)

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(*Continued from page 156*)

K4VFY 530, WA4IMC 224, W4TFL 118, K4NMZ 93, WA4JIM 53, K4VWE 38, WA4NRP 30, K4SOI 15, WA4-NVG 4.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7TNW. Congratulations to W7IZ on receiving his A1-Operator certificate. K7-POF has a new QTH. K7SWX is attending school in Colorado. K7ZLA is in Saudi Arabia working for ARMCO. He has applied for his 7Z3 call. K7TXS has a new three-element, triband quad. W7VKO needs only Africa for WAC on RTTY. W7FEW showed the Arizona Radio Club color slides that he took in Alaska. WN7-BIA is a new Novice in Tucson. Would appreciate it if each active club in the section would send the names of its president and secretary, together with information on the current meeting place and night to your SCM. Reporting monthly traffic to your SCM does not require that you be a League member or a member of a particular net. K7RUR is doing a fine job as OO. Your SCM and his XYL attended the ham convention at Palm Springs, Calif., and had a great time. Traffic: (Sept.) K7TNW 348, W7FKK 46, K7RUR 1. (Aug.) K7UXB 38.

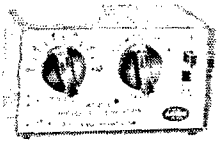
SAN DIEGO—SCM, Don Stansifer, W6LRU—New officers of the Newport Club are K6IME, pres.; W6-WYH, vice-pres.; WA6WZQ, secy.; W6MYC, treas.; K6OKZ, sgt. at arms. The club has a new policy of a question and answer period of any electronics questions members may have. W6QJW spoke to the San Diego V.H.F. Club on Oscar III at its Oct. meeting. The club's Third Annual Christmas Dinner Party will be held Dec. 2. Contact WA6OSB if interested. WA6LAG has his 450-Mc. rig mobile. New members of the V.H.F. Club are WA6KGZ and WA6MOC. WB6IQM has a new Swan 400. W6YZV continues to print and publish the excellent paper for the Palomar Radio Club. K6GNZ reports that 38 Orange County awards have been issued. W6UYM has passed the Extra Class exam. WA6-UOO and WA6PHA were both recently married. New appointees include W7SMB/6, in Anaheim, as OO, and WA6WTD, Costa Mesa, as ORS. Guest visitor at a special San Diego DX Club meeting in Oct. at the home of W6CAE was G6QB. WB6GMM has a new tri-band quad, and ended his first year of hamming by receiving an A-1 Operator Club certificate. SEC W6SK vacationed north in October. Asst. SCM W6EWU received the De Forest Award at the Southwestern Division Convention. WA6ROF, ORS in Orange, helped at K6BPC during the Oct. SET. The EC in Imperial County is W6DLN. To all from your SCM, the best in Season's Greetings. Make a New Year's resolution to keep reports coming in for this column. Traffic: (Sept.) K6BPI 4657, W6IAB 3941, W6YDK 2785, WB6JUH 726, W6EOT 372, WA6ROF 107, WA6CDD 62, WA6ZWR 39, K6IME 34, WB6GMM 13, W6WRJ 10, W6DGM 2. (Aug.) W6YDK 3186.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—Your new SCM is anxious to have the latest addresses of all radio clubs in San Luis Obispo, Santa Barbara, and Ventura Counties in order that we may keep you informed of matters of interest to all amateurs in this section. K6BUD has a new SR-160 mobile and is joining the gang on 3895. WB6DPV is alternate net control for the Mission Trail Net, and with only 35 of well-radiated power. WA6JBE, with a new HZN Tri-Ex tower to put up was transferred to Florida. The Ventura County Council of Radio Clubs and its monthly social activity is drawing nearly 100 hams and friends. The Lompoc ARC sponsored a ham social during September with WA6OKN, K6AAK and W6QJW as guests Traffic: WB6DPV 40, WA6OKN 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—K5GVS has been awarded the "Annual Outstanding Amateur Award" by the Midland ARC for his work in RACES and his untiring efforts in assisting beginning hams and old-timers as well. In addition to a handsome engraved plaque the recipient receives a Life Membership in the club. W5LR, RM, has moved to a new location, 1314 Holly Glen Dr., Dallas 32, Tex. Gene has a new SR-160 and reports fine results. WA5DQP, net control for TEX C.W. Net, needs more operators to check in as he is having trouble finding outlets for the traffic. This net meets on 3770 kc. at 0100 and 0400

(*Continued on page 160*)



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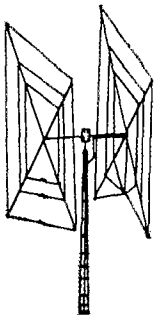

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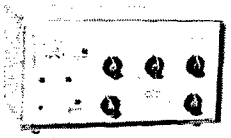
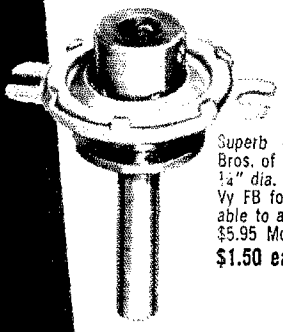


AMECO 2 & 6 METER CW/PHONE XMTR

Model TX-62 complete 75 W. phone and CW transmitter has built-in power supply and modulator. Tunes easily. 50-54 Mc. and 144-148 Mc, Xtal (8 Mc) controlled or can take VFO, Meter reads final grid or cathode current or RF out. Size: 11½x9½—6" high, shipping weight approx. 20 lbs.

Tx-62, wired and tested **$149.95**



PRECISION PLANETARY-VERNIER for exceptionally fine tuning

Superb craftsmanship by Jackson Bros. of England. Ball bearing drive, ¼" *dia. Shaft 1⅛" long; 6:1 ratio.* Vy FB for fine tuning. Easily adaptable to any shaft. *Comparable value* $5.95 Model 4511 DAF.

$1.50 ea. **10 for $13.50**

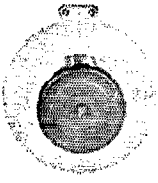
Shown approximately actual size

VERSATILE MINIATURE TRANSFORMER

Same as used in W2EWL SSB Rig—March, 1956 QST. Three sets of CT windings for a combination of impedances: 600 ohms, 5200 ohms, 22000 ohms. (By using center-taps the impedances are quartered). The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x ¾" w. x ¾" d. New and fully shielded.

Amateur net **$1.39**
3 for **$3.49**
10 for **$10.75**

PRECISION BALL DRIVE DIAL



Another superb product of Jackson Bros. of England. 4" dia. dial with 6:1 ball drive ratio. Fits standard ¼" shaft. For that velvet touch . . .

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DIRECT/5:1 REVERSE VERNIER DRIVE

The newest in the line of fine tuning aids from Jackson Bros. Direct/Slow Reverse (5:1 ratio) Vernier Drive. Easy fixing — requires only one ⅜" hole. High torque, low-back lash, smooth and permanent movement, coaxial spindles, ¼" shaft dia.

Model 4111/RV **$1.95**

actual size

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65 Cortlandt St., N.Y. 7, N.Y. 212 — Digby 9-4730 • 525 Jericho Tpke., Mineola, N.Y. 516 — Pioneer 2-2290 • 225 Main St., Norwalk, Conn. 203 — Victor 7-5889

(*Continued from page 158*)

daily. This is a good opportunity for you c.w. operators to get some experience in traffic-handling. K8ISR/5 is a new OBS and will transmit bulletins on c.w. Tues. through Fri. on 7076 kc. at 1130 GMT. The Red River ARC's new officers are WA5CTD, pres.; WA5BWM, vice-pres.; WA5DQP, secy-treas. The club meets the 2nd Sun. of the month at the new County Court House and all amateurs are invited. The Panhandle ARC, Amarillo, is to be congratulated on its club bulletin, *The Local Oscillator*. The paper is newsy and the "test your knowledge" section should help to further your ability to pass an Extra Class exam. SCM comment: In a real emergency, *listen, don't talk*. If your area is needed you will be called. During the recent Hurricane Hilda, I heard many stations checking in on the emergency frequency stating "I am standing by if you need me." Traffic: K5FLD **211**, W5VFM 69, W5LR 10, W4OSG/5 6, K2EIU/5 3.

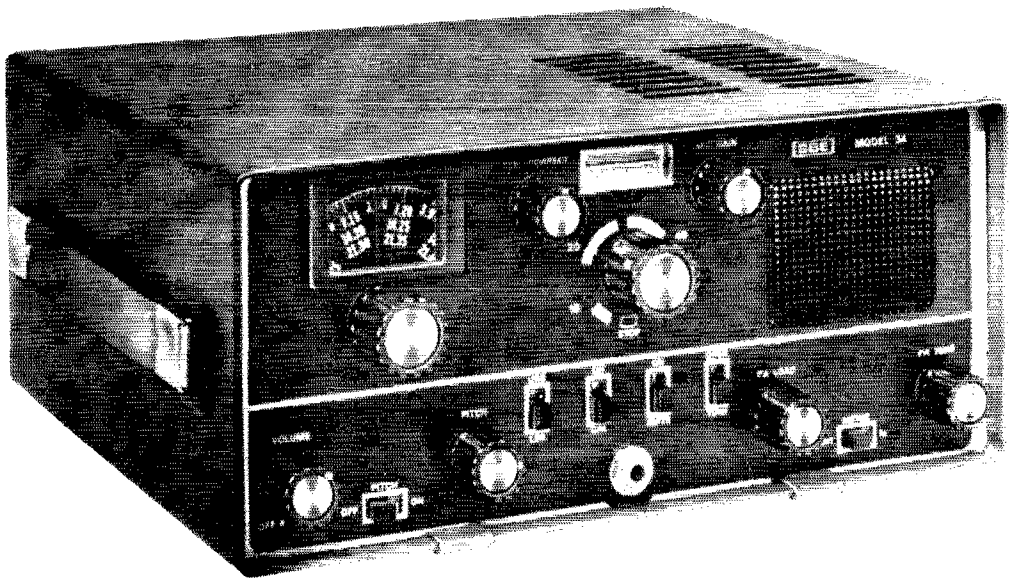
OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX. SEC: K5DLP. K5GCM is the new EC for Nowata County and W5OZA is the new EC for Rogers County. Griff is now on sideband and really putting a rock-crushing signal out of Inola. W5JEB, formerly of Frederick, is now at Sapulpa. We plan on having an antenna-raising to get Father Joe back on the air soon. WN5KKX is a new Novice in Tulsa and is working hard on his General. The new officers of the Electron Benders Amateur Radio Club are W5FWW, pres.; WA5DBM, vice-pres.; K5JFJ, secy.; W5GZD, treas.; K5OOV, trustee; K5ZCJ, editor. The Tulsa Chapter of the American Red Cross has provided the Electron Benders with a meeting place and also a room to set up their transmitters. The Red Cross has gone all out to get the communications set up in its building; was pleased with their efficiency and had a private telephone installed for them. This is the type of relationship that we like to see between the two organizations. K5CAY has his 600-watt 2-meter transmitter on with a rock-crushing signal all over Oklahoma. W5DRZ still has plenty of the 77 certificates left. If you have worked all 77 Oklahoma counties, contact Preacher and he will give you any information that you might need in getting the certificate. Traffic: K5TEY 518, W5UYQ 59, W5DRZ 43, W5MFX 36, K5KTW 25, WA5BNG 18, K5DLP 18, W5PML 8, K5OCX 5.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM: VE6PV. RM: VE6AEN. The Vulcan Club reports it will be running two classes this winter, beginners and advance. This is your chance to help out, fellows. The club also will hold social evenings with auctions, swap and shop and transmitter hunts. The Calgary Assn. will be running on-the-air code practice, code practice for the Boy Scouts and also a beginners' class. Help is needed from you fellows around Calgary. Do your share. With winter coming on the fellows are looking for lots of activity. Red Deer is expecting a very active season. No reports were received from the Calgary (s.s.b.) club, the Edmonton Club, the Medicine Hat Club or the Lethbridge Club. What's going on, fellows? VE6PV should be back on the air soon. VE6TG has no modulator and the wind blew down the antenna but he should be back on very shortly. Our SEC reports that he received only two reports this month. Harvest should soon be done and activity should pick up. Get your reports in, fellows. VE6HM and his XYL should be back from England soon. Traffic: VE6FK 7, VE6SA 5.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —Your SCM has returned from a holiday in the interior of B.C. and has proven by hearing for himself and seeing Europe on DX being worked by VE7AC. His c.w. dipole must be connected to Europe. VE7BCC and VE7BDH have a neat corner console of companion Heathkit units. VE7BHW, sitting on top of a hill in Oyama, s.s.b.'s the DX. VE7DB still has the home-brew rig of yesterday. We cruised through pictures of many years in amateur radio. I wonder where some of the old west-enders are today. VE7BCV provided mail and worm service across Shuswap Lake. VE7LP is a super salesman so had a trip to New York for his effort. VE7DB reports on increasing activities on 6 meters. We missed VE7ALF but had a nice visit with VE7ACH, his XYL, and found he is working DX on 40 meters. VE7ADM is back in Nanaimo and soon will be active on 6 and 2. The Burnaby ARC provided communications for a Rover Scout "MOOT" in the Garibaldi Mountains. Operators were VE7BIY, VE7AEG and VE7BNG. VE7BAR/7 was operated under many difficulties but they were all surmounted and the

(*Continued on page 162*)



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431 E. Green St., Pasadena, Calif.	213 684-0861
6116 N. 27th Ave., Phoenix, Ariz.	602 AM 4-3895

"Worlds Largest Distributors of Short Wave Receivers"

(Continued from page 160)

reports from the Scout's Hq. indicates a job well done. VE7AAV has been awarded a Ph.D. New amateurs in Victoria are VE7BRL, VE7BSC and VE7BSJ. *Zero Beat*, VSWC's newsy paper, is well put together by its editor, VE7AKY. A donation will bring it to you. Traffic: VE7BHH 74, VE7QQ 27, VE7BHW 9.

MANITOBA—SCM, William H. Horner, VE4HW—The visit to DOT facilities at the new Winnipeg International Airport, sponsored by the WARA, was well attended. VE4SN did an excellent job in explaining the operations. Our SEC VE4OL is on a two-month stint at Comox, B.C. VE4HB is Acting SEC during John's absence. With VE4UX as Parade Marshal and VE4EW, VE4CF, VE4UF, VE4TH and VE4OK all mobile on 6 meters the UMARS boys did a fine job in marshalling the annual "Freshie" Parade. VE4UE, VE4CM and VE4JA are among the newcomers checking into the 6-meter net. There is some talk of starting a c.w. 75-meter net. The interchange of traffic between the Manitoba and Saskatchewan 75-meter phone nets works fine and an eastern connection with an Ontario net is anticipated. VE4GK did a fine job operating VE4JAM during the Boy Scout Jamboree on-the-air and the Scouts made many contacts through other VE4 stations. VE4QA/VE8 is operating a.m. from Hall Beach, N.W.T. VE4TC has his new tower and beam up at Birds Hill. VE4QL, VE4GC, VE4FB and VE4HW participated in the Pembina International Boy Scout Camporee held at the "Oasis." VE4NY enjoyed his overseas trip. VE4SK has his talking ticket. Traffic: VE4JT 33, VE4QD 28, VE4QJ 18, VE4JA 14, VE4EF 13, VE4HW 11, VE4AN 2, VE4GE 2, VE4LQ 2, VE4EX 1, VE4MK 1, VE4UM 1, VE4XQ 1.

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A. E. W. Street, VE1EK. VE1AI is getting good results with his home-built 420-Mc. walkie-talkie equipment. VE1IF is using 160 elements in his 2-meter beam. Congratulations to VE1AYL, VE1ABQ and VE1JG, who have received their Old Timer's Club certificates. VE1-AYL was the first YL in the area to receiver her license—hence the distinctive call. Certificate Hunters are reminded of the certificates available in the Atlantic Provinces. They include WAG, WANB, WANS and WAVO. The move to establish 26,975 kc. (11 meters) as a calling and emergency frequency is gaining momentum. Amateurs who also use GRS equipment should make note of this. New calls include VE1AGD and VE1JD. Know of a new amateur in your area? Why not let this office know so that his call could be included in this column. Just a reminder that several test emergency drills will be held during the next few months. Your assistance and cooperation in these tests are greatly appreciated. You do not have to be a member of any organization in order to participate. Traffic: VE1OM 22, VE1DB 13, VE1AEB 8.

ONTARIO—SCM, Richard W. Roberts, VE3NG—The Ontario Division ARRL Convention was held in London and from all comments was one of the best. Winners of the top two prizes were VE3QW, the SR-160, and W8JXU, the Heath Ham scanner. VE3DH is visiting in G-Land. VE3DQB is now OO in the Soo area. VE3CYR held a no-warning SET in Peterboro and had response from twelve mobiles. We now have 2 PAMS for the very large Ontario Phone Net. VE3-CQN has been appointed to work with PAM VE3CFR. VE3EUM works all bands, phone and c.w. A network of s.s.b. mobiles and portables stations was used effectively as a safety factor and to check the aircraft during the Air Rally for the Governor General's Cup, held at the Buttonville Airport near Toronto. VE3LI, Toronto EC, was in charge. VE3DGX, of Windsor, is off on a DXpedition to Easter Island. VE3ETM took ill at the convention but is now fully recovered. VE3-CEC, of the Hamilton Club, again is in charge of a program for would-be hams at the Central Night School. The Sudbury and District ARC has made application to hold an ARRL Ontario Division Convention in its fair city in 1965. The Radio Society of Ontario is offering a new certificate. VE3AML will give you details. VE3-BDX, of Ottawa, uses one watt on 144 Mc. and skeds VE3EYU, 50 miles away. VE3CJJ is on 2. VE3CVD has moved to Montreal. VE3LK overhauled his rig over the air via instructions from VE3FCU. Kitchener-Waterloo issues a fine bulletin. VE3ENU is in the hospital. Traffic: (Sept.) VE3DRF 187, VE3AUU 154, VE3-CYR 154, VE3CFR 117, VE3BUR 114, VE3NG 110, VE3DPO 103, VE3EHL 81, VE3BZB 65, VE3FGV 62, VE3FTM 58, VE3AWE 46, VE3EBC 40, VE3EZY 39, VE3BTV 33, VE3BLZ 30, VE3AKQ 25, VE3RCS 19, VE3CFI 17, VE3EGG 16, VE3WW 16, VE3OWN 15, VE3FEH 14, VE3CLK 12, VE3BWM 11, VE3LI 10, VE3DH 8, VE3DVE 8, VE3VD 7, VE3OT 3. (Aug.) VE3CYR 108, VE3FGU 65, VE3EAM 28.

(Continued on page 164)

(Continued from page 162)

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. In conjunction with the SET, the Montreal AREC group led by SEC VE2AUU carried out a successful operation in connection with a large car rally sponsored by "Interline 100." Seventy-four cars took part. Eight mobiles, 2 walkie-talkies and 2 fixed stations comprised the operating group which handled some 1000 pieces of traffic on the 11-meter band. Other SET activities took place on c.w. nets with VE2s OJ, BRT, ALH, BEZ, AGM, DR and others very active. VE2BR entertained many of his O.T. pals at his summer QTH near Lachute. VE2BRA is a very reliable NCS on 144 Mc. VE2AGD is always QRX for traffic at his Northern St. Maurice destination. VE2AGI and VE2AJD again are starting courses for newcomers. Incidentally, the MARC is doing a splendid job in this department. VE2KQ deserves plaudits for his cooperation during a Scout rally at Jarry Park. Merci a VE2ALH pour les informations suivantes: VE2OB et 2 BCD se promènent en Californie. VE2ADL et VE2AGH ont reçu leur nonveaux HT-32-B. VE2IM et VE2AZR experimentent sur 2 m. en s.s.b. VE2UZ a reçu son nouveau beam. VE2PA espère être actif sur 11 m. bientôt. VE2AIR/2 essaie un beam sur 80 m. VE2ALH s'est servi de son NCX-3 comme repetiteur sur 80 m. avec un mobile sur 11 m. Votre Asst. SCM a eu l'occasion de visiter K2USA lors d'un voyage a N.Y. VE2PY actif sur 11 m. VE2MX et VE2BY on repris leurs activitées pour la nouvelle saison. Un autre nonveau club: VE2AJ. VE2MO ont eu un visiteur de marque en la personne de VE2BE. Alex Reid. Traffic: VE2AUU 90, VE2BEZ 90, VE2DR 86, VE2BRT 68, VE2ALH 53, VE2BRD 41, VE2EC 39, VE2BMS 38, VE2OJ 36, VE2ABT 31, VE2TA 20, VE2JJ 15, VE2BCB 14, VE2BOC 14, VE2SD 12, VE2BG 10, VE2HV 10, VE2CP 9, VE2QC/2 3.

SASKATCHEWAN—SCM, Mel Mills, VE5QC—I have been your SCM for one year; what have we accomplished? The main thing is an AREC organization that can be truly called an organized amateur radio emergency *service*. Good public relation work was accomplished, especially in the North, under EC VE5-BO. Barry's Sept.-Oct. exercise was well executed with all aspects covered. SEC VE5CU has done a very good job organizing the province but of course the big credit goes to *you AREC members!* Let's all make a resolution for the new year to put into practice at *all* times the good operating procedure used during tests. In this way operating on our bands will be easier and our cause at Geneva will be helped. Have moved, so please address *all* mail to Box 801, Saskatoon. The very best of Seasons Greetings to all of you and yours. May your loved ones be near you at this time of year. Also help others to be near their loved ones. Be especially alert for Yuletime traffic and dispatch it with the best possible haste. You'll help give others joy at Christmas and also will enrich your own feeling of goodwill. Try it, you'll agree. Merry Christmas and a Happy New Year. Traffic: VE5HP 128, VE5LM 66, VE5BO 7, VE5CB 2, VE5IR 1.

VHF-Summary

(Continued from page 87)

WN2MYO 102- 34- 3-B
WA2IQU 21- 7- 3-A
W2LST (7 oprs.)
32,165-725-43-ABCD
WA2FSQ (5 oprs.)
32,130-586-51-ABCE
W2PEZ/2 (10 oprs.)
13,300-345-38-ABCD
K2DEL (8 oprs.)
2924-172-17-AB
WB2JVE (WB2s FPY JVE)
553- 79- 7-A

MIDWEST DIVISION

Iowa

WAØCVA 224- 56- 4-A

Kansas

KØITF 774- 86- 9-AB
WØIEX 282- 47- 6-AB
KØGIC 108- 36- 3-AB
WAØDZI 60- 15- 4-AB
WØHNG 42- 14- 3-AB
WØCMB 22- 11- 2-B
WØBPE/Ø (17 oprs.)
1044-174- 6-AB
KØPFV (KØs MMJ PFV)
124- 62- 2-A

Missouri

WØZBL 1020-102-10-AB
KØTLM 138- 46- 3-A
WAØHGK 114- 57- 2-A
WAØFLL 108- 27- 4-AB

Nebraska

WAØDJK 16- 8- 2-A

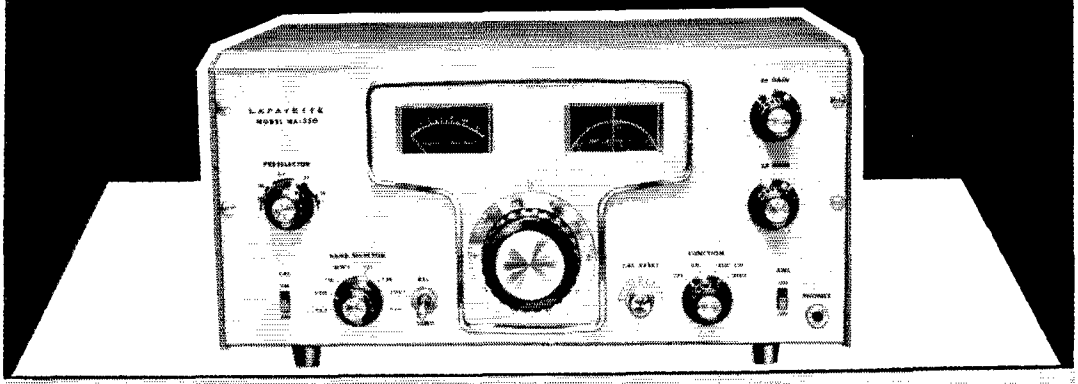
NEW ENGLAND DIVISION

Connecticut

W1RJA 6758-218-31-AB
K1WHS 3784-171-22-ABC
W1HKL 3600-225-16-B
K1PKQ/1
3564-198-18-B
K1PVT 2142-119-18-AB
K1RTS 1067- 97-11-B
K1VFX 888- 74-12-A
K1MBA 528- 48-11-B
WN1AOQ 100- 25- 4-B
W1USF 30- 5- 3-D
WØEXS/1 28- 7- 4-B
W1BDI 12- 6- 2-B
W1MEH/1 (8 oprs.)
15,984-443-36-ABC
K1VMI (Kls IKE PUR VMI) 10,700-413-25-ABC
KØZQR/1 (WA1BWF, K1PLX, KØZQR)
5129-223-23-AB
K1WME (WN1BZV, K1WME)
3021-159-19-AB

(Continued on page 166)

NEW! LAFAYETTE



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- 12 Tubes
- Crystal-controlled 1st Oscillator
- Transmitter-type VFO for 2nd Oscillator
- Preselector Tuning
- Crystal-controlled BFO (Dual frequencies)
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- Selectable upper and lower Sidebands
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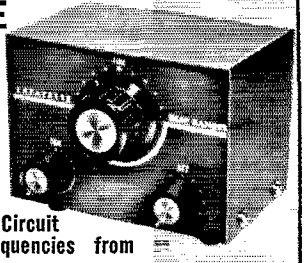

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- Provides "beat" frequencies from 3.5-32MC
- Connects to Receiver's Antenna Input
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(Continued from page 164)

WA1COJ/1 (10 oprs.) 2740-137-20-AB
K1RKT/1 (K1s RJD RKT, W1ZZU) 2610-174-15-B
W1BGD/1 (W1BGD, K1s CEC QNF) 2300-115-20-AB
K1ZTF/1 (4 oprs.) 2032-127-16-AB

Eastern Massachusetts

K1AGB 5632-163-32-ABC
W1QXX 2457- 86-27-ABC
K1MIM 1430-130-11-A
K1LLR 1024- 62-16-ABD
K1FPR 760- 76-10-A
W1JSM 564- 47-12-B
K1KKS 320- 20-16-AB
K1ZGH/1 260- 26-10-A
K1FZE 84- 28- 3-B
K1EJM 22- 11- 2-B
W1CTR/1 6- 6- 1-B
K1UVS (K1s FNX UVS) 1177-107-11-A

Maine

K1NTD 232- 29- 8-A
K1KKK 60- 15- 4-A

New Hampshire

W1ALE 1748- 92-19-AB
W1TVP 472- 59- 8-A

Rhode Island

K1QHE 1584-144-11-A
K1IRK 902- 82-11-A
WA1AGE 504- 63- 8-A
W1POP 232- 29- 8-B

Vermont

W1AIM 690- 46-15-AB
W1EXZ 133- 19- 7-AB
W1HDQ/1 20- 5- 4-A
W1QQ/1 2- 2- 1-B
K1QIZ/1 (K1UZK, W1s JXQ WIA) 1914-189-26-AB
W1KBI/1 (W1KBI, K1REM, W1TLZ) 4557-217-21-AB
W1IPJ/1 (K1s CHY JSE PIV) 3822-142-26-ABCD

Western Massachusetts

K1ULZ 636- 53-12-AB
W1FVT 336- 28-12-A
W1UCB 45- 8- 5-ABC
K1OOR/1 (18 oprs.) 62,586-1052-57-ABCD
K1KBO (WB2EGI, WN3BIV) 1672- 88-19-AB

NORTHWESTERN DIVISION

Oregon

K7GWE/7 416-104- 4-AB
W7TYR 335- 65- 5-ABC
K7EAU 60- 30- 2-A
K7AUO/7 (13 oprs.) 488- 59- 8-ABC
K7QXF/7 (K7s QXF RRB, KØZMU) 300- 58- 5-ABC

Washington

K7BJV 72- 24- 3-A
K7DTH (K7s DTH JZP) 1353-123-11-AB

PACIFIC DIVISION

East Bay

WB6LXB 292- 73- 4-A
WA6VAT 105- 21- 5-AB

Nevada

K7ICW 84- 13- 7-ABC

Sacramento Valley

W6GDO 1020- 48-17-ABCD
WA6PAB 232- 29- 8-AB
W6HBU/6 (7 oprs.) 1944-157-12-ABC

San Francisco

K3JIE/6 76- 19- 4-AB
WB6GUG/6 (4 oprs.) 3180-204-15-ABC
WB6CKT/6 (4 oprs.) 1727-157-11-AB
W6BCC (6 oprs.) 1470-147-10-AB
K6NCG (multiopr.) 392- 49- 8-AB

San Joaquin Valley

W6VKD 85- 17- 5-B
K6OKC/6 (K6s ANZ OKC) 530- 48-10-ABD

Santa Clara Valley

K6QEZ/6 1050-105-10-AB
WB6HFR 840- 84-10-AB
WA6VPL 1- 1- 1-B
W6GD/6 (8 oprs.) 6136-212-26-ABCDE

ROANOKE DIVISION

North Carolina

WA4BVW/4 1554-111-14-AB
WA4SQB 332- 83- 4-AB
W4DGF/4 90- 30- 3-B
K4MHS 70- 14- 5-AB
WA4REX 54- 54- 1-B
WA4PVS 9- 9- 1-A
W4GG/4 (8 oprs.) 1122-102-11-AB
WA4SHA/4 (5 oprs.) 535-107- 5-AB
W4PAR/4 (5 oprs.) 420- 60- 7-AB
WA4QCM (5 oprs.) 332- 83- 4-AB
W4FDO/4 (WA4BBY, W4FDO) 236- 59- 4-B

South Carolina

W4CPX 208- 26- 8-AB
W4DEN 119- 17- 7-AB
K4JQY 36- 9- 4-A

Virginia

W4VCC 11,025-303-35-ABCD
K4VWH 4592-287-16-A
W4UIS 2156-154-14-A
WN4TYZ 30- 15- 2-B
K4WYS (6 oprs.) 483- 69- 7-A

West Virginia

WA8FSE/8 (8 oprs.) 5208-217-24-AB
K8WWW/8 (K8s WMQ WWW, WA8DAU) 1521-117-13-A
WA8KJX/8 (W8CKY, WA8KJX, W8TKF) 424- 53- 8-A

ROCKY MOUNTAIN DIVISION

Colorado

WØEVZ 516- 73- 7-ABCD
WØHLS/Ø 68- 34- 2-AB
WØWYZ 36- 7- 4-ABCD
KØZAQ 1- 1- 1-A
WØAJY/Ø (6 oprs.) 219- 73- 3-AB
KØBTO (K0s BTO YJG) 32- 16- 2-AB

New Mexico

WA5ETF 11- 11- 1-B
W5KDT/5 (5 oprs.) 150- 30- 5-AB

Wyoming

K7VTM/7 (K7s HAW VTM, KØQAN) 175- 32- 5-ABC

SOUTHEASTERN DIVISION

Alabama

K4WHW/4 332- 83- 4-A
WA4PHF 80- 20- 4-AB
W4YRM 78- 26- 3-AB
WA4GGG 66- 22- 3-A
W4ZNI 66- 33- 2-A
WA4SBD 51- 18- 3-A

Georgia

W4FWH 306- 34- 9-AB
K4YZE 21- 21- 1-B
WA4PZO/4 (K4s FLR PHB, WA4PZO) 1350-135-10-AB
WA4QPL (Multiopr.) 1216-154- 8-AB
WA4BEU (WA4s BEU EFI) 184- 46- 4-AB

SOUTHWESTERN DIVISION

Arizona

W9KLD/7 24- 12- 2-AB
K7NHK 15- 15- 1-B

Los Angeles

WA6ZRK 232- 58- 4-AB
WA6SLF 100- 50- 2-B
WB6CGM 78- 26- 3-AB
WB6FRP 46- 23- 2-B
WB6CDF/6 (8 oprs.) 3447-363- 9-ABCD

San Diego

W6GZK 535-107- 5-AB

(Continued on page 168)

TREMENDOUS SAVINGS ON LIKE-NEW EQUIPMENT

for the SWL, Newcomer, or Extra-Class Amateur

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- Plenty of Free Parking

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75S1	339			NC190	149
75S3	459			NC270	159
75S3B	439			NC300	189
32S1	449	$	$ $ $ $ $	G76	189
32S3	569		NEW	G76 DC SUPPLY	69
30L1	379	$	DRAKE & SWAN $	GSB100	249
KWM2	795		*equipment*	GONSET III 6MTR.	149
DC SUPPLY	69	$	$	GONSET III 2MTR.	179
32V3	229		*We also*	SUPER 12 CONV	39
DRAKE 1A	139	$	$	G66B	67
DRAKE 2A	169		*stock the*	RME 4350A	119
DRAKE 2B	207	$	$	RME VHF126	179
DC3 DC SUPPLY	99		*complete*	KE93&AC SUPPLY	117
SX43	77	$	$	CLEGG INTCPR	319
SX62A	279		*line of*	POLYCOM PC6	239
SX99	79	$	$	POLYCOM 62B	279
SX100	179		*brand--new*	DX35	39
SX111	167	$	$	DX40	44
SX140	72		DRAKE & SWAN	DX60	77
S85	69	$	$	DX100	99
S108	69		*equipment.*	VHF1 SENECA	159
S118	69	$	$	HA10 WARRIOR	189
S120	39		*Used,clean*	SB10	77
SR150	369	$	$	HR10	69
SR34	199		*gear*	RX1	179
FPM200	975	$	$	MT1 XMTR	47
HT32	299		*accepted in*	VF1 VFO	19
HT32B	389	$	$	HG10 VFO	34
VALIANT	209		*trade. Write*	QF1 Q MULT	9
RANGER	129	$	$	HW20 2 MTR	179
ADVENTURER	29		TRIGGER *for*	HM10A GDO&COILS	34
CHALLANGER	79	$	$	CENT B SLICER	69
500	395		UNSURPASSED	KNIGHT T50	27
6N2	99	$	$	KNIGHT T60	39
THUNDERBOLDT	279		*trade-in*	V44 VFO	27
122 VFO	29	$	$	KNIGHT VTVM	29
6N2 VFO	39		*allowance.*	AMECO TX86W	47
MOBILE VFO	19	$	$ $ $ $ $	EICO 723	34
HQ100C	109			EICO 666	49
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NC88	67			TRIPLETT 3414	72

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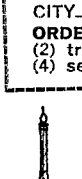

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(*Continued from page 166*)

WA6JMQ 60- 15- 4-AB

Santa Barbara

WA6UPX 180- 36- 5-B
WN6HXO 78- 28- 3-B

WEST GULF DIVISION

Northern Texas

K5IVB 240- 80- 3-A
WA5IZN 48- 24- 2-AB
WA5FYF 15- 15- 1-A

Oklahoma

W5WAX/5 371- 53- 7-AB
W5HUJ 78- 39- 2-AB
W5PZ 68- 17- 4-B
W5LOW 48- 16- 3-AB
K5VOZ/5 (9 oprs.)
152- 38- 4-AB

Southern Texas

WA5FJN 96- 48- 2-A
WA5AUA 66- 33- 2-AB

CANADIAN DIVISION

Ontario

VE3EWZ 1074-179- 6-AB
VE3BNW[5] 635-127- 5-B
VE3DSE 524-131- 4-B
VE3BGA 287- 41- 7-AB
VE3RN 118- 59- 2-B
VE3DNR 88- 44- 2-B
VE3AQG 76- 38- 2-B
VE3FOL 74- 37- 2-B
VE3AAH 66- 33- 2-B
VE3CIT 39- 13- 3-AB
VE3DTV 29- 29- 1-B
VE3FJS/3 (9 oprs.)
1547 119-13-AB
VE3ZZZ (VE3s AGW BQN)
1040-104-10-AB
VE3DFB-3 (VE3s DFB FNV) 530-106- 5-B
VE3VM (5 oprs.)
140- 70- 2-B

Quebec

VE2BMQ 112- 26- 4-BD
VE2N1 (10 oprs.)
1343- 76-17-ABD

World Above

(*Continued from page 98*)

long for tropo and quite short for M/S work, and there is no activity on 144 Mc. on the entire path for the boys to observe openings (?).

K7RKH and K7ZOK are both going AFSK on two and six meters; K7DRV is rebuilding his two meter gear for better coverage and has installed a tower and antenna array for tracking Oscar III. Al, K1ICW, also reports the first Nevada (K7ICW) to Arizona (K7RKH/7) QSO on 220 Mc. on September 7. Al was running 500 watts input to a 4X250B screen modulated into a single horizontally polarized Yagi (11 elements). K7RKH/7 was running a 6360 P.A. with some troubles. Al sez: "As a side note, I managed a QSO with him on 6, 2 and 220 Mc. Many of the southern Nevada v.h.f. gang were able to make their first Arizona contact this way. Arizona is the most difficult state to work from here on v.h.f. as the nearest activity is 200 miles over horrible mountains."

T.V. is once again on the move with K3ADS/3 now building a rig at Lebanon, Pennsylvania. Visual frequency is 445.25 Mc. and audio at 449.75 Mc. Anyone within viewing distance of Lebanon can get in touch with Larry by writing him at 2058 Cornwall Rd. Lebanon, Pennsylvania. Antenna is 400' above average terrain; power is 40 watts, visual-4 watts, aural. WA4STJ in Hollywood, Florida has received permission to use a kw. on 420 Mc. and hopes to soon build equipment for 900 watts s.s.b. on that band. Jim sez hed' like to hear from other fellows who "have gone this route". WA4EVQ sez he's still looking for an MA-4060A power varactor for his 432 Mc. tripler.

At Detroit W8WNX sez the band (?) had good tropo openings on September 3, 4, 7 and 8 when signal levels from W8DQU and K8ZES were S9. Larry sez he worked the first VE3 that has been active on 432 in years, VE3EMT at London, Ontario. What about Rae, VE3BPR? W1BU worked him several months ago on 432 Mc. QST

[1]K3YGC, opr. [2]WA9CYG, opr. [3]K8UDJ, opr. [4]K6KOP, opr., [5]VE3DFZ, opr.

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VALUES OF THE MONTH

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The Carborundum "Ham Load" is supplied as a single unit with standard coax connector for easy mounting on rack or cabinet, or for designing into home-brew equipment. Although small in size, the high-temperature ceramic resistance element *dissipates up to 250 watts* ***output*** for 5 minutes! Unlike bulbs or wire-wound resistors, SWR remains essentially flat at less than 1.5:1 up to 54 Mc (with the load mounted at least 5" from metal *reflecting surfaces*).

SPECIFICATIONS

Resistance: 50 ohms, non-inductive. **SWR:** Less than 1.5 at 54 Mc. **Dissipation:** 250 watts (up to 5 minutes); 150 watts continuous. **Connector:** Standard coax (SO-239 type). **Size:** Approximately 13½" long by 1" diameter. **Mounting:** Any convenient location. **Caution:** Due to heating when loaded at high power, the unit should be mounted in freely circulating air.

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IT is with deep regret that we record the passing of these Amateurs:

W1BZ, John P. Moses, Brewster, Mass.
WA1CAV, John J. Keane, Danvers, Mass.
W1ED, Alfred J. Carver, Turner, Maine
W1FS, George Donnelly, Meriden, Conn.
W1NC, Philip L. Warren, Cambridge, Mass.
W1QLA, James DeVita, Watertown, Mass.
W1VSE, Merwin Richardson, New Britain, Conn.
K1VVJ, Eve Rogers, Orange, Mass.
W2EDP, George A. Slaughter, Springfield Gardens, L. I., N. Y.
W2FWG, Robert Dixon, Amityville, L. I., N. Y.
W2JDY, George R. Ricard, Somerville, N. J.
W2SIP, Philip C. Swierczak, Pennsauken, N. J.
K3JUA, Leonard Eagan, Baltimore, Md.
W3ZSM, J. Carl Rosenberg, Baltimore, Md.
W3AEH, Ira G. Boswell, Graham, N. C.
K4BND, Charles Long, Arlington, Va.
K4BZ, Elywin E. Young, Pompano Beach, Fla.
K4ECJ, William E. "Wimpy" Turner, Happy, Ky.
WA4FRJ, Millard A. MacConnel, Venice, Fla.
W4HJM, William C. Steen, Salisbury, N. C.
WA4HZX, Tom Anderson, Dublin, Ga.
W4KAN, C. Ralph Beamon, Norfolk, Va.
WA4KJW/VP9, Lowell W. Belter, Columbia, S. C.
K4LHM, Manual Depaula, Opa Locka, Fla.
WA4OKK, Eugene Yoakum, Alexandria, Va.
W4UK, Lynn V. McMoran, Greenville, N. C.
K4VDA, Howard V. Riley, Roanoke, Va.
W5FEY, Harry Budden, El Paso, Tex.
Ex 5IP, Porter T. Bennett, Dallas, Tex.
W5PRT, J.O. Jones, Falfurrias, Tex.
K6BJ, John L. Reinartz, Aptos, Calif.
K6BMR, Stephen E. Washington, Bakersfield, Calif.
WB6DZK, Ted Hunt, Santa Barbara, Calif.
W6GDB, Paul E. Tibbetts, Lemon Grove, Calif.
WN6JHM, Karen E. Van Brunt, Altadena, Calif.
W6JMG, Stanley G. Guenther, Santa Ana, Calif.
W6KEB, Ivan Cook, Long Beach, Calif.
WA6KHI, Charles E. Dalton, Maywood, Calif.
W6KYM, James M. Thorburn, Newport Beach, Calif.
K6PZM, Joseph Chernus, Los Angeles, Calif.
WA6SFJ, Scipio J. Spann, Compton, Calif.
W6ULF, William E. Smith, Healdsburg, Calif.
W6WL, Antone J. Fischer, Long Beach, Calif.
W7AGT, Anna L. Peckham, Yakima, Wash.
W7JH, Henry L. Jones, Seattle, Wash.
K7MSL, Harold Carlson, Carpenter, Wyoming
W7OA, Harry L. Bergey, Boise, Idaho
K8ANX, Albert C. Meyers, Columbus, Ohio.
W8IJ, Francis R. Gibb, Columbus, Ohio
W8RYF, Floyd C. Paulisse, Grand Rapids, Mich.
K8ZLH, Clair W. Palmer, Niles, Mich.
K9AQW, John V. Wright, Princeton, Ill.
Ex 9BB, Harold J. Buckley, Chicago, Ill.
W9HZB, Elmer V. Minniear, Garrett, Ind.
WA9LJA, Robert Allen, Rockford, Ill.
W9NIU, Robert M. Nicholson, Tonica, Ill.
W9QLH, Blanche G. Edwards, Godfrey, Ill.
K9TWD, Richard V. Fraim, Evansville, Ind.
W9UJK, Kenneth F. Triggs, Huntington, Indiana
KØEIV, Emil Chotena, Ord, Nebraska
KØOOA, Andrew Bahlay, Denver, Colo.
G2FM, Fred McMurray, Worcester Park, Surrey, England
KH6FIR, Richard F. Noble, Kailua, Hawaii.
VE3BOD, B. Nelson Brunton, Ottawa, Ont., Canada
VE3SI, Lorenzo Richard "Doc" Thompson, Toronto, Ont., Canada

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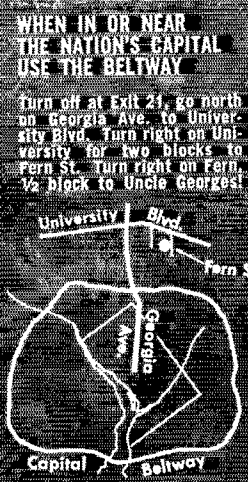

(Continued from page 118)

294 W4SKO W8PUD

293 W3ECR W8BKP PZ1AX ZS6Q

292 PY4CB

291 W1JFG W3MAC

290 W2PTE W3WGH K4HEF

289 W1CLX

288 W2RGV

287 PAØHBO

286 W4EEE SM5LL YV5AB

285 W5IYU K9KYF DL9OH

284 K1LXG DL7BA GI3IVJ

283 WØGKL

282 WA2IZS W4OM ON4RC PAØFX

281 W7HIA W9ILW

280 W1OOS W1ZW W2BQM W4TDW W9LNM YV5AJK

279 K9LUI MP4BBW YV5AFF

278 W6BAF W8ZET

276 W8QJR

275 W5MMK

274 W1ADM W1PST W2VCZ K6EVR W9EXY DJ2BW LA5HE

273 WØSYK

272 W7ADS WØBMQ

271 W1UOP

270 W1FZ W4AZD W4PAA K6LGF W8NGO K9ECE CX2AX

269 W4SSU WØTJ

268 K2MGE WA6EYP W6MBD W8JBI G3NUG IICTE

267 W2CKY WØMLY

266 K5MDX

265 W1HX W1ORV TG9AD ZP5ET ZS1DO

264 CR6BX

263 W4HA W9HB

262 K2BZT W5KC W9SFR IIUA

261 W1GKK W1WDD K4AJ W5LZW W9BEK LA7Y ZS6FN

260 W1JYH W2TVR K5JEA W8WT W9UZC

G3FNN YV5AXQ YV5EC

259 W6HYG W9NZM EA7ID ON4DH

258 W3CGS IISM

257 K4HYL VE2WW G3AIZ ON4SZ

256 W1YDO W4RLS

255 W2GNQ YV5AQC

254 W4JGO W8CLR WØPGI YV5AIP

253 W4CWV W6RCD W6YMV W8YBZ

252 W2BOK W9JYJ DL3RK

251 W1BIH W4MS W4UWC W8BGU W8BRA W8END K8LSG K8ONV K9PPX WØNFA F8PI G6LX IIRIF

250 W1ICV W6NJU K8NZD CT1PK LA8LF YS1O

249 W2PTM KØRAL IIKDB

248 W1FPH W4NJF

247 K2JGG DL3DW

246 W4CFD

YV5AKP ZS6UR

245 W3FWD W7DLR

244 WA2ELS W7ZAS

243 W5KFT W6QOG G3AAE

242 WØCVU

241 PAØSNG

240 W4ZRZ W5TIZ K6VVA

237 W5ASG W6CHV W8ONA DL1FK F3DJ IICQD

236 W5HJA G3HDA SM5WJ

235 W9LTR

234 YV5BBU

233 W4DCR W4VZU DL1KB PAØZD

232 W2QKJ WA2RAU CX3AA DJ3VM G4CP

231 K2CNX K2JFV W3VSU W6ZJY PY1NC

230 W4BYU W4NYN W6BSY W8CUO W8IJZ DJ3CP HK3LX

229 K1JMV WØBFB WØQGI

228 W3AYD W3YZI PY7YS

226 W2GBC W7CMO VE2YU

225 W4GRP W4RBZ W5ARY

224 W9YFV

223 W2SUC W2WMG W4DLG

222 W3BVL OY7ML

221 W1LHZ K1SHN W2FGD

240 K4WHD W5GXP VE1WL HBØKU

220 WA2EOQ W2HMJ W4FPS W4PJG W5ERY W8ALJ W8SZS W9HP W9PQA W9ZSZ KØMNO LA5YE YV5ANQ ZL1PV

219 WØCPM

218 W3DJZ

217 K4ASU

216 K5QWZ W6CYI W9JLH VE4XO IIRB SP9FR

215 W8NXF IT1TAI KP4CK

214 W1MMV W4EEU K8OHG VE3ES DL3EA

213 KØTJW YV5BQF

212 K6ERV OZ3Y 9M2DQ

211 W2YTH K4BVQ W9GMY WØMCX JA1DM VK2DI XE1CV

210 W1HJB W2ODO W6TZD K8PUU G3BID OE1FF TI2PI VK2JZ YV5AQS

209 W2LKW W8HBI

208 W4EEO W5PWW W6TXL DL9OV

207 W4HUE VE2NV EA4CX UR2AR

205 W2CYX W2QWS W9ECQ WØGAA ZP5EC

204 W2GT W2JIL WA4ACA YV5BFT

203 W3RUT W8EKW K9COS

202 W4SHP W7BTH DL3BK EA7GF PY1AGP

201 W1FAB W1UMC W2TQR W4BBL W5JCY K6CYG KØUKN CR6CA F2MO G3NUY IIBAF SM5RY XE1HHT

200 W1ETF W2CPI W2DEC W2HXG W3ICQ W3OBD

211 W3QMG W5LBI W6KLC W8ACT W8WC KØMAS VE1PQ EA1GH F8SK KP4CL PJ2AF XE1SN ZL4BO

199 W1WQC K6EXO W8NVP WØLIL WØQLX

197 W1DGJ WA6NWZ

196 W1GOX W8QNW HB9FE ZK1BS

195 W2JLH DL7HU

194 W1HR

193 DL7AA SM3AZI

192 W1AUR W2EOH VE2WY

191 W7AUS W9FVU WØLBB CX3BH YV2CJ ZS6BBP

190 W2SNI K6ENX VE3CIO DL6PC DL7AB IIZCT SP7HX UA2AO

189 W2AEB K2TAP W5INL OA4PD

188 W1BHP SM7ACB

187 WØMAF

186 W1JXM W8WZ

185 W2CZF

(Continued on page 174)

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Address_____
City_____ State_____

(Continued from page 172)

184
W1DBM W3VKD W4HKJ W4JDR HCWN

183
W2GHK K3DNU W6USG K9EMG VE5JV HK4EB ZS4F

182
W3HCO K4LPW W5RDA W8JXY HRC OQ9PD

181
WA2HOK W3LPF CE3WN EA4GZ SM5DW

180
W1VAN W3EVW K3TOQ W4NI W5QVE W7QPK W8MXS VE3MR EP2AG HZLW SM5BPJ

179
K1UDP W2LEC WA6FPB W7BPS W8GLK G4JW HB9EU XE1IL

178
WB2CNA W5DVV G3HCU

177
W9HPS ZS5PG

176
W1RO W4PRP W9IVG G3WW

175
W2ZTV

174
W4RVL W9JUV W0MRJ DJ5LA

173
K1DPI W5CE G2MI HZPB

172
W2GKZ K4HRG SP8CK

171
W1BPM K1IDW W3BSC W4AVY W9GAI VE3BKL

VE3BTI

170
K1JNE W1KID W1WKO K2OEA K2POA K2UTC W4BXG K5YYI W8EVZ W0JWL W0PMU K0RDO HASO HTBU KG4AO PY7EC

169
W5DA DL1PM DJ5CU SP9KJ

168
W1SGA W5IPH W8GUZ

167
W8LAV

166
K1ANV W1FQA W4HIO W6KTE WA6TGY DL5AO DJ0IK

165
WA6MAZ HSCA HZFT

164
WA6DET W7AHX SM5VS ZL3AB

163
W5CME W6SIA W8AJH W0ANF JA2JW

162
K4OEI W7DQM W0DIB

161
W4LVV W5DNL WA6LDV K0KKN CX2CN DL3AA DJ3OJ EA3GI HBPW HVS

160
K1BDP W2MOF

W3QIR W4LLV W0GUV W0YYS

159
W2BRV K4DSV W5EJT W9WIO VK5QR

158
VO1DX DJ8CB

157
VE2BCT ZS6AMV

156
W1CUX K8DYX K0JJR DJ2KS HKDZ XE1AE

155
W2NQR K5DFZ VE3CBY

154
W1AMO HK3AFB

153
W1MQV K1SEO W3SW W6WX W9UMJ DL9CT SP9RF

152
K4TWF W4YQB K6CQM WA6SBO VE2AFC CN8EU CX2AY DL3NE

151
W2OWL W8PNS W0SFU F8SC ON4AR VP6WD

150
W1PNR W2GRY K2KGS W2MM W4ZKM W5AJY W5HZH W6KUT W6LDA W9RKJ K0TRG VE1OC VE3PV CT1HF DL3VZ HBXK LA5LG LU1DJU OA4KY OE1PC YV3DV

149
W8CUT W8JFD VE7HJ DL1BS HAIJ

148
W6WNN DL4FX

147
W8TTN ZS6WS

146
WA2VOH W0UIM VE3RE DJ5VQ KC6BK IT1SMO SM5MC ZS6YQ

145
K0WKE CR7LU

144
W4BFR W4BWR HBDV

143
W6DAX VE3CJ F8WE GD3ENK PY2QT YV5BIG

142
W1VRR K5GOT W8BDP W9LAA CR6AU HSF OK1MP PY3AHJ YV5BS

141
W1JSK W2JAE VE3DGX EP3RO

140
W1AJV W1MZB W1OHA W1VFK W2FXA W2ZVS W3UMU W5NXF K6HZP K6OHJ K6YK W8WUQ W9JFJ K0OYQ VE3RO EA2FE HB9RB LA3SG TG9AZ

139
W2PEV OZ7BG

138
VE1ADE CX5AF KG6ALD

137
WA2TAG W6EPZ IT1ZDA

136
K6AYO EA8CR FG7XL

135
K1INO W6PHN W8FAW W0WMA

134
W0ZVM CR7CR F2FO OX3JV PA0LOU

133
K9ALP W9QYH DL1JW ZL1AAS

132
W2BZN K4PXY W6NGA W7AQB W9DWQ

131
WA2WDV W4BQY W4PLL W7PRY K9ZEQ DL2OX HTMG LA1MB LA8LG YV5EF

130
W1AW W1HZE K3BNS K3BMS K4SBH K4WIS W5LDH W9GPI W0YZQ VE6AAV GW3NWV

129
W6TGB W8TOZ W9WKU DJ2MM F2KC HC2JT ZS4LX

128
K1OOJ K2IQP W3GRS W7UMJ IT1GAI

127
W8AMZ K9LIX K0IFL 5R8CM

126
K1GHT K2YIY W5NTL G3ABG HIYI

125
W1FJJ W2MZB W3MYE W3QZT W4IKL K6UXV W8CIQ W8ZDF W9SRJ VE3CTX DL5QB DL7FT HLCF OZ8EA SM7BHF

124
WB2FSW K0LFY OA4OS PA0UC TN8AA ZL3NS

123
W2RWE K5RWB W6DFR W6PAL W9PVA VE2BCK DJ2UU DJ4OP HCAO

TG9US

122
K1PVG W4TFL/1 WA5AKH K6SOK

121
W1YQF W0EXU W0PNQ

120
W1BAB W9RDI K1IMP W1QCO K1RTB W1VRK WA2FQG W2HC W2PDB K2RAP K3MNW K4FTY W5EGS K5SGJ W6NAT K8GOP W9DNE K9JJS K9TRP K9VRV/4 W0AGX CO8RA G3KLL HLX LU8BAJ VS6EK YU3OV 9Q5AB

119
K1IMD W5NW KL7MF W9NLJ W0OGW VE3DDX HR3HH JA1BK TL8AC UL7JA VU2PP ZD2CKH

118
W1OJR W2ELW WA2WPP W9PBY DL1AR HCID HZQ ON4UN OQ5IE PA0PRF YV5AMW ZL2UW

117
W4AXE K4DRO W4YSY DJ7AA

116
W1NTH K4UAS SM6RS XE1EK

115
W3ZQ DL5HI HL K4VOF PY7JL

114
W2EVV WA2IEK

113
W1KJB WA2JBV K3GKU W0EXU W0PNQ

112
W3NM W3TEC W4UF W6OHU W8GG W9RH W0OBJ HB9X HTM ZC4FR

111
K8AJK W9RDI W9YT VE3BSJ G3DOG HB9BR KR6QB

110
K1DMG K1LWI K2IDF K3BFH WA4LYQ W4NDE W4RKN W6BYB KH6BXU W9PAO K0PIE VE3AGC CR7IT DJ4TZ HA9OZ OA1W VS1GC 9K2AP

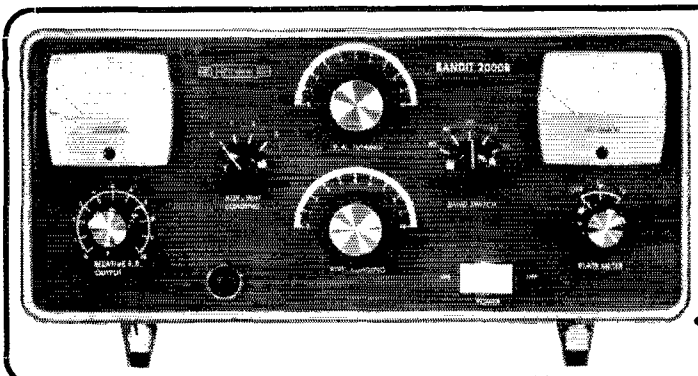
109
W5LGG W5NW KL7MF W9NLJ W0OGW VE3DDX HR3HH JA1BK TL8AC UL7JA VU2PP ZD2CKH

108
F7DB G3NMH TG7GZ 9G1DY

107
W2RHX WA2UHV W6LCK W9WFS W0QUU DJ3LT DJ8EG HZ1AB ZL1ARY

106
K1IGO K3IVI W4TUC K4VOF WA6KNE W7QPL W9ADV W9JJC VE3EG

(Continued on page 176)



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(Continued from page 174)

G3PTN	**104**	K4LYG/7	K9RNQ	W5EDX	W1LTY	W6TZN
G3PZO	K1N1Y	W8MNQ	DL9BS	K5SGK	W1NLU	W7MKI
I1DFD	W2AGO	W9TKW	EA4GR	WA6ESB	K1QJT	WA8AJI
PY7AEG	W2GRS	W8CAU/-	G3OGE	W6KG	W1SIK	W8EEP
YV5ALC	W4HVU	CN8	I1SPK	K6RFU	WA2IWH	W8FGS
ZS1TZ	K6KCI	DJ2VZ	JA1GV	KH6BIH	W2RIR	K8WOT
	W6LV	DJ6QB	PAØHSJ	K7HJN	WA2MXW	W8YCP
105	G3HQT	DL8DX	TI2WD	KL7BJC	WA2QNW	WA9ENB
W4AQT	KR6HL	F2JT	UW3BV	W8PNC	K3HHY	KØWEM
K4PQV	PAØKF	I1ALM	YO2BN	W8VBJ	K3PDC	VE2AMP
W5WLD	YV5ED	JA1AAT	ZS6AKI	K9DQO	K4ACJ	VE2ANK
K6AHV		KX6AE		K9ICI	W4ELB	VE1OX
K6RSY		OA4AV		KØWEN	W4FZO	CN8AW
K7CHT	**103**	TG9SC	**101**	F9HM	WA4KLT	CR6DU
K8ZPK	W1JSQ	XE2WH	W1EZL	DJ2WN	K4LPR	DL4BT
G3SDN	K1OLT	YV5AHG	W1TZ	OZ4IP	W4MVB	F9DX
I1AHN	W1RFE		WB2CCO	SP5HS	K4RHL	I1ANY
I1AKI	K2ISP		K2MPS	VP7CX	W4RZN	JA9CQ
I1NE	K2JJK	**102**	W2QNE	XE1AZ	WA5EFL	KZ5US
OA4GG	K2YLM	K1MCL	WA2RNM	XE1CE	K5IIX	PAØWR
UA1MU	K4CAH	K2DQI	W2ZDP	YO7DZ	K5OPT	PZ1BE
VR1G	K6GHU	W2JSX	W4JRW	YV1EE	K6EDA	ST2AR
ZS6QW	W6YIN	W6IEG	W4MRH		WA6MWG	YU6CB
9G1EE	W4UAF/-	W6REH	W4NKO	**100**	W6TSH	YV1EL
9G1EX	KH6	W6ZKM	K5ODC/4	K1LBR		

Transistor Keyer/Muter

(Continued from page 16)

is muted. As the key opens, the reverse takes place.

Adjustment

Three different p-n-p transistors were on hand, and all three worked well. The base current in each had to be different because each transistor had different electrical characteristics. The current-limiting resistance required varied from 70K to 1.1 megohm for the three transistors. I finally used the 2N591 because it is readily available, has a break-down voltage between collector and emitter of 32 (the muting voltage is 22), and it costs 58 cents. The base current is 0.2 ma. with 700K resistance in the base.

The base current to give nearly full conduction across the transistor is found by varying the series resistor and using the receiver S meter as the indicator. On a steady signal, the S meter should drop just perceptibly when the switch is turned from operate to stand-by, which means that the transistor conductivity is just short of full value. No difference in signal-to-noise ratio is discernible. If the base current is higher than this level, there will be an objectionable click in the headphones or speaker as the key opens. At the level of current suggested above, there is absolute silence in the speaker between make and break except, of course, for the monitoring sidetone.

There is one other consideration in determining the proper limiting resistor. In my previous article, I showed how to get rid of the idling current while the VOX relay remains closed when working break-in. The bias voltage is raised to eliminate the idling current in the final which causes the hash in the receiver. This higher bias voltage is also found at the key-jack terminals. Since this is the voltage that is used to bias the transistor base, it follows that the base resistor should be chosen with the exciter bias set for c.w. break-in. Once this resistor is selected, the transistor and resistor may be soldered to a terminal strip and

(Continued on page 178)

(Continued from page 176)

mounted in any convenient place. No shielding is required.

With this modification, the receiver stand-by switch is used in the stand-by position for c.w. reception only. If the transmitter bias is reset for s.s.b. operation,[1] the receiver stand-by switch should be used in the normal operate position. The stand-by switch should also be turned to the operate position for c.w. reception if the transmitter exciter is not turned on; otherwise, the receiver will be muted.

For the benefit of those who use 30L-1 linears, I might mention that the antenna-relay control of this amplifier normally places cutoff bias on the amplifier tubes during standby periods. Since break-in operation requires the amplifier to be in operating condition at all times, the tubes do not have a chance to cool down during receiving periods. To offset this, I have followed a suggestion given to me by W5IQH. A 220-ohm ½-watt resistor is connected across a phone plug and, this plug is inserted in the antenna-relay jack (J_3) of the 30L-1. This increases the fixed bias on the 811As and reduces the idling current to zero. With this connection, the tubes run much cooler in break-in operation. The original plug from the exciter should replace the resistor plug for s.s.b. operation.

Developing this system has been most interesting and rewarding to the author. I have found that the transistor in this application is a de luxe switching device with none of the disadvantages of the mechanical relay. I have learned much about the workings of both the receiver and the exciter, as well as how to put a transistor to good use. The subject matter is basic and is presented purposely in rather elementary form in the hope that it may stimulate some of the readers into a further understanding of their own equipment and extend the usefulness of their rigs. The ideas are entirely suitable to other equipment than that mentioned in the article. I hope to meet you on c.w. break-in soon. QST

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Crystal V.F.O.

(Continued from page 70)

conductor exposed at the open end. Set the crystal switches to the frequencies indicated above each oscillator tank circuit in Fig. 1. Bring the probe from the receiver close to the output coil of each oscillator in turn, tuning the receiver to the specified frequency, and adjusting the oscillator coil for maximum response on the S meter.

Move the probe to a point close to the grid of the 6AN8A pentode. Adjust L_3 and L_4 for maximum response at 12,346 kc. Move the probe to Pin 7 of V_5, and adjust L_8 for maximum response at the same frequency.

Move the probe to the grid of the 6CL6, and adjust L_{11} and L_{12} for maximum response at 3755 kc. Now watch the output meter while C_2 is adjusted for maximum deflection.

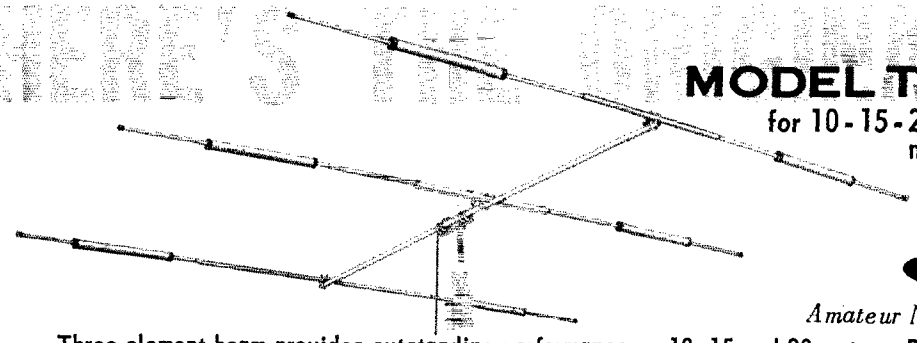
After maximum output has been obtained on 3755 kc., the crystal switches should all be turned alternately fully counterclockwise and fully clockwise while the output level is checked for uniformity. By juggling coil adjustments, particularly of L_{11} and L_{12}, it should be possible to come up with reasonably uniform response across the 3500-4000-kc. band, although C_2 will have to be peaked up at intervals across the band.

In operation, the unit is switched until a signal appears in the receiver passband; then the frequency is zeroed in with the interpolating capacitor. With a little practice it is possible to do this almost as fast as one can zero a conventional v.f.o. Setting to zero beat is a real pleasure, since 180 degrees shaft rotation corresponds to a frequency change of little over 1 kc. on 80 meters.

A thorough test of the frequency stability of this unit has not been made, nor is it contemplated, since it would be a monumental job, using the equipment at hand. On the few frequencies where the v.f.o. signal could be set to beat against the author's frequency standard in the receiver, the beat has stayed within 10 c.p.s. on 80 meters for an hour (both oscillators hot). Clearly, it is questionable which oscillator was drifting, to what extent, and in which direction. We conclude only that the stability is excellent, approaching that of a good single-crystal oscillator. QST

Feedback

In the 432-Mc. converter described by WA9HUV in October, 1964, *QST*, C3 is shown improperly connected. It should be from the left end of L_4 to ground, rather than from the plate of V_2 to ground. In other words, this stage should look like the other two on either side of it. Thanks to WA2WEJ for bringing this to our attention.



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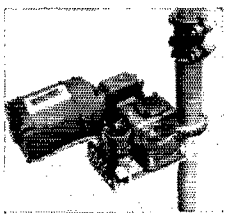

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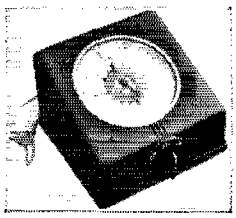

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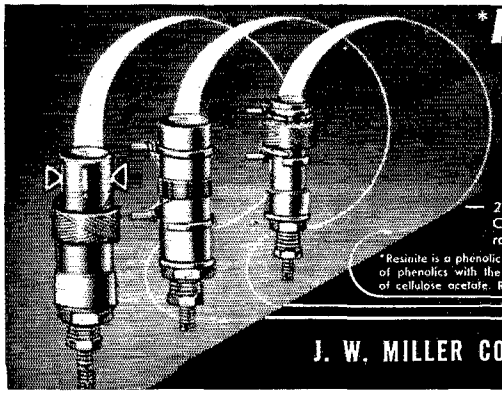

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Hints and Kinks

(*Continued from page 71*)

USING V.H.F. CONVERTERS WITH THE COLLINS S/LINE RECEIVERS

CONTINUOUS frequency coverage can be obtained with the Collins S/Line, to provide whatever tuning range a v.h.f. operator desires. This is done by using suitable crystals, which can be supplied by the manufacturer, in the receiver. This possibility is implied in the instruction manual, which lists all the crystals needed to give coverage of any frequency from 2 to 30 Mc.

What is not too generally known, however, is that the number of crystals one can substitute is limited only by the number of sockets in the crystal board in the receiver. The impression is conveyed that crystals for the 14-Mc. range, for example, can be used only in the "C" or 14-Mc.-range sockets. Actually, the 21- and 29-Mc. positions can be used for crystals that extend the 14-Mc. range. At W1HDQ, we use the three crystals supplied with a 75S-3 to cover 14.0 to 14.2, 14.2 to 14.4, and 14.8 to 15 Mc. Then we obtained the 8777.5-kc. crystal for 14.4 to 14.6 Mc., the 8877.5-kc. for 14.6 to 14.8 Mc., the 9077.5-kc. for 15.0 to 15.2 Mc., and the 9177.5-kc. for 15.2 to 15.4 Mc.

The instruction book states ". . . crystals for the extended 10-meter coverage must be plugged into the sockets marked E." This is true, if the calibration of the PRESELECTOR control is to be retained, but the receiver works just as well with extended-frequency-range crystals inserted in any convenient socket. We removed the three 21-Mc.-range crystals (Range D) and the first of the 28-Mc. one (Range E) and substituted the crystals listed above. On Range D, the preselector control now peaks around 7 Mc., indicated, and the Range-E position peaks around 4 Mc., indicated.

There can be no "wrong" peak; merely rotate the PRESELECTOR control quickly for maximum noise, regardless of where it appears on the dial, and you're all set for high-accuracy reception with exactly the same performance as would be available if you took the trouble to rig up some sort of external crystal-switching arrangement connecting into the customary C range. We Scotch-taped the crystals for 21 and 28 Mc. to the inside of the receiver cover, so that they can be plugged back in, should we want to use those bands in the normal way at any time. Small range tabs were taped over the numbers marked on the receiver band switch, so we know at a glance what part of a given v.h.f. band we're covering with our converters.

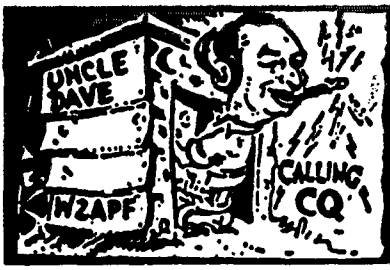
— *W1HDQ*

SILVER FOR U.H.F. LEADS

SILVER ribbon wire, suitable for u.h.f. and v.h.f. use, is available as "silver solder" in ribbon form from most large hardware or industrial supply stores for 30 or 40 cents a foot.

— *Dennis Reed, K7VGZ*

(*Continued on page 184*)



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3 EL. 15 METER BEAM	83.50
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4 EL TRI BAND BEAM (TELREX TBS416)	85.00
20 METER 5 EL. BEAM (TELREX 504A)	110.00
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5 EL. 6 METER MOSLEY BEAM	15.00
3 BAND 10-15-20 MOBILE WHIP	17.50
5 EL CH. 6 TV ANT. CAN BE CUT FOR 2 MTRS.	2.00
6 for	10.00
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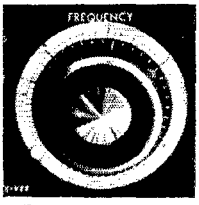

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(Continued from page 182)

COLOR CODING LEADS

THE eight wire leads in my beam antenna installation terminate at a small metal box mounted at the top of my antenna mast. All the wire leads are of one color, and a system of color code identification was made by employing an inexpensive package of assorted colored pipe cleaners. Short lengths of about one inch were simply bent around each strip lug, twisted tight, and then snipped off flush. The operation is fast, neat and practical. The colored pipe cleaners are usually stocked by five and dime stores.

— *William Staiger, W7IN*

MOBILE LOG DEVICE

I HAVE found one solution to the problem of keeping a log when operating mobile. The unit is a pilot's flight-plan log holder and has a curved bottom that fits snugly on the operator's leg. A leg strap is provided to make sure the log stays put! A clip at the top and bottom of the device holds the log sheets in place. The gadget holds 2 pencils and even has a built-in pencil sharpener. A night light powered by two small batteries is also included. My unit was manufactured by Jeppesen & Co., and probably can be purchased at aircraft supply houses or the local airport.

— *Alan R. Haywood, K6AUE*

CURING LOOSE COIL SLUGS

A loose slug in a coil form can be made to hold its adjustment if the threads are rubbed across a lump of beeswax or a candle. The wax causes the threads to bind, resulting in slug stability. This idea can only be applied to slugs that are seldom adjusted, since the wax will not remain in the threads for long if the slug is turned frequently.

— *Julian N. Jablin*

HIGH-VOLTAGE AUDIO LIMITER

THE article in July 1964 *QST*, "Ever Use An Audio Limiter?", mentions that "one-volt limiting may cut the volume too much for some ears."

My solution to this problem is to use a selenium rectifier in place of the silicon diode. Selenium rectifiers will provide approximately 10 to 12 volts peak-to peak of audio clipping. If this is too much audio for your ears, simply use a potentiometer on the output side of the limiter circuit and feed the phones from the potentiometer arm. The selenium rectifiers I used are the 200-p.i.v. 300-ma. TV-replacement type.

— *E. J. Epp, VE4SX*

RUBBER-BAND HEMOSTAT

WHEN I solder semiconductor diodes, transistors, or other items easily damaged by heat, I protect them from the heat by gripping the leads with long-nosed pliers which have a rubber band wrapped around the handles. The rubber band keeps the pliers gripping the wire tightly.

— *Sam Taylor, jr., W6RJC*

QST

25 Years Ago this month

December 1939

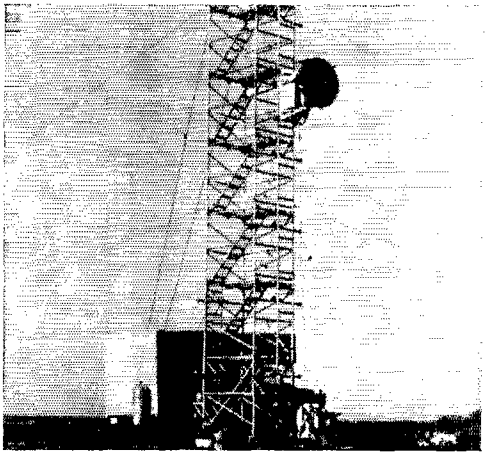
. . . The first installment of a UHF Department (now "The World Above 50 Mc.") appeared in this issue with the present *QST* V.H.F. Editor, Ed Tilton, W1HDQ, the contributing editor.

. . . Clint Desoto, W1CBD, reported on the proposed Byrd Antarctic expedition which was to use amateur radio for all personal traffic from the Antarctic ice.

. . . Technical articles included one on how to build a four-tube superheterodyne receiver by W1JPE (By Goodman, now W1DX). The receiver used a stage of regenerative 1600-kc. i.f. amplification for selectivity and image reduction. In the words of the author, "we had some doubt at first as to the degree of single-signal reception that could be obtained with regeneration at 1600 kc., but it surpassed our highest hopes. . . . . ." "A Homemade Exponential Horn" was the title of an article by E. E. Combs. It dealt with increasing the efficiency of small dynamic speakers. A midget 80-, 40-, or 20-meter transmitter that ran 5-watts output and was small enough to fit inside the area of a postcard was described by Fred Sutter, W8QBW. W1LJI's article on "Five Bands Without Changing Coils", gave information on single-control tuning to cover five bands.

. . . A report in the What The League Is Doing" column held forth little hope for the assignment of amateur calls on automobile license plates. It seems that the state of Michigan tried it for one year but found that the system resulted in widespread complaint from peace officers over difficulty of identification. QST

Strays



The Canadian government, in connection with microwave telephone system tests, has erected a series of 300-foot aluminum towers, which can be erected in less than eight hours. Well, that kind of elevation is nothing to pass up, and VE6AEK didn't. He's got his antennas up there, too, high above the microwave dish. At last report, Hugh was calculating requirements for a gamma match, and planned to load the tower as a vertical.

Happenings

(Continued from page 94)

ANOTHER TOWER VICTORY

Teamwork by the League's General Counsel, the amateur with the problems and his attorney, also an amateur, has resulted in another victory for hamdom, this one without actual trial. Leslie V. Burr, KØZEJ, was issued a summons by the Town of Grantwood Village two and a half years ago when he put up a 40-foot antenna tower. He retained Alfred A. Speer, WØBOA, who has worked closely with General Counsel Booth. The amateur took down the tower, made application for a building permit, was refused, appealed, attended a hearing, moved for a change in the ordinance, got this put through and then finally, in September, was granted a building permit.

The case is presented here, not because it establishes any new principles, but because it is typical of a majority which never go to court but which may be solved by careful teamwork on the local level with assistance from the League. See the editorial of *QST* for July, for further information on this general subject.

FEE INTERPRETATIONS

When an applicant modifies a license, as when moving back to his original call-area after an absence, and requests a former call under the provisions of Section 97.51, he has to pay the fee for modification, $2.00, in addition to the fee for special call signs, $20.00.

The same principle holds when an application for renewal or for a second-station license is filed with a request for a specific call: both the $4.00 and $20.00 fees must be sent.

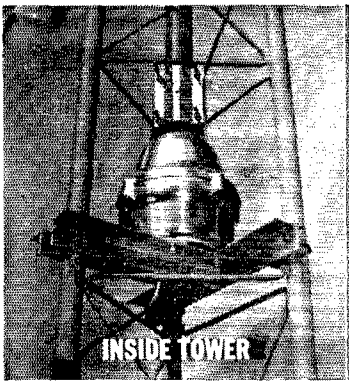
When an application for a station is filed by an amateur radio club located in a Veterans Administration Hospital, and it is shown that the club is operated at the expense of the Veterans Administration, the station will be considered the same as a station for recreation under military auspices, and no fees will be charged for its license applications under authority of Section 97.55 (b).

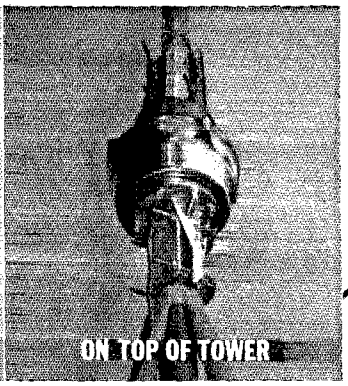
PHOTOCOPIES FOR FCC FILING PURPOSES

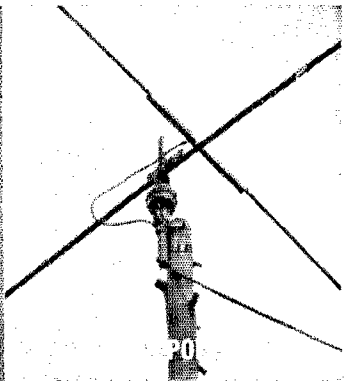
FCC no longer can return outdated or superceded licenses to amateurs after it has finished processing an application for renewal or modification of a license. Under its present system and using its present forms, the Commission requires the information on the license card to supplement that on the form 610.

However, the FCC will now accept a photocopy of the license from amateurs submitting applications for modification or renewal in lieu of the original. The photocopy is simply fastened to the form 610 in the space which says, "Attach your present license here." The new procedure is FCC recognition of many amateurs' desire to keep a complete file of license documents. QST

A 64-page cumulative index to *QST* is available for 25¢ postpaid, covering the years 1950–1963. Request your copy from ARRL Hq., 225 Main St., Newington, Conn.







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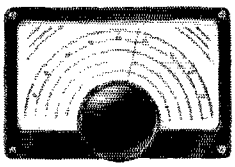

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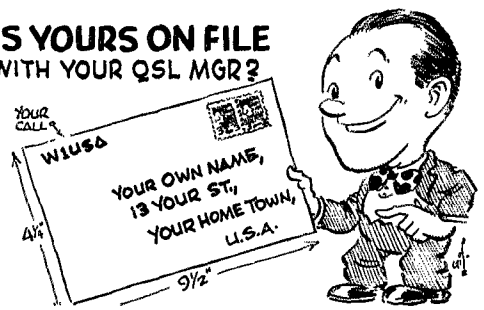
W1, K1, WA1 — G. L. DeGrenier, W1GKK, 109 Gallup St., North Adams, Mass. 01247.
W2, K2, WA2, WB2 — North Jersey DX Ass'n, P.O. Box 303, Bradley Beach, N. J. 07720.
W3, K3, WA3 — Jesse Bieberman, W3KT, P.O. Box 204, Chalfont, Pa. 18914.
W4, K4, WA4 — Thomas M. Moss, W4HYW, Box 20644, Municipal Airport Branch, Atlanta, Ga. 30320.
W5, K5, WA5 — H. L. Parrish Jr., W5PSB, P.O. Box 9915, El Paso, Texas 79989.
W6, K6, WA6, WB6 — San Diego DX Club, Box 6029, San Diego, Calif. 92106.
W7, K7, WA7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon 97301.
W8, K8, WA8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland, Ohio 44110.
W9, K9, WA9 — Ray P. Birren, W9MSG, Box 510, Elmhurst, Illinois 60128.
WØ, KØ, WAØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn. 55921.
VE1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N. S.
VE2 — John Ravenscroft, VE2NV, 135 Thorn Crest Ave., Dorval, Quebec.
VE3 — R. H. Buckley, VE3UW, 20 Almont Road, Downsview, Ont.
VE4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — Karel Tettelaar, VE6AAV, Sub. P.O. 55, N. Edmonton, Alberta.
VE7 — H. R. Hough, VE7HR, 1291 Simon Road, Victoria, B. C.
VE8 — George T. Kondo, VE8RX, % Dept. of Transport, P.O. Box 339, Fort Smith, N. W. T.
VO1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.
VO2 — Douglas B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
KP4 — Joseph Gonzalez, KP4YT, Box 1061, San Juan, P. R.
KH6 — John H. Oka, KH6DQ, P.O. Box 101, Aica, Oahu, Hawaii 96701
KL7 — Alaska QSL Bureau, Box 6226, Airport Annex, Anchorage, Alaska.
KZ5 — Ralph E. Harvey, KZ5RV, Box 407, Balboa, C. Z.

(Cards for SWLs may be handled via Leroy Waite, 39 Hanum St., Ballston Spa, N. Y.)



HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.
(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.
(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.
(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**
(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.
(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.
(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**
(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WE buy all types of tubes for cash, especially Eimacs, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TOROIDS: Uncased 88 Mhy, like new. Dollar each. Five/$4.00. P. O. DaPaul, 309 South Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel Kellogg 8-0500.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel NOrmandy 8-8262.

WANTED: All types of aircraft on ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX. Collins linear amplifier, Type 204; Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

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SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts: 617-598-2530 for the gear u want at the price u want to pay.

FOR Sale cheap: QST or CQ, any quantity. Send your list for quotation. Cash for call books before 1942. Want early radio gear and publications. Erv Rasmussen: Box 612, Redwood City, Calif.

WANT: R-391/URR receivers, parts, assemblies. Nick Thompson, 99 Water, Millinocket, Me.

CRYSTAL Bargains. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

COLLINS AM wired kit, $5.00. State model. KWM-2 2 Kc. independent receive control: $15.00. Kit Kraft, Box 763, Harlan, Ky.

SELL Or Swap: IBM Exec. typewriter, with or without IBM Contract, like brand new (cost $700). G. Dubbs, 741 Campus St., Uniondale, N.Y. 11553.

FOR Sale: Plate Transformers 3600-0-3600 VAC @ 1000 Ma. CCS, with 110 V and 220 V primaries, $35.00. One Year Guarantee. Peter W. Dahl Co., 5331 Oaklawn Ave., Minneapolis, Minn. 55424. Tel 922-7618.

WANTED For personal collection: Benwood Bakelite Rotary Gap; antique gear dating back to 1915 or earlier. Spot cash! WØZB, 4 Williamsburg, St. Louis 41, Mo.

QSLS? SWLS? Personalized made-to-order one-day service!! Largest variety samples 25¢. DeLuxe 35¢ (refunded). (Price misprint in my last ad, sry!) Sakkers, W8DED, Box 218, Holland, Mich. (Religious QSL samples 25¢.)

C. FRITZ, bringing hams greater QSL returns, over a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Illinois).

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSLS. Twenty exclusive designs in 3 colors. Rush $3.00 for 100 or $5.00 for 200 and get surprise of your life. 48-hour service. Satisfaction guaranteed. Constantine Press, Blandensburg, Md.

QSLS, SWLS, Gorgeous Rainbows! Top quality! Fast service! Low prices! Samples, 10¢, (refundable). Joe Harms, WA4FJE, (ex W1GET, W2JME), 905 Fernald, Edgewater, Fla. 32032

QSLS. Distinctive. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y.

QSLS. Samples 20¢. QSL Press, Box 281, Oak Park, Illinois, 60303.

QSLS "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

QSLS-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601.

QSLS "Frier" Harvard St. Schenectady, N.Y. 12304. Large "Clip and Design" Catalog with samples, 25¢.

DELUXE QLS. Petty, W2HAZ, Petty Printing Co., Inc., 1702 5th, Trenton, N.J. 08638. Samples, 10¢.

QSLS. Stamp and Call bring samples. Eddie Scott, W3CSX, Fairplay, Md.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXK, 1996 N. M.-18, Gladwin, Mich.

QSLS, SWLs. XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!), Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSLS-SWLS 3-colors, 100 $2.00. Samples dime. Bob Garra, 414 Mahoning St., Lehighton, Penna.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS, 100 for $3.00. 28 new drawings. Samples 10¢. Brigham, Colson St., North Billerica, Mass.

QSLS. Samples 10¢. Wildcat Press (W6CMN, Bill), 6707 Beck Ave., North Hollywood, Calif. 91606.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

QSLS. Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLS until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSLS, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS, SWLS. Gorgeous Rainbows, etc. Top quality, fast service! Low prices. Samples 10¢ (refundable). Joe Harms, WA4FJE, (ex/WIGET, W2JME), 905 Fernald, Edgewater, Fla. 32032.

ZIP Code Rubber Stamp, Call, name, address, with ink pad. $1.00. K4ISA, Perry, Box 8080, Allandale, Fla.

SUPERIOR QSLs, samples 10¢. Ham Specialities, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS, Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLS 300 for $4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy, 100, $4.50. Rutgers Vari-Typing Service. Free samples Thomas St., Riegele Ridge, Milford, N.J.

QSLS. Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Samples 15¢. Agens for Call-D-Cal decals. K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

½" Call QSLS $2.40/100, $2.90 (2 sides). Samples. Gariepy, 2624 Kromer, Ft. Wayne, Ind.

GREET Ham Friends with 3-D Personalized Christmas cards. Newest holiday idea. Brilliant, sparkling designs. Samples 10¢. 3-D QSL Co., Monson 2, Mass.

QSLS—100 3-color glossy, $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64114.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to Yarsco, Box 307, Yorktown Heights 1, N.Y.

CUSTOMIZED QSLS with your autographed photo. Dime brings sample. Pic-Ur-QSLs, Rice Lane, Baltimore, Maryland 21207.

RUBBER Stamps, 3-line, $1.00. Andrew Travis, 2002 West 8th, Austin, Texas. 78703.

RUBBER Stamps $1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

1965 Desk Calendars, your name, call, address, 3-$1.00. H. Morgan Printery, 443 Euclid, Akron, Ohio.

QSLS, $1.75 up. 1965 catalog-samples, 10¢. Longbrook, Box 393-W, Quakertown, N.J.

QSLS. Finest. Dime. Filmcrafters. Box 304, Martins Ferry, Ohio.

PICTURE OF yourself, home equipment, ec. on QSL cards made from your photograph. 250—$7.50 or 1000 $14.00 ppd. Samples free. Write to Picture Cards, 129 Copeland Ave., La Crosse, Wis. 54603.

QSLS, SWLS. 3 & 4 colors, 100. $2.00. Samples dime. W3UQL, Garra, Lehighton, Penna.

EXCLUSIVE QSLS. Price—Quality—Delivery. Samples, 10¢. K1NCZ Press, 535 Walpole St., Norwood, Mass. 02062.

QSLS. Samples, dime. Printer, Corwith, Iowa.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

HUNDRED QSLS: $1.00. Samples, dime. Meininger, Jesup, Iowa.

QUALITY QSLS. Get the best. Samples 10¢, 25¢, 50¢. Savory, 172 Roosevelt, Weymouth, Mass.

QSLS. Free samples. WA6QAY Press, 3363 Wicopee Place, San Diego, Calif. 92117.

CANADIANS! Selling Collins 32S-1 with 516F2 A.C. supply, $550.00. Will consider trade for other electronic gear W. Geber, Benson, Saskatchewan, Canada.

CANADIANS: Viking II with VFI-VFO, $175.00; SX-96, $180.00; HX-20, $250.00. All in exclnt condx. Sell or trade: Minshell electronic organ, needs some work $200.00. VE3FS, 1985 Arch St., Ottawa, Ont., Canada.

CANADIANS Or U.S.: DX-60 and VF1, $110; QF1, $10. Skylane quad, almost new, $40. VE2QV, Harrison, 926 Mollins Dr., Lancaster, N.B., Canada.

CANADIANS: Heath Cheyenne Comanche. Used two years. New tubes. VE2BQA, Schwartz, 4984 Circle Road, Montreal, Quebec P., Canada.

COLLINS 75A owners, tuning knob, 6 to 1 reduction, $7.00 postpaid. Wenglare, W4VOF, 1517 Rose St., Key West, Fla.

MUST Dispose: 82 copies Proceedings of the IRE, 3 vols. complete, 1926 to 1952. Real bargain for lot. Write for list. Mrs. Miriam Y. Knapp, W1ZIM, 191 Beechwood Road, West Hartford 7, Conn. Tel: 521-2055.

TUBES, Diodes, transistors wanted. High cash prices paid. Astral Electronics. Box 636, Elizabeth, N.J. Tel: 354-3141.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

RTTY Gear for sale. Write for list, 88 or 44 Mhy Toroids five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

304TL tubes wanted. Also other xmttg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 74 Willoughby St., Brooklyn 1, N.Y. 11201. Tel. UL-5-2615.

ELECTRONIC Tubes: Top brands sold at substantial savings! (Minimum order $15.00). Authorized G-E Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only—Commercial Quantities). Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016 212-MU 6-2834.

200V SSB, $545; HT-32, $225; AN/FRR-21 rcvr, 14-600 Kc., $175; SP-600JX-17, $425; Collins R-390, R-390A, R-391, R-388, 51J-3, 51J-4 general coverage receivers. Alltronics-Howard Co., P.O. Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

HAM Discount House. Latest amateur equipment. Factory sealed cartons. Send self-address stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

WANTED: For personal collection: QST May 1916 W1CUT, 18 Mohawk Dr., Unionville, Conn.

WANTED: Tubes, all types, write or phone W2ONV. Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel. GArfield Area code 201-471-2020.

"HOUSE Of Happy Hams!" Get our new or used gear for less with cash and no trade. Make us an offer or ask for ours H & H Electronic Supply, 506-510 Kishaukee St., Rockford, Illinois.

SELLING Out: Apache, $135.00; Mohawk, $135.00; Marauder (wired by Heath engineer) $250.00. All neat as a pin! Gordon L. Wright, K5EHX/W5IPA, 4515 Gloster, Dallas 19, Texas.

FOR Sale: All in perf. condx: Collins 75A-4, ser. 5394, and KWS-1 ser. 1245 vernier dials on both units: $1000. Pick-up deal only! Srv. no shpng. Madison L. Courtnay, Jr., W2MAT, 388 Howell Ave., Riverhead, L.I., N.Y. Tel: 516-PA7-2771.

TOROID RTTY Kit: Mark-Space/Discriminator and bandpass filters. Includes 4-88 mhy and 1-44 mhy uncased, like new toroids: info sheet, mounting hardware and six mylar capacitors $5.00 ppd. Toroids 88mhy less capacitors, $1.00 each. 5/$4.00 ppd. KCM Products, Box 88, Milwaukee, Wis. 53213.

NEW ENGLAND: Selling 300W AM/CW rig, in exclnt condx, extras, terrific appearance. TVI suppressed: $125.00. Operating at 40 Clarissa Rd., Chelmsford, Mass. Tel: AL-6-5902. K1UQC

WANTED: VRO-Matic, P&H Model 8010 for KWS-1. R. K. Palmer, K3MTW, Smethport, Penna.

WANTED: HRO-60 coil sets. WB2FIL RD 1, Box 315, Old Bridge, N.J.

HW-12-22-32 owners inexpensive Triband conversion. Complete plans, $4.00 postpaid. Plans, Box 17, West Bend, Wis.

WANTED: SX-88 42 36-A 37, A-1 condition. Leon Etheridge, 505½ Figueroa, Folsom, Calif.

NEED Replacement parts for BC-610 and model 28 printer. Furnish list and prices. WØBVA, 800 East Quincy, Pittsburg, Kans.

SELLING: Collins 75A3, $325; Ranger, $125.00. Excellent condition, manuals included. Write: William Bank, 2250 Fuller, Ann Arbor, Mich.

ATTENTION RTTY'ers Typewriter ribbon re-inking device, $3.00 postpaid. W7ARS, Walter, Walter E. Nettles & Companies, 8355 Tanque Verde Rd., Rte 2, Box 694R, Tucson, Ariz.

WASHINGTON Amateur Radio News. Free copy. Foundation for Amateur Radio, 2509—32nd St. S.E., Washington, D.C. 20020.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU, 118 S. Clinton, Chicago 6, Ill.

CASH For Callbooks. For private collection, U.S. Government Callbooks before 1927, Radio Amateur Callbook Magazine 1942 wanted. W8EF, 801 Lake Shore Road, Grosse Pointe 36, Mich.

COMPLETE Station, Apache, like new NC-55; NTS-3, original cartons: manuals, accessories. Everything in perf. condx. Best offer over $310. WA2MXR, Route 35, Manasquan, N.J.

SELLING Out: Collins 310B-1 xmtr/exctr, TVI suppressed, in perf. condx, crated. $145.00. Also: complete KW final, AM/SSB/CW featuring 4-400A, vacuum variable capacitor and rotary coil tuning, pi-network matches any antenna, bands 10-80, separate bias and screen supplies; 750 modulator; KW power supply components: scopes, and many other top units. Write for free list. S. A. Tucker, W2HLT, 51-10 Little Neck Pkwy, Little Neck, N.Y. 11362.

RANGER II: F/W mint condx, full factory warrantee card, $250.00. Collins 75S-3 with 3.1 Kc. mechanical filter in AM position, mint condx, $475.00. Prefer local pick-up deal. No trades, srv. P. G. Balko, Hillcrest Rd., New Canaan, Conn. W1KHW.

HUNTER Bandit 2000A linear amplifier, Ser. No. 439. Only eight months old and unused last 90 days. Has Hunter bias modification installed. In mint condx: $425.00. K4ZIF, Milt de Reyna, 4030 Hallmark Dr., Pensacola, Fla. Tel: 433-6552.

COLLINS 32V-2 complete with instruction manual. All new tubes including final. Better than 100 watts output on 80-15 c.w. and a.m. Can be used on SSB with external generator. Cabinet in exclnt condx. Will ship collect. Best reasonable offer. W1BGD, 111 Buena Vista Rd., West Hartford, Conn.

200V SSB, $545; HT-32, $225; AN/FRR-21 rcvr, 14-600 Kc., $175; SP-600JX-17, $425; Collins R-390, R-390A, R-391, R-388, 51J-3, 51J-4 general coverage receivers. Alltronics-Howard Co., P.O. Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

"HOSS-TRADER" Ed Moory offers Demonstrator Equipment with Factory Warranty: Cash & No Trade Deal: Galaxy III, $269.00; Galaxy V, $369.00; SB-33, $279.00; SB-ILA, $169.00; Swan 400 & VFO, $369.00; NCX-5, $489.00; NCL-2000, $439.00; Drake 2-B, $199.00; Bandit 2000-B, $429.00; SR-160, $239.00; HQ-170 AC-VHF, $329.00; TR-3, $409.00; Unbelievable Used Bargains: NC-300, $125.00; HT-37, $279.00; HT-32, $229.00; Gonset GSB-101 Linear, $139.00; Heath Warrior Linear, $159.00; DX-100, $69.00; Perfect Viking Valiant, $179.00; Ranger, $99.00; Almost New HT-32-A, $329.00; 2-B, $189.00; Factory Reconditioned KWS-1 & 75A-4 Serial 5234, $1085.00; New Hy-Gain TH-3 Beam, Ham-M Rotor, $159.00; 32S-3, $495.00; Ed Moory Wholesale Radio., Box 506 DeWitt, Arkansas. Phone WHitney 6-2820

SPEECH Booster and Compressor. Greater talk power, readability, range—mobile, fixed—AM, SSB. No modifications required. Transistorized. Guaranteed $18.95 postpaid. Rann Industries, 2801 West 50th Terrace, Shawnee Mission, Kansas.

SELL: Very compact grounded grid kilowatt amplifier, 10-80, uses pair UE572A with separate compact 2 Kv 500 milliampere solid state supply. Both for $135.00. Also have kilowatt amplifiers using pair of 4CY300As. Requires 5 watts drive, $125.00. Less power supply. W6HHN, 3467 Rambow Drive, Palo Alto, Calif.

SB-33: SSB Xcvr. Unopened factory carton, $340.00. Many junk box bargains. K9OER, 2522 Orrington Ave., Evanston, Ill.

MERRY Christmas to all from "D.B." and Paul. W4UDQ, and W4HHK-A4HHK. Box 417, Collierville, Tenn.

SILICON Rectifiers and capacitors: 1N3212-(400Piv-15 amp)—$1.00 each; 1N342 (400 piv-500 ma), 4 for $1.00; TM24 (200 piv-3 amp) 5 for $1.00; capacitors, 5000 mfd., 35 Vdc, $1.00 each. New 4CX1000A, socket, filament trans. plate choke, $125.00; 4CX250R, $29.95 ea 4-65A, $8.95 each; 4-125A, $19.95 each; 4-250A, $24.95 each; 4-400A, $29.95 each. Wanted: new and used tubes, parts, components. Mid-West, 54 Mia Ave., Dayton 27, Ohio.

S-11, $20.00; Wollensak, T-1500, accessories, $110.00; HD-11 Q-Mult., $7.00; Snap-Master, $10.00; Ocean-Hopper, $3.00; Adventurer, xtals, $30.00. Wanted: SX-96, clean, B&W coils, coil turrets. Bill Rotecki, 614 Rochdale, Lombard, Ill.

CENTRAL Electronics 10A W/QT-1; Harvey-Wells TBS-50 W/VFO; Knight TV-FM sweep generator; Heathkit impedance bridge at 1 kc; Ferris noise and field intensity meter 32A; Wheatstone bridge, 1-49. Best offer takes. Gordon Ostlund, 212 Market St., Pocomoke City, Md.

FACSIMILE Transceivers, TT-IF/TXC-1 with power units; PP-86 E. TXC-used, like new condx, tested, ready to use. Best offer. TS-34 AP, oscilloscope, used, $35.00; VTVM Heathkit, Model V-5, used, $7.00. Dale E. McLaughlin, RFD #7, Frederick, Md.

MUST Sell: Hallicrafters SR-150, AC supply, DC supply. Only 9 months old. $450.00. George Stacks, 3200-B Chandler St., El Paso, Texas.

VHF-UHF custom building converters, transmitters, KW amplifiers. Frontier electronics, Box 323-2, Orr, Minnesota, 55771 Everett, WØHPS, Frankie Hoard, WØPYC.

COMPLETE Servicing on all types of equipment: amateur, commercial. Authorized warranty for Johnson, SBE, Clegg, National, Gonset, and others. Reasonable rates and fast, efficient service. Edwards Communications Service, 1821 Ave. M., Lubbock, Texas. Tel: PO-2-2591.

TS-175/U freq. meter, in xclnt condx w/book. Best offer over $125.00 takes. D. E. Thompson, K8OTJ, 8357 BH, USNA, Annapolis, Md.

MAKE An offer! Yours may be the best! Gonset 6-meter converter, 2-PE-103 dynamotors, 2-42 to 50 Mc. FM tuners, RME Boomerange, ARC-5 VHF xmtr and rcvr. Tecraft 2-meter converter, International Crystal FCV-1 6-meter converter and VFA-1 2-meter preamp. Heathkit AR-3 rcvr and Eldico griddipper. Model 14 typeing reperf and 14 TD. $75.00 and $50.00 or $100.00 for both. Send card or stamp for more information or let me know your needs. Robert V. Blaney, W9FRU, RR 4, Decatur, Indiana 46733.

SELL Or trade: In mint condx, KWM-2, all bulletins cash, Narco or King Omni-radio combination. B. L. Hinnant, Whiteville, N.C.

SELL: Globe Champion, 300A 275W, 'phone, 350W. c.w. In excint condx. $275.00. Thomas Morrison, 1316 Glenwood Ave., Joliet, Illinois.

GALAXY 300 ES-PS, $280; NC-270, $140. Both in excint condx. Dutch, WA9GJA, 900 Boston, Marion, Ill.

FOR Sale: Gonset G-50, 6 meter transceiver, first $200 buys. Donald K. Szathowski, 706 W. Wylie, Bloomington, Ind.

4-1000As wanted. M. J. Fein, Box 28, Scarsdale, N.Y.

CALIFORNIA: Apache and SB-10. $195.00; HQ-170C and matching speaker, $195.00, 50-watt plate modulated Globe Hibander for six and two with Viking 6N2 VFO, $110.00. Two-meter Nuvistor converter for HQ-170, $20.00. WB6IDX, Riverside. Phone: 689-5735.

SELLING Out HQ-180, $250.00; HX-500, $350. Take them both for $500. They cost over $1100. Both pieces like-new condx. KØIZJ, Charles Forst, 10042 North Marlene Drive, Affton, Missouri 63123.

VALIANT, $185.00; HQ-110C, $160; HT-40, $65.00; Vibroplex Original, $10.00; AT-1, $15.00; Johnson 122 VFO, $25.00. HB antenna coupler, $10.00; Ameco code osc., $10.00; NC-88, $50. Sell or trade for gud transcvr. Joseph Redman, 1613 Ashley Drive, Rockville, Maryland.

WANTED: TR-44 rotor and Ameco PCL preamp. Sell: NC-183D with plug-in Sideband detector Oct. 1963 and AVC Oct. 1957 QST. Excint condx, for $190.00. F.o.b. Scotia, N.Y. Don McCune, K2HWE, 21 Lillian Drive, Scotia, N.Y. 12302

SELL Warrior linear, in A-1 condition: $160.00. Will deliver within 100 miles D.C. Area. Maj. Eden, Box 13, Bolling AFB, D.C.

MATCHBOX: Johnson kilowatt model with SWR meter and TR relay, $85.00. W2CZT, Wetherald, 128 Chestnut Hill Dr., Rochester, N.Y. 14617.

WANTED: Nonworking or incomplete BC-221 or LM frequency meter. Write me condition and price. W1DGJ, 143 Richmond Road, Ludlow, Mass.

HEATH HX-20 with HP-20 p/s. In excint optg. condx. Bargain at $170. Simons, W3UB, Bryn Athyn, Penna.

NOVICES: DX-40, $45.00; VF1, $12.00; $55.00 for both. Have manuals and these items in mint condx. WA6VCX, Bob Posey, RFD 1, Box 440, Galt, California.

FOR Sale: Swan 240, SW-117 AC pwr. supply, D-104, Johnson lo-pass filter, Johnson Speed-Ex bug, Hy-Grain 12AVS antenna, 75 ft. of coax, perf. condx. $300.00. Paul Gerald, 7716 Sale Ave., Canoga Park, Calif.

SELL: Brand-new Globe HG-303 75-watt Novice transmitter, $60.00. Like-new Bud 7 ft. enclosed cabinet rack, $40.00. Stereo pair Shure 330 ribbon mikes, $100.00. Monaural hi-fi Heath tuner and amplifier, EV and University speaker system, $60.00, speaker system alone $30.00. Send for list of further items. Pete Stark, K2OAW, 519 East 86th, New York City 10028.

SALE: HQ-110 rcvr in A-1 condx, $120.00; Knight R-100 receiver with xtal cal., "S" meter and matching speaker, in A-1 wcondx; Harvey-Wells TBS-50C, 2-80 meter transmitter with matching VFO and power supply, $55.00; 2 new 4-400A transmitting tubes, $45.00 for pair. F.o.b. Clarksville, Tenn. Tom Schropp, WN4ONY, RR #6, Salem Road, Clarksville, Tenn. 37040.

WANTED: Hammarlund SPC-10 converter, also gud modern tube tester. State price and facts. Will answer all letters, C. F. Albertoni, 1410 Brookwood Drive, Suffield, Ohio K8JBE.

VIKING 500, $425.00; HQ-170C, $225.00; Gonset/Elmac mobile 6 thru 80, $120.00. All are in like-new condx. Will trade on gud sailboat 20-40 ft., or KWM2, S/Line, G-50, G-76, K6KZT, 4434 Josie Ave., Lakewood, Calif. Tel: HA-11974.

DCS-500 for sale: $150, constructed as in Handbook, in excint condx, works on 80 but less 40, 20, 15, 10 meter coils. Paul Bowman, WA4QBM, Box 692, Culpeper, Virginia 22701.

FOR Sale: Collins 75S-1 receiver with c.w. filter and xtal. In perf. condx, 10 day free trial, $340. Plus shipping. E. Shafer, W8MSG, 3479 Kersdale Rd., Cleveland 24, Ohio.

COLLECTORS: Early tubes, gear, magazines. Send SASE for list. 75A4 serial 5806. Best offer. A. R. Theberge W1SMI, Hoyt Ave., Lowell, Mass.

SELL: Heath HW-32 20 meter SSB NP23 AC supply PTT mike, $135.00; DX-60-WG10, $85; B&W L1000A without supply, $75; Eico 730, $30. First check or m.o. takes each. K1CSB, 44 Stone St., Danbury, Conn.

SALE: Apache low grid drive on high bands. SB-10 good. Both $125.00. Drake 1-A good, $100. Pick-up deal only, sry K. R. Rietman, 1719-8th St., Elk River, Minn.

200V Central Electronics, like-new condx w/manual, $525.00; HRO-50TI National receiver, calibrator, 5 coils, bandspread on 80 through 10 meters. Panadaptor PCA-2T-200 and Central Electronics Model A sideband slicer, all in gud condx: $225.00. K3UXG, Dave Ruggles, RFD 2, Coopersburg, Penna. 18036, Phone: 215-865-5145.

SELL Or trade: GR Variac, 5 KW type 50A; 2 Amer. pwer. tfrs, 3-7 KVA 2500/3750 50/60C. UTC LS-99 choke. Wanted: Multi-band beam rotator. Describe. Best offer. W4MIB, 109 Mill St., N.E. Vienna, Va.

FOR Sale: Globe Scout 680, $65; Globe LA-1 linear, $70. Both units factory wired. WA9AXQ, La Porte, Ind.

HW-32, in mint condx, $119.00. WB2EPG, Howard Klein, 123-60 83rd Ave., Kew Gardens, New York 212 BO 8-7297.

MECHANICAL Filter wanted. 6 Kc. for 75A-4. K1IPR.

HT-32. $325.00. Excellent appearance and performance, complete with mike, spare tubes, dummy load, book. Will ship same day; all replies will be answered. Bob Higgins, 104 Maple Pl., Cranford, N.J. 201-276-8161 after 9 EST.

HQ-170C, excint condx, $199.50. Shipped prepaid. W5CNO, 1623 Sequoia, Tyler, Texas.

TA-36 Mosley 6-element Triband beam, almost new. Best offer over $75.00. F.o.b. Knoxville, Tenn. George E. Dominick, 1025 Nokomis Circle, Knoxville, Tenn. 37919.

WANTED: Ancient tubes, de Forest spherical audion with screw base "H" transmitting tube, Fleming valve, WD-11s, other old junkers. March 1938 Radio Craft. W9EWK, 610 Monroe Ave., River Forest, Illinois 60305.

WANTED: Old ham license plates from different states. Mike, WA4OED, Box 14, Milan, Tenn.

SELL—Motor-Generator shaft connected on castiron base. Esco Mfg. specially made for radio transmitter power. Generator is double commutator, 1000, and 500 DC volts at .5 AMP, 1 HP, 3 phase, 220 VAC. Used about 20 hours. O. D. Bryant, K46YV, P.O. Box 33, Mt. Vernon, Ky.

SALE: Johnson KW Matchbox, regular or rack-mounted, $135.00. 3684 Hedgewood Dr., Winter Park, Fla.

SELL: Johnson 500 factory-wired, $290. Hallicrafters SX-96, $90; Gonset 3-element Triband beam, $30, SCR-522, $15.00. ARB receiver, six volt operation, $20.00. WA2OHK, John Buck, Jr., 203 Prospect Rd., Centerport, N.Y. 516-AN1-5457.

CLEANING Out: 300 mmfd vacuum variables $35.00; 4-400A's, new, $20.00; used, $5.00; air system sockets $5.00, chimneys, $5.00; 4X250B's, new, $10. 3B28's, used, $1.00. Send stamped envelope for list of the goodies. WA4ETD, 1705 Powatan St., Fayetteville, N.C.

WANTED: Commercial, military, all types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URN, URM, TS, 618S-1-T, 17L 51R-V-X, others. Ritco, P.O. Box 156, Annandale, Va.

DRAKE 2A and 2AQ. Both work FB. $125.00 for the pair. K8SPR, 168 Westwood, Akron, Ohio.

NCX-3 with FB AC PS, $275.00; without, $260.00. 813s, GG KW final with PS. Write for complete details. $80, HRO rcvr, 4 coils, $40. All F.o.b. Wanted: SSB/c.w. exciter. 1526 Potter, Parkridge, Ill. Tel: 698-3538. B. Ost, WA9AXX.

SELLING, in excint condx, little used: NCX-3, Warrior, 20A, HQ-170, Bandhopper VFO, PH-600A, Monitorscope, HP-20, HP-23, Away at school till Xmas vacation. Write for information. K3DSM, Gene, 352 Woodley Road, Merion Station, Penna.

WANTED: Detailed instructions, circuit diagram and any other info on modification kit #250-41-1 for Johnson KW amplifier serial number prior to #100-300. Johnson Company advises non-availability. Will pay reasonable fee for info or temporary loan for reproduction by Xerox. W4JZZ, C. Hall, 530 North Oakland, Arlington, Va. 22203.

TECHNICAL Manuals for surplus electronics. Stamp for list. S. Consalvo, W3IHD, 4905 Roanne Drive, Washington, D.C. 20021.

HEATH Mohican 10 transistor all-band portable receiver. New. Asking $75.00. Astatic T-3 mike and grip stand, $18. Electro-Voice 602 mobile mike, $15.00. New Stuzzi portable hi-fi tape recorder, cost new $269.95. Asking $85. Large selection of new transmitter and receiver tubes worth over $175.00. Entire lot $20 or send SAE for list. Want: Heath 10-10 'scope. E. Pyle, K1DKK, 305 E. Calif. Blvd., Pasadena, Calif.

COLLINS KWS-1, 74A4, both factory modified last year and in excint condx. TA-33, Ham-M rotator and Spaulding 40 ft. SS tower. All one year old. Complete package deal: $1300. Lt. Jerry Nielsen, KØDTO, P.O. Box 1217, Blytheville AFB, Ark.

SELL: HT-9, in excint condx. All coils, xtals, spare 814's, with manual, $85.00. William Lafferty, W2DPX, 2541 Fix Road, Grand Island, N.Y.

HALLICRAFTERS HA-6 transverter, cavity resonator, 60 watts SSB, 60 watts c.w., 15 watts AM, $200. In new condx, 538-5481; also 6 meter beam es abt 60 ft. of coax RG/8-U if you can take it down. George Snow, Jr., Box 105, Callery, Penna. 16024.

SSB Twins: Heath HX-20, HR-20 and HP-23, AC supply, all in excint condx. Will deliver within 100 miles: $200.00. WIMBX, 2389 Winsted Road, Torrington, Conn.

COLLINS Gear, immaculate: 75S-1, $300; 32S-1, $450; 516F-2, $70; 30S-1, $950; package deal: $1,650. Model HDM-354, 54 ft. galv. Tri-Ex tower (motorized): Ham-M Rotator; 16-ft. mast, 2" thrust-bearing, $650; 3-el. model 326B 20-meter Telrexbeam, $175. All this equipment is in perfect and mint condx. Must sell this little used station as have sold my place and cannot use it at new location. Jule Miller, WØYIT, Rte. 1, Box 164, Henry Ave., Manchester, Missouri.

WANTED: New cabinet for Valiant II. Claf, Apartado 7565, Mexico City, Mexico D.F.1.

WANTED: Oscilloscope transformer 2700V at 5 Ma. 4-el. Tribander. Brian Alsop, WA2KSD, 31 Clement Dorm, RPI, Troy, N.Y.

CASH Only: 351D2 Collins, mobile mount $95; 516E1 12-volt p/s, $165; SR-150 transceiver w/PS150/120, AC supply. Used 25 hrs., $600; TA33 Jr. 3-element Tribander, $50.00; GSB201 linear, used 10 hrs., $275. Above with manuals. Will consider offers. Write for misc. item prices. Bill Rogers, 711 E. Los Angeles, Vista, Calif.

HOLIDAY Best wishes from WØCVU. On the air since 1913. First Iowa radiophone station on eighty meters. 73s and CUL.

ATTENTION! "Equipment Exchange—Ham Trader" now combined! Bigger, better offers than ever! Send $1.00 for next 12 interesting issues. Sample free. Al Brand, WA9MBJ, Sycamore, Ill.

SELL: HQ-170-C. In A-1 condx. WA4SAR.

200V Central Electronics. The transmitter with everything. In excint condx. $399. K2JZW, 212-332-5870. Nussbacher, 2570 Homecrest Ave., Brooklyn 35, N.Y.

SALE: Microphone, Shure 55, gud condx, $25.00. Gilbert R. Smith, 1544 East Belvidere Ave., Baltimore 12, Md.

HONOLULU: Selling surplus gear at bargain prices. HQ-160, Eico 720, Knight VFO, all clean and gud condx. Glad to demonstrate. George, KH6EWA, 2215 Ala Wai Blvd., Honolulu 15, Hawaii. Tel: 934-725.

NATIONAL HRO-7R, gud condx, spkr and P/S:9 tuning units, 50 Kc to 30 Mc; $65.00. James D. McCauley, 6541 Odessa Ave., Van Nuys, Calif. 91406. Tel.: STate 6-1281.

FOR Sale: All in perf. condx: Collins 75A-4 rcvr, vernier dial, w/matching spkr, $500; Central Electronics 20A with VFO 160 thru 10 meters, $185; Johnson Ranger factory-wired w/FSK added, $145.00. Auguste Schwab, Jr., K2LGS, 560 Woodmere Blvd., Woodmere, L.I., N.Y. 212 FRanklin 4-9470.

COLLINS 32V-3, in excint condx: $225.00. Ken Brown, K2SUY, 127 W. 3rd St., Rancocas, N.J. Tel: (600) AM 7-5589.

SELL: Elco 720, Scott 65-watt modulator; Knight VFO, Dow-Key relay, $130.00, F.o.b. New Rochelle, N.Y. W2KFB, Hirsch, 53 Darling Ave., New Rochelle, N.Y.

NCX-3, DC supply, Bandspanner, P/T mike. Bought new last month. Sacrifice: $400. Onderwyzer, K1KSS, 26 Dodds Ct., Burlington, Vt.

COMPLETE Mobile rig! Cheyenne, matching power supplies, mic, Super 12, Slim-Jim whip, FB condx! $175.00. WA6UYB, 5037 Raton Circle, Long Beach, Calif. 90807.

FOR Sale: Johnson Challenger xmtr with built-in PTT and co-ax antenna relay, 1 yr. old: $85.00; B&K model 650 automatic mutual conductance tube-tester, $50.00; Central Electronics MM-2 with RM-455 adapter, $65.00; Jones Micromach 576BA directional coupler, 100-200 mc, 120 watts, and 412S5 pwr/SWR indicator, $40; Grundig tape-recorder, stereo play back, monaural record, portable, self-contained, model TK-55, excellent quality, $95.00 K7JUS, P.O. Box 5695, Tucson, Ariz.

FREE! Write for Blue Book List. WØGFQ, Leo, offers you hundreds of Reconditioned Equipment Bargains. Galaxy 300, $229.00; AF-67, $49.95; HT-37, $269.00; Warrior, $195.00; Poly-Comm 62B, $229.00; HT-32, $254.50; HX-50, $249.95; Cheyenne, $49.95; Marauder, $254.50; Meteor $59.00; HT-41, $254.50, and many, many more. Ask for our new 1965 catalog. Write to Leo, Box 919, Council Bluffs, Iowa.

HALLICRAFTERS Station: SX-117, HT-44, P-150AC. Still in warranty. Best cash offer. WA4HAH, 1441-47th St., Birmingham 8, Ala.

FOR Sale: 75A-4 receiver, 3.1, 1.6 filter, speaker, $475.00: 32V-3 transmitter new spare 4D32 tube, $250; C-E MM-2 multiphase analyzer, RM-455 adapter, $50.00: G-R counting rate meter, 1500-B, $45.00; Heath Mohawk receiver, $200. R. Littler, W8JRG, 640 Snowhill Blvd., Springfield, Ohio. Tel: 513-322-8722.

FOR Sale: Mobile transmitter, Elmac A-54 ser, #1304, w/manual includes 15M modification, gud condx, $30.00; 6M transceiver HE-45A, bandspread 50-51 Mc, w/microphone and manual. Like new condx: $75.00. WA2JPJ, 75-51 196th St., Flushing 66, L.I., N.Y.

CLEGG 99'er, in gud condx: $90; HC-45B, also gud condx, with VFO, $85. Gonset Com. I, 2-meters transceiver, in gud condx: $90. WB2IFC, 413 Holmes Dr., Burlington N. J.

SALE: Heathkit Marauder, HX-10, $300. James C. Bailey, K3AVA, Tall Timbers, Maryland.

COLLINS 30S-1, $825.00. W4HVR, Manning Jeter, 3470 Warrenton Road, Montgomery, Alabama. Telephone 205-263-6484.

SELL: Hammarlund HQ-170 rcvr; WRL Globe Scout trans, $40; 2-meter Gonset Comm. III, $175.00; Astatic D-104 mic, $15. CDR Ham Rotor. Alan Woolman, WA2AEO, 275 Central Park West, NYC.

APACHE, NC-109 w/mic and bug, all in excint condx and all for $225.00; also have Lettine 240. WA2PDE, 165 Evans, New Hyde Park, N.Y. 516-FL-4-0005.

F/W Globe Champ 300A, 350 c.w., 250 AM. Original cost $495. Like new condx. Only 50 hours on fils. Owner lost interest. $135.00!! K8IKB, 1414 Tiffin, Findlay, Ohio.

FOR Sale: Knight R-100, Knight T-150A, Eico 666 tube-tester, Instructograph, and other electronic items. Most are new or like-new condx. Write: R. Frans, 743 Cardington Road West, Marion, Ohio. 43305.

COLLINS 75A-2. $160; Heath 5" 'scope, $40: Hammarlund HC-10, $60; three 833A's ea. $25.00; xfrmr 3100-1600-0-1600-3100 at 1000 mils, $50: 5 KVA diesel electric, 115-230 volt, like new, $400: Atlas 10 in. metal lathe, $300; great for ur lab; Swap or sell antique 2½ hp. steam engine, ($50): also antique 31 cal. Colt. Want S/Line equipment. E. E. Hampshire, Rte 1, Box 169, Camdenton, Mo.

FOR Sale: Hallicrafters complete KW. Excint condx. HT-32A, 33A; SX-101A; HA-1 keyer and key; Johnson KW Matchbox, kike & relays, etc. Asking $1500. Make cash offer. Sry, will not ship. K2HDW, Carr, 505 So. Main St., Geneva, N.Y.

SAVE $100! New NCL-2000, in factory sealed carton, $485. F. S. Eggert, 11833 Wisconsin, Detroit 4, Mich.

TEN Years of QST: 1951 through 1960, four issues missing from run: June 1951, Jan, Aug, Oct, 1957: $30.00. F.o.b. Denver. WØCAW, 1840 South Milwaukee, Denver.

SELL: HQ-170C, one-owner, mint condx, recently aligned, $200. Pair BC-611 handi-talkies with manual, 3.885 Mc, matched xtals, and spare parts chassis. Work perfectly. All for $50. PE-103 dynamotor with 6 and 12 volt brushes. Best offer. WØDRU, 5830 W. Moore Lake Dr., Minneapolis 21, Minn.

SELL: C.E. 20A, two years old in excint condx and appearance, with manual, $125.00. Ship express collect. WØNYX, 1408 Denver, Waterloo, Iowa.

LATEST SBE-33 and DC-2 dc power supply with mobile mounting plate, $395. WA2FSD, 11 Burbury Lane, Great Neck, L.I., N.Y. Tel: 516-482-7857.

WIFE Says clean up shack! Collins 75A-3 with 3.1-800 cycle filters and plug-in product detector with SSB and CW xtals. No modifications, excint $300. Heath Apache and SB-10 excint electrically, mechanically; asking $250 for both but might sell separately. RME DB-23 preamp, $25; Collins F455H 3100K filter, $25. New Instructograph with tapes, $25. BC-610 power transformer, $25. QSTs from 1933, one 1922 issue left. SASE for price list. No trades. All items F.o.b. W3KA, 10406 Insley St., Silver Spring, Md. 202-585-2580.

AR-22 Owners. Know where your beam is pointing. Compass rose for your indicator calibrated 6° increments. $1.00 postpaid. WAØDGM, 2411-57th, Des Moines, Iowa 50310.

TCK-7 Navy Transmitter mfd. by G-E, two 813s final, two 304 TLs mod. All one unit with A.C. supply. $375.00. Don Mathews, W6RRY, Box 761, Paso Robles, Calif.

FOR Sale: Custom built all-band 130-watt, fone/c.w., Collins VFO front end, Viking 1 pi-final, dual fil. voltage, can use 6 or 12 volts, $225.00. 3000 volt 500 mil p/s, xfrmr, rectif., filter and swinging chokes, oil-filled capacitors, complete with AC, 500 mil meters and control panel, $125.00; 15 KVA pole pit, $15; BC-348C, AC converted with matching spkr, $50; Thordarson multitap 300 watt modulation xfrmr, $10; Bud cabinet 5½ ft., $25. Kern 20 meter Helix beam, $10. John Benson, WØHBE, 1328 Ford Ave., Glencoe, Minn.

BOOST Reception: 3.5-30 megacycle SK-20 Preselector kit, $18.98. Boost modulation—AAA-1 clipper-filter kit, $10.99. Reduce noise, NJ-7 Noisejector, IF, wired, $4.49. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, Calif. 95822.

KEYER-Monitor keys your transmitter safely, for months on two, internal flashlight cells. Monitors your keying with crisp speaker-tone. Sealed relay contacts for long life. Keys beyond 100 WPM. Attractive cabinet has front key-jack, tone/off control, and rear keying terminals. $18.95. PP USA. Electro-Signal Lab, 782 Broad St., Weymouth, Mass. 02189.

PRINTED CIrcuit boards, Hams, Experimenters. Catalog 10¢. P/M Electronics, Box 6288, Seattle, Washington. 98188.

G-76, spotless. Transceiver, and AC supply. $275 takes both. Leonard Meadows, K2HPW, 2645 Clydesdale Ct., Oceanside, N.Y.

SWAP Globe Champion 350 (400 W PEP, 275 W AM, 350 W. CW) 160 thru 10 meters, for offset printing press in gud condx. Like new, $495 orginal ham price. W9ERU, Gene Hubbell, Box 350, RR 4, Rockford, Ill.

HALLICRAFTERS FPM-200 transistorized transceiver with two VFO. Only a few hundred ever manufactured but in my opinion the finest piece of equipment ever developed. Sold new at $2650. Make an offer. Central Electronics 200V like new. Cost $795. Make offer. WA6TLS, 7549 E. 4th Place, Downey, Calif.

TCS-13 transmitter, receiver, antenna tuner, 12V dynamotor supply, control-speaker box, all cables and manual. All original equipment, and in gud condx. Best offer or swap for good commercial general coverage receiver such as SX-99, HQ-140. Jim Johnson, 3 Hadley Lane, Willingboro, N.J.

SX-99: $75.00. Works perfectly. Box 160 Yost Hall, 10902 Euclid Ave., Cleveland, Ohio. 44106.

LIKE New, perfect: SX-115, HT-44, PS-150-120 original cartons, manuals. Also console, jeweled Vibroplex, Dow-Key, mike, clock, spkr, etc. Value over $1200. Sacrifice, best cash offer or sailboat. Prefer pick-up deal. Gray, W2EUQ, Painted Post, N.Y. 607-96-25924.

FOR Sale: SuperPro BC-779 receiver, converted for 15-10 meters, includes Heath Q-Multiplier, $75; homebrew 813 final with HT-18 driver, National tank circuit, cool 150 watts, $75; Heath DX-20, expertly wired, ideal for Novice, $35. Shipping charges extra. Walter Deemer, 8 Garden Pl., Brooklyn 1, N.Y. Tel: UL 5-6592.

CLIFF-DWELLER 80-40, $75.00; Hy-Gain TH-3, $70.00; AR-22, $20.00. Leedham, WA2TDH, 101 West 23rd, NYC 11. Tel: WA 4-1825.

ESTATE OF K9AQW: HT-37 transmitter, $300: In mint condx. Reasonable offers considered. Contact Dick Hade, K9HSK, 132 So. Euclid, Princeton, Ill. 61356.

SELL: SX-100, clean, manual, original carton, $165.00. W8PJH, 125 Orchard Hill, Amherst, Ohio. 44001.

HAMMARLUND HQ-180C, in excint condx: $225.00, to make room for S/Line. WB2MDA, 310 Hoffnagle St., Philadelphia, Penna. 19111.

COLLECTOR'S Item, early Day AC trf. table, Model 43 Atwater-Kent, matching spkr. Works, looks fine $100 plus shipping. W7DDI, S. DeLeci, Star Rte. 1, Union, Wash.

SELL Like-new Hallicrafters SR-34 AC-DC b and 2 transceiver; National VFO and Finney antenna. Recently factory aligned. Make offer. W9IHM.

WANTED: National NPW-3 condenser and gear box. W. E. Lawrie, 4739 Saratoga, Downers Grove, Ill.

FOR Sale: Heath Seneca, $140; DX-40, $35. Knight R-100 rcvr, $55.00; Finco 6 and 2 meter beam, $23.00. All for $225.00. Steven Vantine, K1JPU, 104 Rockmeadow Rd., Westwood, Mass.

SELL Comm. III 6 M with xtals and mike plus new Saturn halo: $120. K2ARO, 177 Roosevelt Rd., Hyde Park, N.Y.

BACK QSTs for sale: Sept., Oct., Nov., Dec. 1921; 1922 through 1962 except June, July, 1924; April, May 1939; June, July 1949, August 1955; July 1957, Oct, Nov, Dec, 1960. The following single copies: April 1922, August 1923, June, Nov, Dec, 1943; Jan, Feb, 1944. All in excint condx. Charles T. Miser, Garrett, Ind., P.O. Box 63.

COLLINS 310B-1 exciter. All band, excint: $100. WØBVH, 191 Cimarron Rd., RR # 1, Rosemount, Minn.

KW Matchbox with VSWR, excint condx. $90 firm. Hy-Gain HyTower, $75 firm. W8FWJ, 225 Hillcrest Dr., Cincinnati, Ohio. 45215. Tel: 513-761-8896.

COMPLETE Mobile station: Elmac AF67, PMR6, James p/s for rcvr & xmtr, all 12V, $120.00; HQ-129X, mint condx, $85; Central Electronics Model B Sideband Slicer, $20; Mark Mobile 160M Heliwhip, $20. Paul C. Pokrop, W1YRT, 44 Assisi Way, Norwalk, Conn.

SELL: Ranger, $125.00; S-76, $75. Vy clean! Archie Bowans, Monroe, Iowa.

PHILADELPHIA Area! DX-100, ready for SB10, $95.00. K3OST, Anthony Musnick, 222 Marple Road, Broomall, Penna. Tel: EL6-2849.

75A-4, excint condx, $375.00; Drake 2-B, used only one month, $210.00; HT-41 linear, new condx, $250.00; HT-45, $250.00; DC supply for TR-3, $90.00. W8WGA.

SELL Or Trade: QSTs 1925, 48 complete. Offers? Want: Tribander, rotor. WB2OTT, 5001 Overbrook, Douglaston, L.I., N.Y. 11362.

FOR Sale: Hickok 292X microvolt signal generator with cables, instruction book and original carton, $75.00; new ARCS-123 with tubes 100 to 150 mcg. Transmitter, never modified, $20; TC-99B Telrex Triband beam with assembly instruction book, $100; HQ-10 Heathkit monitorscope, assembled, $70; 75A4 Serial #2564, vernier dial, 3.1 Kc. filter and 2.1 Kc. filter with Type 312A1 spkr, $550.00; HT-32A serial #3321009, one of the last produced, in original carton, and instruction book, $475.00; HT-33A Mark 1 serial #269344, instruction book and original carton, $500. All f.o.b. Metairie, La. Sil Thompson, W5BUF, 1013 Elmeer Ave., Metairie, La. Tel: 504-834-8508.

MOVING: W6KEG is selling out. Write for large list of receivers, transmitters, tubes, test equipment, meters, miscellaneous parts, etc. Send stamp or 10¢ in coin to Bob Woods, 2142 N. Parkway Dr., El Monte, Calif.

COLLINS S/Line, complete station for $1300 with possible financing or best cash offer. R. G. Paige, 4615 Shoreline Dr., Salem, Oregon.

GONE Transceiver. Make offer on any or all of: Knight R-100 and T-150; Globe Scout 680; Morrow MB-560 xmtr, Elmac PMR-6A rcvr; W2EWL SSB exciter; Knight 5" 'scope. Stamp for list of parts. Scott Norman, 9900 Merrill, Chicago, Ill. 60637.

TRIBAND Beam, 20-15-10, Gotham, $40; CDR-AR22 rotor, $25.00, 100 ft. RG/8-U $6.00; kilowatt Matchbox (built in SWR bridge) $120; 275-watt Matchbox, $30. Glenn Baxter, K2-SNJ, 31 Claremont Rd., Scarsdale, N.Y.

SELL: Invader, 75A4, Thunderbolt, 20 beam. Make offer. W7OYA.

FINE HQ-129X, matching speaker, $110; complete 75M mobile, $30. Jim Miller, WA4IQD, 221 Parkview, Athens, Ga.

6-Meter Communicator III, xtals and mike. Best offer or trade. K2YAW, Primavera, 755 Bronx River Rd., Yonkers, N.Y. Tel: 914-BE-7-5027.

SELL: Microphone "Shure" 404-C w/brackets and instructions. Never used. $13.50. You ship. WA2QDR, 63 Second St., New Rochelle, N.Y. 10801.

NEED Money: Will sell Hallicrafters SX-101A with speaker, used only one month; $265.00. Will ship. James Henderson, 239 Dorothy Drive, Torrington, Conn. 06790.

CIRCUITS From Handbook, QST, CQ, etc. constructed. All work guaranteed. Reasonable. Write for free list. Whitmore, WA6IKV, 3240 Machado Ave., Santa Clara, Calif.

LOS ANGELES Area: Complete SSB station Eldico 100M, Drake 1-A, 65 ft. crank-up tower with rotator, $550.00. Ed Sanden, K6JMW, 240 W. Cypress Ave., Monrovia, Calif. Tel: 359-4172.

DRAKE TR-3 with AC-3 AC pwr/supp. and MS-3 matching spkr. New in mint condx. Operates perfectly all bands. Never mobile. Warranted. In sealed factory cartons. $535. Will ship. C. Brooner, Box 261, Morton, Ill.

FOR Sale: DX-100, never modified, SX-71 receiver, 100 Kc. calibrator, coax relay, 3-element 15M Hy-Gain beam, 80M vertical with coil, MoniMatch. All in mint condx. Spare tubes. All for $285.00. No trades, sry. Walt, K2YOZ, 25 Leeds Dr., Port Washington, L.I., N.Y.

SELL: Collins 32S-1, $375.00; 516-F2, $75.00. You can't tell from new. M. Brody, 65-43-171 St., Flushing 65, L.I., N.Y.

NATIONAL NCX-3; NCX-A; NCX-D. All like new. Best offer. W9YXX, Bob Lee, 1068 Woodward, South Bend, Ind. Tel: 219-232-2265.

BUY, Sell, trade. Details, 10¢. Lupi, WA2NHH, 1225 Hillside, No. Bergen, N.J.

FOR Sale: Johnson Invader 2000, $935.00; Gonset Model 3350 12VDC p/s with cable for G-76, $60.00. Both of these units cannot be told from new. Seeing either of them will confirm appearance and quality. Karl Lispcomb, KØCFD, 87 Canterbury Lane, Joplin, Mo.

COLLINS 32S-1 xmtr, $300.00. J. F. Young, W5HXW, 1234 Glen Cove, Richardson, Texas. Tel: 14-235-6927.

GLOBE HG303 for sale: 6146 75 watts, ideal Novice, emergency xmtr, hardly used. Will ship. $45.00. Waldemar Horizny, W2KVL, 138 Cypress St., Floral Park, L.I., N.Y. 11001

WANTED: Johnson Courier amplifier. Send details on condition. W4MVM, 5801 Shadesview Dr., Mobile, Ala. 36608.

SACRIFICE good B&W 5100B transmitter, $95.00; Collins 75A2 receiver, $150.00. Willie Murphey, W5SAR, Box 314, Guthrie, Okla.

QSLS 1928 through 1963, complete run. Make offer. Joe Favorite, W8FUM, 1041 W. 6th St., Huntington, W. Va.

CRYSTALS Airmailed: MARS, CD, Nets, SSB, Kits, Novice, etc.—Custom finished etch stabilized FT-243 .01% any kilocycle, 3500 to 8600 $1.90. (Five or more same or mixed frequencies $1.70) (Nets—Ten or more same frequency $1.35). 1700 to 3499 and 8601 to 20,000 kilocycles $2.50. Overtones supplied above 10,000. Add 50¢ each for .005%. HC-6/μ miniature above 2000 add 75¢ each. ARRL Handbook kits, FT-243; "DCS-500", "Three band Converter", "IMP" $9.95/set. "SSB Package" Filter or Mixer $11.95/set. Airmailing 10¢/crystal, surface 5¢. Write, be specific. Crystals since 1933. C-W Crystals, Box 2065-Q, El Monte, California.

GALAXY 300, $225; PSA 300, $50. Simpson Model 303 VTVM, $25. P. J. Kovi, 4415 Yorkshire Ave., Parma 34, Ohio.

SIX Meter Gonset Communicator IV, mobile mike, xtals, $200 plus shipping. Dale Hatfield, WØIFO, 750 34th St., Boulder, Colo.

5" Oscilloscope and laboratory signal generator. First $100 takes both. Lt. Barry M. Prentice, Co C, 705th Mn Bn, Ft. Carson, Colo.

GONSET G66B and G77A: $190 for both with 115/6/12V supplies. Will sell separately. Beasley, 131 Newberry, Oak Ridge, Tenn. 37830.

FOR Sale: DX-100 with external modulation monitor, $115.00; DX-100B, $120.00. SX-101 Mark III, $200.00. F.o.b. Richard Lamb, 1322 SE Linn, Boone, Iowa.

HEATH Marauder, immaculate appearance, in perf. operating condx, aligned by Heath, new finals, $250.00. Robert Fortman, WA2YZN, 636 Chilton, Niagara Falls, N.Y.

WANTED: One Millen Grid Dip Meter and one Millen antenna bridge. Bruce Mull, WAØBGZ, 117 Suffolk Dr., Hoyt Lakes, Minn. 55750.

FOR Sale: KWS-1 and 75A-4, $1050. 6 meter FM mobile G-E, 4ER6 rec., $30. 4ET5F trans., $20. M. H. Klapp, W2EQV, 17 Kenosha St., Albany, N.Y. 12209.

NATIONAL NC-300, speaker, 6 meter, 2 meter converters, $230; Viking II with 122 VFO, $120.00; SB-10, $65; B&W L-1000A kilowatt linear, $225.00; Central Electronics gated amplifier, new, $40.00. Everything is in excint condx, w/manuals. W2FET, 2 Ridgeway Ave., Oaklyn, N.J. 08107. Tel: 609-854-1027.

MUST Sell entire station. All equipment mint condx w/manuals. SBE-33 transceiver, LA-1 linear and mobile supply, and mobile mounting plate for SB-33, $450.00. Thor 6 and power supply with D-1-4 and 4-L Telrex, $275.00. The package for $700. Steve Perlbinder, 411 East 53rd St., New York City, N.Y. 10022.

WANTED: HW-12. Sell: HX-20, $175.00, KW PR 813 GG, $120; TH-4 beam, $80; 32 ft. Spalding tower, $25.00; Prop pitch motor, indicator, transformers, $35; teletype model 26B on desk, $70. TU- $25; TCS-12 station, $30; S-120, $35.00. Reflected power indicator, 2 meters, $15.00. K7VYR, Al Churchill, 210 No. 24th Ave., Yakima, Wash.

VALIANT in new condition. Must see to be appreciated. Write Lee Mattis, 19 Amstel Ave., Newark, Delaware.

CONSIDERING A top quality sideband station with less than 50 operating hours? Am offering mine for $625.00. Will ship your instructions and expense. Equipment is HT-32A, SX-101A, R-47 speaker, D-104 mike on grip stand, Johnson 275 watt Matchbox, with separate SWR bridge and meter. All in immaculate and like-new operating condx. Additional misc. equipment on inquiry. WB6JZW/KØQVX, 1610 Kitchener Dr., Sunnyvale, Calif.

DRAKE 2B plus xtal calibrator for sale, best offer over $189. Hurni, KISDR/3, Lambda Chi Alpha, Gettysburg College, Gettysburg, Penna. Excint condx.

BC-211AH w/orig. calib. book, $35.00; old time National SW-3 and Radiola 111 receivers, $20 each; Hammarlund S-200 spkr, like new, $9; several gud microphones, high voltage xfrmers and supplies, condensers, etc. Want: Johnson T/R sw. or equivalent, also instruction books for Navy RDZ-1, Model SA-3 or BC-1031 Panadaptor and BC-211 AK freq. meter. W6WIE, 6920 Adams Ave., La Mesa, Calif. 92041.

HAMMARLUND HX-50, $265; HQ-180C, $255. Both in excint condx. Want: Collins S/Line. Ted Bennett, WA2JXG, 23 Hampton Road, Lynbrook, N.Y.

SALE: KIZQJ estate: DX-100B, $130.00; RME-4300 rcvr, best offer; AM2 bridge, $13.00; Heith Handy tester, $8.00; Triplett 360A VOM, $40, vertical trap antenna model 80AV, best offer. Donald Munger, RR 1, New Milford, Conn. Tel: EL 4-3408.

2M Transceiver, Sonar CD-2, 25W, input, 8 xtal positions, 110VAC-6VDC, $150; Hallicrafters S-85 rcvr m/S-meter, $60. K2DAC, Larry Finch, 16 Linden Blvd., Great Neck, N.Y. Tel: 516-HN6-0027.

TRANSISTOR Tester. Sell Hickok Industrial 1880 Tester, in excint condx. Tests all types thoroughly. Cost $725.00. Sell for $475 F.o.b. N.Y. Further information: Budd Meyer, 105-10 65th Ave., Forest Hills 75, L.I., N.Y.

SELL: Hallicrafters S-108 receiver; Heathkit HD-11 Q multiplier; Lafayette TM-59'er "S" meter. All are in top working condition. Will sell as a unit or separately. Steve Ross, 2612 Washington St., Paducah, Kentucky.

RCVR HQ-180-C, $200; Apache TX-1 xmtr, $150.00; xmtr including Johnson low-pass and Speed-X bug. All equipment unblemished and unmodified. WA2TCP, 12 Alder Lane, Liverpool, N.Y.

NCX-3 and NCX-A; New condx, $349.00. 8815 Mobud, Houston, Texas Tel: GY-4-4748.

LIKE New 4CX250B, $15.00 pair; excellent 4X150A tubes, $5.00 pair. Both are guaranteed. 2000 volt DC silicon rectifier stacks, $8.95, guaranteed. Need good astronomical telescope. Deal? K4BHV, C. M. "Cy" Pruett, Star Rte. C, Flamingo Bay, N. Ft. Meyers, Fla.

CLEANING Out before XYL has to. VHF, UHF, SSB, Hi-Fi rigs, tubes and parts. SB-33, HA-2, etc. Stamp for list. What do you need? W4API, Box 4095, Arlington, Virginia 22204.

WANTED: 2-meter Halo with mobile mounting. 10 thru 80 trap dipole, prefer Telrex. W4PC, P.O. Box 482, Pinellas Park, Fla.

SELL: SB-33, mobile supply and mount, Bandspanner ant., Turner mobile mike, $335; HT-37, $290; 51J3, $250; LA-400, $115.00. WA2DTX, Bill O'Byrne, 209-33 35th Ave., Bayside, N.Y. Tel: HA 8-0710.

HUNTER Bandit, like new condx, make offer. Noise blanker for 75A4 with instructions 136C-1, $59, new Collins VFOs, mobile supply 516E-1, new. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

WANTED: Loose Coupler, Wm. B. Duck, Navy Model, C. Brelsford, W2CTA, 255 Danbury Circle South, Rochester, N.Y. 14618.

NATIONAL NC-300 with xtal cal., $130. K3GNI, Royersford, Penna.

NEW! Totatable inverted "V" Dipoles give you combined vertical and horizontal radiation pattern for general efficiency and DX. Turn radius only 12½ ft. Low SWR ratio with 52-ohm coax feedline. Simple. Practical. Complete for 20 M, $21.95 for 15 M, $17.50. Vero Industries, 51-31 69th St., Woodside, N.Y. 11377 Tel: 212-426-0101.

TRADE Or sale: DX-60, $40; VF-1, $10; ART-13, $40 and p/s, $45; Eico 425 'scope. K3RYH Glenn Gray R #3, Slippery Rock, Penna. Tel: HArrisville 7352319.

AFTER 50 years my call of 1913 was reassigned to me, W9DI. Many thanks to ARRL and FCC for making it poss.ble, also to HG, HPM, CDT, E. E. Bucher, Philip Edelmann, Victor Laughter and many others. Retired, will swap stories. William Roscoe Cottrell, 22 S. Clay St., Hinsdale, Ill.

MOBILE SSB, Swan 240 and Adcom 350 P.S. $328. Original owner, deliver California. K6AY, 2819 Park Blvd., Oakland, Calif. 94610. Phone 415-452-3466.

SELL: Drake TR-3, AC power supply, original cartons. Mint condition. $475.00. R. F. Kreiner, KØSOA, Hampton, Iowa.

WANTED: 30L-1. K3VPH. 814-238-1940.

FOR Sale: Heath HO-13 Ham Scan $55 and P & H AFC-2 compressor amplifier, $25.00. Both in perf. condx and like new. Dr. Francis Blauston, WB2ICS, 225 Bryant Ave., White Plains, N.Y.

LAFAYETTE Starflite transmitter, $40. Lafayette VFO, $35. Hallicrafters S-53A receiver, $30. All in exclnt condx. WB2-JVB, 15 Primrose Ave. West. White Plains, N.Y.

WANT A real gallon? Heath Chippewa and KS-1 power supply (See QST July 1960). Perfect. Not a scratch! $250.00. K2QIL.

FOR Sale: Absolutely perfect 75A4, #2707, spinner knob, matching speaker plus factory cartons, $395.00. Also, make offer on QSTs December 1931 through December 1963 and 18 binders. WØRAK. 623 N. 5th St., St. Peter, Minn.

WANTED: Drake TR-3 with power supplies, 4-1000A, 3-1000, 4-400 or UE-572B tubes, B and W LPA MU 2 cathode tuner. K3BHB, 903 Western Ave., Jeannette, Penna.

APACHE, SB10 and SWR Heath meter, all in exclnt working condx and like new. $260. Lew Wallace, Wendy Drive, Collins, N.Y.

DX-100, perfect condx: $85.00. BC-342, $30; HQ-10 Monitor 'scope, $40. Eldico keyer, $25.00; HD-11, Q-multiplier, $10. V-4-6 vert., $5.00. K8QCL, 18101 San Juan, Detroit, Mich. 48221.

MOST Equipment excellent: Questions, write—or have list. Heath Mohican transistorized communications rcvr, $68; Apache $135.00; KL-1 Linear with supply, $275; Heath/Tasco #300 4½" Newtonian equatorial telescope (sunspots), $45; Hazeltine CAP-1 VHF wavemeter/oscillator, $18; Navy RDZ-1 200-400 Mc. rcvr (110 Vac), $45; Gonset G-66B rcvr, $75. Jim Trout, W8GGK, Rte. 1, Stevensville, Mich.

MUST Sell: Heath HX-10 Marauder SSB transmitter, in exclnt condx. Dummy load, coax relay, and Knight SWR meter included. $250 or your best offer. G. M. Walsh, K1WWN, 280 Austin Rd., North Kingstown, R.I.

FOR Sale: Clegg Intercepter, $265.00; RME 6900, $235.00; Elmac AF68 with M1070 supply, $175; Heathkit Seneca $150. Will trade for photographic equipment. John Savage, K9ACR, Box 56, Macy, Ind.

HEATHKIT Marauder, brand new, professionally wired, $295.00; Mohawk receiver, used, but in exclnt condx, $150.00; Warrior linear, used, also in exclnt condx, $175, or sell the works for $550. Will be willing to ship. Richard A. Hoppe, 208 E. Monroe St., Valparaiso, Inc.

HE-45B w/halo, exclnt condx, $100; HQ-100 AC w/clock timer, perf., $125.00; ID 60/APO-10 Panadapter-scope w/a-c p/s, 3 IF inputs-variable sweep 0-100 Kc., 0-1 Mc., $75. Jerry Adams, K2TDV, 1125 Grand Central Ave., Horseheads, N.Y.

MOHAWK Receiver with speaker, $175.00; Johnson T/R switch, $17.50; Hy-Gain 14aV vertical, $17.50. W6UCL, 5724 8th Ave., Sacramento, Calif.

FOR Sale: Viking Valiant, National 303, both for $500. Excellent condx. Will ship. W. O. Allen, 88 Cray Terrace, Fanwood, N.J.

HA5-VFO 80 thru 6 meters. Viking Challenger 80 thru 6: $125.00. Burton, WB2AOM, 526 W. 152nd St. New York 10031.

"SURPLUS Goodies" Collins ARC-1 VHF, 100-156 Mc. transceiver $16.50; ARC-2, $45.00; ARC-3 transmitter $12.50; ARC-3 receiver, $16.50; T-23/ARC-5 $12.50; Collins ART-13, $35.00; BC-639 VHF receiver with AC/PS, $75.00; RBL 15 Kc.-600 Kc. VLF receiver, AC/PS. The best VLF in surplus $85.00; Complete Bendix ARN-6 ADF, 100 Kc to 1750 Kc, $69.50; Hallicratters R-274/FRR receiver 540 Kc-54 Mc, $175.00; 0-5B/FR RTTY exciter unit, $35.00; R-28/ARC-5 VHF receiver, $19.50; AN/URR-13 200-400 Mc. receiver, $65.00. New boxed tubes, 832A, $7.50; 866A, $1.75; 4X150A, $7.50; 4X250B, $14; 4CX300A, $16.50; 4-1000A, $65; 250TH, $12.50 450TH, $18.50; 3BP1, $6.50; 3RP1, $6.50. Slep Electronics, Dr. 178Q, Ellenton, Fla. Tel: 722-1843.

SALE: One each: SX-111, near new condx with R-47 spkr, $160; Heath HR-10 receiver, near new, $50; D-104 mike, $10; Globe AT4 Matcher Sr. (new) $50; Globe 755A VFO (new), $40; Globe Scout Deluxe transmitter with factory improved circuitry (near new) $100. K5STO, 7418 Quail Run, San Antonio, Texas.

SELL: NC-155, $150; 8 mm movie camera (swap) $10; also slide rule, $10; drafting set $5.00. Bob Fisher, 25 Sterling St., Newtown, Penna.

SALE: Johnson Ranger II, exclnt condx, transmitter $235.00; RCA CR-91 similar AR-88 old but excellent general coverage receiver, $150, all manuals. 6 meter Ameco Nuvistor converter with p/s, like new, $25.00. Heath SWR bridge model AM-2, like new, $9.00. All offers will be considered. WA2TSC, 7427 Grant Ave., Pennsauken 8, N.J. Tel: 609-NO3-3102.

WANTED: Good clean Elmac PMR-7 and Heathkit SB-10 with manuals. Dick Shotwell 371 Dubois, Twin Fals, Idaho.

QSTs 1922 to 1962. Some issues slightly damaged, but mostly in exclnt condx. Best offer all or part. Johnston, W5COC, Walnut Springs, Texas.

HOWARD Radio Specials: KWM-1 w/A.C., $429.00; 20A, $139.00; GSB100, $225.00; NC-183, $169.00; NC-300, $199.00; SX-111, $150.00; Invader 20 $325.00; new equipment reduced 2B, $249.00; NC-270, $209.00. HT-37, $425.00; HA-6 w/AC, $325.00. Free list. Box 1269, Abilene, Texas 79604.

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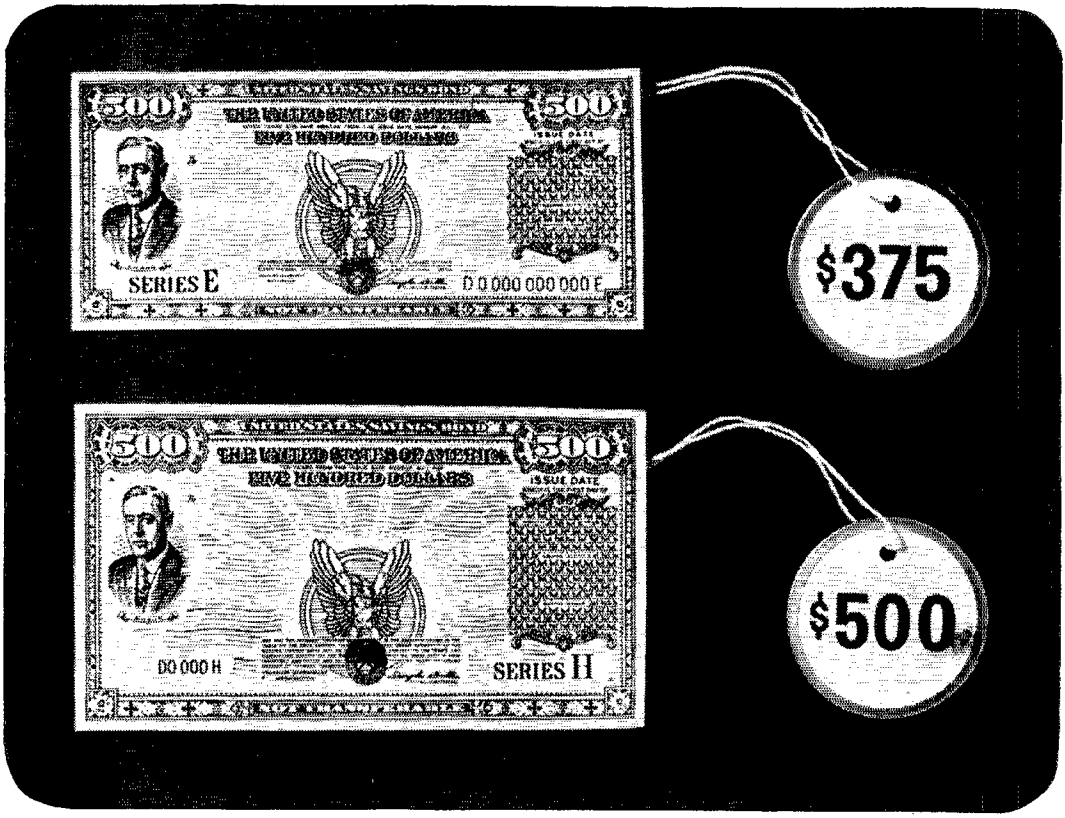

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Index to Volume XLVIII — 1964

ANTENNAS AND TRANSMISSION LINES

AUDIO-FREQUENCY EQUIPMENT AND DESIGN

BEGINNER AND NOVICE

COMMUNICATIONS DEPARTMENT

CONTESTS AND OPERATING ACTIVITIES

CONVENTIONS

EDITORIALS

EMERGENCIES

FEATURES

FICTION

HAPPENINGS OF THE MONTH

HEADQUARTERS BUILDING

HINTS AND KINKS

IARU NEWS

KEYING, BREAK-IN AND CONTROL CIRCUITS

MEASUREMENTS AND TEST EQUIPMENT

MISCELLANEOUS GENERAL

MISCELLANEOUS TECHNICAL

MOBILE

OPERATING PRACTICES

POWER SUPPLY

PROJECT OSCAR

QST ARTICLE CONTEST

RECEIVING

RECEIVING

RECENT EQUIPMENT

REGULATIONS

(See "Happenings of the Month")

RTTY

SINGLE SIDEBAND

TRANSISTORS

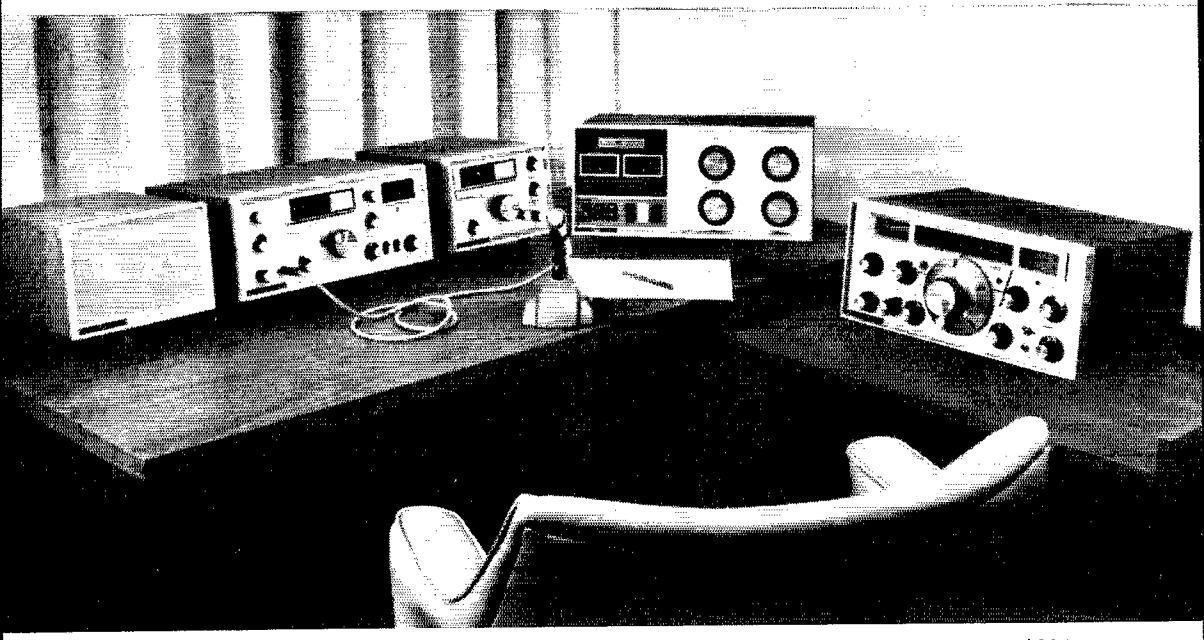
TRANSMITTING

TRANSMITTERS

V.H.F. AND MICROWAVES

50 YEARS OF ARRL

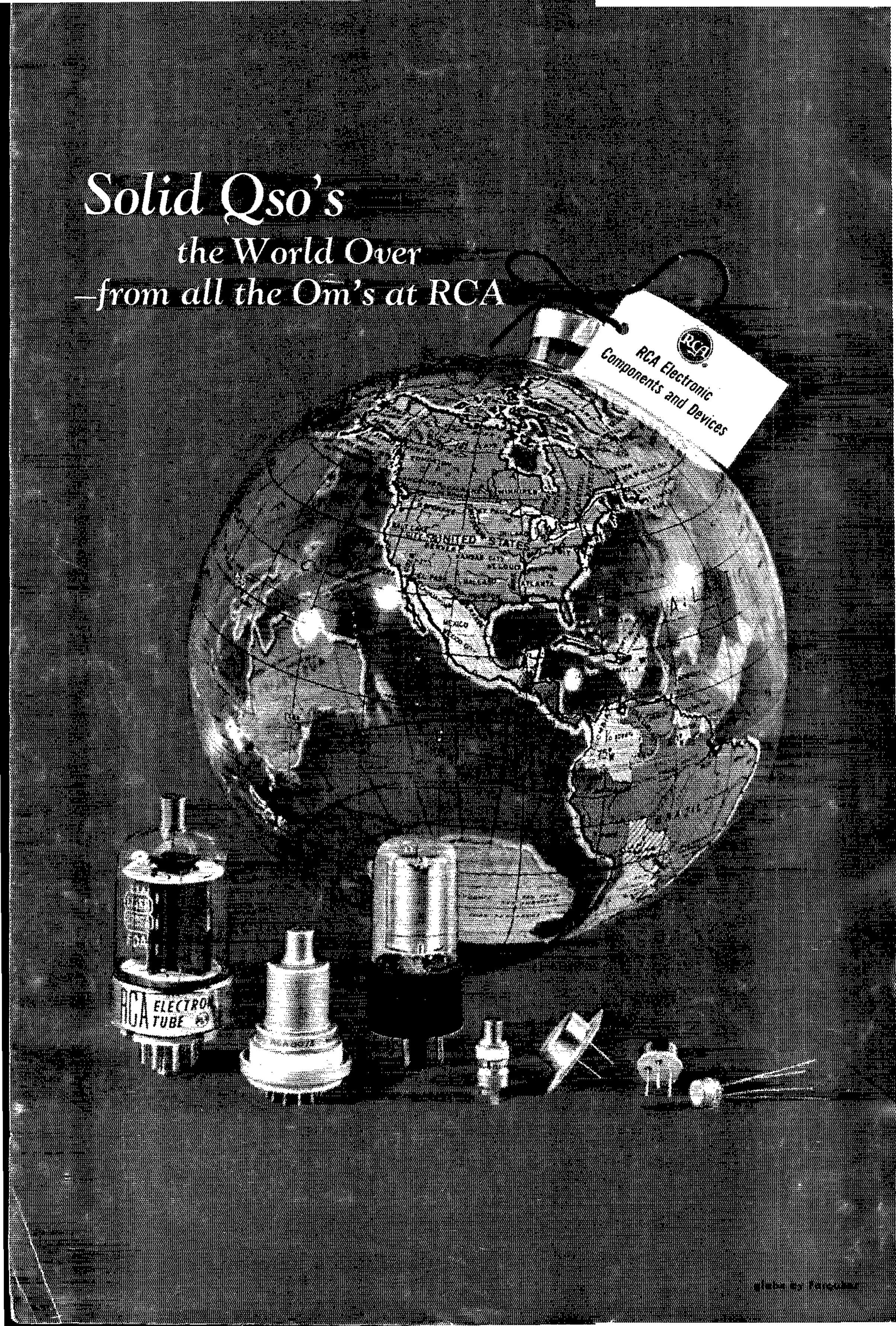
Live a little



This desk-top amateur station by National includes the NCX-5 all-band transceiver, with digital counter read-out accurate to 1 Kc on each band and **Transceive Vernier** control to provide up to ±5 Kc separation of receive and transmit frequencies. Transmit-receive selectivity is provided by National's 8-pole crystal filter with greater skirt selectivity than any filter ever manufactured for amateur equipment. The NCX-5 provides operation on upper or lower sideband, compatible AM, or break-in CW. $585 ■ The NCX-A power supply/speaker console operates from either 115/230 V.A.C. and provides all operating voltages for the NCX-5. $110 ■ The VX-501 VFO console provides choice of completely independent transmit-receive frequency control of the NCX-5, as well as transceive operation from either VX-501 or NCX-5, and also offers five crystal channel positions for net or novice use. $225 ■ The NCL-2000 is a completely self-contained 2 Kw SSB PEP linear amplifier for the 80 through 10 meter bands, with minimum peak output of 1300 watts. It may also be operated for CW, AM, or RTTY at 1000 watts DC input. $585 ■ The HRO-500 is a frequency synthesized and phase-locked solid state receiver covering the five kilocycle through 30 Mc frequency range with identical 1 Kc calibration, high stability from turn-on, and 10 Kc per turn tuning rate throughout. **Passband Tuning** is offered for SSB and CW operation, and IF bandwidths up to 8 Kc are included. Operates from either 115/230 V.A.C. or 12 V.D.C. sources. Power drain from a 12 V. battery (with pilot lamps switched off) is 200 Ma. $1295 ■ Not pictured is the popular NCX-3 tri-band transceiver, at $369.

NATIONAL RADIO COMPANY, INC. **37 WASHINGTON STREET, MELROSE, MASS. 02176**

World Wide Export Sales: Aurienia International Group, 85 Broad St., N. Y. C.; Canada: Tri-Tel Associates, 81 Sheppard Ave. W., Willowdale, Ontario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